

# THE ARAL, LAKE or SEA

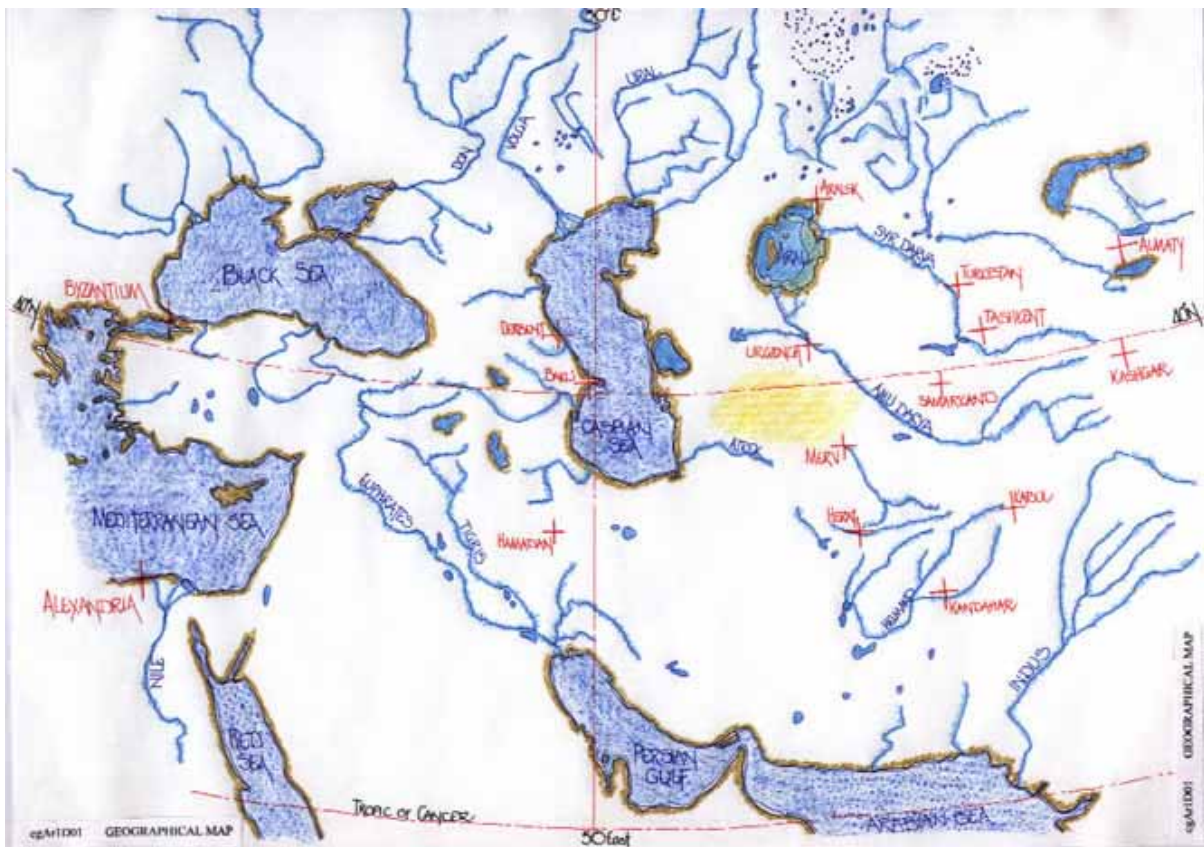
Michael J Ferrar 2010

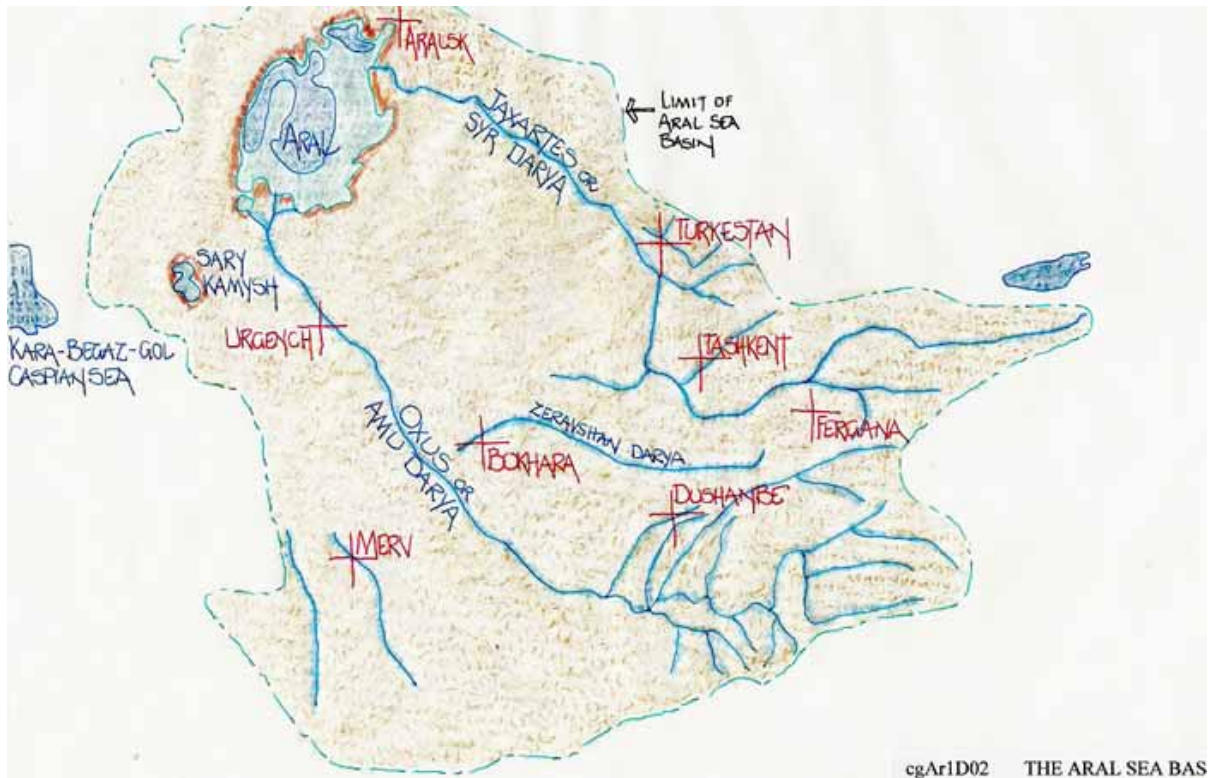
## SYNOPSIS

From the beginnings of cartography maps produced within the 'European' sphere have omitted the Sea of Aral. That situation persisted until the 16th century when first the Russians and then the European map-makers realised it was a separate entity to the much larger and western Caspian sea. Arab map-makers however knew of its existence and geographical position.

Why was this so? Why does it appear there was sufficient data to correct this anomaly some 1000 years ago? And, why was no action taken?

## THE SEA OF ARAL





Firstly it is not a Sea but an inland lake, a terminal lake with NO outfall. Being extremely shallow it is subject to the vagaries of climatic conditions which appertain in its central Eurasian desert location. It is subject to intense evaporation in summer, and thus its inflow, the waters that feed this terminal lake are crucial to its survival.

Basically, two rivers may be determined as feeding the lake and the general surrounding areas. They are the Amu Darya, which enters from the south and the Syr Darya which enters from the east. However, they are not equal in their flow rates. The former receives its discharges of water from the Pamirs in two flood seasons. The first in late spring comprising snow melt and the second in mid-summer comprising glacial melt. The Syr Darya receives only one flood melt in summer, fed by melting snow as there are no glaciers at its source.

Thus any climatic condition which affects the melt affects these rivers and can reduce the flow rate drastically. Therefore the Aral can be considered a variable entity which would present a very different visual aspect to any traveller at a given period in history<sup>1</sup>.

## GENERAL DESCRIPTION

In the Würm Glaciation (about 11000BCE) the northern ice sheet completed its south-wards journey a short way north of the Caspian Sea. The ice retreated and the land between the Caspian and Aral became mostly marshland, quite wet at times when the great northern rivers full of ice-melt overflowed and this area received its share. The multitudes of lakes that now exist are testament to the ancient process. The climate changes which followed saw an Aeolian effect on this area which dried the shallow waters and left salt deposits. Hence, the

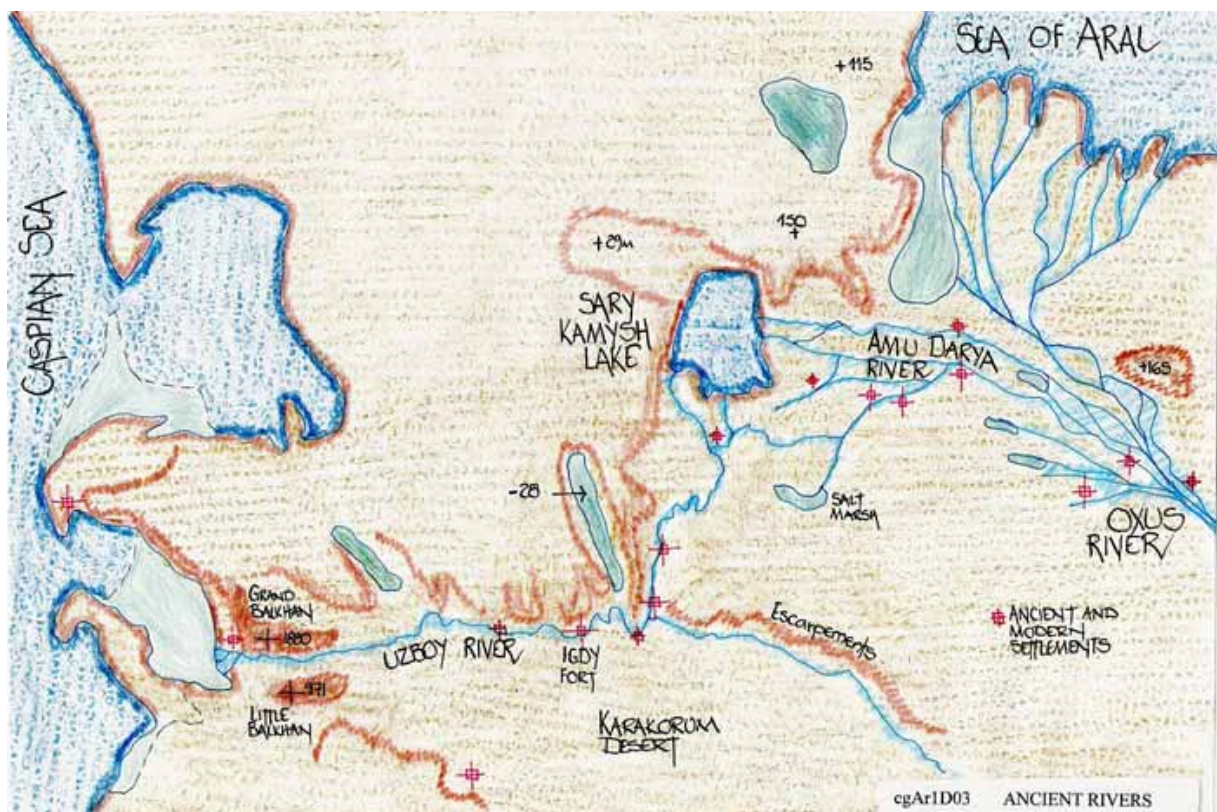
Aral is actually a saline lake. Traces of salt, the marshy lakes and the desertification caused are so very evident today<sup>2</sup>.

It should be borne in mind that some of the land to the east of the Caspian Sea is actually some 28 metres below Mean Sea Level. Between it and the Aral the land rises gradually as a desert plain but in small pockets to as much as 340 metres, except small hilly areas, although there is the Nebit Dag Mountain at 1880m. There are, however, scores of depressions below MSL and ancient river beds, the UZBOY channel being one such.

The major rivers are however significant in forming the landscape of the Sea of Aral.

The first and greatest is the Amu Darya, known to the Greeks as the OXUS, and to the Arabs as the Jaihun. It rises in Bactria and forms the border between Margiana and Sogdiana before passing into Chorasmii. It is also the eastern boundary of the Karakorum Desert. Originally it is thought to have flowed north towards the Aral with a tributary turning west through Sary Kamysh Lake towards the Caspian Sea.

## ANCIENT RIVERS



This western arm was the UZBOY which is now a dry river channel, but flowed some 750Km from the branch in the Amu Darya river. A riverine civilisation existed along the banks from at least the 5th century BCE until the 16th century CE, when the water which had fed the Uzboy abruptly stopped flowing out of the main course of the Amu Darya. The Uzboy dried up<sup>3</sup>!

## ANCIENT TEXTS

Professor O A W Dilke<sup>4</sup> expressed the situation as follows;

*“The Greeks and Romans were rather slow to change their views of the North which they had developed over hundreds of years. By 500BCE, Hecataeus of Miletus described the idea of an encircling ocean, with the Rhipaeon Mountains north of the Danube, and the Hyperborean’s living in the far North between these mountains and the ocean. All inhabitants of these areas tended, in the Greek world, to be called Scythians, but in fact Scythians inhabited southern Russia. As knowledge increased of the Dnieper, the Don, and the Caspian, and as through Alexander’s conquest, even the Afghanistan area came to be known, the cartography of the European and west Asian North was sketched in by geographers.”*

*”The ocean to the north is the Scythian ocean; the Caspian, as in Eratosthenes, flows into it. The peoples furthest east, in Pomponius Mela’s text, are the Indians, Chinese (Seres), and Scythians. The last named inhabit the Scythian shore of the ocean from the far East to the Caspian Gulf, except where they are deterred by cold.”*

Lucius Flavius Arrianus<sup>5</sup>, “The Campaigns of Alexander”, states in Book3;30;

*” that the source of the Oxus is in the Indian Caucasus; it is greater than any other Arian river reached by Alexander’s army, except the rivers of India, which are the greatest in the world. It empties itself into the Caspian Sea in Hyrcania. Alexander marched for Marakanda the Royal city of Sogdiana moving thence to the Tanais. Like the Oxus, this river, too (according to Aristobulus the natives call it the Orexartes) rises in the Indian Caucasus and flows into the Caspian Sea; it can hardly be the Tanais which the historian Herodotus describes as the 8th of the Scythian rivers having its source in the great lake flowing into a greater, called Maeotis: this other Tanais is regarded by some as the boundary between Asia and Europe, on the supposition that from this corner of the Black sea, Lake Maeotis and the river flowing into it actually divide Asia from Europe in the same way as the Straits between Gadeira and the nomad Libyans divide Libya from Europe and in the same way, presumably as Libya is divided from the rest of Asia by the Nile.*

*It was his (Alexander’s) intention to found a city on the Tanais (Jaxartes) and name it after himself”.*(Alexander the furthest, modern Chojend).

Arab historians of the Middle Ages write that the Uzboy was a water course used by merchants who navigated it for centuries and had to overcome its several rapids. Its route to the Caspian Sea departed from the Sary Kamysh lake, that being its source, although the lake is fed by the Oxus, and flowed south to the town of Kurstysh, before the river turned west to the Caspian Sea and its outlet. The Uzboy thus carried the waters of the Oxus to the Caspian Sea, but only a small percentage of the total flow, because of its physical bed constraints<sup>2</sup>.

Thus it is hypothesized that a large amount of the Oxus river flow actually dissipated itself in the Karakorum desert area south of the Aral. It appears reasonable to consider that the Oxus (Amu Darya) could not carry more than 20-30 Km<sup>3</sup> per year to the Sary Kamysh Lake, when the total flow of the Oxus towards the Aral was 60-70 Km<sup>3</sup> per year. Thus it is considered only a small amount of the Oxus actually reached the southern Aral confines<sup>2</sup>.

The second river is the Syr Darya, and it is a westerly flowing river as it approaches the Aral. The Syr Darya was known to the Greeks as the JAXARTES and to the Arabs as the Sayhun or Sihun. Rather late for our researches, but pertinent are the comments of Babur Sultan<sup>6</sup>, who wrote in 1530, *“The Sayhun- Jaxartes- does not flow in any sea, but engulfs itself in sands very far downstream of the city of Turkistan”*.

The region between the Amu Darya or Oxus and the Syr Darya or Jaxartes has been known in history as Massagetae and later as Transoxiana. The Arabs called the region north of the Amu Darya, Mawaran-nahr, meaning literally, “The land beyond the river”.

The narratives of the Indian Veda's provide a tantalising glimpse of geographical information. It is possible that the core region of Vedic culture was the landlocked area between the Oxus and Jaxartes river systems and up to the Hindu/Sindhu River. The g.Veda X 75.5 refers to some 55 rivers in the area. This archaic geography allows that the Hapta-Hindu or Sapta-Sindhu in Sanskrit might include the rivers Oxus and Jaxartes, and that the location of the Aral Sea and Lake Labnor might not then have been the same as now.

## **COMMENT**

The Aral is thus a nebulous lake, perhaps changing size and shape quite dramatically in the shortest of timescales. The Oxus and Jaxartes certainly flow towards the Aral and at times have discharged into its eastern and southern areas.

The area is also known locally as the Turan Flats, extending from the Caspian Sea to the Aral and south to the Hindu Kush. The land area is enormous and now dominated by the Karakorum (black sand) desert to its south. There is a basic meteorological problem of southerly winds tending to evaporate the salty water and thus deposit salt upon the lands south of the Aral which tends to make the land in-fertile.

But, the over-riding picture is one of diffusion of the waters, forming areas of flood plain, albeit short lived, and because of the salinity of the general area, salt-pans, marsh land and generally lands unsuitable for agriculture.

If the lands from the Caspian Sea to the Aral and along the Uzboy were settled in the 5th century BCE, then during the historical period of the Ancient Greeks there were geographical facts to be gleaned from the itinerant traders who crossed this vast area.

Fortunately, or unfortunately, Alexander the Great did not proceed in his quest to conquer the oikoumene and venture north into this area. His limit (the

provinces of Margiana, Sogdiana and Bactria which are part of the Amu Darya/Oxus river system) appears to have been dictated by discipline rather than the Pamirs in which his furthest point is Alexandria Eschate, Alexandria the Furthest, now Khojend. Thus an opportunity for quite good intelligence from Baetis and Diogenes, his “Bematists” was lost. We should perhaps note that later historians writing about Alexander’s conquest have tended to extend the limits of his conquests, but quotations from historians such as Quintus Curtius Rufus<sup>7</sup> in his ‘History of Alexander’ are quite enlightening; as follows; 7.10.1-3; 7.10.13; 7.10.15; and 8.2.14.

*“Sogdiana is mainly desert; barren wastes cover an area some 800 stadia wide. The country is of enormous length, and through it flows a river, called by the inhabitants the Polytimetus. As a torrent it is compressed into a narrow channel by its banks; then it enters a cave which takes it underground. The only indication of its invisible course is the sound of running water, for the actual soil under which this considerable river flows betrays not the slightest trace of boggyess.”*

*“ and 3 days later reached the River Oxus. This is invariably dirty because of its silt content, and it is unhealthy as drinking water.”*

*“After this he crossed the Ochus and Oxus Rivers and came to the city of Margiana, in the vicinity of which sites for 6 towns were chosen, 2 to the south and 4 to the east.”*

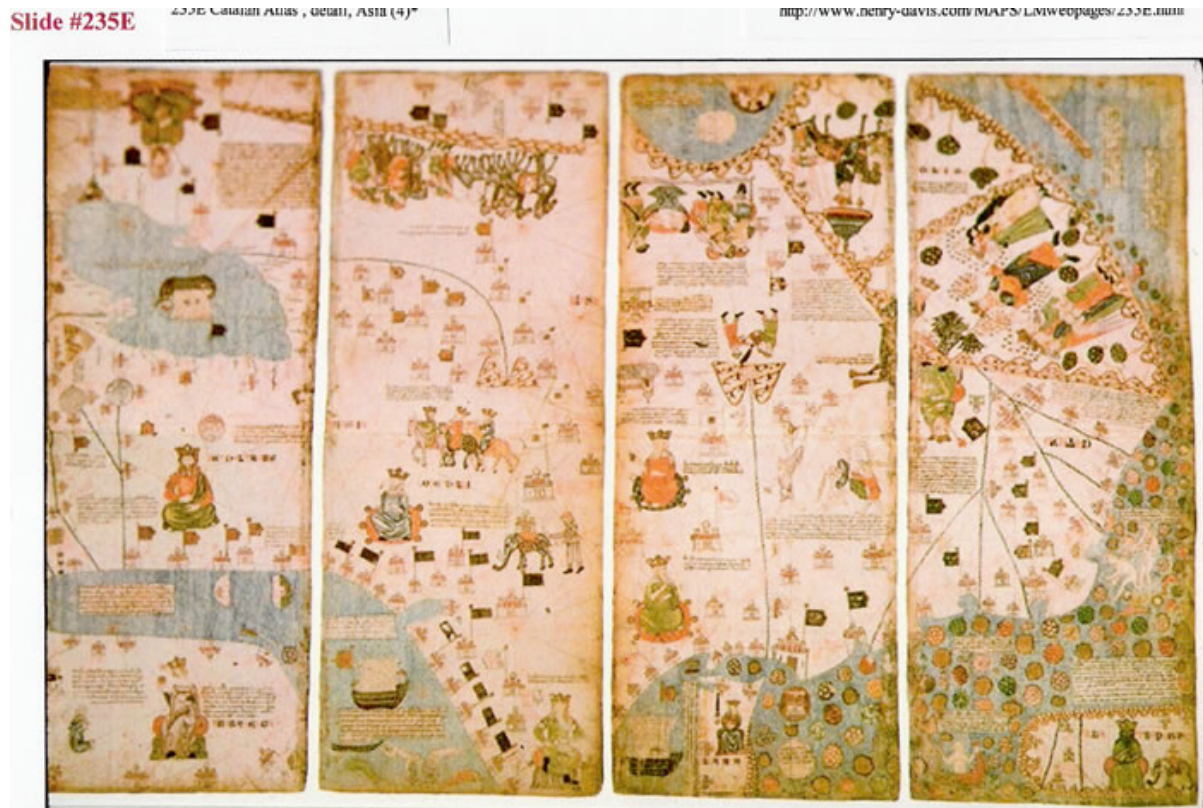
*“He then came himself to Xenippa an area on the borders of Scythia.”* (Near Bokhara)

## **GEOGRAPHICAL HISTORY**

From a purely European perspective the lands north of India and east of the Caspian Sea were Terra Incognita. The earliest written descriptions (and maps) are of Greek authorship and considered the Caspian Sea as a large gulf stretching south-wards from the ‘Northern Ocean’. It is a constant feature of maps drawn by the Greek Geographers, such as, Hecataeus<sup>8</sup>, Herodotus<sup>9</sup>, Dicaearchus<sup>8</sup>, Eratosthenes<sup>10</sup> and Posidonius<sup>8</sup>. Some Greek Geographer/historians, such as Herodotus<sup>9</sup> c485-425BCE, endeavoured to describe these eastern lands and by the 3rd century BCE exploration for conquest, as already discussed, shed a partial light upon these lands and peoples.

Eratosthenes<sup>10</sup> made a determined effort to map the oikoumene, but, he limited the oikoumene in the east to the Ganges Delta, later adding 2000 stadia to this limit and to the western limit, to uphold the Greek metaphysical belief of an oikoumene of length/breadth ratio of 2:1. However, we are informed by both Strabo<sup>10</sup> and Pliny<sup>11</sup> that Eratosthenes<sup>10</sup> gave distance measures from the Caspian gates via Bactra to the Jaxartes River. Sufficient extra data to enable them to include the whole of this north-eastern quadrant of the oikoumene came from those major trade routes which flourished in the 2nd c BCE, when more stable empires allowed a free flow of goods, particularly Silk from China.

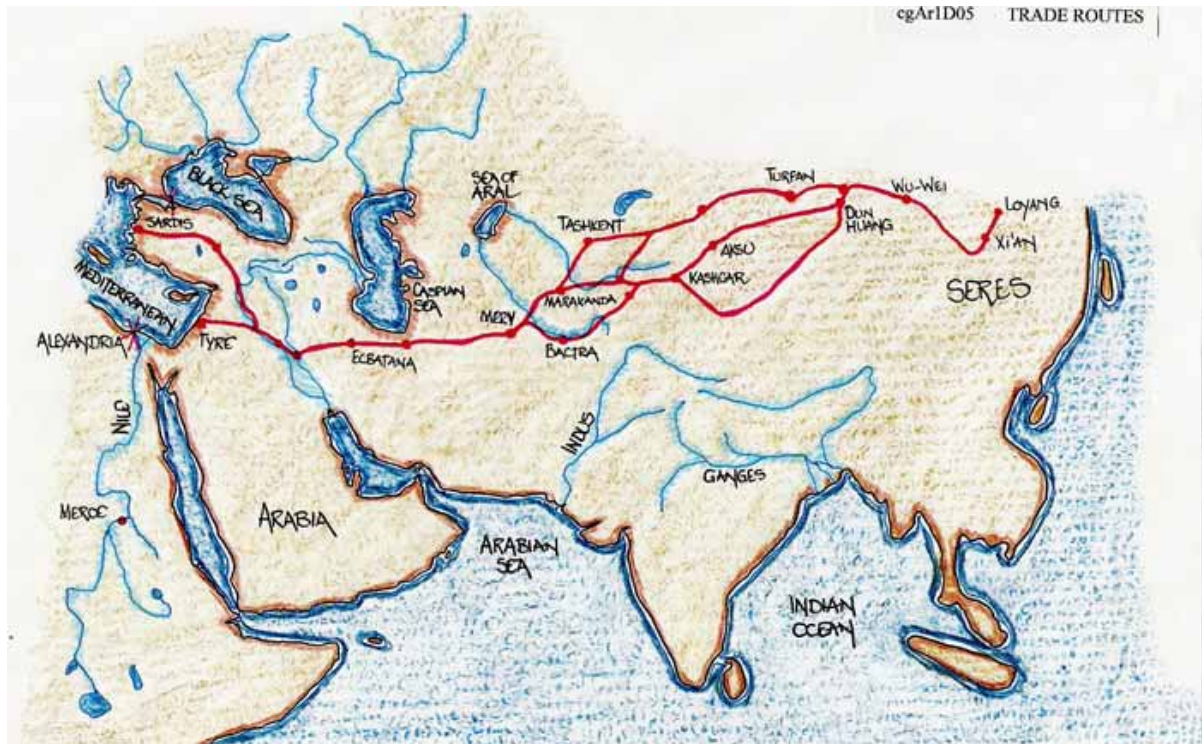
In the 1st c CE, the era of Marinus the Tyrian<sup>12</sup> and later in the 2nd c CE, that of Claudius Ptolemy<sup>12</sup> those trade routes had provided information covering the limits of China, the Seres, and its capital.



## ANCIENT TRADE ROUTES

The problem for ancient geographers was one of distance measure and overcoming the metaphysical belief that the oikoumene could only encompass a given land area. Pliny in his "Natural History"<sup>11</sup>, written 77CE, actually sets down the proportion of each part of the oikoumene giving specific percentages to the European, African and Asian landmasses. Strabo, using the work of Eratosthenes from the 3rd c BCE as his basic text endeavours to indicate that this great land area east of the Caspian Sea was in fact tangible. Alexander the Great<sup>5,7</sup> had in fact altered the perception of many historians following Eratosthenes and closed the gap in European knowledge, a disturbing gap caused by the conflicts between the Greek and Persian worlds. We know that the Persian, or Achaemenid dynasty empire c500BCE included Hyrcania (Caspian), Parthia, Margiana, Sogdiana and importantly Chorasmi whose homeland was based upon the Oxus River. In the east the empire extended to the Indus River, to Kashmir, and in the north to the land of the Massagetae which straddled the Jaxartes River. In the west it included all of Anatolia and for a time part of Greece and Egypt. The Achaemenid Empire collected data for centuries and thus later Arab historians were able to write about its eastern extremities.

European geographers had little or no contact with their opposites and thus had only the data available from peripatetic traders, their verbal descriptions and estimated travel distances which could be used to construct maps of the Asian hinterland.



The geography of Eratosthenes is based entirely on travel distances, Strabo in his book is quite clear on this point, and when we read the text of Claudius Ptolemy describing the geography and cartography of Marinus the Tyrian it is the same technique described. But as explained Marinus c75CE, had sufficient data to enable the Caspian Sea and the Oxus/Jaxartes river systems to be plotted upon the map of the oikoumene, as well as the Seres to the eastern ocean.

But what description was given regarding the land between the Caspian Sea and the Jaxartes River.

Strabo<sup>10</sup> writing in c5BCE describes the area in Book 11 chapters 6, 7 and 8. He discusses the Hyrcanian Sea, the River Oxus and the River Jaxartes. At one point the Jaxartes is confused with the ARAXES which is to the west of the Hyrcanian Sea, but is thought to be an appellative common to several rivers around the Hyrcanian Sea and thus the cause of much confusion.

Strabo, Book 11.8.1 states the following;

*" As one proceeds from the Hyrcanian sea towards the east, one sees on the right the mountains that extend as far as the Indian Sea, which by the Greeks are named the Taurus. Beginning at Pamphylia and Cilicia (Anatolia) they extend thus far in a continuous line from the west and bear various names. In the northerly parts of the range dwell first the Gelae and Cadusii and Amardi, as I have said (11.7.1), and certain of the Hyrcanians, and after them the tribe of the Parthians and that of the Margianians and the Arians; and then comes the desert which is separated from Hyrcania by the Sarnius River as one goes*



*eastwards and towards the Ochus River. The mountain which extends from Armenia to this point, or a little short of it, is called Parachoathras. The distance from the Hyrcanian Sea to the country of the Arians is about 6000 stadia. Then comes Bactriana, and Sogdiana, and finally the Scythian nomads. Now the Macedonians gave the name Caucasus to all the mountains which follow in order after the country of the Arians; but among the barbarians (natives) the extremities on the north were given the separate names "Paropamisus" and "Emoda" and "Imaus"; and other such names were applied to separate parts".*

Thus we arrive at the Oxus (Ochus) river, and the beginning of a confusion of names and actual flow patterns. The Sea of Aral is basically dependent upon the Oxus and Jaxartes and thus we must take heed of the descriptions in the texts of such ancient geographers as Strabo, Pliny, Pomponius Mela<sup>13</sup>, Ptolemy, Arrian, etc. But, we must be cautious; Strabo, as stated is using the text of Eratosthenes, the three books written c250BCE. Thus in reality there is some 250 years of new knowledge available to Strabo, etc; knowledge he and others should be able to insert into their texts and thus update Eratosthenes. But does Strabo thus update Eratosthenes? In 11.6.1, the text is as follows;

*"The second portion begins at the Caspian Sea, at which the first portion ends. The same sea is also called Hyrcanian. But I must first describe this Sea and the tribes which live about it. This sea is the gulf which extends from the ocean towards the south: it is rather narrow at its entrance, but it widens out as it advances inland, especially in the region of its recess, where its width is approximately 5000 stadia. The length of the voyage from its recess might be slightly more than that, since its entrance is approximately on the borders of the uninhabited world. Eratosthenes says that the circuit of this sea was known to the Greeks; that the part along the coast of the Albanians and the Cadusians is 5400 stadia; and that the part along the coast of the Anariaci and Mardi and Hyrcani to the mouth of the Oxus River is 4800, and thence to the Jaxartes, 2400. But we must understand in a more general sense the accounts of this portion and the regions that lie so far removed, particularly in the matter of distances."*

The important and verifiable distance is between the two river mouths, 2400 stadia. This can be converted in two ways using the Eratosthian Stadia of c0.1575Km or the standard Greek stadia of c0.184Km. Thus we have either 378 Km or 440Km. But from just where was it measured? On the 1960 shoreline it is c378Km, but, across the intervening land it is c440Km. A most unsatisfactory result, as from this we cannot determine the base measure. In 11.8.9, Eratosthenes is quoted as giving the distance from the city of Bactra to the Jaxartes River, which he can only have obtained from the text of the Bematists' who accompanied Alexander the Great. It is given as 5000 stadia.

Can we test each measurement against a geographical plot to ascertain the veracity? Not really, as these are rather nebulous in their descriptions.

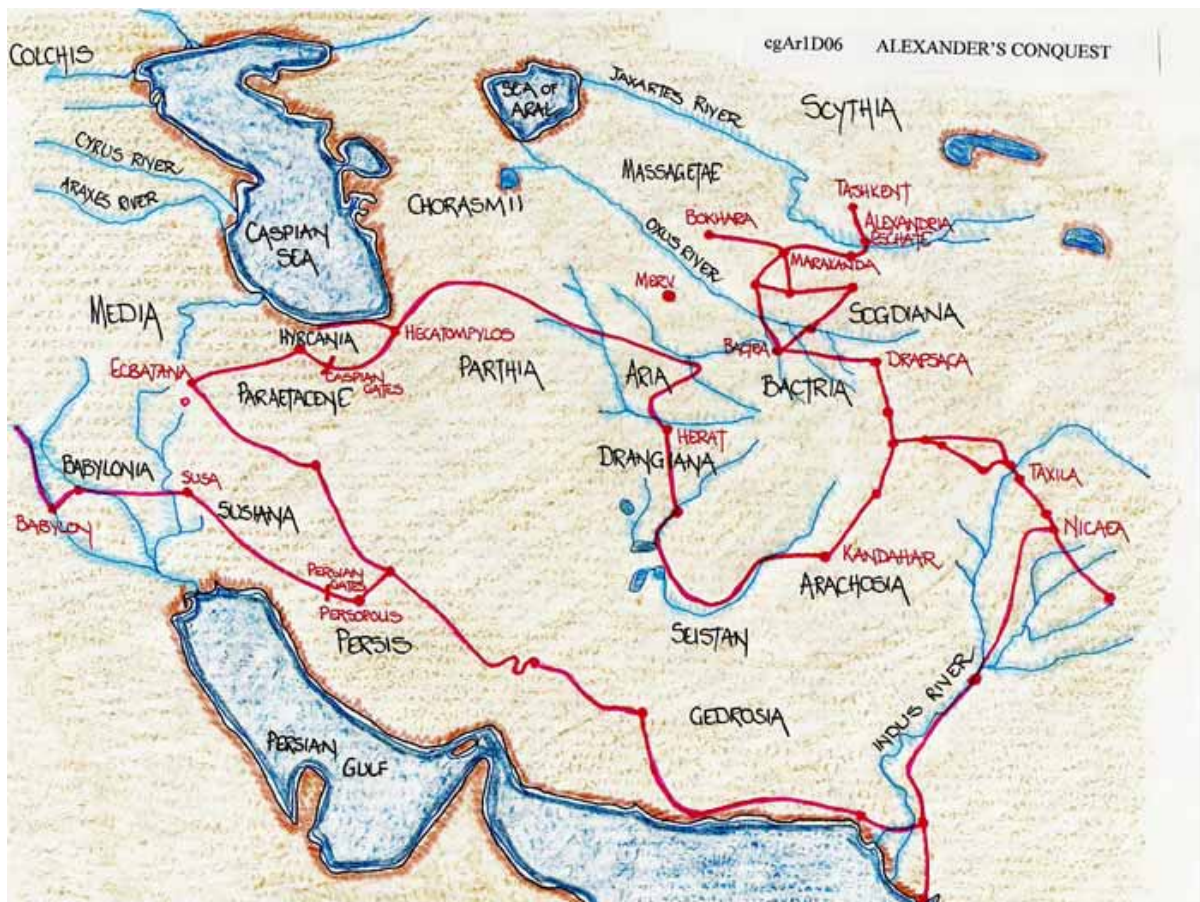
Is it necessary to try to do so? Yes!

From such texts we can obtain another tool which aids our investigation into the itinerary measures given by the ancient geographers.

Strabo has already indicated in 11.1.41 what Eratosthenes considered a reasonable methodology;

*“For, since Eratosthenes asserts that where it is a question of very remote regions he will give merely the traditional distances without vouching for them and admits that he got them by tradition-though at times he added the words “in a line more or less straight”-it is not fair to apply the rigorous test to those distances which do not agree with each other.”*

## ALEXANDER THE GREAT



Thus in Strabo book 11, chapter 8, section 9, we read a full measurement text, as follows;

*“Eratosthenes gives distances as follows; from Mount Caspius to the Cyrus river, about 1800 stadia; thence to the Caspian gates 5600; then to Alexandria in the country of the Arians, 6400; then to the city of Bactra, also called Zariaspa, 3870; then to the Jaxartes River, to which Alexander came, about 5000; a distance all told of 22670 stadia. He gives also the distance from the Caspian gates to India as follows; to Hecatompylos, 1960; to Alexandria in the country of the Arians, 4530; then to Prophthasia in Drangge, 1600 (others say 1500); then to the city Arachotis, 4120; then to Ortosparia, the junction of the three roads leading to Bactra, 2000; then to the borders of India, 1000; a*

*distance all told of 15300 (sic) stadia. We must conceive of the length of India reckoned from the Indus River to the Eastern Sea, as continuous with this distance in a straight line. So much for Sacae."*

Note, the sum of the distances is actually 15120 stadia, but the 15300 is also quoted in 15.2.8.

Itinerary travel<sup>14</sup> was very difficult to calculate from the descriptions of the traders. Was it just persons walking, carrying Silk bundles; was it pack animals, Horses or Donkey/Ass or was it the Bactrian camel fully laden. There are various speeds attributable to each. They may not seem appreciably different, but when the time of travel is calculated in months, and animals require rest and recuperation breaks after arduous portions of the route, and it is necessary to await another caravan to exchange goods, then the calculation is at best absolutely a blind guess. Many papers have been written regarding the travel periods both on land and sea, but they are only a guide. The texts Mt1 and Mt2 endeavour to explain the overall length of the oikoumene as calculated from itinerary travel from "The Capital of the Seres" to "The Gulf of Issus" and the Mediterranean Sea.

But, Strabo has set the scene for the landscape description of the Aral/Caspian basin of the Turan depression.

Pliny, however (6.10), is quite certain of his terminology. The Araxes River, appellation or not, rises in mountains with the Euphrates, although they then flow in opposite directions.

However, in 6.15, "The Caspian and Hyrcanian Sea" Pliny describes it as being linked to the Scythian or Northern Ocean. He then quotes;

*" Eratosthenes gives the measure of it on the south-east-----as 5400 stadia, thence----to the mouth of the river Zonus he makes 4800 stadia, and thence to the mouth of the Jaxartes 2400 stadia. Agrippa---states it as far as its extent is known to be 480mpm (480 x 8 = 3840 stadia) and 290mpm or 2320 stadia in breadth. There are not wanting, however, some authors who state that its whole circumference, from the Straits, is 2500mpm or 20000 stadia."*

Thus from the mouth of the Zonus (Oxus) to the Jaxartes may be taken as a direct copy of the original text, unaltered by any later exploration or peripatetic measure.

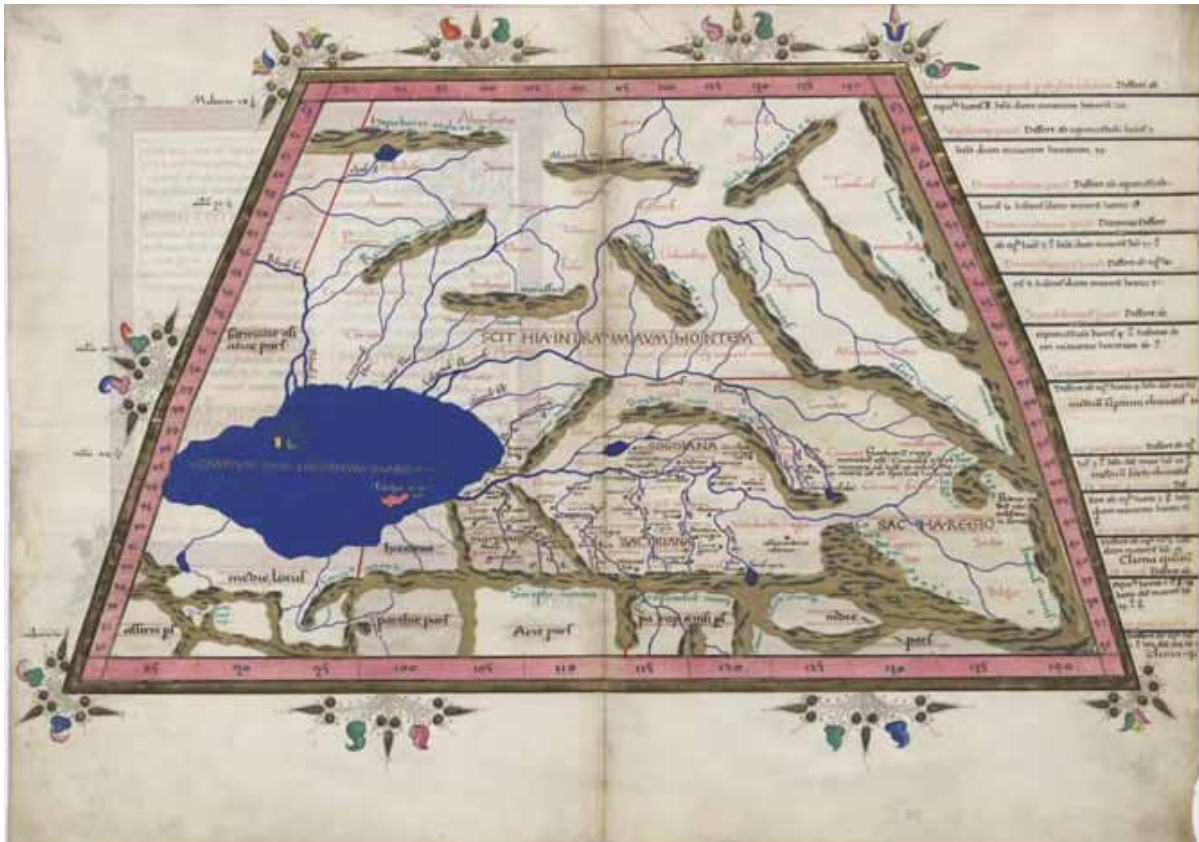
Pliny in 6.17, "Media and the Caspian Gates" as does Strabo in 11.8.9 gives the itinerary measures attributable to the Bematists of Alexander.

Pliny 6.18, "Nations situate around the Hyrcanian sea", states, *"the Derbices also, through the middle of whose territory the River Oxus runs, after rising in Lake Oxus"*. Here we possibly have the confusion of the Oxus flowing towards the Sea of Aral and splitting into many channels, the westerly flowing into Lake Sary Kamysh and out again in a southerly and then westerly direction as the Uzboy River.

In 6.19, Pliny confirms this when he discusses that the Oxus was used by

Indian merchants conveying goods from the Oxus to the Caspian Sea and thus to the Pontus, all as previously indicated.

## CARTOGRAPHICAL REPRESENTATIONS



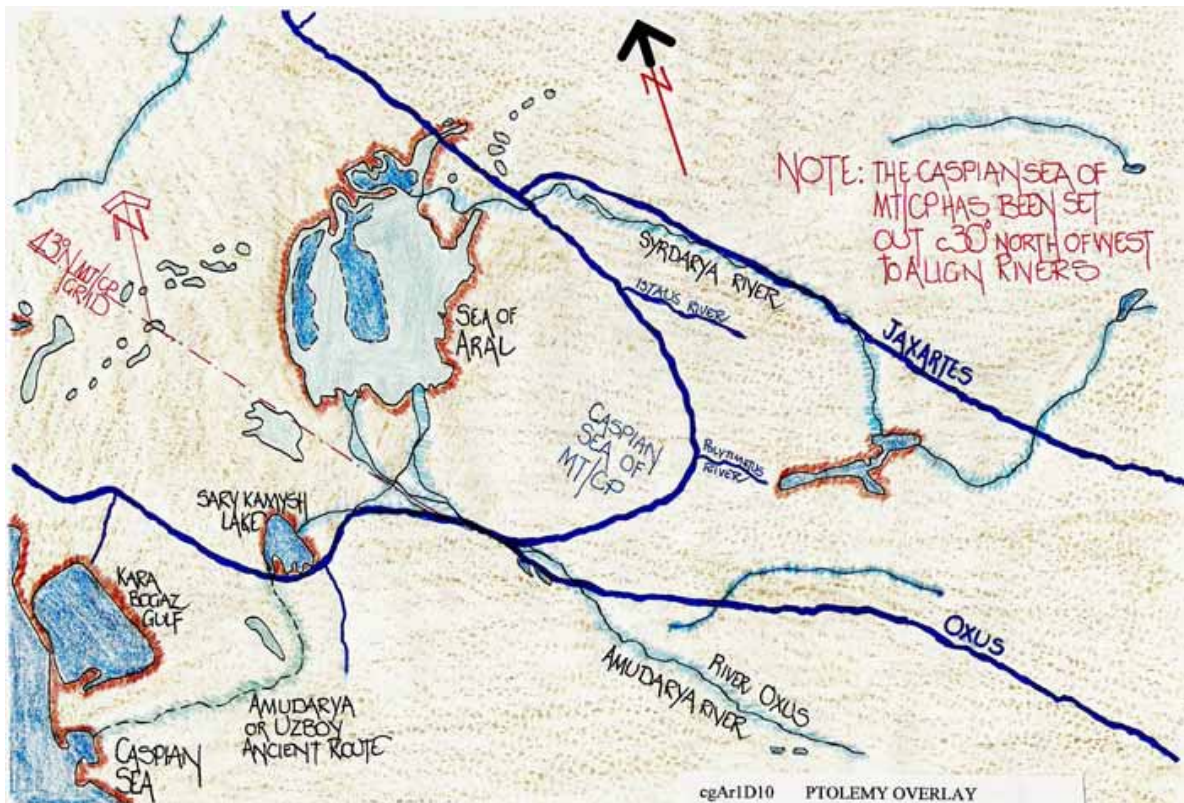
As previously stated, only the Caspian Sea appears on maps pre 1000CE. The most important representation is by Marinus the Tyrian/Claudius Ptolemy (MT/CP). This cartographic 'tour de force' has an elongated Caspian Sea which covers from  $48^{\circ} 50'$  to  $40^{\circ} 00'$ , or  $8^{\circ} 50'$ , 4400 stadia latitude and from  $79^{\circ} 40'$  to  $103^{\circ} 00'$ , or  $23^{\circ} 20'$ , 9300 stadia longitude, and has the major rivers in their relative positions geographically. They are the Volga, Ural and Emba/Zhem to the north; the Safid and other small rivers of Iran to the south; the east which is really the Sea of Aral and has the Jaxartes/Oxus to the east and south-east, and finally the west which includes the Cyrus and Araxes Rivers.

In fact the limits of the MT/CP Caspian Sea are determined by Rivers. To the north it is the River Rha (Volga),  $87^{\circ} 30'E$ ,  $48^{\circ} 50'N$ ; to the East it is the Polytimetus,  $103^{\circ} 00'E$ ,  $45^{\circ} 30'N$ ; to the south it is the Stratonis River,  $90^{\circ} 20'E$ ,  $40^{\circ} 00'N$ , and in the West the Cyrus River,  $79^{\circ} 40'E$  and  $44^{\circ} 30'N$ .

But can we establish the real geography hidden in this the ancient cartography? The response is most certainly yes, because MT/CP have included in their texts and information the where-with-all to align Geographical maps to those of MT/CP.







But as text [Ca1](#) fully explains the real calculation point or terminal point of the distance measurements for the oikoumene is the “Sacred Promontory” of Iberia, now Cape St Vincent. It is given a longitude of  $2\frac{1}{2}$  degrees east, (but east of a nebulous point, the Fortunate Isles), and is actually the zero point of the calculation by Marinus the Tyrian in his original text where the oikoumene is determined at 15 hours or 225 degrees.

However, that is not the ‘hidden’ factor. The Sacred Promontory is given the latitude of  $38^{\circ} 15' N$  and that is precisely  $7^{\circ} 15'$  or 3625 stadia north of Alexandria. But, Cape St Vincent is actually  $37^{\circ} N$  and, therefore, 60 latitude geographically north of Alexandria at  $31^{\circ} 0' N$ . That is  $6 \times 604$  stadia or 3624 stadia, precisely the distance given by MT/CP.

If we study the comparative figures for Byzantium, we find that they are precisely the same; i.e. the Poleis of Byzantium has been located by MT/CP at the correct distance north of Alexandria. Therefore by using Alexandria as a fixed point in both latitude and longitude we can overlay same scale maps to ascertain the position of the Caspian Sea of MT/CP and establish its origin from geographical facts.

Diagrams [Ar1D08](#) and [Ar1D09](#) illustrate the geographical and MT/CP plots super-imposed from Byzantium/Alexandria to the east, Kazakhstan and the Kyrgyz Republic. This area maps the Black Sea or Pontus Euxine plus the Sea of Azov/Palus Maeotis, eastwards across the Caspian sea/Hyrcanian Sea, to the Sea of Aral and the rivers Oxus and Jaxartes. Thus the ancient lands of Anatolia, Armenia, Media, Hyrcania, Parthia, Margiana, Ariana, Scythia, Sogdiana and Massagetae, which is between the Oxus and Jaxartes are included.

The ancient geographers and cartographers were not so very wrong in their estimation in the actual positioning of the Caspian Sea; the marsh land which probably looked like a sea, eastwards to the Sea of Aral; and thus its encompassment within the Caspian Sea, and the situation of the rivers Oxus and Jaxartes.

In fact diagram **Ar1D10** indicates just how accurate the positioning of these rivers actually is. The MT/CP plot drawn at 500/400 stadia per degree has been twisted northwards by approximately 30 degrees to align the discharge points of those rivers on the MT/CP plot with the geographical plot.

If we calculate by simple trigonometry the distance between the Jaxartes and the Oxus Rivers at the Sea of Aral, it is 1921 stadia or 355Km, i.e.  $1921 \times c0.185\text{Km}$ . However, the 2400 stadia of Strabo/Pliny is either  $2400 \times c0.1575\text{Km} = 378\text{Km}$ , or,  $2400 \times c0.185\text{Km} = 444\text{Km}$ . But the statement is “2400 stadia from the mouth of the Oxus to the Jaxartes”, which could mean to a certain point on the Jaxartes and not its mouth, but it does appear to point to the Stadion of Eratosthenes in use.

The fact that the MT/CP plot encompasses both the Caspian Sea and the Sea of Aral with rivers correctly identified and positioned, points to my belief that the land between the two seas has from its original “flooded lake” which occurred after the Würm Glaciation, evinced by the myriad of lakes to the north, at times reverted to a flooded area, marshland, visually a lake from the salt pans reflectivity.

Certainly the River Oxus flowing from the southeast northwards, splitting into a myriad of channels, some flowing to Lake Sary Kamysh and then forming the Uzboy River flowing to the Caspian Sea may well have formed a visual barrier to the travellers who described this area probably in the period 900-500 BCE.

The fact that the locals and Arab merchants knew differently would not have been carried through to the Greeks who were engulfed by their traditions and philosophical ideas. Many geographers who wrote supposedly definitive texts regarding the oikoumene were in fact limited by this metaphysical requirement. In fact it is quite obvious that real geographical knowledge did not arrive in a form at all convincing to western geographers until the 16th century. It would appear that the only geographer who had knowledge of the two seas was Al Idrisi<sup>15</sup>, who indicated the correct landscape on his map of the world, drawn for Roger of Sicily, the Tabula Rogeriana, dated to 1132CE. The Catalan Atlas<sup>16</sup> of 1354 CE has the Caspian Sea and the Oxus River, Jaxartes and Volga, but also has the Euphrates possibly connected to the western side of the Caspian Sea south of Bakou/Baku. This is of course the Araxes River which is known to rise in the mountains with the Euphrates, and is in fact placed by Pliny only 6mpm or 48 stadia from each other. Thus we may assume that it is quite possible they may have been given the same source for different routes or flows.



## **PALUS OXIAS OR LACUS OXIANA**

One curiosity though is on page 133 of volume 1, "The History of Cartography"<sup>17</sup> in a chapter discussing "the foundations of theoretical cartography in Archaic and Classical Greece". Diagram 8.2, "principal places associated with maps in the Greek World", has the Sea of Aral labelled "Palus Oxiana".

MT/CP place the Lacus Oxias at 111<sup>0</sup>0E; 45<sup>0</sup>0N which is some 450/500 Km east of their easternmost point on the Caspian Sea, the mouth of the Polytimetus River at 103<sup>0</sup>0E; 45<sup>0</sup> 30'N. However if the MT/CP map of the area, diagram [cgAr1D07](#) is studied the lake is in the correct geographical position, part of the River Jaxartes system, but their actual description is describing another lake, not The Sea of Aral.

I quote; " The mountains between the rivers of Sogdiana have their termini in 111E;37N and 122E;36<sup>0</sup> 30'N, one of its rivers flows from Oxia Lake, the middle of which is located 111E;45N and there are other rivers flowing from these mountains called Comedarum from which the Jaxartes flows, and into which river they empty."

This lake is a mountainous lake, not a lake of the Turan Plains.

## **CONCLUSION**

This paper was not concerned with the decline of an inland Lake or Sea which has been expressed as a political point by many persons. Even though the enigmatic photograph of two ships stranded in the salt plain aptly illustrates the current situation.

It discusses solely the reason why MT/CP should produce a map of the oikoumene which was contrary to all previous maps that indicated the Caspian Sea as a large gulf from the Northern Ocean; and why did their map greatly oversize the Caspian Sea to encompass the Sea of Aral? Herodotus in Book 1, clearly states that the Caspian Sea does not connect to any other. That was written in c445BCE hence, several cartographers had enough data to draw a correct Caspian Sea. Thus it is clear that the confusion surrounding the Caspian Sea meant the Sea of Aral would be conflated into that Sea. The Caspian Sea was an inlet, a gulf not a Sea or Massive lake! The Sea of Aral was that Sea or lake with the rivers Jaxartes and Oxus spilling their waters there-in. Thus a conflation and utter confusion existed.

It has shown that itinerant traders carried with them sufficient knowledge to enable accurate maps to be drawn, but, also just how strong the metaphysical beliefs engendered by the original Greek cartographers was and just how long it took to overcome those beliefs and the data used.

The East because it was never conquered by a western army was an unknown entity with only the trade routes, sea trade to Cattigara Sina ( Canton) etc., providing sparse data until the trade increased sufficiently for Europeans to travel and eventually a map of Europe, Africa and Asia , as drawn by MT/CP

could be constructed.

Thus the Sea of Aral can be seen as a metaphor, lost, found and lost again!

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- 12) "Marinus the Tyrian and Claudius Ptolemy" see texts [Cp1-Cp4](#) and [Ca1](#).
- 13) Pomponius Mela /Slide 116 and monograph as 8)
- 14) Itinerary Travel. See texts [Mt1](#) and [Mt2](#) for a discussion of route mileage.
- 15) Al Idrisi, Slide 219 and 219A and monograph's as 8) above
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