

**TITLE:** *Sketch map of the Distribution of Land and Sea*

**DATE:** 1029 A.D.

**AUTHOR:** *Abu al-Rayhan Muhammad ibn Ahmad al-Biruni*

**DESCRIPTION:** Al-Biruni worked during the first half of the 11<sup>th</sup> century A.D., first in his native Khwarazm under the patronage of the last of the local rulers (i.e., Khwarazm is an area situated in and around the river basin of the lower Amu Darya in north-eastern Persia where it empties into the Aral Sea). In 1017, on the conquest of Khwarazm by the Ghaznavid ruler Mahmud, al-Biruni was carried off almost as part of the booty to Ghazna in modern-day Afghanistan, capital of the Ghaznavid Dynasty which was based in what is now central-eastern Afghanistan. Under Mas'ud I (reigned 1030-40), the son and successor of Mahmud, al-Biruni was able to go on with his writing and scientific work. It was here about 1036 that he completed his great astronomical work *Kitab al-qanun al-Mas'udi fi al-hay'ah wa-al-nujum* [Book of instruction in the elements of the art of astrology], which includes not only his astronomical tables but, in the tradition of al-Battani, a table of geographical coordinates of important places throughout the world. This table has over six hundred entries and hence is double the size of that of al-Battani or of Ibn Yunus.



Al-Biruni's world map shows a single world continent spread-eagled like a pancake on the surface of a voluminous *Encircling Ocean*. This single world continent occupies the lion's share of the northern hemisphere and comprises Asia, Africa, and Europe without any divisions. The Indian Ocean and the *Encircling Ocean* are one in the face of a significantly foreshortened Africa. This al-Biruni-type of world map circulates alongside the *Islamic Atlas* vision of the world in copies of medieval Arabic and Persian encyclopedias in the later Middle Ages. It is found, for instance, in copies of al-Qazwini's (d. 682/1283, #222) *'Ajapib al-makhluqat wa gharaqib al-mawjudat* [Wonders of creatures and the marvels of creation] and Yaqut al-Hamawi's 13<sup>th</sup> century *Kitab muqjam al- buldan* [Compendium of lands].

Although the Balkhi School maps (#214.2) exerted the greatest influence on later mapmaking, we should pay attention to the several other types of world mapping that developed independently of Greek geographic traditions. A sketch map drawn by al-Biruni (973-1048) exemplifies just such a map, and exerted considerable influence on some important geographers. His map shows a different distribution of space that more closely matches modern-day representations.

The relative locations of places in Asia, including China, bear similarity to sites plotted in the Balkhi School maps, yet al-Biruni's sketch of the world bears considerable differences. An open oceanic expanse in the southern hemisphere that corresponds to the Indian Ocean replaces traditional *terra incognita* at the southern part of Africa in the Balkhi School maps. The Indian Ocean is therefore connected to the Atlantic Ocean under the southern tip of Africa (which is depicted as a rectangular, not triangular, shape).

Al-Biruni was born in 973 in Khwarazm in Central Asia, which at the time sat at the eastern end of the Islamic world, although still far from the Islamic cultural center Baghdad. He was perhaps best known as a polymath; his skill in diverse fields like astronomy, mathematics, geography, and multiple languages (including Persian and Turkish) were well known. With this unusual intellectual talent, al-Biruni amassed earlier geographic works in order to create a synthesis of all known theories of world

geography from Greek, Persian, and Indian traditions, including ideas about longitudes and latitudes. He was familiar with Indian traditions of mathematic geographical measuring, such as the Indian coordinate table called the *Zij* book that determined geographical positioning independently of the Greeks. Together, the multiple perspectives of different schools and the knowledge he synthesized helped him to utilize new ideas about how to sketch the world map that presents new theories about the distribution of land and sea.

However, many of al-Biruni's new ideas and information came to him through the journeys he personally made, especially to Asia. Although al-Biruni did not travel as far as China, he gleaned much new information about places like China when he worked in the court of Mahmud of Ghazna.

Al-Biruni was a first-rate scholar, interested in all branches of science, though it is as a mathematician and an astronomer that he is remembered. He was an excellent critic who read widely. He had good knowledge of Greek scientific sources and was extremely interested in Indian scientific theories, so that he could and did compare the different cultural streams that came the way of the Muslim intelligentsia of his day.

In the geographical field it was mainly the mathematical and astronomical aspects that interested him. Here he was specializing in those aspects that had been neglected by previous geographers, and thus one might expect to see an improvement in Islamic cartography.

Among the projects al-Biruni mentioned in some detail was the measurement of the degree of latitude. He carried this out in Khwarazm and in Ghazna, and he produced a new method of measurement by using a convenient mountain from which the horizon could be observed. He also attempted to measure the difference in longitude between two places using the distance between them in miles. This was difficult, since the direct distances between places could not be worked out with any accuracy. However, he produced a result for the longitude of Ghazna east of Baghdad, setting out the theory behind this operation so that it was there for any later scholar to improve. He also gave a complicated theory based on this for calculating the *qibla*, or the directions of Mecca from any place. Al-Biruni also criticized the projections of Ptolemy and Marinus, and by the latter he obviously meant the rectangular projection as shown us by Suhrab. In his works he gives the theory behind two different projections, one of which would be known today as an *azimuthal equidistant* projection and the other as a *globular* projection. Finally, he made scientific comments on the distribution of land and water on the face of the globe.

Few of these points were taken up by al-Biruni's successors, and his scientific work exerted very little influence on future Islamic cartographers. No one took the azimuthal projection, drew a graticule, and placed toponyms in their proper places. If al-Biruni himself did so, we have no surviving examples, and his successors do not mention it. Al-Biruni's latitude and longitude refinements are incorporated in his tables and were copied to some extent after his death. Perhaps the most accepted piece of information was the distribution of land and water, because the eastern extension of southern Africa toward China, which was a prominent feature of the Islamic world map up to al-Biruni's time, was now discontinued. Only al-Idrisi (#219) and direct copies of earlier maps like those of the Balkhi School insisted that the African landmass filled the southern part of the *oikoumene* [known world] from west to east. Al-Biruni's only direct contribution to cartography was a sketch map showing this distribution. It appears in the manuscripts of the *Kitab al-tafhim li-awa'il sina'at al-tanjim* [Book of instruction on the



principles of the art of astrology], copied in 1238, and is his version of the circular world map showing how independent his thought was from the contemporary standard of Islamic cartography. He so reduced this eastward extension of Africa, which was a legacy of Ptolemy that the Indian Ocean appeared to cover the whole southern hemisphere. This sketch map was occasionally used directly by later authors—for instance, al-Qazwini in his cosmographical work *‘Aja’ib al-makhlūqat* (#222), but its influence was very clear in practically all future Islamic maps of the world.

Scattered throughout collections of medieval and early modern Arabic, Persian, and Turkish manuscripts are thousands of cartographic images of the world and various regions. The sheer number of these extant maps tells us that from the 13<sup>th</sup> century onward, when copies of these map manuscripts began to proliferate, the world was a much-depicted place. It loomed large in the medieval Muslim imagination. It was pondered, discussed, and copied with minor and major variations again and again, and all with what seems to be a peculiar idiosyncrasy to modern eyes. The cartographers did not strive for *mimesis* [imitation of the real world]. They did not show irregular coastlines even though some of the geographers whose work includes these maps openly acknowledge that the landmasses and their coastlines are uneven. They present instead a deliberately schematic layout of the world and the regions under Islamic control.

These images employ a language of stylized forms that make them hard to recognize as maps. Scholars of Islamic science and geography often ignore and belittle these maps on the grounds that they are not mimetically accurate representations of the world. What these scholars miss, according to the historian Karen Pinto, is that these schematic, geometric, and often symmetrical images of the world are iconographic representations, *carte-ideographs* of how medieval Muslim cartographic artists and their patrons perceived their world and chose to represent and disseminate this perception.

Each map consists of a set of geometric configurations. Though some are more geometric than others, most lines are straight or arced, rivers are wide parallel lines, and lakes are often perfect circles. Towns are sometimes squares, circles, or four-pointed stars or, if they are stopping places on a straight route, resemble small tents or perhaps doors to caravansaries. Thus much of the drafting is ruled with either a straight or a curved edge. The only exceptions are mountains, which are drawn as a collection of peaks or perhaps piles of rocks, though even here the base, which probably represents the position of the range on the map, is a straight line or a regular curve.

**LOCATION:** British Library, MS. Or. 8349, fol. 58a, London

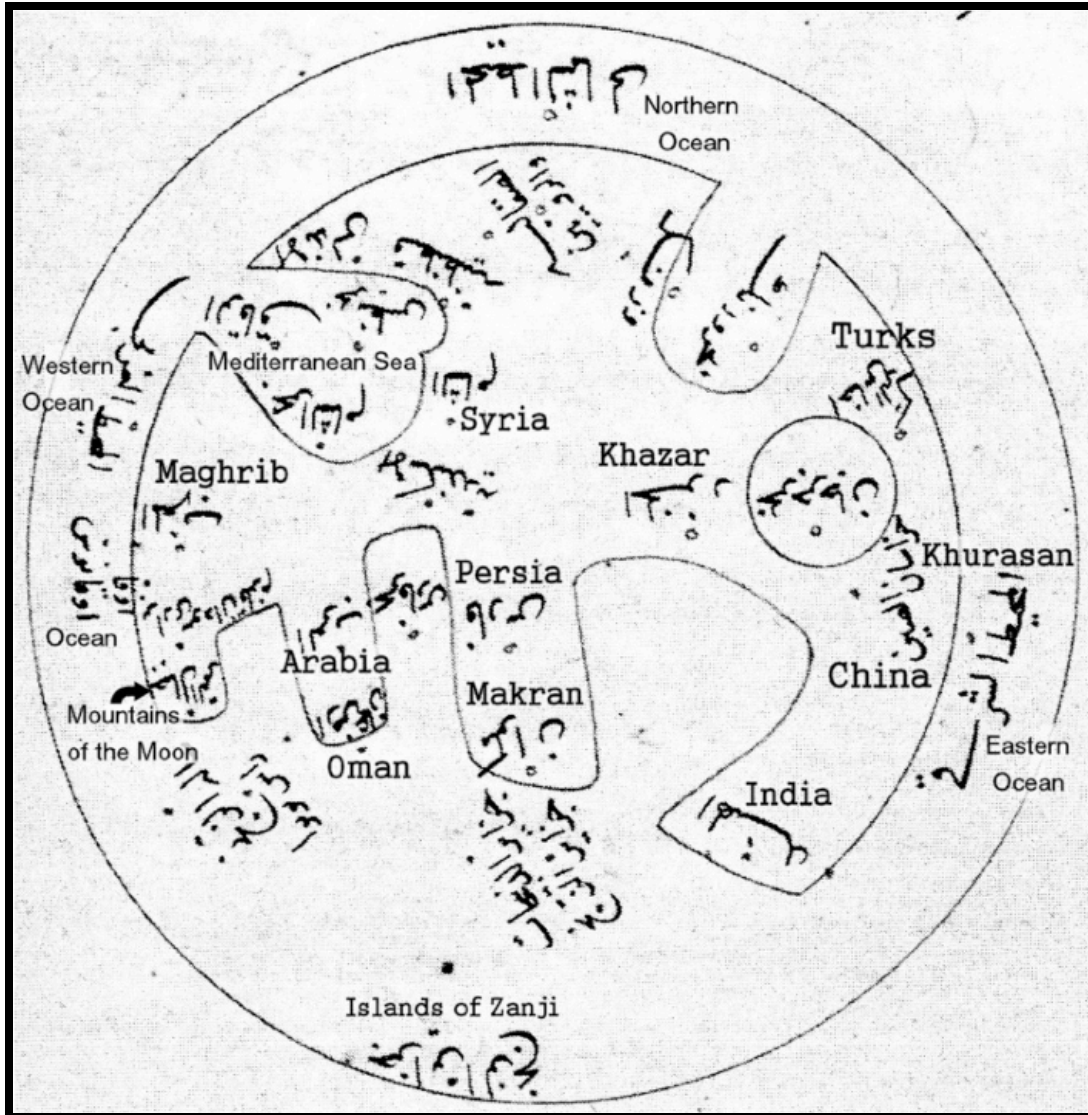
#### REFERENCES:

- \*Harley, J. B., *The History of Cartography*, Volume Two, pp. 141-142, Figure 6.4.
- \*Park, H., *Mapping the Chinese and Islamic Worlds*, pp. 78-79.
- \*Pinto, K., *Medieval Islamic Maps*, pp. 16, 31, 99, 153.

\*illustrated



Sketch map of the Distribution of Land and Sea, 635/1238  
(oriented with South at the top); 9.5 cm diameter  
British Library (MS.Or.8349, fol. 58a), 14<sup>th</sup> century

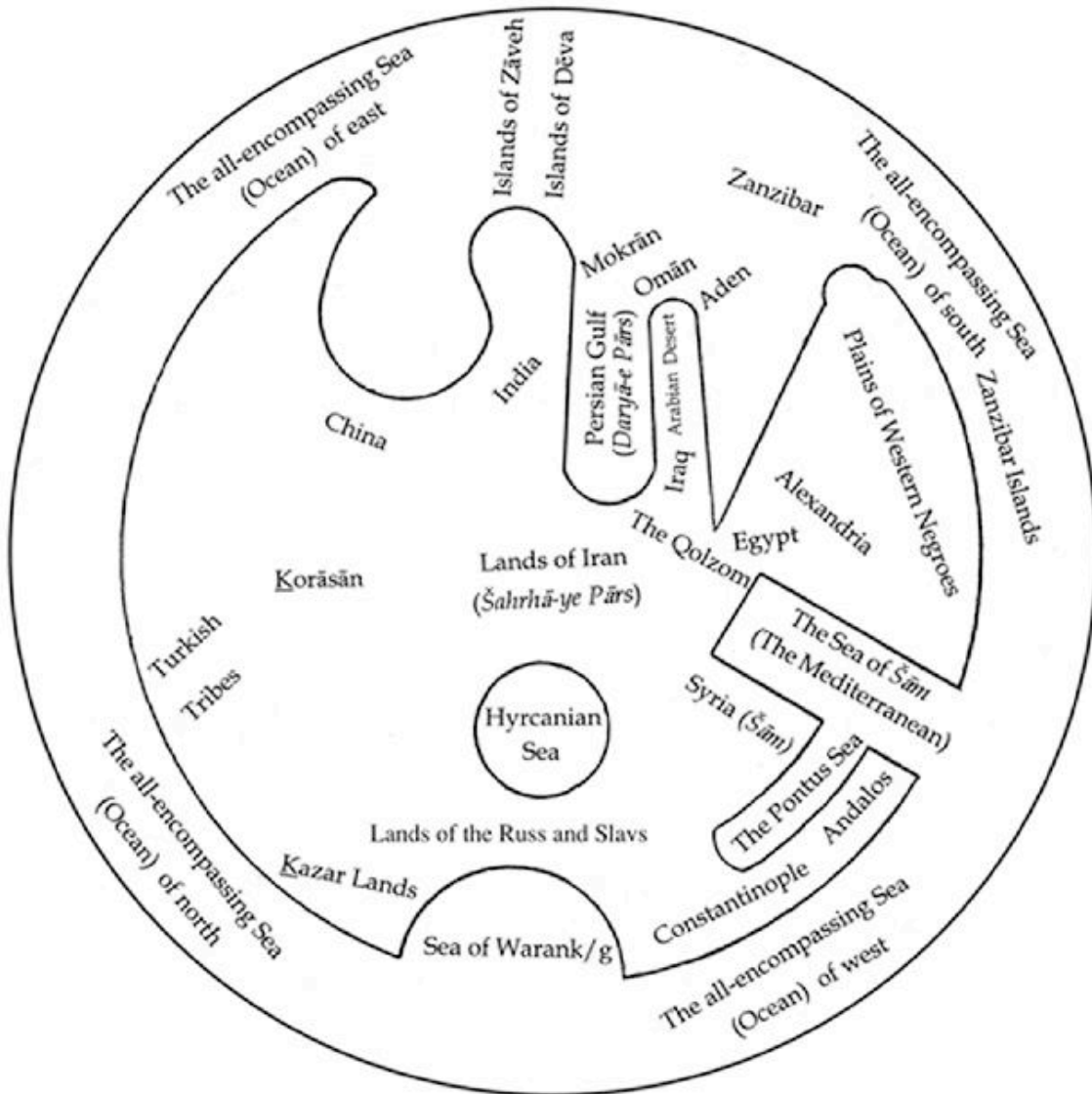


Re-oriented with North at the top and some translations





World map of al-Biruni, Distribution of Land &amp; Sea

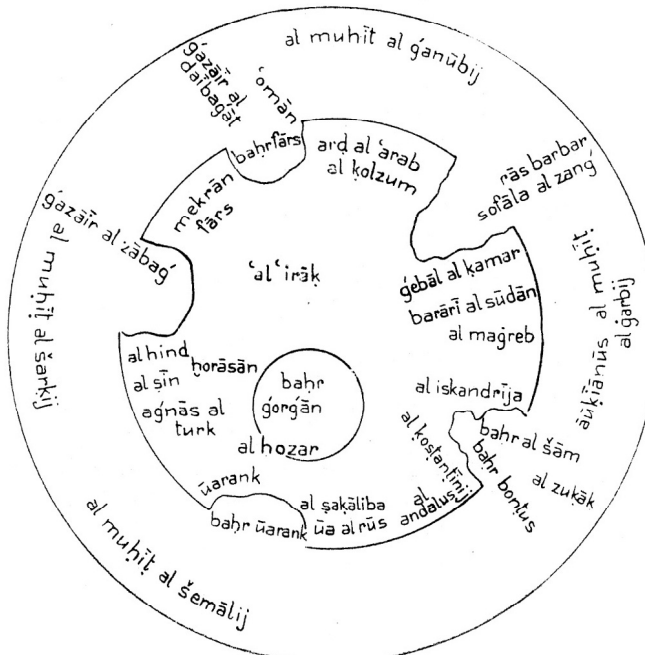


Translation of a world map of al-Biruni, Distribution of Land & Sea





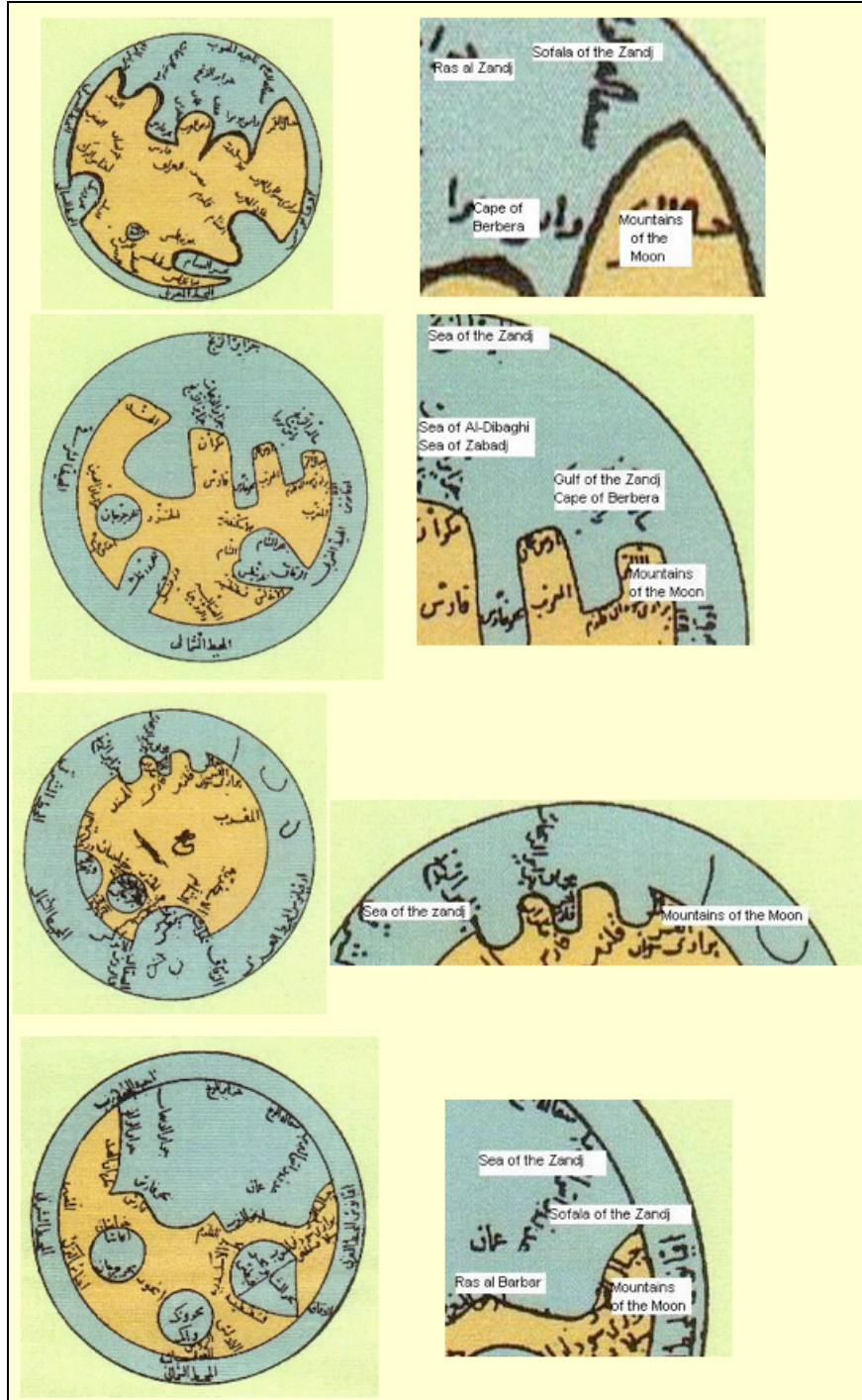
min kitāb al taḥqīm āwā'il šinā'a  
al taḥqīm al bīrūnīj



Karte der 7 Meere von al Biruni.



The following maps are taken from: *Persian Gulf in Old Maps* published by the government of Iran. Not all maps are part of al-Biruni's manuscript work. Some are found in the manuscripts of other authors.



QUADRANS HABITABILIS  
according to  
ABU RIHAN BIRUNENSIS  
A.D. 1030

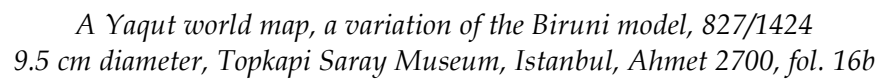
The map illustrates the Eastern Hemisphere as known in the 11th century. It features a grid of latitude and longitude lines. Key geographical features and regions labeled include:

- Regions:** RUSSIA, TURK, TIBET, MAHA DIN, SIND, HIND, FARS, ARABIA, SUDAN, SINA, RUSSIA, TURK, TIBET, MAHA DIN, SIND, HIND, FARS, ARABIA, SUDAN, SINA.
- Bodies of Water:** MARE TENEBROSUM, MARE ARABICUM, MARE INDICUM, MARE LAREVI, MARE RUBRUM.
- Rivers:** Nile (Fons Nil), Tigris (Fons Tigris), Euphrates (Fons Euphratis), Indus (Fons Indus), Ganges (Fons Ganges).
- Islands:** Sumatra (Sumantra), Java (Java), Ceylon (Ceylon), Maldives (Maldive).
- Other Labels:** RUSSIA, TURK, TIBET, MAHA DIN, SIND, HIND, FARS, ARABIA, SUDAN, SINA, RUSSIA, TURK, TIBET, MAHA DIN, SIND, HIND, FARS, ARABIA, SUDAN, SINA.

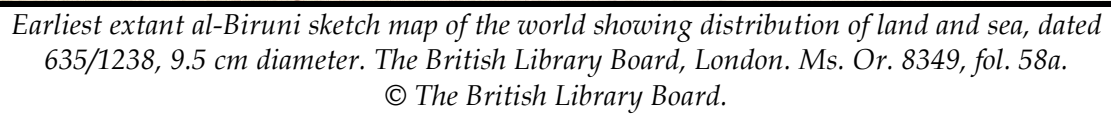
From E. Rhys, *A Literary and Historical Atlas of Asia*

*Place Names: A Complete Map of Globes and Multi-continent, Sudan, Sofala, Turk, Hind, Russia, Fars, Arabi*

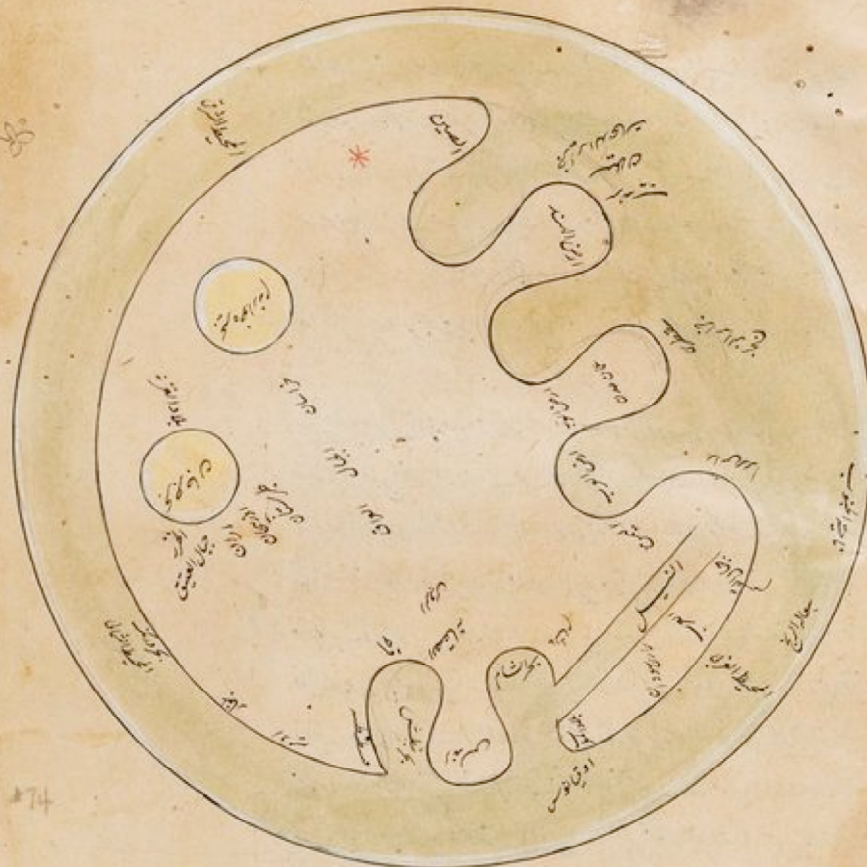












والتفهم بما يحكيه عجيبة ذكر السمرقندي حمته الله عليه في كتابه ان ذوالقمر نارا دان اي عرب  
ساحل ذوالبحر غرقت مركبا و امر دبا ليسر غدا فله اعلى اثنى شئ من خبره فصار الركب سننظم  
شئيا لاسلم المفاوذا الرجوع فقال بعضهم ليسر شرا اخر اعلان النطق على شئ من قبض جود و هو

