

Philosophies and Methodologies in Geography (GG-CR-16201)

CREDIT-2nd

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LECTURE-I

Contribution of Phoenicians

More than 2,500 years ago Phoenician mariners sailed to Mediterranean and south-western European ports. The Phoenicians were the great merchants of ancient times. They sold rich treasures from many lands. These Phoenicians (the Canaanites or Sidonians) were Semitic people. Their country was a narrow strip of the Syrian coast, about 160 miles (260 kilometers) long and 20 miles (32 kilometers) wide. The area now comprises Lebanon and parts of Syria and Israel. Their territory was so small that the Phoenicians were forced to turn to the sea for a living. They became the most skillful ship-builders and navigators of their time. They worked in the silver mines of Spain, passed through the Strait of Gibraltar and founded the city of Cadiz on the southern coast of Spain. They sailed to the British Isles for tin and may have ventured around southern Africa. They founded many colonies, the greatest being Carthage.

The Phoenicians began to develop as a seafaring, manufacturing, and trading nation when the Cretans--the first masters of the Mediterranean--were overthrown by the Greeks (see Aegean Civilization). Not only did they take the fine wares of the Eastern nations to the Western barbarians, but they also became skilled in making such wares themselves--especially metalwork, glass, and cloth. From a snail, the murex, they obtained a crimson dye called Tyrian purple. This was so costly that only kings and wealthy nobles could afford garments dyed with it.

Perhaps the most significant contribution of the Phoenicians was a syllabic writing, developed in about 1000 BC at Byblos. From this city's name come the Greek word *biblia* (books) and the English word *Bible*. This form of writing was spread by the Phoenicians in their travels and influenced the Aramaic and Greek alphabets. After the Jews and Egyptians, it was the Phoenicians who contributed to the advancement of geographical knowledge. Phoenicians occupied Asia Minor (coastal Turkey, Lebanon, Syria, Israel) while Tyre (Tyr) and Sidon (Saida) were their major ports and towns. Gadeira (Gadis) was established by the Phoenicians as early as

1100 B.C., while Carthage (near the present Tunis) and Utica cities were established in about 813 B.C. along the northern coast of Libya (Africa) as the colonies of Phoenicians.

Thus, Phoenicians were the first repositories of geographical knowledge. But their narrow, selfish and secretive policies prevented them from communicating to others the information they had obtained about the distant nations and trading centres.

The Phoenicians were expert sailors who are credited with discovering how to use the North Star to gauge direction. As a result of this discovery, the Phoenicians could sail on the open seas and in the ocean; they no longer had to use the coastline as a navigational aid. Phoenician sailors passed this important information on to the Greeks and other Mediterranean cultures.

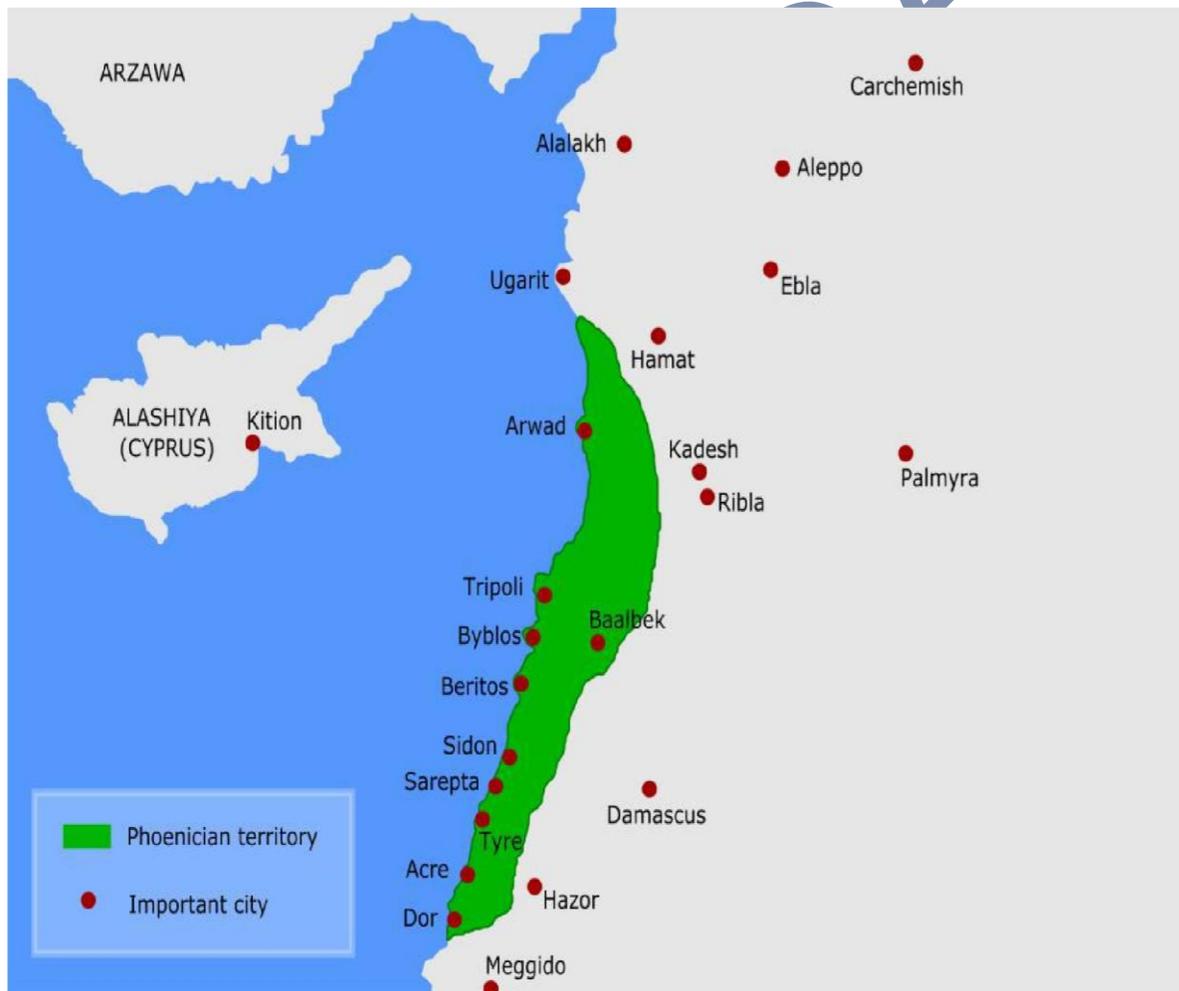


Figure-1

LECTURE –II

Contributions of Greek Scholars in Geography

Geography as a field of knowledge has its roots in the Greek scholarship. This is not surprising as in the ancient times Greek was one of the well flourished civilizations dating back to 500 BC – 200 BC with its centre in Greece and its surrounding areas.

Greek period is rightly called as the “Golden period” because all Greeks provided a framework of concept that guided the western thinking for many centuries. It was the most advanced economy in the world. The Greek philosophers of that time have provided the theoretical and scholarly base for the philosophical thinking through models, concepts, and paradigms which guided Western academia for many centuries. A large number of concepts and theories in the geographical philosophy seem to have an inclination towards the Greek tradition.

Roots of Greek Scholarship

The roots of the ancient Greek scholarship are found in the observations, measurements, and generalizations of scholars in Egypt, the cradle of science. The Egyptians had developed ways of measuring land in order to collect taxes. This led to the identification of North-South line. Another major contribution is the art of writing and also manufacturing of something on which they could write.

The Greeks borrowed the basic principles of algebra from the Mesopotamians and Sumerians. The sexagesimal system was also taken from them which believed that there are 360 days in a year. The Sumerians divided the year into twelve months; each month with 30 days. Even the idea that a circle has 360 degrees is from this scholarship; they had divided the circle of the zodiac into 360 parts.

The Greeks came to know about explorations and navigation from the Phoenicians, the settlers of modern Lebanon. These people not only possess expertise as explorers and merchants but also invented the world’s first phonetic alphabets. They even established a port along the shores of the Mediterranean Sea in the city of Carthage.

The ideas about the celestial bodies were adopted from the observations made by the Babylonians and Assyrians on the movement and position of the celestial bodies which gave birth to the discipline of astrology.

All these developments along with the determination of Greek scholars to gain more and more logical and useful knowledge about the earth surface as the home of man laid the roots of geographical thinking.

Major Greek Philosophers

In the ancient Greek scholarship, two traditions of geographical studies are found, namely, the mathematical tradition and the literary tradition. It is a common belief that **Homer** is regarded as the *Father of Greek Geography*. This is because he introduced the literary tradition through his monumental work '*Odyssey*' and '*Illiad*'. He described the four winds coming from different directions and named them Boreas (North), Eurus (East), Notus (South) and Zephyrus (West).

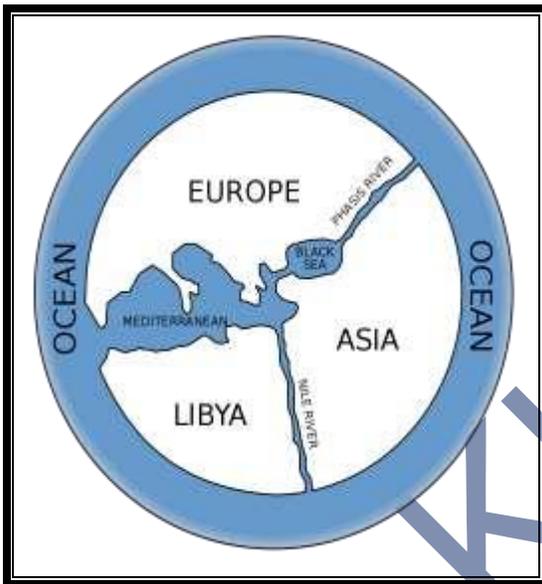
Thales was the first Greek genius, philosopher, and traveler who was concerned with the basic theorems of geometry. He proposed the following six geometric propositions:

- i) The circle is divided into two equal parts by its diameter
- ii) The angles at either end of the base of an isosceles triangle are equal
- iii) When two parallel lines are crossed diagonally by a straight line, the opposite angles are equal
- iv) The angle in a semi-circle is a right angle
- v) The sides of similar triangles are proportional
- vi) Two triangles are congruent if they have two sides and one angle respectively equal (James and Martin, 1972)

He visualized earth as a disc floating on water. He was also the first who started the measurement of the earth and location of things on the face of the earth; thus establishing the mathematical tradition. Not only this, he laid the foundations of empirical studies, that is an explanation can be checked through ground observations and measures; a critique of the traditional unscientific explanations.

Anaximander is credited with the introduction of a Babylonian instrument known as *Gnomon* into the Greek literary world. Gnomon is a pole set vertically above a flat surface on which the varying position of the sun and other celestial bodies could be measured by the length and direction of the shadow cast by the vertical pole. He is even credited to produce a world map to scale. This map is based on the information gathered from the Sumerians who had an archive of pictorial maps. Interestingly, this map has an ocean encircling the world.

World Map as given by Anaximander



Anaximander's Gnomon

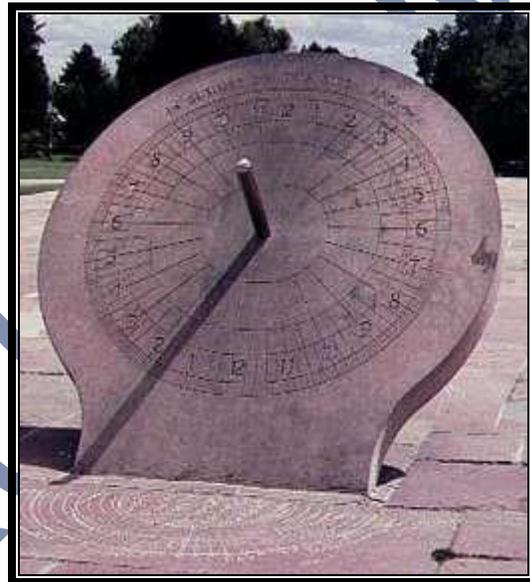


Figure-2

Thales and Anaximander are credited for the initiation of mathematical tradition in geography. The credit for originating the literary tradition goes to **Hecataeus**. He was a Greek scholar of 6th century BC from Miletus (the center of learning in those days). He was a pioneer scholar and one of the earliest writer of Greek prose. He was the first Greek scholar to classify the information about the then known world and brought it to Miletus. His work is known as "*Ges-periodos*" or Description of the Earth. It was the first systematic description of the then known world, that was published by the end of 6th century BC. Ges-periodos describes the places in the vicinity of the Mediterranean Sea which was called as perplus means coastal area.

Hecataeus divided his book ‘‘Ges-periodos’ ’into two parts, part ‘A ’dealing with geographical information about Europe’ and part ‘B’ dealing with Libya. This book is a blend of the literary tradition and the topographical-ecological tradition.

Hecataeus for the first time gave two approaches for the study of geography:

a) Nomothetic or law seeking approach.

b) Idiographic approach (descriptive).

Hecataeus prepared the world map but it was based on the map of Anaximander; he had just modified it. He divided it into two parts by drawing a line passing through Hellespont, the Caspian Sea and Caucasus mountains. The northern part he named as Europa and southern part as Libya that includes Africa and Asia.

The World according to Hecataeus



Figure -3

Herodotus was an outstanding Greek scholar of 5th century BC. There is no exaggeration in the statement to say that Herodotus was the **father of history**. He is credited with the idea that ‘*All history must be treated geographically and all geography must be treated historically*’ (James

and Martin, 1981). He is also identified as the **father of ethnography** as he provided a vivid portrayal of cultural traits of people who were unknown to Greeks. His works were based on his own observations during his travels. He contributed both in physical and human geography. Herodotus came up with the concept that Egypt is the gift of the river Nile where he emphasized that silt and mud of this river lead to the development of Nile delta. It was he who for the first time gave the concept that winds move from cold to hot places. He attempted to measure the age of the earth on the basis of the rate of sedimentation and estimated that one foot of sediment is formed in 880 years. Taking the total sediment strata 158 km thick, Herodotus calculated the age of the earth as 440 million years when the exact age of the earth is 4.6 billion years.

Plato and Aristotle also made valuable contributions in the field of geography. Plato is regarded as the master of deductive reasoning - from the general to the particular. He is considered to be the first scholar who adopted the idea of round earth located in the center of the universe with the other celestial bodies revolving around it in a circular motion (geocentric concept).

Aristotle provided the first paradigm within the theoretical framework that existed in Europe at that time. He emphasized that the observations which were made through the senses do not provide explanations; especially the scientific explanations. He formulated laws or fundamental principles of scientific explanation, which became a guiding force for the scholars in future centuries. He agreed with Plato that the earth is spherical in shape and went a step further by seeking an explanation for the spherical shape. He even contributed to the branch of human geography when he put forward the concept of variations in habitability on the surface of the earth on the basis of latitudinal position. He opined that the regions nearer to the Equator were uninhabitable and named it as the Torrid Zone. Similarly, the parts of the earth which were away from the Equator and were permanently frozen were also uninhabitable – the Frigid Zone. The population of the Earth lived in the Temperate zone which existed between the Torrid and the Frigid Zones.

Eratosthenes has been regarded as the '**Father of Geography**'. He is the one who coined the term Geography, deriving from two words '*geo*' meaning '*the earth*' and '*graphy*' meaning '*to describe*'. He is credited to provide the definition of geography as the '***study of earth as the home of man***'. His outstanding contribution for which he is known throughout the

world is his measurement of the earth's circumference. He has used Thales theorem – When two parallel lines are crossed diagonally by a straight line, the opposite angles are equal - while measuring the earth's circumference (Figure- 4). He has also prepared a world map with respect to correct distance (Figure-5). His remarkable contribution was his text''**Geographica**'' . He also delineated the world into five climatic zones: one Torrid Zone, two temperate zones, and two frigid zones. He also measured different latitudes and longitudes. It is for this reason that Eratosthenes is considered as the *father of "Geodesy"*.

Calculation of the Earth's circumference by Eratosthenes

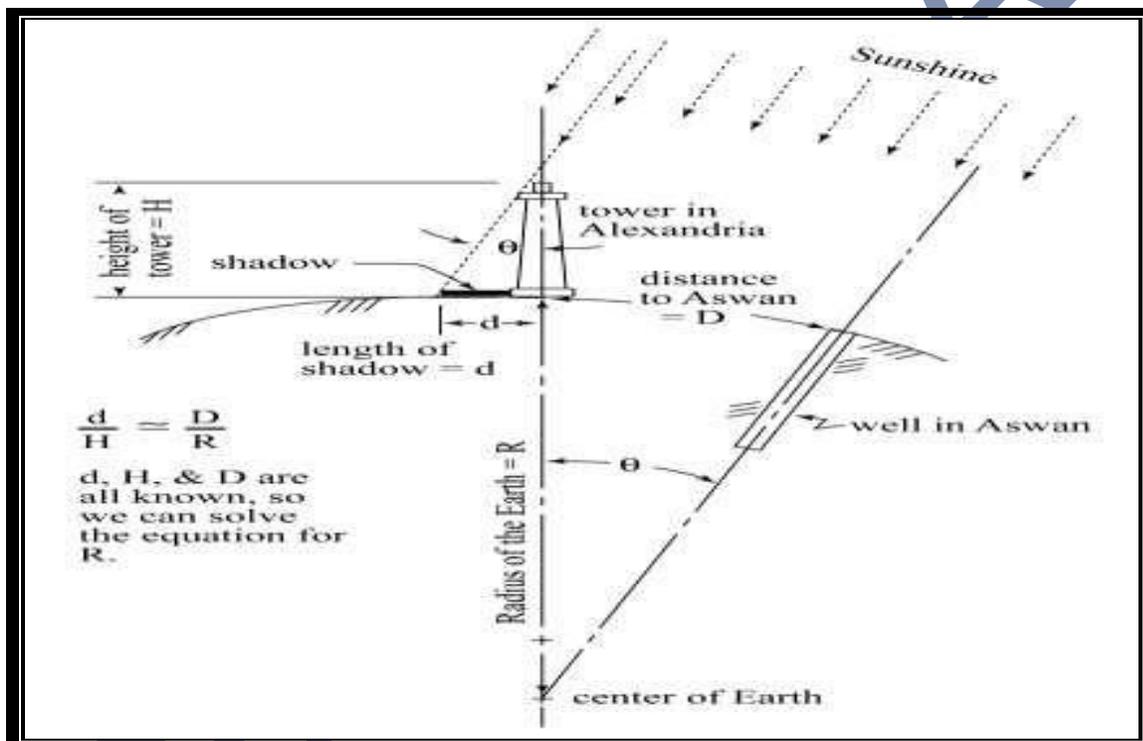


Figure - 4

The World Map of Eratosthenes

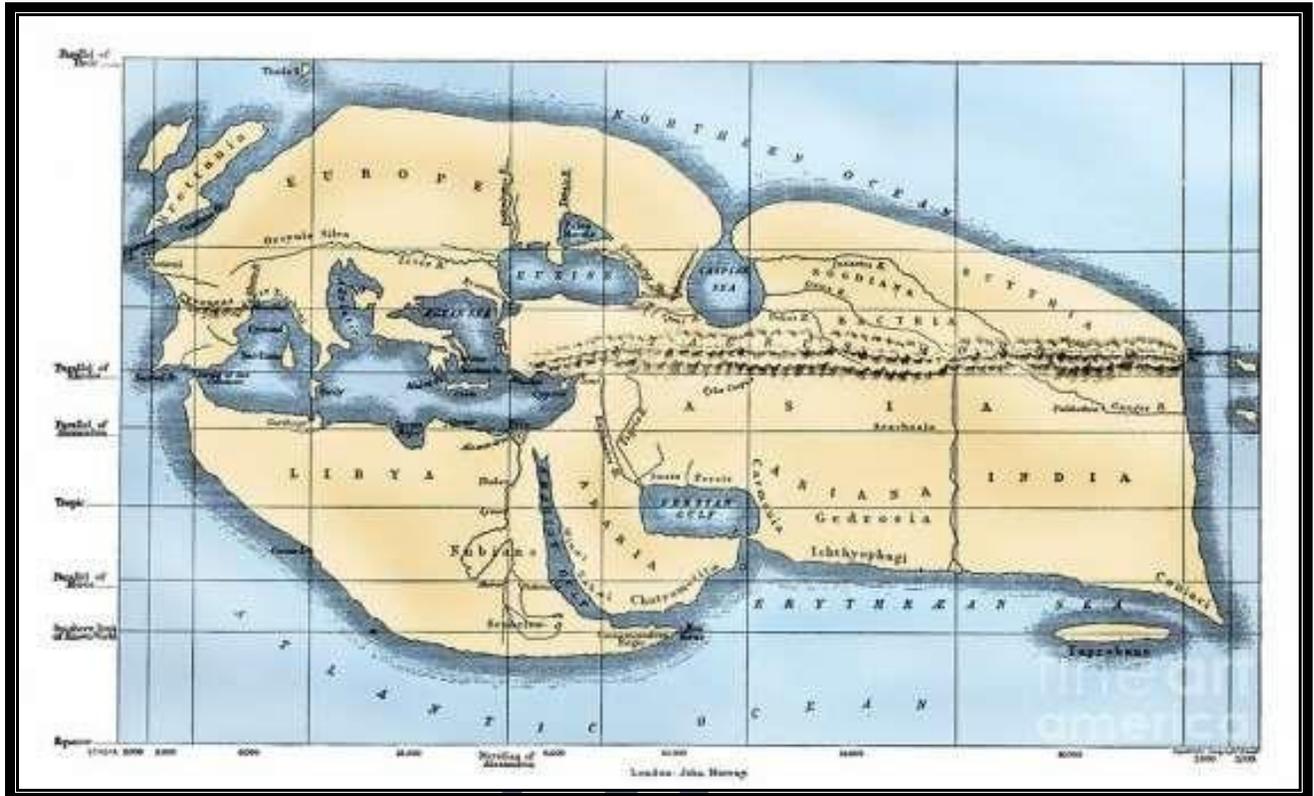


Figure-5

Hippocrates in his book *On Airs, Waters, Places* explained the man-nature relationship in the context of climatic conditions.

Hipparchus established the concept of locating the exact position of each place on the surface of the earth. On the basis of an Assyrian arithmetic, he divided the circle into 360 degrees. He made an attempt of showing the three-dimensional earth on a flat surface. He is credited with devising two projections to do so; these are the stereographic and the orthographic projections. He even pointed out that these projections have their limitations as they can only represent a hemisphere and not the entire world. Thus, he supported and flourished the mathematical tradition of geography. Another important contribution of Hipparchus is the invention of *Astrolabe* – an instrument similar to Anaximander’s Gnomon but easier to handle. Its purpose was to provide accurate measurement of latitude at sea by observing the polestar’s angle.

Another important Greek scholar who deserves mentioning is **Posidonius**. He recalculated the earth's circumference and came to a figure much smaller than that of Eratosthenes (approximately 18000 miles).

Strabo, a Greek scholar and traveler was highly influenced by the historical topographical tradition of former Greek scholars especially Homer, Hecataeus and Aristotle (Adhikari, 2010). He was in acceptance of Aristotle's zones of habitable world – the *Ekumene* (as defined by Eratosthenes). His biggest contribution is his monumental work '*Geographia*' in 17 volumes; a compilation of writings of his predecessors. Out of these 17 books, eight are on Europe, six on Asia and one on Africa (Egypt and Ethiopia). The first two books were devoted to the historical review of the development of geography from the times of Homer.

LECTURE-III

Contribution of Roman Scholars in the field of Geography

The geographical scholarship in the ancient period is incomplete without the advancements made in the Roman Empire. Although Romans did not contribute at such a large scale that it can be compared to the contributions of the Greeks, the writings and the contribution of **Ptolemy** cannot be overlooked. He revived the mathematical tradition of Thales which was long forgotten. For him, geography was *a science of the art of map-making*. This concept was borrowed from the works of earlier Greeks especially Aristotle, Hipparchus, Posidonius and Marinus the Tyre (his teacher). He came up with a monumental work known as "*The Almagest*" – the standard reference for the study of the movement of celestial bodies for a long time.

He even accepted Aristotle's view that the earth was spherical in shape, centered in the universe and remained stationary; the celestial bodies revolving around it in a circular motion. Another significant contribution of Ptolemy was in the field of map making. He improved and modified previous maps by adopting a projection for the world map which had a graticule of meridians of longitude and parallels of latitudes (Figure 6).

The World Map of Ptolemy

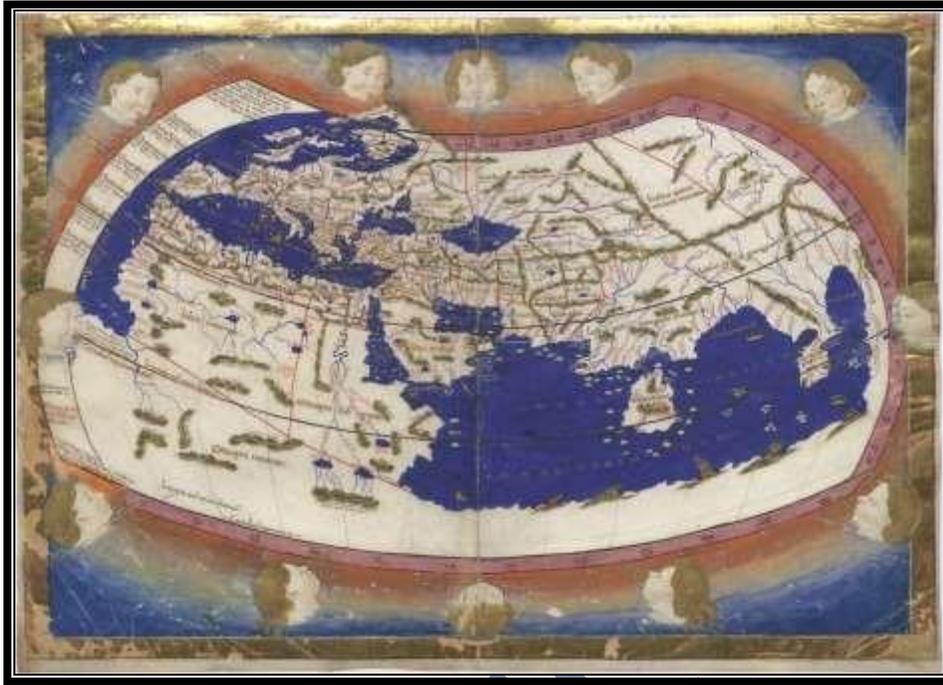


Figure-6

After the completion of the *Almagest*, he started writing *Guide to Geography*, which consisted of eight volumes. In the first volume, he discusses the map projections. In volumes two to seven, he provides a table of latitudes and longitudes so that every place can be given a precise location in mathematical terms. He accepted the idea that the regions near the Equator were uninhabitable because of higher temperatures.

Contributions to various sub-branches of Geography

The knowledge about earth has been there through pre-historic times, though in an elementary manner. Greeks were the first to demonstrate the importance and utility of geographical knowledge to the world. They talked of man-environment relationship and stressed that geography as a discipline provides the best understanding of interdependencies between human beings and nature. As already stated they were the ones who developed the concept of geography as the study of earth as the home of man. They laid the foundations of some basic traditions of the discipline – mathematical and literary. Not only this, they gave the discipline a scientific inclination, by deliberating on both deductive and inductive reasoning. Greeks developed the

framework of descriptive geographical writings which became an essential tool in the coming centuries.

The major contribution of Greeks was in the fields of physical and mathematical geography along with astronomy. Many fundamental concepts have been put forward by them like accurate measurement of the earth's circumference, earth's position in the solar system; the shape of the earth; *ekumene*, habitable regions of the world and so on. In the field of cartography, they brought the first map of the world on paper with the help of projections. Even the philosophical foundations of human geography have their roots in the Greek and Roman scholarship; worth mentioning are the writings of Strabo who laid the foundation of chronological paradigm in geography - the regional approach- when he concentrates on different parts of the earth in 17 volumes of his book *Geographia*. Similarly, Ptolemy's *Guide to Geography* written in 8 volumes laid the foundation of a comprehensive view of the world.

Conclusion

It would be right to conclude that the Greek and Roman scholarship laid the base of scientific geography which left its imprints for centuries to come. The impact is so huge that after the death of Ptolemy it left a vacuum in the history of geographical thinking. As James and Martin (1981) have rightly remarked that after the death of Ptolemy, the geographic horizons that had been widened both physically and intellectually by the Greeks and Romans closed in again. It took many centuries before the effort of describing and explaining earth as the home of man got the attention of geographers.

LECTURE-IV

Contributions of Arab Geographers

Introduction

Muslim geographers in the medieval period made valuable contributions to the geographical thinking unlike their Western counterparts. They are remembered for the concepts, paradigms and theories which still are of vital importance even in present times. The base their knowledge was much wider and enriched than the Christian scholars. Their interest in geography was the product of their geographical surroundings; though it was purely theological in perspective. The

rise and spread of Islam from 7th to 14th century further widened their horizons as Muslims started travelling across the world either for religious or economic reasons.

In the field of geography the Muslim scholars have made significant contributions in the fields of mathematical, physical, and regional geography. Their knowledge was based on the information gathered on the works of Greeks and other oriental civilizations. Through these observations and analytical reasoning they made noteworthy interpretations on different phenomenon occurring over the surface of the earth especially in the fields of climatology, geomorphology, cartography (determination of cardinal points) and so on. Muslim geography flourished in the city of Baghdad and it became a centre of learning for more than a century.

Historical Background

Most of the Muslim geographers like Al- Maqadisi (945-1000 AD) followed the scientific method while compiling their works. There were three main sources of information, namely, the relevant available literature, personal observations made during their own travel and the information gathered from reliable persons about the lands for which the other two methods were not enough. They were passionate for travelling which is evident from the fact that they believed in collecting information themselves. Examples may be cited of Al-Idrisi's (1100-1166 AD) travels in south, north and west Europe, Ibn Hauqal's (943-969 AD) journeys to eastern part of Europe, Al-Biruni's (973-1050 AD) travels in India, and finally Ibn Battuta's (1304-1368 AD) travels which covered faraway places like India and China along with the entire Muslim World. Ibn Battuta's travels in Africa took him as far south as Timbuktu on the river Niger (Schoy 1924; Ahmed 1947; Al-Shargawi 1968; Khasbakh 1971; Kish 1978; Al-Feel 1979; Al-Naggar and Al-Difa'a 1988).

One of the most important characteristic of Muslim scholars was that they brought comprehensiveness within the geographical thinking. The idea of specialization was not there as most of the writings are related to both physical and human geography; they also include facts on history, religion, philosophy, customs, dress and diets. The works of only two Arab geographers can be described as being highly specialized, namely, Al-Dinawari's (d. 805 AD) work on

climatology, and AlAsma'ai's (d. 739?) book on plant geography. The Muslim geographic thought that evolved during the Middle Ages can be viewed from two perspectives. In the first case the contributions in geography were highly influenced by the works and writings of oriental civilizations namely Persians, Indians and Greeks. The second perspective holds more importance as here the purpose was not only to correct the wrong concepts passed down from previous civilizations but also make their own innovative contributions. Apart from making wonderful advancements in the field of astronomy and mathematical geography, Muslim geographers even investigated new branches of geography like urban, religious and linguistic geography.

Prominent Arab Scholars

The Muslim scholars in the middle ages made remarkable contribution to the geographical scholarship. Their contribution is of such an importance that some of the theories and concepts given by them still hold an important place in the philosophy of geography. As already stated that the scholars of the Muslim world had more wider and enriched horizons the information thus provided was more realistic in nature; this becomes more important as during middle ages the Christian world was undergoing one of its darkest period and where no new substantial advancement was made. Some of the major contributions of the Muslim scholars have been discussed here.

These scholars have made remarkable observations in the field of physical geography especially climatology. To start with, reference can be made of **Al-Balkhi** who collected climatic data from the accounts of various Arab travelers and prepared the world's first climatic atlas based on that data entitled *Kitab-Al Ashkal* in 921.

Al-Masudi was another important scholar who hailed from Bagdad. He was a geographer, a historian a world traveler and a prolific writer .He wrote on diverse themes and his important works include *Mehraj-al-Duhab*, *Kitabul Aswat*, *KitabAkhbar-Zaman*. Al-Masudi described the weather conditions of the places he visited or sailed through and also pointed out that the salt in the seas comes from the land. In the field of study of landforms he appreciated the role of process of erosion and adjustment of streams to structure in the evolution of landforms.

He had a clear idea of the spherical shape of the earth. In the field of human geography he tried to study the relationship between human beings and the environment and explained the impact of environment on the mode life and attitude of people (environmental determinism). He even divided the world into seven regions on the basis of language.

Al-Biruni was a Tajik by race and a Persian by culture; his main interests include astronomy, mathematics, chronology, physics, medicine and history. He was a prolific writer; books include *Kitab-al-Hind, Al-Qanuan-Almasudi and Tarikul Hind*. *Kitab-al-Hind* (1030) is regarded as his monumental work which deals with the geography of India. He describes the processes shaping the landforms under normal conditions and even identifies the significance of rounded stones in the alluvial deposits in the southern part of the Himalayas. He mentioned that the distribution of rainfall in the peninsular region is controlled by the eastern and western Ghats. He provided detailed information about the source of Indus and explained the phenomena of floods in its basin. He gave the description of the city of Qannauj. He has provided an accurate account of the seasons of India describing the nature of monsoons. He had also studied Indian culture and Hindu beliefs.

In his astronomical writings he discussed and approved the earth's theory of rotation on its axis and correctly calculated the latitudes and longitudes of many places. He provided his views on the origin of universe in his book *Al-Tahidi*. He explained the phenomena of solar and lunar eclipses. He also attempted to measure the longest and the shortest distance of the moon and the sun from the earth. He studied the relationship of tides with the phases of moon. In geomorphology he compared the fossils discovered in the plains of Arabia, Jurjan and Khwarizmi along the Caspian Sea and suggested the occurrence of sea at these places in the earlier times. One of the most interesting observations made by him is that "*at the south pole the night ceases to exist*" (Adhikari, 2010).

Another scholar who is credited to have made significant contribution to geomorphology is **Ibn-Sina**. He gave the idea of landscape erosion when he observed that the streams cut down their valleys when flowing down the mountains.

He further states that these streams worn down the mountains in a slow but steady process. He even examined the presence of fossils in the rocks in higher mountains.

Al Idrisi was a leading scholar of the 12th century. His most important and famous book was *Amusements for Him Who Desire to Travel Around the World (1154)*. His world map is considered as his most important contribution to geography.

His map was based on a rough rectangular projection. He had studied Ptolemy's work. His description of Sicily is perhaps the most detailed one and it is of great historical importance. Al Idrisi travelled over a great part of world including Spain, France, England, Sicily, Morocco, Asia Minor and interior parts of Africa. He described the course of many rivers including the Danube and Niger with precision.

He did not agree with the Greek's classification of the world into five climatic divisions and provided a more sophisticated classification based on climate.

Ibn Batuta was the greatest Muslim traveler of his time. He spent 28 years in travel and crossed a distance of more than 75000 miles. His primary interest was in people though he has described the physical conditions of various regions that he visited. His description of house types and building materials in deserts is very interesting and informative. Through his experience he labels Morocco as the best of the countries. His book *Rihlah* provides an insight into the soils, agriculture, economy and political history of the then Muslim world. He came to Delhi on an invitation of Mohd. Tughlak and served as a Qazi of Delhi.

Ibn Khaldun was basically a historian but his writings also have been important as they were based on travel. His most important work is known as *Muqaddimah*. In his writings, Ibn Khaldun has maintained that the northern hemisphere is more densely populated than the southern. He stated that the population along the equator is sparse, but there is an increasing concentration away from it up to 60 degrees. Further away there is little or no population. He emphasized the role of fertile land in the origin of settlements. He has argued that the origin of the large cities have always been in the form of small settlements. Ibn Khaldun is considered as one of the early environmental determinists as he tried to correlate man and his environment in a scientific way. He is also credited of establishing political geography in the middle period where he discusses the rise and fall of dynasties and empires. He formulated the first concept of life-cycle of the state. In the words of Kimble (1938) "*Khaldun may be considered to have discovered the true scope and nature of geographical enquiry but the fact remains that his*

knowledge of the physical earth is based largely on Greek theory; and his ideas about environment influence are not highly sophisticated.”

The period from the fifth and fifteenth centuries was remarkable as several concepts and theories were firmly established. There were improvements in the art of navigation which set the next step for the discovery of the world.

LECTURE-V

Contribution of Arabs to different branches of Geography

On the whole, it may be said at the outset that Muslim geographers paid less attention to the physical aspects of geography as compared to the human ones. Nevertheless, there was reference to landforms, oceanography, climatology and biogeography (James and Martin 1981). Here we will discuss their contributions to the various fields or sub-branches of geography.

a) MATHEMATICAL GEOGRAPHY

The Arab scholars were highly influenced by the Greek ideas about the shape and size of the earth. They considered the Earth as the centre of the universe, around which the seven planets revolved. They made use of the Ptolemy's prime meridian to calculate time and longitudes. This meridian was considered to pass through the Fortunate Islands, Abu Mashar. These scholars made use of the shadow of the sun to determine latitudes; when the shadow happens to be on the meridian. Al Battam is said to have measured the earth's circumference as 27,000 miles.

b) PHYSICAL GEOGRAPHY

In physical geography they have made significant contributions to climatology, geomorphology, oceanography and bio-geography. Each one of these are discussed here.

i. Climatology

The first climatic atlas is credited to Al-Balakhi who gathered climatic data and information from Arab travellers and prepared the first climatic atlas of the world— *Kitab-ul-Ashkal* (921). One of them divided the world into 14 climatic regions. His name is Al-Maqdisi who also presented the

idea that the southern hemisphere was mostly an open ocean and most of the world's land area was in the northern hemisphere. The doctrine of environmental determinism found roots in the writings of Ibn-Khaldun, Al-Beruni and Al-Masudi who described the influence of climatic conditions on the lifestyle of the people. Ibn-Khaldun further opined that people residing in the warmer parts of the earth were more passionate. He related the dark skin colour of the Negroes with the location of their habitat in the warmer region. Al-Masudi described Indian monsoons and even elaborated the factors like location, height above the sea level, setting of a place with accordance to mountains or sea and soil type all play a decisive role in the weather and climate of a particular area. Geographers like Al-Istakhri, Ibn Khordadbeh, and Al-Maqadisi divided world into different climatic regions using the temperature and rainfall indices.

ii. Geomorphology

Al-Beruni in his Kitab-ul-Hind opined that the stones became round because they had fallen along torrential mountain streams. He also discovered that alluvial soils became finer in texture farther away from mountains. Ibn Sina keenly observed the works of agents of denudation and ascertained that mountain streams erode the slope; the highest peaks occur when the rocks are especially resistant to erosion; the mountains are immediately exposed to the process of wearing down as soon as they rise up. Al-Maqadisi (945-1000 AD) in his book: "The Best Divisions for the Classification of Regions" divided Syria into four geomorphological zones running parallel to the Mediterranean Sea as follows:

1. A sand plain running close to the sea.
2. A mountainous area with vegetation cover and settlements
3. An area of lowlands and depressions with deep river valleys (part of the rift valley) having settlements.
4. An area of cold high mountains where 'Bedouins' lived.

Al-Masoudi (895-957 AD) refers to the changing relationship between land and sea. He even talks with reference to a 'geographical cycle' and categorically identifies three stages of rivers - youth, maturity and old-age. He further establishes his point by stating that these three stages are similar to those found even in the lives of plants and animals.

iii. Oceanography

The most outstanding contribution in the field of oceanography was that the Arab scholars proved that the main reason for tides was the gravitational pull of the sun and the moon. This observation was done by Al-Qazwini. Al-Masudi noted that due to the presence of vegetation and salinity the colour of the ocean water varies from place to place.

iv. Biogeography

Abu Zeid Al-Ansary (732-825 AD), Abu Said Al-Asma'ai (740-828 AD), Ikhwan Al-Safa', and Al-Qazwini. Al-Asma'ai are some of the noteworthy Arab scholars who contributed in the field of plant and animal geography. Al-Qazwini even made an attempt to classify and distribute the natural vegetation of the Arabian Peninsula.

c) HUMAN GEOGRAPHY

The branch of Human geography interested Arab geographers, and they made contributions to almost all the sub-branches of human geography, that is, cultural, urban, medical, economic and so on.

i. Cultural Geography

Ibn Khaldün divided the population of the world into two categories - nomadic and sedentary; and argued that nomadic life preceded sedentary life of human beings. Scholars like Al-Maqadisi and Al-Istakhri wrote how physical characteristics of man especially their physique, colour of the skin, temperament, and costumes differs from region to region. Al-Maqadisi along with Al-Hamadani even made reference of the fact that in Arabia people spoke different dialects. Ibn Khaldün in his book relates that as the Arabs started travelling they blended with the non-Arab communities which resulted in the distortion of their language – Arabic. Some scholars also studied the distribution of other languages in other regions especially Persia.

ii. Urban Geography

In the field of urban geography these scholars diverted their attention to the studies of urban settlements. They related the concepts of site and situation and even tried to classify towns and cities on the basis of their size. Al-Khwarizmi in his book 'Surat Al-Ard' or 'Description of the Earth' (d. 850 AD) fixed the coordinates for nearly 539 towns. In another monumental work,

Al-Bakri (1040-1094 AD) came up with a geographic dictionary of place names where he notes down approximately 5200 sites. Some Muslim scholars like Al-Qazwini (1208-1283 AD) and Ibn Khaldün (1332-1406 AD) wrote on the relationship that existed between environmental conditions and health in relation to the establishment of new settlements. These scholars also directed their attention on the morphology of urban settlements especially with regard to the internal structure of the towns. The functions of these settlements have also been dealt with. Al-Maqadisi even identified a hierarchical order in his discussion on the settlement system; this was with respect to the size of the settlements. He stated that very large urban centres or capital cities were like Kings while the regional centres were like ministers. He also provided detailed writings on the cities of Makkah, Taif and Jerusalem. One of the works that needs special mention in this field is the model proposed by Al-Qazwini (1208-1283 AD) for the city of Qazwin in Persia.

iii. **Economic Geography**

Ibn Khaldün made an attempt of defining trade; he stated that it is the act of making profit by buying goods at low prices and selling them at higher prices. Writings also covered famous marketing centres at the local, regional and international levels. Writers gave accounts of the goods that entered into commercial transactions and the routes used for their delivery. There was also reference to the currencies, and the measures and weights in use (Muhammadain 1981, 1984)

iv. **Medical Geography**

Another branch in which the Arab and Muslim geographers of the Middle Ages made valuable contribution is the medical geography. Large part of their writings is related to the study of diseases and their occurrence in various regions. Many of them believed that there exists a positive relationship between disease and climate. Yaqüt Al-Hamawi (1179-1229 AD) stated those practicing medicine should have sufficient knowledge about their geography as well. Al-Maqadisi noted that the inhabitants of Baghdad had a low rate of life expectancy. The name of Al-Nuwairy (1287-1342 AD) needs to be mentioned as he identified the places that were known for poisonous animals like snakes and scorpions and also such places where carriers and vectors of disease such as rats, mice, fleas, ticks and flies were found in large numbers. The contribution of these scholars in the pharmacological studies cannot be ignored, they wrote extensively on the

extraction of medications from herbs and plants. (Muhammadain 1981, 1984; Al-Naggar and Al Difa'a 1988).

Conclusion

The above account clearly shows that the Arab and Muslim geographers had contributed in a considerable way to geographical scholarship. The Muslims had more advanced culture than did most of medieval Europe, and had made great discoveries in various fields of study (Hasan 1967). They preserved many of the writings of ancient Greek, Roman and other oriental civilizations and made use of them to enrich their knowledge.

To sum up, one can say that the contributions of Arab and Muslim geographers gave a better understanding to the geographical thought and broadened its horizon as number of sub-branches like regional geography, mathematical geography and surveying developed. Most of the works of the scholars of the Middle Ages were comprehensive in nature as they covered almost all aspects of both physical and human geography.

LECTURE-VI

Impact of Dark-Ages on Geography

The **Dark Ages** is a term often used synonymously with the Middle Ages. It refers to the period of time between the fall of the Roman Empire and the beginning of the Italian Renaissance and the Age of Discovery. Many textbooks list the Dark Ages as extending from 500-1500 AD, although it should be noted that these are approximations.

The term Dark Ages was coined by an Italian scholar named Francesco Petrarch. Petrarch, who lived from 1304 to 1374, used this label to describe what he perceived as a lack of quality in the Latin literature of his day.

Other thinkers came along and expanded this designation to include not only literature, but also culture in general. The term, thus, evolved as a designation for the supposed lack of culture and advancement in Europe during the medieval period. The term generally has a negative connotation.

Debate continues to rage among historians over whether the Middle Ages were, indeed, dark or not. Increasingly, many scholars are questioning whether the term Dark Ages is an accurate description or not.

The ancient Greek and Roman civilizations were remarkably advanced for their time. Both civilizations made a number of contributions to human progress, notably in the areas of science, government, philosophy, and architecture. Some scholars perceive Europe as having been plunged into darkness when the Roman Empire fell in around 500 CE. The Middle Ages are often said to be "dark" because of a supposed lack of scientific and cultural advancement.

The decay and disintegration of the Roman Empire led to the decline in literature, science, and explorations in the European and South-West Asian parts of the world. This, however, does not mean that geographical knowledge at that time did not flourish in China, India and South-East Asia.

The period of about five hundred years, i.e., 200 A.D. to 700 A.D., which followed the publication of Ptolemy's "The Guide to Geography" was an age of complication, turmoil and abridgement. During this period, not a single work of originality in any field of the sciences and humanities was written. There was continuous deterioration, both in the theory of geography and the practice of exploration from the glories of the Greek and Roman periods.

Most of the correct classical concepts were forgotten and old errors reappeared about the map of the world and the habitable parts of the globe. Firmianus (260-340 A.D.), one of the leading protagonists of Christianity, denied the concept of a spherical earth. The interpretation of the nature of the universe reached its fullest expression in the work of Cosmas of Alexandria (600 A.D.). His book "Christian Topography" written about A.D. 550, refuted all the pre-Christianity views on geography. He worked out on earth modelled in all respects upon „Moses Tabernacle“. Cosmas, who was a merchant in early life, travelled fairly widely.

During the period of Christian Europe, there was a deterioration in the art of map-making. The fairly accurate delineations of the better-known coastlines of the Greco-Roman period were lost, and instead maps became purely fancy. This was the period of the so-called TO maps. Completely dominated by Christian supernaturalism, the map-makers of Dark Age made no

serious attempt to show the world as it actually is. Instead, Firmainus followed an ideal pattern in his own mind, concentrating on artistic and symbolic expression.

About the Dark Age, the German scholar Schmid summarizes as New countries were not discovered; the empire became smaller not greater; trade relations, thanks to the war in the east, the south and the north, became more and more restricted; besides, there was no longer any question of research in industry and of the spirit of discovery. Thus, the only books that were put together were compilations from older works

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