ARAB GEOGRAPHY

Arab geographers in the medieval period preferred to *formulate their concepts as generalisations of empirically observed facts* and insisted on the importance of direct observation. Unlike their counterparts in the Christian world, they made valuable contributions to geographical knowledge, though some Arab scholars made logical deductions from existing theories and their conclusions conformed to near realities. They would be long remembered for some of their concepts, models and paradigms which still govern the method of geographical teachings.

It would be appropriate to have a brief outline of the driving force which seemed to have enriched and widened the Arab geographic horizon between 800 and 1400. The geographical writings of the period were based on a much greater variety of sources than those of Christian scholars. The spread of the Arabs in the medieval period was one major event that enlarged and widened the geographic horizon of the religion of Islam. Islam became the 'raison d'etre' of the Arab world because it commonly held together the Arabic-speaking people of Arabia who were previously grouped in small isolated wandering tribes and had no feeling of unity.

The followers of Islam embarked on a conquest of the world outside Arabia. In 641, they conquered Persia and, in 642, they took control of Egypt.

They moved across the Sahara and by 732 took possession of the Great Desert. They marched through the Iberian Peninsula into France. For some nine centuries, the Arabs had ruled most of the Iberian peninsula. Arab rule was also extended eastward into India and eventually to some of the islands of south-east Asia. The Arabs organised military expeditions across the Black Sea into the Russian Steppes. Successive military expeditions in Europe, North Africa and Asia helped them to acquire stimulating knowledge about the land and people they conquered, and to unfold the ancient Greek tradition in geographical scholarship preserved at the museum in Alexandria.

Arab geography flourished in the city of Baghdad which was founded by the Arabs near the ruins of Babylon in 762, and for more than a century it was the centre of the intellectual world. Baghdad may be compared with the Greek intellectual centre, Miletus, which remained a centre of academic innovations between 770 and 570 BC.

With the patronage of the caliph Harun al-Rashid, a project was started for the translation of the works of the Greek philosophers and scholars into Arabic. Materials pertaining to geographical ideas were collected from all available sources, and the translators were paid the weight of their books in gold (Ahmed, 1947, 5). From Baghdad, therefore, a flood of new ideas from varied sources began to spread throughout the Arab world. Eventually, the innovations were carried forward into Christian Europe as a result of Latin translations from Arabic.

Among other innovations was the use of the decimal system in arithmetic, which was brought into Baghdad from the Hindus, who learnt if from the Chinese. It is equally important to note that the Arab geographers/scholars showed a genuine fascination for Greek traditions and concepts rather than for the Roman heritage. They preferred to adopt the Greek concepts about the shape and size of the Earth and conceived of the Earth as being located at the centre of the universe with the celestial bodies in circular motions around it.

At the direction of Al-Mamum, the scholars of the Baitul-Hukma (Academy) attempted to recalculate the circumference of the Earth. They made use of the same method as devised by Eratosthenes some ten centuries before. On the level plain of the Euphrates they set up a north—south line and fixed the latitude at either end by observations of the stars. They then measured the distance between the fixed points and decided that the length of a degree was 56-2/3 Arabic miles. The scholars attempted several other measurements, but arrived at almost the same results. These values were much too small, owing to errors in the linear measurements. The circumference of the Earth was, thus, found to be 20,160 miles, much less than what Eratosthenes had calculated. The Arabs assumed that the Mediterranean Sea defined the western limit of the known ekumene while the eastern limit was defined by Sila (Japan).

The Arabs in medieval Arabia had access not only to translations from Greek, but also to the reports and accounts of their own travellers. As a result, they had a much more accurate knowledge about the world than their counterparts. One of the earliest Arab traveller was Ibn-Haukal who travelled through some of the most remote regions of Africa and Asia. He sailed along the east African coast to a point some 20° South of the equator. To his surprise, he found people in large numbers living in those latitudes. This observation made him discard the Greek view that the equatorial torrid parts were uninhabited. In spite of this observation of Ibn-Haukal, the Greek concept of the habitable zone persisted for a longer period and appeared in different forms.

Arab scholars in the early medieval period made *substantial contributions to the field of climatology and physical geography* and some of their concepts still have relevance in modern geographical thinking; They made some important observations regarding climate, and processes shaping landforms. In 921, **Al-Balkhi** collected information regarding climatic data from the accounts of different Arab travellers who made direct observation in course of

their expeditions and journeys. On the basis of the collection of climatic data, AI-Balkhi prepared the world's first climatic atlas Kitab al- Ashkal.

Al -Masudi, who was born in Baghdad towards the end of the ninth century and died in 956, had gone south as far as Mozambique, south of the equator, and prepared a very good description of the monsoon. His concept regarding the monsoon seemed to have been formulated as a generalisation of empirically observed facts of the climate he witnessed during his voyage along the east African coast. He described the evaporation of moisture from the water surfaces and the condensation of the moisture in the form of clouds. He had a conception of the sphericity of the Earth and believed that the surface of the Earth must be curved. He provided description about the effect of environment on the mode of life and attitudes of people, and held an opinion on environmental determinism (Husain, 1988, 91).

In 985, **Al-Maqdisi** prepared a new climatic map of the world with 14 climatic regions which was an improvement over the map of Al-Balkhi. Al-Maqdisi was of the opinion that climate varied not only as regards latitude, but also according to east and west position. He also presented the idea that the southern hemisphere was mostly open and that most of the world's land area was in the northern hemisphere.

If Al-Balkhi, Al-Masudi and Al-Maqdisi could be known for their contribution to climatology, then **Al-Biruni** and Ibn-Sina would be known for their *contributions to geomorphology.* AI-Biruni, who had been to India during the time of Mahmud Ghaznavi, prepared his great geography of India 'Kitab-al-Hind' in 1030. The book deals with the processes shaping land forms under normal conditions. He identified the significance of the rounded stones he observed in the alluvial deposits south of the Himalayas. The stones became rounded, as they were rolled along in the torrential mountain streams. He also observed coarse alluvial materials near the mountain and finer alluvial materials farther away from the mountain. One of the interesting observations credited to him is that '*the south pole night ceases to exist*'—an information which he probably collected from the accounts of those explorers who might have voyaged to the far south before the eleventh century.

Avicenna or **Ibn Sina** is credited with the idea of *landscape erosion.* He had the opportunity to observe mountain streams in the act of cutting down their valleys in the mountains of central Asia. He deduced a hypothesis on the basis of this observation that mountains were being constantly worn down by streams, and the highest peaks occurred where the rocks were especially resistant to erosion. Mountains are raised up and are immediately exposed to this process of wearing down, a process that goes on slowly but steadily. Ibn Sina also observed the presence of fossils in the rocks in high mountains, which he interpreted as examples of nature's effort to create living plants or animals that had ended in failure. It was eight centuries later that James Hutton presented similar ideas concerning the process of erosion. He had probably never heard of Ibn Sina, and could not read Arabic.

It was **Al-ldrisi** or **Edrisi** who for the first time made extensive corrections of the erroneous ideas of the Roman geographer Ptolemy. AI-Idrisi was of the opinion that there were uncertainties concerning the actual arrangement of mountains, rivers, or coastlines. On the basis of much new information, he was able to prepare a new geography. In 1154, he produced a book with the title *Amusement For Him Who Desires to Travel Around the World*, in which he corrects the idea of Ptolemy regarding an enclosed Indian Ocean, and the idea of the Caspian Sea as a gulf of the world ocean. He also makes correction of the courses of rivers, including the Danube and the Niger, and the alignment of several major mountain ranges. He had shown that the Greek division of the world into five climatic zones did not correspond to reality and suggested a more sophisticated world climatic system (Holt-Jenson, 1981, 11).

One of the great travellers of the medieval Arab world was **Abdullah Muhammad** surnamed

Ibn-Batuta. He was born at Tangier in 1304, and at the age of 21 in 1325, went out to make the usual pilgrimage to Mecca where he proposed to complete his studies of the contemporary Arab law. But his interests focused on the land and people of North Africa and Egypt which he passed through to reach Mecca. He was so fascinated by nature that he decided to give up his study of law, and switched over to travelling across the then Arab territory. He carefully avoided following the same route twice. He went to many parts of Africa never before visited by any person. He sailed along the Red Sea, visited Ethiopia, and then moved southward along the coast of East Africa as far as Kilwa, nearly 10°S of the equator, where he learnt of an Arab trading post at Sofala in Mozambique, south of the modern port of Beira and more than 20° south of the equator. His visit to the south of the equator confirmed what Ibn-Haukal had implied in the tenth century that the torrid zone in East Africa was not torrid, but it was occupied by a large native population that justified the raison d'etre of Sofala.

From Mozambique, Ibn-Batuta again sailed for Mecca, and after a brief stop at Mecca, he again left for journeys to Baghdad and Persia, and the land around the Black Sea. He travelled across the steppes of Russia and then went to Bukhara and Samarkand. He crossed the Asiatic mountain through Afghanistan and moved into India. He was in the court of the Mongol emperor in Delhi for several years and had the opportunity to travel widely in India. The emperor appointed him as ambassador to China, but certain reasons delayed his reaching China on time. However, before going over to China, Ibn-Batuta visited the Maldive Islands, Ceylon, Sumatra, and eventually went to China where he stayed for a shorter period. He finally left India and in 1350, returned to Fez the capital of Morocco. In 1351, he made a trip to Spain, and again came back to Fez. During 1351–53, Ibn-Batuta travelled across the Sahara and reached Timbuktu on the Niger river, gathering important information about the culture traits of Arab Negro tribes living in that part of Africa. In 1353, he finally settled at Fez, where at the Sultan's command, Ibn-Batuta devoted himself to writing a lengthy account of his travels (Ibn-Batuta, 1358). During some thirty years, he visited a linear distance of about 75,000 miles, which in the fourteenth century was world record. Unfortunately his book, written in Arabic, made little impact on the Christian world as no attempt was made to translate it into Latin.

The last great Islamic geographer of the medieval period was **Ibn-Khaldun** (writing between 1382–1405). He established the foundation of political geography in those of his writings which analysed the rise and fall of the empires. Like Ibn-Batuta, he was born on the Mediterranean coast of north-west Africa. He spent most of his life in the cities of what is today Algeria and Tunisia and also for a time in the Arab part of Spain. In 1377, when he was 45, he completed a voluminous introduction to his world history, known as Muqaddimah (or, Introduction to History). It is the most detailed autobiography available in the medieval Arab history and reflects among other things the politico-geographical thinking of the late fourteenth century Arab world. The book begins with a discussion of humankind's physical environment and its influence, and points out the characteristics of humankind's that are related to her/his culture or way of living rather than to the environment.

Ibn-Khaldun concentrated on the most powerful units in the political hierarchy of his own times—the tribe and the city which were epitomised in the struggle between nomadic and sedentary states. Both Bedouins (nomadic or savage) and urban (sedentary) peoples were considered 'natural' and interrelated groups. He explained their differences deterministically in terms of choice of livelihood: agriculture and animal husbandry necessitate desert life, while commerce and industry demand an urban location. Both groups, however, were held to be related on the evolutionary scale, with the Bedouins of the desert preceding the urban folk. The latter, descendants of immigrant nomads, had reached the last stage of civilisation in their cities and hence were at the point where decay sets.

Ibn-Khaldun also discussed the group's functioning in space, and it is here that the *nature of environmental-political relation and of territoriality* come into play. He suggested that the qualities of courage, alertness and loyalty prevailed among the Bedouins, but the sedentary people by contrast represented immobile concentrations of wealth, lack of courage, loyalty, common lineage and tribal cohesion. Hence, the sedentary states had to develop new and complex systems of political organisation for security against attack and for their own self government. Where contiguous, the two types of socio-political organisations were interdependent, not only in an evolutionary sense, but also functionally. However, the sedentary state dominated in this functional relationship both economically and politically.

Ibn-Khaldun was of the opinion that war-like nomads often founded large states, but after a while the nomads were absorbed by their permanently settled subjects as peasants and townmen, the rulers lost their warlike spirit and eventually their kingdoms collapsed. He both predicted and lived to see the collapse of the Islamic state he lived in.

At the fall of Damascus in 1400, he actually met Tamerlane, the conqueror and devastator (Holt-Jenson, 1981, 11–12). Ibn-Khaldun is credited with having *formulated the first concept of the life cycles of the State* which still holds some relevance in tribal Africa and Asia.

Though his generalisations with regard to the Bedouin and sedentary states/political organisation were based on the empirically observed facts, his views on the ekumene and other aspects of the climatic determinism seemed to have been deduced from the earlier Greek notions.

He accepted the traditional *seven climatic zones* running parallel to the equator. He repeated the idea of Aristotle that 'there existed an uninhabitable zone along the equator because of intense heat, and an inhabitable polar zone because of cold' (a view he borrowed from the Norsemen). Ibn-Khaldun shared the view of Albertus Magnus and pointed out that the people turned black when they lived too close to the Sun, and when the black people moved to the temperate zone they gradually turned white or produced white children. 'Ibn-Khaldun may be considered to have discovered the true scope and nature of geographic inquiry, 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' (Kimble, 1938, 180).

CHINESE GEOGRAPHY

The Chinese had a rich tradition in geography, and the heritage that developed in the ancient Chinese world of geographic horizon, seemed to have been passed on to succeeding scholars. The Chinese paradigm in the medieval period was also concerned more with observable things and processes and with the formulation of theory. This is evident from the view of the Chinese geographer **Shen Kua** who presented an idea in 1074 about the erosion of mountain: 'considering the reasons for these shapes, I think that (for centuries) the mountain torrents have rushed down, carrying away all sand and Earth, thus leaving the hard rocks standing alone ... standing at the bottom of the ravines and looking upwards, the cliff face seems perpendicular, but when you are on the top, the other tops seem on a level with where you are standing. Similar formations are found right upto the highest summits.'

The Chinese had a *rich tradition in the art of map making* which seems to have been inherited by the scholars of medieval China. Two beautiful examples of Chinese maps were carved in stone in 1137 AD based on data that probably had been surveyed before 1100 (Needham and Ling, 1959, 547–48). The first map entitled 'A Map of China and the Barbarian Countries', shows a wider area extending from the Great Wall of China north of Peking, southward to the island of Hainanand westward to the mountains of inner Asia. The second map, known as 'The Map of the Tracks of YU the Great' covers essentially the same area, but is even more accurate in showing the courses of