

Introduction to Muslim Geography

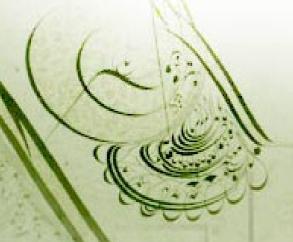
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INTRODUCTION TO MUSLIM GEOGRAPHY

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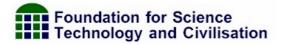
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Muslim geography is a subject that has been vastly explored by scholarship. The rich bibliography attests to that.¹ The best work in the field, however, and strangely enough, is the least publicised. Indeed, I.Y. Kratchokovsky's work has had extracts only translated into French, but nothing from it exists in either Arabic or English.² It is 919 page long, covering the works of 260 Muslim geographers, and includes a bibliography of 54 pages, a so thorough work that has taken its author forty years to complete. `A work of a lifetime gifted to us,' says M. Canard in his review of Kratchokovsky's work³

Islamic geography includes many branches. Amongst these are mapping, travellers' descriptions of lands and regions they pass, geodesy, maritime exploration etc... Because of this diversity and vastness, this subject will be divided into sub sections. The following will deal with the descriptions made by Muslim travellers and geographers of lands and countries they passed through. Such accounts are the first of some places that include China, where the Muslims preceded Marco Pollo by centuries, thus becoming gems of information. One such accounts, Ibn Fadlan's description of Northern Europe, and Scandinavia, in particular, has become the inspiration for the famed novelist Michael Crichton's Thirteenth Warrior. As a whole, if the translations of Muslim scientific works in the 12th century represented a huge transfer of science, Muslim geography opened up a vast knowledge of the world, part of such world in those days only the realm of fantasy, somehow like the vision of Mars today.

Islam urged people to open their minds and horizons, and know about the wonders of God's creation. The vast land of Islam was also unhindered by frontiers as Al-Biruni observes in *The Book of the Demarkation of the Limits of the Areas.*⁴ `Islam,' he states, has already penetrated from the eastern countries of the earth to the Western. It spreads westwards to Spain (Andalus), eastward to the borderland of China and to the middle of India, southward to Abyssinia and the countries of Zanj (i.e., South Africa, the Malay Archipelago and Java), northward to the countries of the Turks and Slavs. Thus the different people are brought together in mutual understanding, which only God's own Art can bring to pass.....' Obtaining information concerning places, thus, became easier and safer, besides correcting (Greek (Ptolemaic) `Geography', where places in the east were to be found actually in the west, and vice versa.⁵ Bulliet is also of the opinion that the Islamic society was a place where long distance travel was common, an impression supported by the rarity of historical evidence of political barriers to travel, even between hostile states, or by efforts of governments to control the movements of their subjects.⁶ The measure of a prosperous and strong Islamic state, then, was that the routes were so secure that travelers could move wherever they wished without molestation.⁷

It was around the middle of the tenth century that Muslim ships reached the Chinese town of Khanfu, now Canton, and where soon was to grow an important Muslim colony.⁸ The first description of China precedes that, in fact, and dates from the early ninth century. It is the work of a merchant: Suleiman, and a



navigator Ibn Wahab, whose accounts are taken up by a Muslim of Siraf: Abu Zeid Hassan. Abu Zeid makes the point that he does not reproduce distorted accounts and stories by sailors; and that it is better to relate truth however much shorter. He informs us that boats sailing for China departed from Basrah and Siraf. Chinese boats, much larger than the Muslims', also visited Siraf, where was loaded merchandise brought from Basrah. From there boats sailed to the Arabian coast, to Muscat, then Oman, and from there to India; then various other points of anchorage where exchanges were made, and finally to China. The most frequented Chinese port was that of Khanfu. Muslim traders had their own establishments, and exchanges took place involving the emperor's officials who chose what suited him before any other person. From Khanfu some Muslim traders travelled as far as the empire's capital, Khomda; a two month journey. Ibn Wahab tells of his encounters with the Chinese emperor, and some of his views on religions. He also describes the Chinese capital, divided in two halves; separated by a long, wide road. On one side resided the emperor and his entourage and administration, and on the other lived the people and merchants. Early in the day, officials and servants from the first half enter the second, made their purchases, and then left and were not seen again. China, according to Muslim merchants, was a safe country, and well administered; laws concerning travellers securing both good surveillance and security.

Ibn Fadlan, who, in the tenth century, accompanied a mission from the Caliph al-Muktadir to the Volga Bulgars, in his Rihla (travel narrative) describes his experiences and the people and places he visited, the Khazzars, and on the manners and customs of the Rus. 14 His particular role on that journey was to read out the letter from the Caliphe to the king, to present him with gifts and to supervise the teaching of Islamic laws to the Bulgars. The Embassy had left Baghdad in June 921.15 The journey and the description of the various tribes encountered by the embassy are vividly described by Ibn Fadlan in his Risala.¹⁶ This is not just the earliest account in Arabic of the Volga region, it also gives the topography of the surrounding region, approximately up to 60 degree North latitude, it is also an important source of anthropology on various populations of the region.¹⁷ Ibn Fadlan describes very extensively the populations that live in the region, their trades, manners, clothing, diets, living, and also their customs, such as leaving a sick man alone under the tent with bread and water only, approached by none, waiting for him to die or recover by his own. He also describes religious and other practices, such as the burning of a dead lord on a boat, and alongside him his female slaves. 18 One thing that seems to startle Ibn Fadlan, though, was the extreme shortness of the night in those regions. He was waiting for the call of late night prayers, talking to a tailor from Baghdad for just half an hour, when he heard the call for prayers, and came out to find that it was morning.¹⁹ And the night, he discovered, was so lit that a man could be recognised by another at a distance of an arrow throw.

Born in Valencia, Ibn Jubair (Ibn Jubayr) travelled widely,²⁰ offering good accounts of the life of Muslims and their surroundings in both Eastern and Western parts. The extracts that follow herein are from the English version of his travels.²¹ In the introduction we are reminded of the reasons for Ibn Jubayr's travels. A secretary for the ruler of Granada in 1182, he was forced by such ruler, under threat, to drink seven cups of wine. Seized by remorse, the ruler then filled seven cups of gold which he gave him. To expiate his godless act, although forced upon him, Ibn Jubayr decided to perform the duty of Hajj to Mecca. He left Granada on 1183 accompanied by a physician from the city. The itinerary of Ibn Jubayr, with all his stops, is well marked by two maps that are included in this present version, one for his eastern travels, the other for the western. One of the first places Ibn Jubayr visits is Alexandria in Egypt (pp 30 frwd) in the Spring of 1183, and it left strong impressions on him, especially its famed giant lighthouse of which he had this to say (pp 32-3):



One of the greatest wonders that we saw in this city was the lighthouse which Great and Glorious God had erected by the hands of those who were forced to such labour as 'a sign to those who take warning from examining the fate of others' [Koran XV,75] and as a guide to voyagers, for without it they could not find the true course to Alexandria. It can be seen for more than seventy miles, and is of great antiquity. It is most strongly built in all directions and competes with the skies in height. Description of it falls short, the eyes fail to comprehend it, and words are inadequate, so vast is the spectacle.'

Another glory of the city, Ibn Jubayr notes, are the colleges and hostels erected for students and pious men of other lands by the Sultan (Salah Eddin al-Ayyubi). In those colleges students find lodging and tutors to teach them the sciences they desire, and also allowances to cover their needs. The care of the sultan also grants them baths, hospitals, and the appointment of doctors who can even come to visit them at their place of stay, and who would be answerable for their cure. One of the Sultan's other generous acts was that every day two thousand loves of bread were distributed to the poor. Also impressing Ibn Jubayr in that city was the number of mosques, estimated at between 8 and 12 thousand; often four or five of them in the same street.

In Sicily, at the very late stages of his travels (Dec 1184-jan 1185), Ibn Jubayr recounts other experiences (pp 335 to the end). Drawing his attention was the activity of the volcanoes he found himself in the vicinity, saying (pp.343-4):

`At the close of night a red flame appeared, throwing up tongues into the air. It was the celebrated volcano (Stromboli). We were told that a fiery blast of great violence bursts out from air-holes in the two mountains and makes the fire. Often a great stone is cast up and thrown into the air by the force of the blast and prevented thereby from falling and settling at the bottom. This is one of the most remarkable of stories, and it is true.'

`As for the great mountain in the island, known as the Jabal al-Nar [Mountain of Fire = Etna], it also presents a singular feature in that some years a fire pours from it in the manner of the `bursting of the dam'. It passes nothing it does not burn until, coming to the sea, it rides out on its surface and then subsides beneath it. Let us praise the Author of all things for His marvellous creations. There is no God but He.'

Also striking Ibn Jubayr is the city of Palermo (pp 348 frwrd). He describes it as follows:

'It is the metropolis of the islands, combining the benefits of wealth and splendour, and having all that you could wish of beauty, real or apparent, and all the needs of subsistence, mature and fresh. It is an ancient and elegant city, magnificent and gracious, and seductive to look upon. Proudly set between its open spaces and plains filled with gardens, with broad roads and avenues, it dazzles the eyes with its perfection. It is a wonderful place, built in the Cordova style, entirely from cut stone known as *kadhan* [a soft limestone]. A river splits the town, and four springs gush in its suburbs... The king roams through the gardens and courts for amusement and pleasure.... The Christian women of this city follow the fashion of Muslim women, are fluent of speech, wrap their cloaks about them, and are veiled.'



In April 1185, Ibn Jubayr returned to Granada, more than two years after he left it; and praised God abundantly.

The Moroccan Ibn Battuta's (d 779H/1377 A.D) $Rihla^{22}$ is an account of his travels that took him from Tangiers through North Africa, Syria, Iraq, Iran, reaching India in 1325, where he occupied an important official function. Then, by sea he travelled to China, Java and the Maldives. His descriptions of places, people, customs, cities, and events remain of the first order. His work was translated into French by Defremey and Sanguinetty (preceding note), a translation usefully accompanied by the Arabic version. However, the version chosen here to give some accounts of his work is the English by H.R. Gibb, ²³ who only translated chosen extracts (thus the Arabic and French versions remaining more comprehensive and whole). The merit of Gibb's version is that it gives a very useful and lengthy introduction on Ibn Battuta's life, relating for instance to his adoption of an ascetic life, resigning all his offices and giving away all his possessions at some stage, before he was urged into accepting office again by Sultan Muhammad and become his envoy at the head of an important mission to the most powerful ruler in the world then, the Emperor of China. Gibb also tells of how Ibn Battuta was a hunted fugitive for eight days and was left only with the clothes he was wearing and his prayer mat, forcing him to seek refuge in Malabar, where he became Qadi again (p.6). During his journey from Alexandria to the Maghreb, and on two occasions, he narrowly escaped capture by Christian pirates, still his love for travel was never exhausted (p.8). From each part visited, Ibn Battuta relates his experiences and observations. Thus, on the River Nile (p.52), he states:



The Egyptian Nile surpasses all rivers of the earth in sweetness of taste, length of course, and utility. No other river in the world can show such a continuous series of towns and villages along its banks, or a basin so intensely cultivated. Its course is from south to north, contrary to all other [great] rivers. One extraordinary thing about it is that it begins to rise in the extreme hot weather, at the time when rivers generally diminish and dry up, and begins to subside just when rivers begin to increase and overflow. The river Indus resembles it in this feature.... Some distance below Cairo the Nile divides into three streams, none of which can be crossed except by boat, winter or summer. The inhabitants of every township have canals led off the Nile; these are filled when the river is in flood and carry the water over the fields.'

In Ceylon (p.96) Ibn battuta observed that the people still lived in `idolatry' (Buddhism) yet they showed respect for Muslim darwishes, lodged them in their houses, and gave them to eat. The Indians, on the other hand (p.96),

`never make friends with Muslims, and never give them to eat or drink out of their vessels, although at the same time they neither act nor speak offensively to them.'

The Turks, Ibn Battuta observes (p.143), leave their livestock free to graze without guardians or sheperds.



This is due to their strict laws against theft. Anyone caught with a stolen horse is forced to restore it with nine others; if he cannot do this, his sons are taken instead.

China amazes Ibn battuta for numbers of reasons (p. 282 forward). High quality porcelain is one such things; the huge size of hens and cocks is another. China's hens' eggs are bigger than `our' goose eggs, he notes. His party bought a hen to cook, but it was so big they had to use two pots; and he took for an ostrich a cock. The skills of the Chinese are what amaze him most, though, very talented and precise people. He has this to say:

`I never returned to any of their cities after I had visited it a first time without finding my portrait and the portraits of my companions drawn on the walls and on sheets of paper exhibited in the bazaars... Each of us set to examining the other's portrait [and found that] the likeness was perfect in every respect.... They had been observing us (in the palace) and drawing our portraits without our noticing it. This is a customs of theirs, I mean making portraits of all who pass through their country. In fact they have brought this to such perfection that if a stranger commits any offence that obliges him to flee from China, they send his portrait far and wide. A search is then made for him and wheresoever the [person bearing a] resemblance to that portrait is found is arrested.

Another traveller of great ability, travelling many centuries before Ibn Battuta is Al-Muqaddasi (originally from Al-Quds: Jerusalem). Large accounts of his travels are seen in another section (on Islamic social sciences). He has the distinction of being the first geographer to produce maps in natural colours, which is the practice today. On his travels, he set off from Jerusalem, and visited nearly every part of the Muslim world. His book *Ahsan at-Taqasim fi Ma'arifat al-Aqalim* (the best divisions in the knowledge of the Climes) was completed around 985 A.D. Good accounts of such work are given by J.H. Kramers²⁴ who concludes that `There is thus no subject of interest to modern geography which is not treated by al-Muqaddasi,' who, according to Miquel, is the creator of `total geographical science.'²⁵

Other travellers and geographers described extensively the land of Islam. Amongst them is Al-Ya'qubi's *Kitab al-Buldan* (Book of Countries,)²⁶ completed in 891 after a long time spent in travels, giving the names of towns and countries, their people, rulers, distances between towns and cities, taxes, topography, water resources etc. Ibn Khurdadhbih (d.912 A.D), wrote *al-Masalik wal Mamalik* (Book of Roads and Provinces,) which gave a full map and description of the main trade routes of the Muslim world, references to distant lands such as China, Korea and Japan, and decriptions of the Southern Asiatic coast as far as Brahamputra, The Andaman Islands, Malaya and Java.²⁷

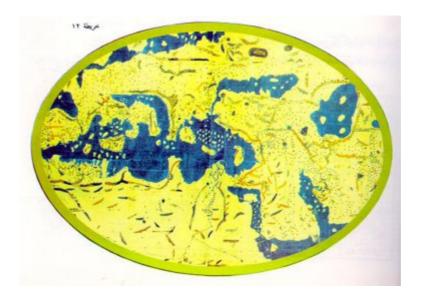
The geography treatise of Abu al-Fida (1273-1331), entitled *Taqwim al-Buldan*, has been known quite early and had a huge reputation in the Latin West, which is expressed by the so many translations of it, either partial or complete. Hence, in the mid 17th century it had an unedited translation by Schickard. J. Gravious in 1650 published in London extracts relating to Kharezm and Transoxonia. A Latin translation was made in Leiden in 1746 by Reiske, published in 1770 and 1771. F.D. Michaelis published the part related to Egypt, Eichhorn the one about Africa, whilst Solvet, in 1839, edited and translated The Maghreb in Algiers; and Reinaud and de Slane published the complete text and half the French translation in Paris in the 1840s. It was left to S. Guyard to complete the task in 1883. Abu al-Fida also remarks the spherical shape of the earth, and makes other observations, well elaborated by Carra de Vaux. Then, long after all these travellers, at the age of the great European discoveries, al-Wazzan (1483-1552), compiled a book on the



topography, peoples' flora and fauna of Africa, a work, which according to Kettani,³¹ was later plagiarised by Marmol and other European scholars. Final reference is to Yaqut al-Hamawi (d.626 H/1229 A.D) *Mu'jam al-Buldan* (dictionary of countries), a work of encyclopaedic dimensions, which includes both his observations, and also his knowledge from earlier sources. For every country, region, town and city, all in alphabetical order, Yaqut offers exact location, gives names, describes its monuments and wealth, its history, its population, and its leading figures, a work of unique value to scholarship.

The last work to consider is not by a Muslim, but by Gabriel Ferrand, a compilation however of accounts by Muslim travellers of the Far East between the 7th and 18th century.³² Ferrand deals with thirty-nine texts, thirty three of which are from Arabic sources, five Persian, and one Turkish.

One of the early travellers to be covered is Al-Yaqubi (875 or 880) who observes (p.49) that China is an immense country that can be reached by crossing seven seas; each of these with its own colour, wind, fish, and breeze which could not be found in another, the seventh of such, the Sea of Cankhay only sailable by a southern wind. Ibn al-Fakih (902), another traveller draws very interesting comparisons between China and India, their customs, food diets, codes of dress, rituals, and also flora and fauna (pp 54-66). Ibn Rosteh (903) on the other hand focuses attention on some Khmer king, surrounded by eighty judges, and his ferocious treatment of his subjects indulging in drink of alcohol and wine, and also his kind and generous treatment of the Muslims. Abu Zayd (d.976) also deals with the Khmer land (p.86 onwards) and its vast population, a land in which indecency, he notes, is absent.



Abu'l Faraj (988) dwells on India (pp 118 onwards), its people, customs, and religious observations. He also devotes much attention to China (pp 130 onwards), and relates that it has 300 cities, all with considerable numbers of people. Whoever travels in China, he notes, registers his name, the date of his journey, his genealogy, his description, age, what he carries with himself, and his following. Such a register is kept until the journey is safely completed, the reason of which being the fear that anything might harm the traveller and bring shame to the ruler.

Ferrand devotes a large section to extracts from Ibn al-Baytar's medical flora of those lands (pp 234-295), and not just from his own observations but also that of his predecessors. Kazwini receives good attention,



too, most particularly his accounts of the marvellous creatures that thrive in the Sea of China (pp 302-4), notably very large fish (whales?), giant tortoises, and monstrous snakes which land on the shores to swallow whole buffalos and elephants.

Ibn Said al-Maghribi (like Kazwini a traveller of the 13th century) has the distinction of locating each place (and so many of them) according to its latitude and longitude (pp.326-352). He dwells most particularly on the Indian Ocean islands, and other Indian coastal towns and cities, for each island giving the length of its coast, and making a meticulous description of what laid in between, the nature of the land, the length of mountains, distances between places and so on.... Al-Dimashqi (1325) also gives very detailed accounts of each island (pp 363-393), its population, flora, fauna, customs etc.... On the island of Komor, also called Malay Island, are many towns and cities, rich-dense forests with huge, tall trees, and white elephants. Also there lives the giant bird: Rokh, a bird whose eggs are like cupolas; the story being that some sailors broke and ate the contents of one such egg, and were pursued on the sea by the Rokh, breaking and carrying huge rocks, which it then hurled at them, relentlessly, the sailors only escaping with their lives under the cover of night.

This story, like other accounts by travellers, forming the basis of many of the tales which enrich Islamic literature such as the adventures of Sindbad the Sailor, and One Thousand and One Night.

1 See for instance:

-S.M. Ahmad: *A History of Arab-Islamic geography*, Publication of al-Bayt, University of Amman, Jordan, 1995.

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⁻Beeston, A.F.L. (1949) `Idrisi's account of the British Isles', *Bulletin of the School of Oriental and African Studies* 13, 1949; pp. 265-80.

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⁻Dallal, A: `Al-Biruni on climates', Archives Internationales d'Histoire des Sciences 34: 3-18.

⁻Ferrand, G. *Instructions Nautiques et Routiers Arabes et Portugais des XV et XVI Siecles*, 3 Vols, Paris, 1921-8; I and II: Arabic texts, III: Introduction a l'Astronomie Nautique Arabe.

⁻ Ferrand Gabriel: *Relations de voyages et textes geographiques Arabes....* 2 vols, Paris, Ernest Leroux; 1913-4.

⁻Ferrand Gabriel, tr and ed. 1922: Voyage du marchand arabe Sulayman en Inde et en Chine redige en 851.... Paris: Editions Bossard. Vol VII of *Les Classiques de l'Orient*.

⁻Grosset-Grange, H. `Analyse des voyages d'Inde a Malacca', *Navigation* 81: 97-109.

^{---- (1979)} La Science nautique Arabe', Jeune Marine, 1977-9, 16-29 (except 22).

^{---- (1993)} Glossaire nautique Arabe ancien et moderne de l'Ocean Indien, Paris.

⁻The History of cartography in prehistoric, Ancients and Medieval Europe and the Mediterranean, ed J.B Harley and D.Woodward, Vol.1 (Chicago, 1987).

⁻George.F. Hourani: *Arab Seafaring in the Indian Ocean in ancient and early medieval times*, Princeton, 1971.

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- -Tibbets, G.R. tr and ed: Arab navigation in the Indian Ocean.... *London Royal Asiatic Society of Great Britain and Ireland;* 1981.
- -Tuulio-Tallgren, O.J. and Tallgren, A.M: *Idrisi, la Finlande et les autres pays Baltiques Orientaux*, Helsinki; 1930.
- ² I.J. Krckovskij: *Izbrannye Socinenja* (chosen works); Vol 4, Moscow, 1957.
- ³ Arabica, Vol 5, 1958, Leiden. Pp 197-200.
- ⁴ In N. Ahmad, *Muslim contribution to Geography* Lahore: M. Ashraf, 1947, p 35.
- ⁵ Ibid
- ⁶ R.Bulliet: Travel and Transport, *Dictionary of the Middle Ages*, Charles Scribners' Sons, New York.
- ⁷ Ibid.
- ⁸ J.H. Kramers: Geography and Commerce, in *The Legacy of Islam*, edited by T. Arnold and A. Guillaume, Oxford University Press, first edition, 1931; pp 79-197; at p. 95.
- ⁹ Relations des Voyages faites par les Arabes et les Persans dans l'Inde et a la Chine, ed. et tr. Langles et Reinaud, paris, 1845, deux petits volumes, Imprimerie Royale.
- ¹⁰ In Baron Carra de Vaux: Les Penseurs de l'Islam; Geuthner, Paris, 1921, pp. 53-9.
- ¹¹ Ibid; at pp. 55-6.
- ¹² Ibid att pp 57-58.
- ¹³ Ibid, at p. 58.
- ¹⁴ For a long account of Ibn fadlan's travel to the Volga Bulgars, see M. Canard: Les Relations de voyage d'Ibn fadlan chez les Bulgares de la Volga; In *Annales de l'Institut d'Etudes Orientales*; Vol 16; 1958; pp 41-146; for extensive extracts on such travels see S.M. Ahmad: *A History of Arab-Islamic geography*; Amman; Albany; 1995 and for a summary see M. Dunlop: *Arab Civilisation, to AD 1500*, Longman, Librarie du Liban, 1971, pp 169-70.
- ¹⁵ M. Canard: Ibn Fadlan, in *Encyclopaedia of Islam*; New edition, vol 3; Brill; Leiden, 1971; 759.
- ¹⁶ S. Al-Dhhan: *Risalat Ibn Fadlan*; Dar Sadir; Beirut; 1993.
- ¹⁷ S.M. Ahmad: A History, op cit, p. 112.
- ¹⁸ Ibid, at 330.
- ¹⁹ Ibid at p. 328.
- ²⁰ Ibn Jubair: *Voyages*, translated with notes by M. Gaudefroy Demombynes, Paris, (1949-65).
- ²¹ The travels of Ibn Jubayr, trsltd from the original Arabic with introduction and notes, by R.J. C.



Broadhurst; Jonathan cape, London, 1952.

- ²² Ibn Battuta: *Voyages d'Ibn Battuta*, Arabic text accompanied by French translation by C. Defremery and B.R. Sanguinetti, preface and notes by Vincent Monteil, I-IV, paris, 1968, reprint of the 1854 edn.
- ²³ Ibn Battuta: *Travels in Asia and Africa;* trsltd and selected by H.A.R. Gibb; George Routledge and Sons Ltd; London, 1929.
- ²⁴ J.H. Kramers: Analecta Orientalia, i, 182-3, in D.M. Dunlop: Arab Civilisation, op cit, pp 166-7.
- ²⁵ Al-Muqaddasi: *Ahsan at-taqasim fi Ma'rifat al-Aqalim*; traduction partielle, anotee par Andre Miquel, Institut Francais de Damas, Damascus, 1963, p. xxiv, in D. M. Dunlop: Arab Civilisation, op cit, at p. 166.
- ²⁶ Al-Ya'qubi: *Les pays*, tr. G. Wiet, Cairo, 1937.
- ²⁷ S.M. Ziauddin Alavi: *Arabic Geography in the ninth and tenth centuries*, Published by the Department of Geography, Aligarh Muslim University, Aligarh, 1965, p. 27.
- ²⁸ B. C. de Vaux: Les Penseurs, op cit, p. 13.
- ²⁹ Abu al-Fida: *Geographie d'Aboulfeda*, ed. and tr. M. Reinaud. 3 vols. Paris, 1840-83.
- ³⁰ Carra de Vaux: Les Penseurs, op cit; pp 21-2.
- ³¹ M. Ali Kettani: Science and technology in Islam: The underlying value system, in Z.Sardar edt: *The Touch of Midas: Science, values and environment in Islam and the West*; Manchester University Press; 1984 p. 84.
- ³² Gabriel Ferrand: *Relations de Voyages et textes geographiques Arabes, Persans and Turks relatifs a l'Extreme orient du VIIem au XVIIIem Siecles*, Ernest Leroux, Paris, 1913-4. Extracts above are from the reedition by F. Sezgin of Ferrand's work, Frankfurt, 1986.