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SOME GLIMPSES OF AL-BIRUNI
AS A GEOGRAPHER

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SOME GLIMPSES OF AL-BIRUNI AS A GEOGRAPHER*

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Burhan al-Haq Abu al-Raihan Muhammad Ibn Ahmad popularly known as al-Biruni was a great scientist and lived and made his contributions in the 4th/5th centuries of the Islamic Calender. But the quality and range of his work is so outstanding that it undoubtedly constitutes a heritage of the world. He was a scientist as well as a humanist and all branches of human knowledge attracted his attention. He commenced his writings at the early age of 28 and was 45 years of age when he was brought to Ghazni by Sultan Mahmud in 407 A.H./1017 A.D. Later he spent about 14 years in India travelling extensively throughout the Muslim domains.

He wrote on numerous topics and subjects ranging from philosophy, ethics, and humanities to social and physical sciences. His knowledge of geography was remarkable for a clear understanding of the physical and cultural aspects which form the core of the environment. Spread over his numerous books are his remarks and discussions on physical geography (mathematical geography, geology, minerology, river morphology, soils, sediments, meteorology, hydrology and bio-geography), and human geography (society, culture, archaeology, economic wealth). In kitab al-Hind he has two Chapters viz., XVIII and XXXI in which a good deal of geographical material is found. But elsewhere in many other pages such material exists.

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*The text used here mainly is al-Biruni's India (تحقیق ماللہند) lahore edition 2 Vols., 1962. Edward C. Sachau's earlier edition, London, 1914 has been consulted also.

To collect these references from his works and sort them out is a stupendous task which must await the collaboration of many scholars in different disciplines. In this short paper an attempt has been made to extract some typical examples of his geographical knowledge in relation to the Indian Sub-Continent and many other general remarks of geographical nature. The source is primarily his monumental work (تحقيق ماللهند) popularly known as Kitab al-Hind (al-Biruni's India) which was completed in 421 A.H./1030 A.D. at Chazni.

GEOGRAPHY OF INDIA

Physical Geography

The sea which is bordered by the continent of India is called the Indian Ocean.[1] The coast of India begins near Tiz in Makran and extends in a south eastern direction to Daibul[2] (al-Daibal) and thereafter stretches via Katch and Somnath to the Gulf of Cambay and further south to Thana and onward to the bay in which lies Singaldib (the island of Sarandip - Ceylon).[3]

Islands in Indian Ocean

Al-Biruni mentioned a number of islands in the Indian Ocean. Alwaq waq, Kumair (Madagascar), Ramm and Diva (Maldives and

1. Vol. 1, p. 197
2. Elliot (Vol. 1, p. 378) identified it with the site of modern Karachi. Various authorities have suggested other locations near by about 35 miles north of Karachi. The recent excavations near Bhambore tempted scholars towards this identification. But as yet there is no finality in this respect.
   According to Baladhuri in Futuh al-Buldan Daibal was situated on a small bay west of the month of the Mehran (Indus). This was the port which was captured by Muhammad Ibn Qasim al-thaqafi. It was then a prosperous city engaged in commerce and trade
3. Modern names of places, natural features and areas are given in parenthesis.

Lacadives). Ceylon was called by him Singaldib or Sarandib. Mention is made of the chain of islands (now called Adam's Bridge) which extend from Ramsher (Rameshvaram) toward Ceylon. Here is also related the story of Sita's exile and Rama's adventures in overcoming Ravana and his monkey devils.[1] He mentions other islands in this ocean lying nearer to China than India, they are Zabaj (Java group) known to the Hindus as Suvarna-dvipa i.e. the gold islands. Pearl fisheries of Ceylon are mentioned and this activity is also found associated with the Zanj Coast (Mozambique) in East Africa. A mention is also made of the islands of Langabalus (Nicobar Islands[2]) in connection with the possibility of cannibalism there.

Mountains of Northern Area

On the northern frontiers of India Kashmir[3] is mentioned. The Himavant (Himalaya) mountains are high and their peaks are covered with everlasting snow. These chains of mountains stretch in the north and traverse the heart of Asia passing through Afghanistan, Kashmir, Tibet and China. He added that the northern and eastern mountains of India in reality form one and the same system extending towards the east and then swerving south until they reach the Indian Ocean. The Himalaya, he said formed a water parting between north and south.

Al-Biruni quoting Bhuvansakosa[4] said that the inhabitable world stretched from the Himaavant Mountains (Himalaya) toward

1. Vol. 1, pp.280-281
2. Ibid, p. 417
3. Ibid, pp. 275-276
4. An ancient geographical work of the Hindus.

south into Bharatvarsha (Northern India). According to him the mythical Mount Meru the top of the world, was situated north of the Himalaya.

The Great Plain

South of the Himalaya lay the vast plain of India which was surrounded by mountains on the north, east and west. The drainage from the mountains flowed down to it. Al-Biruni discussed the origin and the nature of this plain and provided an excellent geomorphological description. He said the plain was made up of fine sediments brought from the mountains. There were large boulders and bigger rounded and water rolled pebbles close to the slopes of the highlands. But at greater distance from the mountains where the streams flow more slowly, stones appear pulverised in the shape of sand and silt and the streams begin to stagnate near their mouths close to the sea. He suggested that the Indian Plain had once been a sea which was slowly filled up by the alluvium of the streams.

Rivers of India

Al-Biruni devotes almost a whole chapter of the book to the rivers. The sources of the rivers, their courses and characteristics were mentioned in some detail. He also acknowledged the eminent Hindu sources of information on rivers and their mythological background. The main rivers of India either rise in the northern or eastern mountains and join the ocean to the south. He tabulated the names of leading rivers and areas which they traversed.[3]

First, he mentions a large number of rivers rising in the

1. Vol. 1, pp. 264-265 2. Vol. 1, Chap. XXV 3. Ibid, pp.347-348

various knots of mountains as mentioned in the Vayu-Purana. They include such names as Godavari, Bhimarathi (Bhima), Kistana, (Krishna) Tapi (Tapti), Durga, Nanda, etc. After this another table is given with names of many more rivers such as Karatoya. The river Sindh or Mehran (Indus) rises in the mountains of Unang in the territory of the Turks, which can be reached via Kashmir and Gilgit. He also calls it the river Vaihand. The river Biyatta, known as Jailam (Jhelum) from the city of this name on its western banks and the river Candarah (Chenab) join each other nearly 50 miles above Jahravar and pass along west of Multan. The river Biyah (Bias) flows east of Multan and afterwards joins the Biyatta and Candarah. The Ivara (Ravi) is joined by the Kaj which rises in Nagarkot in the mountains of Bhatul, and thereafter flows the fifth river of the Punjab Shatladar (Sutlej).

He goes on to say that after these five rivers have joined below Multan at a place called Pancanda (Panchanad), i.e. the meeting place of five rivers, they form an enormous water-course. In flood time it swells to such a degree as to cover a space nearly 10 'farsakhs' about 37 miles (in extraordinary floods as it happened in 1973) and to rise above the trees of the plains, so that afterwards the rubbish carried by the floods is found in their highest branches like bird s nests. This bears a close resemblance to the great floods of 1973. The Muslims called the river by the name of Mehran after it had passed the Sindhi City of Aror as a united stream. He added that flowing straight on, the Mehran became broader and broader, gaining

in purity of water, enclosing in its course places like islands, until it reached Al-Mansurah situated between several of its arms and flowed into the ocean at two places near the city of Loharani (near Karachi) and more eastwards in the province of Katch at a place called Sindhu-Sagara (Sind-Sagar).

The river Sarasti (Saraswati) falls into the sea at the distance of a bowshot east of Somnath. In connection with the Ganges and its numerous tributaries, al-Biruni mentions the Hindu belief that originally the river flowed in Paradise and quoting the 'Matsaya Purana', the writer goes on to say, that after the Ganges had settled on earth it divided itself into seven arms , the middle of which is the main stream known as the Ganges.[2] The river Jamn (Jamna) joins the Ganges below Kanoj which lies west of it. The united stream falls into the great ocean near Ganga-Sagara. In another place, it is said that at the junction of the two rivers, Yamuna (Jamna) and Ganga (Ganges) there is a great tree called prayaga, a tree of the species 'Vata' (?).

Between the mouths of Sarasti and the Ganges is mentioned the mouth of the river Narmada, which descends from the eastern mountains, takes its course in a south-western direction and falls into the sea near the twon of Bharoj (Broach) nearly 60 'yojana' about 120 Miles[3] east of Somnath.

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1. Vol. 1, p. 262
2. Ibid., p. 170
3. According to al-Biruni (Vol. I, p. 167) one 'Yojana' was equal to 8 Arabic miles or =32,000 yards and one 'Kroh'=¼ 'Yojana'.

Seasons and Climate

Speaking of seasons he said that generally the common people believed in two seasons in the year namely, summer and winter. According to the four divisions of the ecliptic which the sun traverses, the year can be divided into four seasons i.e. Spring, summer, autumn and winter. Al-Biruni remarks that the Hindus divided the year into six parts and called these 'ritu' and each 'ritu' consisted of two solar months. There was also a broad tripple division namely, summer (grishma) followed by a rainy season (varshakal-commencing in June-July) and finally, winter (Sitakala). Twelve Indian months are mentioned by al-Biruni (Chaitra, Vaishakha, Jyastha, Ashadha, Sravana, Bhadrapada, Asvayuja, Karttika, Margashirsha, Pausha, Magha and Phalgun).[1]

Al-Biruni noticed the peculiarities of the Indian monsoon, the time of its breaking and described its westward and northward progress, unequal distribution of rain and orrurance of rain-shadows in the northern moutain region. There was more rain in the Central and eastern part of the Gongetic plain and much less precipitation occured in west Punjab and the north west of the Sub-continent. He mentioned the snow falls in Kashmir and the winter and spring rains in Kashmir and the plains to the south.

Itineraries and Distances

When al-Biruni came to live in India Sultan Mahmud's famous seventeen invasions had already taken place. Though regular communications were in a mess, yet he has been able to point out more frequented itineraries. The problem of distances

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1. Vol, I, pp. 283-84

was a ticklish one as the Indian measure was 'Yojana' and al-Biruni took cognisance[1] of 'farsakh', Sachau has suggested that since one Yojana was considered equal to 8 Arabic miles (or 32,000 yards), one 'Farsakh' could be equal to about 3 miles. It appears that al-Biruni's information on routes and roads was derived from military sources, traders and merchants, pilgrims, sailors and travellers. He seems to have checked the information fairly carefully. The important nodal points mentioned by him are: Kanoj, Allahabad, Banaras, Meerut, Mathura, Bazana, Ujjain, Dhar, Pattan, Thana, Lahore, Multan, Peshawar, Almansurah, Loharani and Tiz.

Besides centres of communication al-Biruni speaks of many towns as centres of commerce, pilgrimage, religion and learning. He had personally visited some of these cities. A detailed mention of these towns and their activities is found in different parts of his book.

Regions and areas

Al-Biruni provides some interesting details of the geographical aspects and life of distant areas in the sub-continent. He seems to have a particular liking for Kashmir where he may have spent sometime. He brings out its scenic mountainous nature, the interesting course of the river Jhelum, concentration of population in the vale of Kashmir, and the peace and calm of nature favouring learning and meditation. From travellers accounts he also pieced together information about Nepal, Bhutan and Tibet noting their inaccessibility,

1. Vol. II, p. 276 et seq.

remoteness, life in the hills, and importance of human and animal transportation. He said these areas formed a barrier between India and China.

From kitab al-Hind and other related sources it appears that al-Biruni acquired a good knowledge of many geographical aspects of India. He keenly observed facts and intelligently speculated on them. He had a special flavour for interpreting Hindu sociology and their scientific learning.

On size, Shape, and Movements of the earth

Al-Biruni has examined in some detail[1] in Kitab al-Hind questions connected with the earth, its shape, size and movements. He gives a summary of Hindu ideas in this respect and then adds his own comments on them. He asserted that according to Hindu astronomers[2] the heaven as well as the whole world is round and the earth has a globular shape, the northern half being dry land the southern half being covered with water. The dimension of the earth is larger according to the Hindus than it is according to the Greeks. The earth was in the centre[3] of the universe. He had used Pulisa's 'Siddhanta' and also makes references to the works of Varahamihira, Aryabhata and Vishnucandra, Brahmagupta and others to establish the rotundity of the earth. The earth was fastened on the two poles and held by the axis. The phenomena of day and night as well as the differences in time in east and west are due to the

1. Vol. 1, Chap. XXVI
2. Vol. I, p. 356
3. Vol. I, p. 358

rotundity of the earth and the apparent movement of the sun. al-Biruni discussed the question of the movement of the earth both in terms of rotation and revolution, but he could not make up his mind. Many astronomical ideas and knowledge related to mathematical geography is discussed in his great book Canon Masudicus (al-Qanun al-Mas'udi) written shortly after Kitab al-Hind.

In al-Biruni's time the debate was still raging about the notion of the movement of the earth around the sun or on the contrary the movement of the sun itself. It appears that al-Biruni was somewhat uncertain of his own ideas on the subject and said that either movement would produce the same result astronomically and then added that he had more fully discussed these ideas in his book[1] 'Key to Astronomy' (مفتاح علم الهيئة)

Latitudes and Longitudes of some places

al-Biruni discussed at some length the Indian methods of measuring and finding latitudes and determining longitudes by the Hindu astronomers. After some criticism of the methods adopted he pointed out that the chief meridian adopted by the Indians passed through Lanka (Ceylon) Ujjain, fortress of Rohitaka, the river Jamna, the plain of Thaneswar, and the cold Mountains (Mt. Meru) and that the meridian divided the world into two halves.

Then he went on to say that he had himself observed a number of latitudes and listed some as follows:

Ghazna (33^0 35), Kabul (33^0 47') Peshawar (34^0 44')

1. Vol. 1, p. 373

Waihand (34^0 30') Jhelum (33^0 20'), Fortress of Nandna (32^0 o') Sialkot (32^0 58'), and Multan (29^0 40').

He added that if the latitudes of places are known, and the distances between them have been measured, the difference between their longitudes may also be found.

He devised a new method of finding the Qiblah (Ka 'bah). al-Biruni made certain calculations concerning the diameter of the earth and a degree of latitude by conducting measurements in the Tilla Balanath[1] areas of the present district of Jhelum in the Punjab. The measurements were made on the principles enunciated in Mamun's time. But al-Biruni's final comment was that the instruments used were too small and inadequate and he accepted the value given by Habsh Ibn al-Hasib namely, 56 miles. al-Biruni was fully conversant with the use of an improved type of ustarlab (astrolable) in his experiments.

In some of his work related to geographical information in connection with the discussion of minerals and metals given in his books like al-Saydnah and Kitab al-Jamahir fi Ma'arfat al-Jawahir (Book of minerals and precious stones) al-Binruni expounds his geographical acumen.

He has also tried to explain the origin of the artesian wells and the principles of hydrostatics involved in it. Al-Biruni was among the foremost scholars, scientists and intellectuals of the world. His liberal ideas, wide scholarly horizons, painstaking researches, critical approach and objective outlook were unmatched by other scholars. With his depth of understanding and unbiassed outlook he sounds like a celebrated modern Scientist.

1. Encyclop, Islam, Urdu Edn., Lahore, 1971, Vol.V, p. 266

He believed that the Arabic language in his time had become the vehicle of thought and was the only language in which scientific and literary contributions could be made. But he had mastered several other languages including Persian, Sanskirt, Greek, Syriac and Hebrew. Among his specialisms of knowledge was goegraphy, geomorphology geology, mineralogy, biology, astronomy, mathematics, archaeology and history. He knew about most of the great Muslim intellectuals of his time and entered into discourse with some of them including Abu Ali Sina.

A few generations later, Yaqut Hamavi gave two examples of al-Biruni's love of knowledge and erudition which sifnify his intellectural status. Yaqut says he found in the library of the university at Marw sixty closely written pages listing the works of al-Biruni. In another place he said that al-Biruni always held a pen in his hand and constantly read books and his mind was occupied in sorting out problems.[1]

According to an estimate,[2] the number of his books and monographs exceede 190 and more are being discovered. One of his great books on minerals (al-Saydnah) was written when he had passed the age of 77. There are only a few examples of such monumental scholarship in the world as demonstratel by al-Biruni.

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1. Encyclopedia Islam (Urdu edn.), Iahore, 1971 pp. 263-64.
2. Ibid pp. 267-8.