

# **HAKRA OR SARSWATI CONTROVERSY-Various Versions of Scientists, Historians and Folk-Lorists.**

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Hakra was not controversial 150 years ago, as very few people had heard of it and these had their own imaginations and explanations. For such opinions, they owed responsibility to none, as they would not be challenged, due to lack of mass media.

The British investigators always verified the facts, and controversy once started, was ultimately resolved by most scientific methods, available in each decade. The Hakra question was such a controversy with different versions and it took about 150 years to resolve the issue. Unfortunately the issue still remains too confused, before, the people of Sind, due to lack of communication. There are three types of versions, based on three classes of investigators:-

- i. Scientists
- ii. Historians
- iii. Folk – lorists.

Historical versions on Hakra, recorded mostly in the 17<sup>th</sup> century and afterwards, cannot be considered authentic, especially about the events which in this particular case, took place around 2000 B.C., or even in 11<sup>th</sup> -13<sup>th</sup> centuries A.D., Although historians of these works have been too assertive, the fact remains that their source of information was contemporary folk-lore. Folk-lore on the other hand is full of eulogies and exaggerations and the story tellers (Sugharhs) have given free reign to their imaginations and these have changed from occasion to occasion, according to how good a sugharh was. The very Sindhi language used in folk-lore does not show its antiquity to more than two hundred and fifty years, barring very few isolated cases. Under any circumstances, the recorded and intelligible poetry of Sind cannot be assigned a date

earlier than 15<sup>th</sup> century. Folk-lore, therefore, is not a media to resolve an issue, totally contradicted as it is by the scientific evidence.

It is worthwhile to describe briefly the continuous efforts that have gone into the probe, to find out if the Hakra was an independent river or it was the Sutlej or some other river of

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antiquity. It is also certain that new facts will always come to light, clarifying the position further.

- 1) The earliest mention of Hakra is by Alexander Burnes, a diplomat who in 1833, while describing the eastern branch of the river Indus, (formerly taking off from the main stream, on its up stream's side above Rohri, was irrigating large tracks of land in the eastern desert) mentions of diverting of its waters by Ghulam Shah Kalhora in 1761 A.D., to dry up the rice fields near Lakhpat in Kutch, and also alternations produced by an earth quake of 1819 A.D., on the waters of Hakra or eastern branch of the river Indus.
- 2) Similar views were expressed by many other writers, including McMurdo and the early Gazetteer of Thoronoton, who thought that the Eastern Nara took off from the Indus on north of Rohri. W. Pottinger and del Hoste held similar views.
- 3) Richard Fransis Burton, a surveyer, linguist and scholar, was the third writer, who described Hakra as an ancient course of the river Indus , in his various writings. He used Ma'mui fakirs' poems in support of Hakra and its courses.
- 4) Fife, the first Superintending Engineer in Sindh, who opened the Eastern Nara Canal, thought that the Eastern Nara was a spill channel of the Indus rather than an eastern branch, but was getting water constantly from spill channels of it, in the former (ancient) days and occasionally in subsequent years. This was the first major deviation from the thinking of the times, but was not totally correct, as he had no information about Hakra courses in Bahawalpur, Bikanir, and Ambala.

- 5) In 1871, Cunningham, the first Director General of Archaeological Survey of India, expressed that Raini, Solra and Chautang were different from the Sutlej, and met the Indus above Aror (Alore). The Eastern Nara was an old bed of the Indus. It bifurcated near Jakhro into Puran, flowing south west course, past Hermetelia (Brahmanabad), Patiala (Hyderabad) and turned south-west to-wards Guni to join the main stream. The other branch turned south-east past Umarnkot to meet the first branch near Wanga Bazar, on its way to Koree Creek mouth. Since in his times Indian archaeology was just born and archaeology was based on history, the results depended on how good the historical works referred for the purpose were.
- 6) In 1874 C.F. Oldham of the Survey of India, wrote that Sutlej was discharging its waters in the bed of Sarswati or Ghaggar, which in Sind is known as the Eastern Nara and continued doing so, until about 1<sup>st</sup> quarter of 13<sup>th</sup> century and the Eastern Nara was not the bed of the river Indus as assumed by 1, 2, 3, and 5 above. His information came from official records and maps of the Survey of India, which showed depressions as they existed physically.
- 7) In 1875 an anonymous writer the Survey of India under a pseudonymous name Nearchus, contradicting No. 6 above, stated that the Sutlej never flowed west-wards directly into the Indus, but it was the Jamuna instead, which once flowed westwards and fed the Hakra. He also supported the view of 1, 2, 3, and 5 above that east of Rohri the Indus passed through the bed of Eastern Nara.
- 8) Hughes, an ICS officer in his 'Gazetteer of Sind' (1876), considers the Eastern Nara or Hakra, an old bed of the river Indus and having its source from the Indus, between Bahawalpur and Rupar. He discards Fife's theory completely and thinks that spill water of the Indus near Sabzalkot and Ghotki may have been just another source of supply water to it, rather than sole source.
- 9) In 1886, R.D. Oldham of the Geological Survey of India, based on hydrological studies, stated that the Indus could not have flowed into the Eastern Nara at all. It was Jamuna in

the recent geological times (i.e., during Pleistocene, or 1.7 million years ago), and the Sutlej later on (i.e., during Holocene or 10,000 years ago to present times), that fed the Eastern Nara. In general he supported C.F. Oldhams opinions expressed 12 years earlier, against Nearchus' views. This opinion was respected by some researchers until aerial photography rejected the Jamuna theory.

- 10) Somehow this infuriated Raverty (of Survey of India until 1865), who in 1892 wrote an article of 350 pages, theorizing that there was a mighty river formed by the combined waters of Jhelum, Chenab, Ravi and Beas all of which discharged into that river and then passed through the bed of Eastern Nara. The Indus too discharged into this river as its tributary was called the Mihran". Its main course was along the alignment of Sutlej in the Punjab and the Eastern Nara in Sind, through which it discharged into the Sea via the Koree Creek.

Raverty's maps were highly inaccurate, his theories were imaginary, but he had used vast historical material from Persian, Arabic, Portuguese, French and English sources and for the general history of Sind, the book is still indispensable. His courses of river Indus and Hakra with references to chronology of the historical geography of Sind is unacceptable, but his approach has misled many subsequent and some leading historians of Sind, who have periodically repeated, what was stated by him and created historical blunders.

- 11) In 1894 Major General Haig produced a short but well written history Sind. Although he avoided getting into the hot bed of controversy, his approach leaves no doubts that he believed that the Eastern Nara was the bed of the river Indus.
- 12) In 1904, Col. Minchin and J.N. Barnes, after study of physiography of Bahawalpur State concluded that the bed of the Hakra was too narrow to have carried all of the Sutlej's waters through it, leaving aside that of the other Punjab rivers or the Indus. Thus, it must be an independent stream. However, they did not probe into Bikanir and Ambala areas, to get to original courses, leading from Ambala to the Hakra or Sarswati.

- 13) In 1906 Henry Cousens an archaeologist, became the first writer, who drew the course of the major branch of the river Indus, the Lohano Dhoru, at the time of Arab Conquest of Sind in 711-712 A.D., between the present course and the Eastern Nara. Unlike Fife (Superintending Engineer in Sind), he did not think that Nara was a spill channel of the Indus. He believed that Nara was the bed of another branch of the river Indus.
- 14) In 1924 Ward, a geographer, basing on the general theory that all rivers in the northern hemisphere have westering tendency due to rotating of earth from west to east, stated that the Sutlej which now has westered, was one time tributary of Hakra, which passed through the Eastern Nara. The Jamuna may have fed it too.
- 15) In 1929, Khan, a historian, theorized that Hakra was a tributary of the Indus and not of the Sutlej or of the Jamuna i.e., the Sutlej was tributary of the Hakra. The Eastern Nara was the bed of the Indus through which passed the combined waters of Indus and Hakra and was called the Mehran. Hakra dried up about the middle of 13<sup>th</sup> century A.D.
- 16) In 1932, Whitehead, an archaeologist, stated that the Sutlej could not have oscillated 70-80 miles, to pass through the Hakra and it seems to have dried up due to diminishing rain fall in the Ambala area and consequently the Ambala streams dried up.
- 17) R.D. Oldham, in a personal communication to Pithwalla in 1933 mentioned that, at an early date when Jamuna flowed west-wards, it probably followed the same course as Hakra did in the latter times, as shown in Whitehead's map
- 18) In 1942, Stein, an archaeologist, after examining a number of sites in Bikanir and Ambala, concluded that the Ghaggar or Hakra at one time carried the combined waters of a number of streams, including one or two spill channels to the Sutlej in Bahawalpur and also of a channel of the Indus through the Alore Gap near Rohri.
- 19) In 1942, Ali, a geographer, discussed the problem of desiccation of Ghaggar or Sarswati due to declining rain-fall in its catchment, that led to its drying up.

20) Pithwalla, writing in 1959 states that a portion of Hakra waters seems to have been derived from spill waters of the Sutlej, when it flowed further south. Ambala streams reduced in size owing to accumulation of silt and sand and finally Hakra dried up. Hakra seems to be a distinct, moderate, and perennial river system, flowing around the corner of Bahawalpur and Sind and almost parallel to this border. It was a degrading stream having

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cut a channel of its own, now known as Nara and quite unlike mature type of aggrading the Mehran or Indus of Sind. The Indus itself did not flow through the Hakra valley. Had the Hakra not dried up because of failure of supply in its upper reaches, the process of depositing silt and raising its own level by the Indus on the one (west) side and that of excavating its own channel on the other side (east by Hakra, would have resulted in a sudden breach of the Indus into low lying channel, the Eastern Nara, from which it could not have , been able to get out without raising its bed to the level of adjoining plains. The Indus on account of its westerling tendency left Alore gorge dry and occupied Bakhar gorge.

21) In 1963, M.H. Panhwar, using his theory that, where-ever a river like the Indus has flowed for a number of centuries, water from it must have seeped underground and left large quantities of sweet water, in a considerable depth and width, and these could be tapped for irrigation; verified this fact by actual drilling. It turned out that there was no ground water along Rainy and Eastern Nara, right up to Sindhri in the Rann of Cutch except very small quantities of water in a very narrow width and a shallow depth tapped by dug wells. From Alore to Jamrao head situation was only slightly better. He attributed the latter to the eastern Nara canal having been flowing in that length for over a century now, In his opinion the Indus did not flow through the Eastern Nara bed and Nara or Hakra was a minor river that had dried up many centuries ago, except that, in occasional years, it received spill water from the Indus and the Sutlej. He also found presence of

some courses of a desert river in Khipro Taluka. These courses were finally confirmed 16 years later by Ghose and others by remote sensing.

- 22) In 1964, M.H. Panhwar, drew district-wise maps of the old courses of the river Indus through historical times and also discussed the sources and events which indicated the existence of the river Indus at various places throughout the historical times and also proved this by existence of ground eater at these courses. There was a small improvement on Pithawalla's work of 1959, in terms of historical sources and courses, but ground water occurrence was a new idea.
- 23) Lambrick's classical work and analysis to the historical geography of Sind (1964) is very well written and well discussed document on Harka, but he has not acknowledged Pithwalla's findings on the Indus-Hakra controversy, although this portion of Lambrick's work, is extracted from Pithawalla almost verbatim. What is more interesting is that Pithawalla has listed authorities from 4 to 18 above and so had Lambrick in the same order, but has omitted 4, 5, 8, 11, 15 and 17, comparatively less important sources. However, on the merits of evidence of historical courses of the Indus, this book may not be superseded for decades.
- 24) In 1965 Holmes working with McDonald and Partners on the Lower Indus Project, based on aerial photographs, worked out courses of river Indus during various historical periods and published such information in Vol. 2 of the supplementary volume of the report. This was reprinted. He found no clue of Hakra discharging into the Indus, but found Khangarh flood plains edging the desert in the alluvial plains, caused probably by spill channels of the Indus. His maps show Rainy and Wahind totally in the desert and not entering the Indus plains.
- 25) In 1966-67, M.H. Panhwar drew a 4x8 feet map, of the courses of the river Indus in Sind, during the past 5000, years, based on aerial photographs and found spill-channels from the Indus towards Raini in Sukkur district and also a branch of the Indus passing through Alore gap.

- 26) In 1968 Rakes, probably influenced by Pithawalla (20 above), and Lambrick (23 above), emphasized that the Jamuna was alternatively captured by the Indus and the Ganges systems. This theory, besides remote sensing of Ghose (31 below), was also rejected by Rao etc (1974) basing on the evidence of the Jamuna Fault along the west bank of this river, showing that the river Jamuna could not have westerned.
- 27) In 1969, Wilhelmy wrote on Sarswati-Problem, depending mostly on sources cited by Pithawalla, he mentions that Jamuna formerly flowed west through the present Hansi-Hissar branch of the western Jamuna Canal and was known as Drisha Dvati. Aerial photographs have completely rejected this theory of Jamuna flowing westwards. He does not think that the Hakra was a tributary of the Indus. According to him the Jamuna was captured by Ganges in Rig-vedic times. He seems to have been influenced by Lambrick (23 above) and Raikes (26 above). The latter believed that the Jamuna was alternatively captured by the Indus and Ganges systems.
- 28) In 1969, M.H. Panhwar by used of aerial photographs, showed that Hakra getting spill waters of the Sutlej and the Indus bifurcated at Jamrao canal, then passed to the east of Brahmanabad-Mansura site and again joined eastern branch many miles south, on way to Koree Creek, via the present Dhoro Puran. Above Brahmanabad-Mansura it was also fed by an eastern branch of the Indus making the lower part perennial.
- 29) In 1972 Gurdip Singh and others, after Radio-Carbon Dating of stratigraphy of 3 salt lake deposits in Rajasthan concluded that between 9500 to 4000 years ago, rain-fall in the Western Rajasthan was one stage higher and about two to two and half times the present rains and there was adequate rain-fall in Ambala districts and adjoining Himalyas to start run-off streams of some importance. From this it was inferred by the subsequent writers that a number of streams were flowing south from Ambala district and Sarswati or Hakra being one of them during that period was a perennial river.



- 30) In 1979, Rafique Mughal of archaeological department of Pakistan, after survey of archaeological sites along the Hakra in Bahawalpur, put forth the evidence, that the Mature Indus settlement in Bahawalpur started declining around 2000 B.C. due to declining waters in that river. This supplemented Stein's work in the India territories (18 above).
- 31) In 1979-80, Bimul Ghose, Amla Kar and Zahid Hussain, by use of Land stat imagery and aerial photographs produced courses of the Sarswati through Rajasthan to the Luni, through the Raini and the eastern Nara and through the north western part of desert in 5 different stages, namely: earliest course, three successive major courses, the last one being Ghaggar Hakra through Bahawalpur to Raini. The three intermediate courses met present Nara in Khipro and Khairpur areas. There is also a course of some river entering Sind and meeting Eastern Nara north of Umarkot, but traceable only to some reach and not to the above five systems. This may have been a course before author's five successive stage.

This paper more or less is revolution in the post-1970 thinking on the lost river.

- 32) In 1984, Amal Kar and Bimal Ghose, with the help of aerial photography, concluded that there was no evidence proving that the Jamuna flowed west-wards to feed Dirshadvati. They also concluded that the Dirshadvati had several courses by which it flowed southwards through the desert and was also supplied water from streams originating in the Arrival Hills. Its drying up therefore was mainly on account of climatic changes.

There already existed as much controversy on the Dirshadvati as on the Sarswati or Hakra. For example, Conningam (5 above ) considered Hansi – Hissar branch of western Jamuna canal as lower course of this river. Rapson considered it as present course of the Chautang. Keith and Dye considered its course along the Chautang and then through Hansi-Hissar branch of the western Jamuna canal. Further identification was made difficult, by similar views of Vasishtha, Sharma and Law. Kar and Ghose's use of remote

sensing identified capture of some of tributaries of Dirshadvati by Jamuna and not vice-versa.

An interesting finding contradicting their previous studies of 1979 and 1980 (31 above) was that only an eastern and less important branch of Dirshadvati flowed to the Luni in early times and it collected rain water from Aravali mountains enroute, but later on, westered to pass through the centre of desert upto 74 longitude E and is difficult to trace further beyond this parallel.

At a third stage the Dirshadvati was to become a tributary to the Sarswati or Hakra, But even the change to eh Hakra system went, through a number of stages at various times, while Hakra or Sarswati too kept shifting west-wards.

The authors found it difficult to date the courses of Dirshadvati, but think that major trend of shifting was from east to west and most probably river flowed to the Luni prior to start of aridity during the Pleistocene period.

- 33) In 1985, M.H. Panhwar, on verifying courses of Dirshadvati as given by Kar and Ghose found that the river Dirshadvati could have three different, but of the major courses in the antiquity the earliest course discharged into the Luni. The subsequent two courses passed through the central part of the western Rajasthan desert towards the Sind, where they joined Hakra, the earlier courses was to the north of Umerkot and the last course passed through Nara and Khipro Talukas. The first of these three course was considered to belong to the pre-Pleistocene by the Central Arid zone Research Institute and second and third during Pleistocene.

With the help of aerial photographs Panhwar came forth with a theory that the 2000 soda water lakes in Khairpur and Khipro Talukas am have been formed by the Dirshadvati river which met in these Talukas and the lakes of Sanghar district, the Makhi-Farash depressions were formed at the confluence of Dirshadvati with the Hakra system. His main source was 32 above and he felt that Dirshadvati may have passed through the

Central part of Sindh in Rajasthan on the Eastern desert. The Dirshadvati, along with the Hakra, dried up due to reducing rain-fall, around 2000 B.C.

This statement was true for Sindh's lakes but due to lack of aerial photographs it was not true for the Indian side.

- 34) After the last finding, the present writer kept probing further into the Sind desert and on examination of latest 1:50,000 maps, which are based on aerial photographs, found that the direction of lakes of Khairpur and Khipro was NNE to SSW. If lakes were formed by Dirshadvati, then their direction would have been almost east to west.

He also found two branches of some ancient rivers coming from the north-east direction and meeting Hakra near the present town of Umarkoit.

35) **Conclusion.**

The whole issue was re-opened. The work done by the Indian authors (31 and 32), and the Central Arid Zone Research Institute Jodhpur, on ancient rivers of Rajasthan, was re-examined and this was further supplemented by remote sensing studies in the Rajasthan, are the Eastern Desert of Sind. Following are the conclusions arrived at by the present writer and are illustrated in the enclosed map.

- i. The Sarswati (Hakra) and the Dirshadvati changed its courses a number of times in the Ambala district and Haryana state, due to heavy load of silt they carried from the denuding Siwaliks. The numerous old streams existing here represent various channels of the Sarswati and the Dirshadvati systems, over many a millennia.
- ii. The Dirshadvati and the Sarswati of Aryan Vedic and religious literature were two distinct rivers in the beginning but by the time Aryans reached that area, these had joined together to form one stream, which at various times fed the Eastern Nara or Hakra
- iii. The Chautang, one time considered a tributary of Hakra, was the main stream of the Dirshadvati and later on when the Dirshadvati discharged in the Sarswati, it indirectly became a tributary of the Sarswati.

- iv. The Dirshadvati is another name for the Chautang. Its earliest recognizable course was approximately Rajgarh, Hadyal, Churu Ratangarh, Mokala and Pundlu.
- v. Due to existence of Jamuna fault in Siwaliks, the Jamuna could not have flowed westwards through the bed of Hakra, which is too narrow to carry its waters.
- vi. South of Simla between, the towns of Jagadhar on the east and Patiala in the west, there are at least seven beds of ancient streams and also two more to the west of Patiala. All these flow from NNE to SSW and merge into each other forming two major streams the Dirshadvati to the east and the Sarswati to the West. The Dirshadvati is represented by the eastern most streams now called the chautang and the Sarswati by the rest eight streams, which are considered its tributaries, although stream capture was common between the two, throughout their life time.
- vii. It appears that during pre-Pleistocene period (more than 2.0 Luni river below the town of Bisalpur, some 250 miles east of Sind border on 26<sup>th</sup> parallel. The Luni carried its waters to the Gulf of Cutch probably near the town of Virawah and Pari Nagar, making Nagar Parker a peninsula. The Dirshadvati's nearest point was 260 miles away from Nagar Parker. It could never have flowed through the lower Sind. The Sarswati also followed NNE to SSW to meet Dirshadvati West of Churn and the combined stream discharged in to the Luni near the town of Panchapadra.
- viii. During the early or the Lower Pleistocene (2.0 million years to 500,000 years ago), due to start of aridity, the Dirshadvati's waters reduced and it could not reach the Luni. It then westward to meet the Sarswati in the latter's new course parallel to its old course. The confluence was midway between the towns of Nagaur and Jaisalmer and North of Jodhpur. The tectonic movements in the head reaches of the Dirshadvati and the Sarswati in Siwaliks may to some extent have been responsible in changing courses of these streams but the major factor was large amounts of silt, which they carried with themselves from Siwaliks and deposited it down streams blocking their own path. It is not certain whether united stream of the Dirshadvati and the Sarswati entered. But two branches of some river coming from the central part of the Western Rajasthan desert, entered the Indus plains near present Umerkot. It appears that either Dirshadvati alone or combined waters of the Sarswati and the Dirshadvati

system, which entered Sindh at this point, followed the western adage of Thar desert to the Rann of Cutch via Rahim-ki-Bazar and thence to the sea.

- ix. Further changes took place during Upper Pleistocene i.e., 35000 years ago. The Sarswati westered towards the Indus system, running parallel to the Sutlej for some distance and then making a NNE to SSW turn, towards the central and the northern Sind in four major and a number of minor shifts.

**Chronologically these four major shifts took place in following stages:-**

- a) Sirsa to Pilibangan, Khangarh, Islamgarh, Dharmi Khu, Ghantiali, Shahgarh, Babuhri, Rajat and Mihar Mungra and further along the eastern Nara to Koree creek, touching western edge of Registhan or eastern distort.
  - b) Sirsa to Pilibangan, Anupgar, Sarkhi, Darwar, Mithrau Mandra and further along the eastern Nara to Koree Creek
  - c) Same course up to the Mithrau as above but further down to Wahinda branch and from there along Eastern Nara to Koree Creek.
  - d) Same course up to Mithrau, but further to Sand hand Raini and from there to Eastern Nara and Koree Creek.
- x. During the early and the Middle Holocene, series of further changes took place in westering of the Sarswati.
- a) From Anupgarh to Fort Abbas and to the north of Darwar. From there towards Raini and from Raini along the Eastern Nara to Koree Creek;
  - b) Anupgarh to Ahmedabad and from there to Raini.
  - c) Anupgarh to Ahmedpur and further to the Sutlej.

While it entered the Sutlej, it was still flowing to Raini and the Eastern Nara.

During this period the Dirshadvati seems to have westered from its course of the Chautang to Hissar, Nihar Suratgarh and Anupgarh. At Anupgarh, the Dirshadvati had confluence with the Sarswati.

- xi. The Sarswati had a number of tributary streams in Ambala, district of the Punjab, Haryana state and Ganganagar district of Rajasthan, these tributaries covered a wide valley extending from the Siwaliks and area presently occupied by towns of Dadwati, Ganganagar, Jakhal, Tajewala, Jagadhar, Panipat, Thanesar and Patiala almost a catchment area of about 10,000 square miles, from which it drained its summer and winter monsoon waters, as well as Himal-ayan snows, making the Sarswati a perennial river.
- xii. The Sutlej in its upper reaches contributed some water to the Sarswati, through some of the branches starting at the east and the west of Ludhiana and meeting it at Jakhal, Hanumangarh and south of Dabawati. These were minor channels belonging to the Lower or the Middle Pleistocene period and did not supply any waters during the Late Pleistocene or the Holocene. However spill water during the same area seems to have been a regular occurrence even in the historical times.
- xiii. 2000 desert lakes in Nara and Khipro Talukas were formed by the combined waters of Sarswati-Dirshadvati during the later part of the Upper Pleistocene (35000 years ago), or even in early Holocene. These lakes are oriented towards NNE to SSW, along the Courses of the former streams.
- xiv. Hakra or Sarswati had no major change its course south of Chotiari lake i.e., from this point to the sea via Umerkot, Naukot, Rahim-ki-Bazar, Sindhuri and Koree Creek, at least since Middle Pleistocene (500,000 years to 35,000 years ago). There was an oscillation of about 5-10 miles from east to west over the entire period. The dunes in this belt are not as high as to the east and were formed during Upper Pleistocene (35000-10,000 years ago.)
- xv. Hakra or Sarswati entered Choriari and Jamrao head at two different times but definitely during the Late Pleistocene (35000 to 10,000 years ago). During this period Dirshadvati had joined the Hakra or Sarswati along Hissar, Nahar and Suratgarh

alignment. Change to Anupgarh took place during the early Holocene (10,000 years ago to 6500 years ago).

- xvi. The Hakra has westered above Chotiari in about 5 stages and as soon as it reached the present course of Raini it started flowing almost north to south. The fifth stage was via Raini, the second stage between Sorah and Jamrao Head and fourth stage along the old course which is known as Wahind
- xvii. When the river Indus and the Sutlej were in spate, they spilled. The spill channels of the Sutlej originated on up and down stream sides of Bahawalpur town. The spill channels of the Indus started north-west of Ghunspur (50 miles from boundary of Sind and opposite to Mithan Kot) in Rahim Yar Khan District and also between Ubavro and Pano Akil. Their waters flowed into the Sarswati or Hakra or Eastern Nara, usually each year, even up to 13<sup>th</sup> Century A.D., and occasionally there after.
- xviii. It is not certain from aerial photographs if the whole of the Sutlej during pre-Pleistocene period passed into the Sarswati or only a part of it. During Mid and Late Pleistocene the Sutlej was an independent river allowing only its spill waters to the Sarswati
- xix. The Indus culture settlements exist along the old courses of the Sarswati from fort Abbas to Derawar Fort, as investigated by Mughal, Stein investigated the following sites along Ghaggar and Hakra bed in Bikanir and eastern Bahawalpur:- Bhadrakali, Munda Fatehgarh, Kalibangam, Bhawar, Badopal, Ranimahal, Karnisar, Sardargarh, Sohankot, Suwaiki, Bijnagar, Ramsinghpur, Binjor, Walar, Sandhnawala, Kudwala and Luriwala. All these sites are either Chalcolithic (Indus Culture) or early historical going back to period of arrival of Aryans and none later than about 750 B.C. The earlier sites go back to 2300 B.C.
- xx. Once Hakra or Sarswati became non-perennial, its contribution to the local economy was limited to pastoralism in Rajasthan and Cholistan, but in Sind below Jamrao Head

it supported some agriculture in summer, although not very regularly probably up to 1200 A.D., and occasionally after-wards but this date cannot be stated with accuracy there are however indications of occasional supply of water up to mid 18<sup>th</sup> Century.

- xxi. Even as a non- perennial river, it could not have been utilized for navigation at the time of Greek conquest of Sind, in 325 B.C., and after-wards. As a perennial river it did contribute to navigation and means of communication with the other Indus culture cities in Sind Cutch, Kathiawar and Gujarat.
- xxii. Rann of Cutch was always connected with the sea. It is possible that when the Indus discharged into Gulf of Cutch, this Gulf may have been a fresh water lake, for a few months a year, but in the months of low discharge of the river Indus, it definitely was a sea water gulf.
- xxiii. Pari Nagar, claimed to be a port, could not have been a river port, but a sea port on the Gulf of Cutch
- xxiv. Pari Nagar now is quite far off from the Rann of Cutch as the area in front of it was probably silted up by Luni during past 1000-1500 years.
- xxv. Even in its hay days before 2000 B.C. the Hakra could not have irrigated any land in the Thar desert, except probably some sailabi cultivation along its bed in winter, but below Jamrao head it would have irrigated lands in the Indus plains on its right bank only.
- xxvi. Vast stretches of alluvium lying under sands in Pat of Sukkur district, Nara and Khipro Taluka could have only been deposited by Sarswati-Dirshadvati group during many a millenii.
- xxvii. A study of ancient cultures gives indication that Archaeological sites of the Early (3500 B.C.-2350 B.C.) and mature Indus Culture (2350 B.C.-2000 B.C.) existed



along the ancient courses of the Sarswati, Ghaggar the main channel of the Sarswati on which flourished Kalibangan, and the Chautang. The Iron age or Grey ware sites (around 1000 B.C.) also exist along the upper reaches of Ghaggar, but not along the lower the Sarswati (or Hakra proper) and not many exist along Chautang. This shows gradual drying up of the Sarswati-Dirshadvati system. The supply of water declined very fast around 2000 B.C. destroying urban life, but yet some water was flowing seasonally to support the pastoral Rig-Vedic Aryans, connected with Grey-ware and thus some settlement dating to even Gupta period (3<sup>rd</sup> to 5<sup>th</sup> centuries) survived on its banks.

- xxviii. During Holocene, spill waters from the Sutlej near Bahawalpur too reached the Sarswati or Hakra but during inundation season only and continued doing so during the historical period.
- xxix. Along major courses of the Sarswati and the Dirshadvati there is fresh ground water, specially along Dharmi Khu, Ghantial, Ghotarou and down to Shahgarh, where it is available at 30-40 meter depth. It appears that this ground water in the area moves under the old course from Himalayas in a slow movement which takes centuries.
- xxx. The Sarswati or Hakra was a river much smaller than the Sutlej, an immature and young river, still in the stage of cutting its own channel.
- xxxi. The Sarswati or Hakra was an independent river, on which existed the Indus civilization cities like Kalibangan and others.
- xxxii. The Indus never passed through Alore gorge. An eastern branch of the Indus was flowing through Alore gorge up to end of 10<sup>th</sup> century A.D. Wasters of the Indus did not pass through the Alore gorge to reach the Hakra.
- xxxiii. Hakra never passed through Alore gorge. An eastern branch of the Indus was flowing through Alore gorge up to end of 10 century A.D. Waters of the Indus did not pass through the Alore gorge to reach the Hakra.

- xxxiv. The Sarswati or Hakra was a perennial river, water supply of which started reducing around 2000 B.C. and the Indus Civilization cities on its banks started declining. The death of the river was slow. From perennial it turned non-perennial. Below Bahawalpur the river still had some quantity of water in summer months, so dwindling settlements survived on its banks for a long time, even during the Vedic and historical times.
- xxxv. The ancient settlements along the banks of Hakra or Sarswati go back to the Indus Culture times (2000 B.C., in its whole reach and 2350-1650 B.C., below Naukot), and some of these have been located very close to its mouth in the Rann of Cutch, i.e., near Rahim-ki-Bazar and Sindhuri.
- xxxvi. After 1650 B.C. when it entered Sind it had sufficient supply of water to help in raising some short term crops in the Lower Sind Cutch in summer, for some years, for many centuries. At least after 500 B.C., it became very irregular in summers and also its water reduced in terms of discharge and the number of days it flowed.
- xxxvii. The Mehran is another name for the Indus. The Mehran never flowed through bed of Hakra, nor did a branch of it.
- xxxviii. It had never flowed through the present desert area of Thar Parker district as many folk florists have thought and written, nor was Pari Nagar a port on it.
- xxxix. It had always discharged in the gulf of Cutch of Cutch, then a sea creek and thence to the sea, via Koree Creek. Later on it discharged into the Rann of Cutch.
- xl. The level of Rann of Cutch, a shallow sea gulf, gradually rose due to silt brought by the Indus, the Hakra, Cutch streams and the Luni. Tectonic movements may also have added to the process, but the contribution of the last factor could not have been

substantial as compared to silting. Earth quakes cannot produce a uniformly flat land as that of the Rann of Cutch.

- xli. An eastern branch of the Indus discharged in Hakra but below the passing east to west from Tando Bago i.e., below the present town of Naukot in Thar Parker district. It continues doing so even up to 1758 A.D., when a major hydrological change in the course of the Indus at Hala, cut off this source of supply. This eastern branch of the Indus was called Puran or Sanghro and its different channels of different periods, are known as the Eastern Puran and the Western Puran.
- xlii. This eastern branch of the Indus was never the main stream of the river Indus.
- xliii. Archaeological sites in Jaisalmir district to the east of the Raini and the Wahinda can provide a clue to early settlements and civilizations in the region.
- xliv. Important sites on Chitang or Chautang after it westward near Hisar to meet Saraswati at Anudagarh are Bahadra., Nohar and Rowatsar. Important archaeological sites along the main Saraswati channel are Hanumangarh, Pilibangan, Rangmahal, Sardargarh and Anupgarh in India, and Dhuldra, Mirgarh, Marot, Mangarh and Dingarh in Pakistan.

The Indian sites were examined by Stein (18 above) and Bahawalpur sites by Dr. Mughal (30 above).

In Sind Vinjrot and Dribh Buthi are two sites on Raini and Nohot and Gurho Bhiro, on the eastern Nara or Puran, All these sites belong to the Indus civilization.

- xlv. Sites along old courses leading to Khipro and Nara Taluka have not been examined for their antiquity either in India or Pakistan.

### 36. Folk-Lorists.

The collection of some two score volumes of Sindhi folklore by Dr. N.A. Baloch since mid-fifties for Sindhi Adabi Board, opened a way for a new pursuit into mediaeval poetry, thought, customs, beliefs and modes of life in the ancient Sind, Full or legendary stories, many people have accepted folk lore for a sober history. They, in vain, have been searching fictitious monuments, settlements and tracks of legendary romantic figures and trying to fit these into history by distorting the latter. Below are a few versions of the folk-lorists and present writers comments.

- I) The great folk-lorist Dr. Baloch many a times has been tempted to prove the impossible. Basing on Tarikh-i-Tahiri's legendary tyrant king of Alore, Dilu rai's story, that this maniac in 962 A.D., wanted the merchant Saiful-Maluk to have latter's beautiful mistress Badi-uj-Jamal, to spend a night into his chambers, Saiful-Maluk asked for a grace period of seventy two hours. During the dark of the night, having engaged a fleet of paid labourers, he successfully diverted the river Indus, from the Alore gorge to a new bed and sailed way, depriving the city of Alore gorge to a new bed and sailed way, depriving the city of Alore of water for ever and causing it to fall in ruins. Dr. Baloch, probably having been influenced by Raverty (20above) and like him believes that the river Indus was previously passing through the Alore gap, to the eastern Nara bed and Saiful-Maluk. Successfully diverted it during the dark of one night. The Kotri Barrage was built dry land and the river Indus was diverted through it. No less than 30 bulldozers of 150 horse power would have worked for nearly two years to perform the job. One horse power working throughout a day and a night means work done by 24 men in one shift. In terms of man day 30 bulldozers working for 2 years are equivalent to 3.0 crore men working for 8 hours of one night, provided that this labour can be obtained, their work coordinated, passage for movement provided and tools for excavation and haulage made available. Like Raverty believing Saiful-Maluk, to be genuine, Dr. Baloch has concluded that the Indus has in the past flowed into two groups channels the Eastern system or Hakra through the central Sind. He has even produced such a map, which is based on Henry Cousens, (13 above) with a few modifications. There are other versions of Saiful-Maluk and Badi-uj-Jamal in

Kashmir and the Punjab and one such version is also in Persian, but none of these versions mention Dalu Rai of Sind, or changing course of the river Indus. Many ruins in Sind are attributed to Dalu Rai. One mound of same name in the Punjab has been explored by the Archaeological Department of Pakistan. Dalu Rai and Siful-Maluk both are legendary and so ins this story. There is however, a bund not across Hakra or Nara, but across a spill channel of the Indus Leading to Nara at Bihra 5 miles east of Alore, built by Ghullam Shah Kalhora in seventeen sixties for spreading the water of the river Indus into adjoining lands. Folk-lorist somehow believe that this is the bund of Alore built by Saiful-Maluk and Raverty too believed so.

- II) Of other folk-lore writers Ursani believed that a part of Western Thar bordering the old bed of the Dhoro Puran was called Muhranno because it was adjoining Mehran or the Indus, Or Hakra or Wahindo and this river irrigated the Mehranno area of Thar (Mehran never passed along this route). He also believed that at one time, Hakra a branch of the Indus starting in the Punjab passed east of Umarkot through Thar to the Rann of cutch near the Nagar Parker Taluka and Pari Nagar was a port on the mouth of Hakra, in the first century A.D.

Raichand Harija in Tarikhi Registan has maintained the same versions vebetium, as of Ursan's. The former was encouraged to write on Registan by the latter and the draft copy of the book was also shown to Mr. Ursani, Raicahnd's book came out earlier than Ursanni's. by about a year. It is not certain who influenced whom on these folk-lore versions, which are totally incorrect. The Vol-II of Harijan's Registan has also repeated same versions.

- III) In 1975 Dr. Abdul Majid Memon Sindhi combined some of the Western writings with folk-lore, to come to conclusions, which are only partly correct. Those mentioned below are considered incorrect as concluded by the present writer in para 35 above. Further comments are given in the brackets.

- a) During Ramayana period, elephants were supplied to Ajudhia, from forests on the Hakra banks.

(Ramayana is a fiction, written around 400-200 B.C., when the Hakra was too dry to support thick forests for elephants to live in).

- b) Hakra tribe living in Sind and Balouchistan were boats men, who sailed their boats on the Hakra River.

(The Hakra tribe could not be boatmen on a dry stream. The name Hakra for the dry bed of this river is less than 1000 years old. Its original name known to Aryans was Sarswati, as mentioned in Vedas, Puranas and Mahabharata, all written between 1000 B.C. to 200 B.C. Its name when Indus culture cities flourished on it, is not known. Thus there is no link between this tribe and name of the river).

- c) The Kot-Diji Culture which is different from the Indus Culture of Mohenjo-Daro, established itself at Kot-Diji on the Hakra river.

(Kot-Diji was situated on the Indus and not on Hakra. Kot-Diji Culture is categorised as the Early Indus Culture. All sites on the Sarswati are either the Early or the Mature Indus Culture and do not represent a different culture)

- d) The town of Sarsa was an important rice market, situated on the Ghaggar a tributary of Hakra.

(There is yet no evidence of rice cultivation on the Indus or its tributaries including the Sarswati or Hakra, during the Indus Culture times, when the Sarswati was active).

- e) When Aryans came to the Sub-continent, the Hakra along with its tributaries was a mighty and perennial river. The Sarswati was another river between the Jamuna and the Sutlej and had confluence with the Hakra.

(When Aryans came to the Sub-continent, around 1000 B.C., the Hakra had already dwindled. The Sarswati was the Aryan's name for the stream now called the Hakra.

- f) The Dirshadvati also called Chautang, which got its waters from the Jamuna, had confluence with Ghaggar near Shor.

(The Dirshadvati was an independent stream and was not fed by Jamuna, but had its independent source from Siwaliks).

- g) The Sutlej was a tributary of Hakra and confluence was at Valhar near the Bahawalpur border.

(The Sutlej was never a tributary of the Sarswati at least during Holocene or past 10,000 years).

- h) Marwat was a fort on the Hakra. It belonged to Umar Soomro, who kidnapped an interned Marvi in the fort.

(Capital of Umar Soomro was Muhammad Tur and neither Umarkot nor Marwat. Marvi is legendry figure rather than historical. In Umar Soomro's times Hakra was dry)

- i) A canal from the Hakra took off near Dribth Dhethari, a river port and on its way towards Jaislamir, it bifurcated into two branches and one of them

was called Ludano. Mammal's Kak (magic place) was located on Ludano, which dried up during the Soomra times, turning Kak into ruins.

(Contours of area show that land towards Jaisalmir is at the higher level and a canal can only flow from Jaisalmir towards Dribh Dhethari. Ludano is only an ancient course of Sarswati belonging to pre-Holocene or the early Holocene period. Mumal and he Kak are legendary.

- j) The Hakra passed through Alore gap and due to drying up to the Hakra, Alore got deserted and turned into ruins. During the Soomra period, there was a short supply of water in the Hakra and the ruler of Alore, raised an embankment across it for diverting water to his lands and orchards.

(It was a branch of the Indus and not the Hakra, that flowed through the Alore gap. Diverting of water of the Hakra on up-stream side, by a powerful land owner was firmly believed by people until the British conquest of Sind, when British engineers on checking found no truth in this story).

- k) Below Alore, Hakra had many branches which finally discharged into the Indus, Kot-Diji, Halakandi or Halla, Brahmanabad, Mansura, Pattala or Nerunkot or Hyderabad were situated on those branches of the Hakra.

(Level of the Hakra was too low for its waters to discharge into the Indus. All above towns existed on the Indus or on its branches. Patal may have been near or at the site of Brahmanabad i.e., Mansura and not near Hyderabad).

- l) Dhoro Branch or Eastern Nara took off from the Indus, near Alore and was flowing through bed of Hakra during the Soomra dynasty's rule.



(It was spill waters of the Indus, rather than a branch of Indus, which fed Hakra but only during the inundation season only. No branch of the Indus passed through the Alore gap, to feed the Hakra).

m) There are a number of ruins on Hakra Namely:-

Daseranjo Daro, Bhorijjo-Daro, Hamiro-jo-Bhiro, Hassan Bagh-jo-Bhir, Patan-jo-Bhiro, tubhian-jo-Daro, Rani-jo-Bhiro, Mumual-jo-Bhiro, Gharho Biro, Lehoor-jo-Bhiro, Lailan-ji-Mari, Kinji-ji-Mari or Bhiro, Kauru-ji-Mari, Noor Ali Shah-ji-Bhiri, Sami-jo-Dhir, Pachat-jo-Bhiro, Nihato Bhiro and Khanpur-ja-Dara all in Thar belonging to the Soomra period, as the names show.

(These ruins belong to the Indus Culture period i.e., 2500 B.C.-1650 B.C. or earlier and not to Soomra period. The folk-lore names of Hamir, Rano, Mumal, sonpari, Amrano, Lailan, Kinjh and Kauro, cannot put them to 12<sup>th</sup> or 13<sup>th</sup> centuries, nor can folk-lore stories prove that Hakra was flowing in 12-13<sup>th</sup> centuries. We should, however, be grateful to the author for listing 21 sites on Hakra, which can be explored by archaeologists)

Another folk-lorist Maamoor Yousifani has been very active in interpreting of folk-poetry and co-relating it with history and historical-geography. According to him:-

a) The Wahind or Waheenday –jo-Dary, an eastern branch of the Hakra, passed through the Punjab, Bahawalpur and Jaisalmir and entered Sind in Thar Parkar District. Pari Nagar was a sea port at its mouth on the Koree creek at the place, where it entered the sea.

(Pari Nagar is 120 miles east of Koree Creek. The port on the Koree Creek mouth is Lakhpat.).

- b) The Wahind had two tributaries, the Sarswati and the Dirshadvati, which dried up 3000 years ago, but Wahind kept flowing, and when it dried up, is not known.

(If its sources dried up, where from did its water come?)

- c) Mehran used to flow through Thar. Its route was from Vinjrot, Nara Taluka and eastern part of Khipro Taluka to Chore, where it entered the Hakra.

(Contours of the area show that Vinjrot is at a lower level than the desert area of Khipro and Nara Talukas, and therefore, no river can take this direction).

- d) A branch of Hakra South of Umarnkot made an easternly turn toward Chachhro and from there to Pari Nagar.

(Contours cannot allow this to happen as Umarnkot and Hakra are at a lower level than Chachhro or its eastern parts).

- e) A branch of Mehran on bifurcation near Naukot, passed near Diplo and etc.

(Contours cannot permit this to happen).

- f) Another branch of Mehran called Meenni Nadai, passed through Mithi and on it flourished towns of Kerti and Karli Nagar.

(This flow would also be against contours).

- g) Raini was a third river of Thar desert which was flowing west of Hakra and after traversing desert parts of Khairpur and Sanghar districts, entered the Thar desert near Shadipali. From thence it entered Samaro Taluka and joined Hakra near Naukot. Important archaeological sites on this course are Dasrhan-jo-Bhiro, Bhor-jo-Shahar, Gharho Bhiro, Laila-jo-Bhiro and Patan or Lihore.

(Yousifani's interpretation of river courses knows no limitation of hydrology or contours. Rivers flow from valleys to hills and jump from one hill to another without touching the valleys in between. Rivers siphon across each other without difficulty and rivers fly across a hundred miles of the Rann of Cutch to the sea. Geography has no meaning in his interpretations).

The above are only four examples out of hundreds of versions of folklorists, repeated in various forms. There is no historical and scientific truth in them as is concluded in paragraph 35 (i to xiv) above.

The map attached shows various courses and their probable ages based on remote sensing technology.

- V) The other categorised as historians but holding similar views on genuinity of Saiful-Maluk are: Maulai Shedai, Bhirumal, Shamasuddin and Arshad. Essentially they have taken folk-lore as sober history.
- VI) Folk-lorists have adhered to the poems of Momai Fakirs and also to predictions of Girohrhi to Hakra, as was done by Burton and Haig. Dr. Daudpotta, an authority on Girohri, considers these poems as forgery of early twentieth century and has even traced out the forger.

## REFERENCES

- 1) Burnes, Alexander, Transactions, Royal Asiatic Society London, Vol. 3, 1834, pp., 550-558 and also his earlier article 'A memoir of a map of the Eastern Branch of the Indus'. Government Press Bombay 1928.
- 2) Thornton Edward, A gazetteer of countries adjacent to India on the north west, including Sind etc., London 1844.  
  
McMurdo Capt J, Dissertation on the river Indus, J.R.A.S. Vol. 1, 1834 pp. 20-24.  
Capt. W. Pottinger, Memoir on Sind 1832, article 'Narra or Nalla'. DEL Hoste Memoir on Sind 1832, article 'The Pooran'.
- 3) Richard Francis, Burton, 'Sind and the races that inhabit the valley of Indus'. London 1855 , and his other writings published in memoirs on Sind, Vol. 1 and II Bombay, 1855.
- 4) File J.G. Report on Eastern Nara S.R.B.G.No. LXV, Bombay, 1857 pp. 1-45.
- 5) Alexander Cunningham, the ancient geography of India, Calcutta, 1871.
- 6) C.F. Oldham, Saraswati and the lost river of the Indian Desert, Calcutta Review, VOL. CXII 1874 and also Jour. Royal Asiatic Society Vol-34, 1874, pp. 49-76.
- 7) Nearchus 'Lost River of Indian Desert', Calcutta Review, Vol. 60 No. CXX, 1875.
- 8) Hughes A.W. The Gazetteer of the Province of Sind, London, 1876, pp, 57, 137, 585, and 845.
- 9) R.D. Oldham, A probable change in the geography of Punjab and its rivers, Jour. Asiatic Society, Bengal, Vol. 55, Part 2, 1887, pp. 322-342.
- 10) Raverty H.G., Mehran of Sind J.A.S. Bengal, Vol, 61, Part I, 1892.
- 11) Haig M.R. , The Indus Delta Country, London, 1894.
- 12) Col. Michin and J.N. Barnes, Bahawalpur Gazetteer, Lahore, 1904.
- 13) Henry Cousens, Antiquities of Sind, Calcutta 1929.
- 14) W.H. Arden Ward, Geographical Magazine Vol. XL, London, 1924.
- 15) M.R.I. Khan, Ph.D. Thesis in history, submitted to London University, 1929.
- 16) Whitehead R.B., The river courses of Punjab and Sind, Indian Antiquity Vol. LXI, Bombay, 1932.
- 17) Pithawalla, A Physical and Economic Geography of Sind, Sindhi Adabi Board, Karachi, 1959pp. 298.

- 18) Stein, Sir Aurel, "A Survey of Ancient Sites along the lost Sarswati river Geographical Journal Vol. XCIX, No. 4, April 1942, pp. 173-182.
- 19) S.M. Ali, The problem of desiccation of the Ghaggar plains, Calcutta Geographical Review, Vol. 4, No. 1, 1942.
- 20) Pithwala Manek B.A Physical and economic geography of Sind, Sindhi Adabi Board, Karachi 1959.
- 21) M.H.Panhwar, Ground Water and Surface Water in Arid zone of Hyderabad and Khairpur Divisions, Lahore, 1963.
- 22) Ground water in Hyderabad and Khairpur Divisions. Hyderabad, 1964.
- 23) H.T. Lambrick, An Introduction to the history of Sind, Sindhi Adabi Board, Hyderabad 1964.
- 24) Holmes D.A., in Hunting Technical Services Ltd., and Sir McDonald and Partner's, The Loser Indus Report Vol, 2, WAPDA, Lahore, 1965, Reprinted as revised edition under title 'The recent history of the Indus in Geographical Journal London, Sept. 1968.
- 25) This Map is yet not printed.
- 26) Raikes, R.L. Kalibangan death from natural causes, Journal Antiquity Vol. 42, 1968, pp. 286-91. Rao Y.S.N., Rahman N.A., and Rao D.P., On the structure of Siwalik Range between rivers of Yamuna and Ganga, Journal Himalayan Geology, Vol. 4, 1974 pp. 137-150.
- 27) Withelmy H. Das Uastromtal Zur Ostrand der Indusehene und das Sarswati-Problem Zietschrift fur Geomorphologie supp. 8, 1969, pp. 86-93.
- 28) M.H. Panhwar, Ground Water in Hyderabad and Khairpur Division, 2<sup>nd</sup> edition, 1969.
- 29) Gurdip, R.D. Joshi, and A. Singh, strabigraphic and Radio-Carbon Evidence for Age Development of three salt lake deposit in Rajasthan India. Jour Quarternary Research, Vol. 2, 1972, pp. 496-505.
- 30) Rafique Mughal, New Archaeological evidence form Bahawalpur, paper presented at the International Seminar on the Indus valley Civilization, Karachi, 9Mimograph), 1979.
- 31) Bimal Ghose, Amal Kar and Zahid Hussain, The lost courses of the Sarswati river in the Great Indian Desert, New evidence from Landstate Imagery. Geographical Journal, Vp; 145, No. 3, London 1979, pp. 446-451.
- Bimal Ghose, Amal Kar and Zahid Hussain comparative role of Aravali and the Himalays river systems in the fluvial sedimentation of Rajasthan desert. Jour. Man and Environment Vol. 4, 1980, pp. 8-12.
- 32) Amal Kar and Bimal Ghose, The Dirshadvati river system of India, and assessment and new findings, Geographical Jour, Vol. 150, part 1984, pp. 221-229.
- Dey N.L. Geographical Dictionary of Ancient and Mediaevel India, 1927, reprinted New Delhi, 1979 Law B.C., River of India as in ancient Literature, In Mountains and rivers of India, Calcutta, 1968, pp. 187-21.

- Vasishtha M. Ancient geography of northern India, National Geographical Jour. India, vol. 8, No. 3-4 1962, pp. 197-214.
- Keith A.B., Age of Rig Veda, in Rapson E.J. (ed), Cambridge History of India, Vol-1. 1922, pp.69-101.
- Sharma S.C. Description of rivers of Rig Veda Geographical observed Vol. 10, 1974, pp.
- 33) M.H. Panhwar, Four Ancient rivers of Sind or one lac years of history of Sanghar district, Jour, Sindhological studies, summer 1985, pp. 42-51.
- CAZRI, Research high-lights, 1959-1984, Jodhpur, 1985 pp, 30-33.
- 34) Refer map appended to this article.
- 35) The ages assigned are probable and not absolute. The exact age can be determined after Radio Carbon dating of pollens from the beds of ancient courses.
- 36-i) Balouch Dr. N.A. (Ed) Tarikh-i-Tahiri by Mir Tahir Muhammad Niyasi, Sindi Adabi Board, 1964, pp. 25, 26, 27, 287-291.  
Balouch Dr. N.A. Notes on 'Chachnamah', Sindhi Adabi Board, 3<sup>rd</sup> edition, p. 374.
- Raverty, Mehran of Sind Jour. Asiatic Society of Bengal, 1892 pp. 376-388, under title Saiful-Maluk.
- Tuhfatul Kiram Sindhi translation by Sindhi Adabi Board, 1957, pp. 113-114.
- Balouch Dr. N.A. Sind Ja Ishqi Dastan (Sindh), Vol, I and II, Sindhi, Adabi Board, Hyderabad, Sindh.
- Balouch Dr. N.A. Ghahan San Ghalhiyoon, Sindhi Adabi Board, Hyderabad Sindh.
- Balouch Dr. N.A. In Search of the Indus Culture sites in Sind, Sind University Press, Hyderabad, 1973, pp.1-5.
- 36-ii) Ursani Muhammad Ismail, Sair-e-Registan. Hyderabad, 1965-57, pp. 12-13,3-31, 34-35 basing on Raikes and 35-42.
- Raichand, Tarikh-i-Registan, Vol. I, Sindhi Adabi Board, 1956, pp. 7 and 656 and Vol.-II, 1975.
- Raikes Capt. S.N. Memoir on Thur and Parker Districts of Sind, Bombay, 1856.
- 36-iii) Sindhi Abdul Majeed Memon, Dr. Hakro Daryah, in Nashad (Ed) Utha Meenha Malir. Hyderabad, 1975, pp. 102-113.
- 36iv) Yousifani Maamoor, Thar Parker Zile-meen; Sind Ja Purana Vahkura, Bhira and Khandar, in Nashad (Ed), Utha Meenha Malir, Hyderabad, 1975 pp. 121-142.
- 36v) Shedai Maulai Rahimdad Khan, Tarikh-i-Tamadan-i-Sind, Sindhi, Hyderabad, 1959.

Advani Bheromal, Mihrchand, Qadeem Sind, Sindhi, Adabi Board, Hyderabad, 1957.

Shamasuddin, Ain-i-Qadim Sind (Sindhi), Hyderabad, 1955).

Arshad Hussain Arshad, Multan Qadim wa Jadid, Multan 1968.

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