

THE CONUNDRUM OF ANCIENT INDIAN CIVILIZATION

Part 2 — The Aryans and the Vedic Civilization

Dhruba Mukhopadhyay*

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Who were the Aryans?

A civilization, according to some scholars, is characterized by urban development. In this sense, strictly speaking, the society at the time of the Rigveda cannot be called Vedic civilization because the Vedic people did not establish towns or cities, though there is certainly a Vedic culture. However the term is so deeply entrenched in literature, that we shall use this term in this article. The Vedic civilization (VC) was built by the Aryans. Who were the Aryans? In the Rigveda the word Arya is used for a group of people speaking Old Indo-Aryan language and dialects or Vedic Sanskrit, following Vedic rituals and carrying Vedic culture. Almost all linguists accept that all the Indo-European languages descended from a pre-historic reconstructed Proto-Indo-European language spoken in the Neolithic era (Bryant and Patton, 2005, Encyclopaedia Britannica, 2022, Masica 1991). The homeland of the language, according to general consensus, and based on archeological evidence, is the

*Prof Mukhopadhyay is an eminent geologist, former Professor of Calcutta University, and the President of Breakthrough Science Society

Pontic-Caspian Steppe, a part of the larger Eurasian Steppe. This language is the ancestor of a reconstructed Indo-Iranian language which belongs to the Indo-European family of languages, and was spoken by people who lived in the late 3rd millennium BCE. A number of undifferentiated Indo-Iranian speaking groups, mainly pastoralists with their cattle, had migrated southwards from the Eurasian steppe lands at about 2000 BCE and spread over Northern Afghanistan and adjoining parts of Turkmenistan, Uzbekistan, Tajikistan and Iran and built up the BMAC (Bactria Margiana Archeological Complex) culture (Figure 6).

During 1800-1600 BCE the Indo-Iranian split into two branches, Old Iranian and Indo-Aryan. Common ties of language, culture, mythology and rituals developed between them before they ultimately separated. The latter group might have reached as far the River Indus by ca. 1700 BCE (Avari, 2005) and later built the Vedic culture. The Old Iranian and Indo-Aryan people had a common archaic poetry, like the Rigveda and the Avesta, with many common expressions, like yajna in Sanskrit and yasna in Avestan, mitra in Sanskrit and Avestan, arya in Sanskrit and arija in Avestan, soma in Sanskrit, haoma in Avestan, and there are many more such examples. The two peoples had the same type of priests and rituals. "Taking into

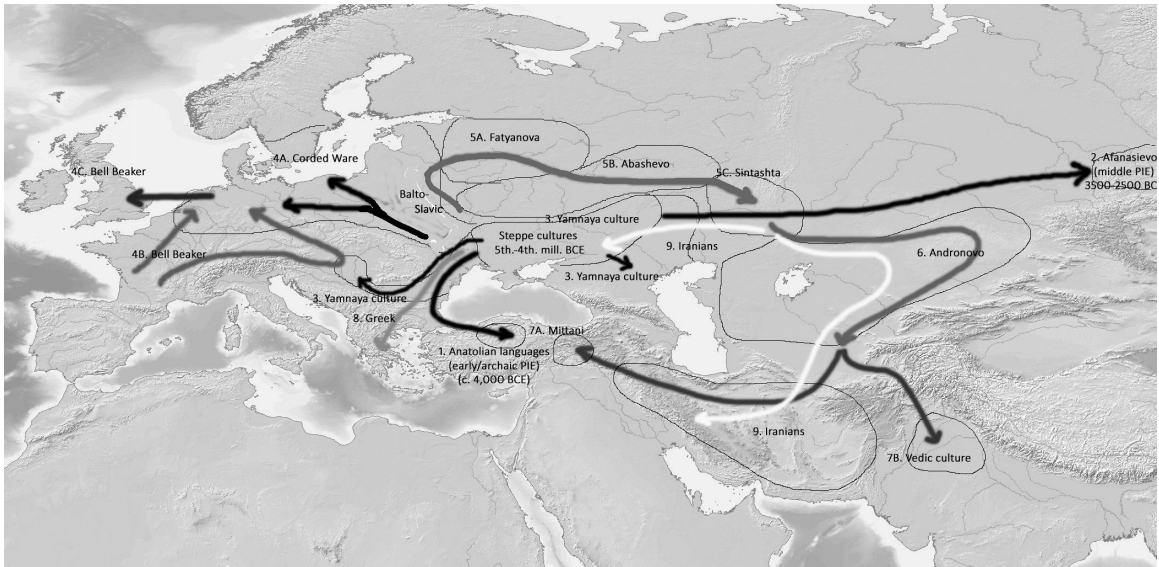


Figure 6: Migration routes from the Eurasian Steppes of the different branches of the Indo-European family.

account the similarities in mythology, language, religious practice and beliefs, we may safely conclude that the traditions of the Avesta and that of the Rig-Veda have emerged from a single common source (Dange, 2002). Among all the Indo-Iranian speakers only the Avestan and Rigvedic people called themselves Aryans.

It must be emphasized that the term Aryan does not connote a race; it is a linguistic community, united by how they lived, worshipped, thought, and particularly what kind of poetic text they composed (Witzel, 2001). The concept of Aryan race was a much later construct particularly championed by the fascist ideologues of the 20th century. The outward appearance, that is the racial characterization, of all the people speaking the Indo-Aryan language cannot be ascertained with any degree of certainty. The people speaking this language might have been quite a diverse group with different physical features, though it is possible that the original

immigrants to NW India might have looked more like Kashmiris or Afghans than the typical North or South Indians.

The Indo-Aryan migrants carried with them their collection of sacred hymns and chants that they had been composing for centuries during their Iranian and Afghan sojourn (Avaris, 2005). The oldest preserved literature of the Indo-Aryan people is the Rigveda. It has been suggested that at least parts of the Rigveda were first composed in the Afghanistan area as the early parts of the text include references at least obliquely to places, rivers, animals, etc., of that land (Witzel, 1995) The other three Vedas, Samaveda, Yajurveda and Atharvaveda are of later composition; some of the verses contained in them are taken from the Rigveda. The migrants were semi-nomadic cattle herders, horse riders and had horse-drawn chariots. Their society was governed by strict moral principles, including adherence to truth, oaths and other oral agreements between individuals

and tribes which regulated water rights and pastures. The migration pattern (Figure 6) inferred from linguistic studies is consistent with the DNA studies to be discussed later.

The Rigveda is replete with descriptions of Indra destroying fortresses, but the Harappan excavations do not show any evidence of such ravages. Hence, the old idea of Aryan invasion exterminating the Harappan people is now abandoned and is replaced by much more sophisticated models of immigration and acculturation. According to the mainstream scholarly view one branch of the Indo-Aryans migrated to Anatolia (Turkey) and the other branch to Afghanistan and NW part of the Indian subcontinent after 1800 BCE (Figure 6). There might have been different waves of immigration over the period of 1800-1400 BCE. Archeological evidence suggest that the migration followed two routes, one from the area of modern Kabul through the Khyber Pass towards the Swat valley (Figure 7), the other through the modern Kandahar through the Bolan Pass towards the Punjab and the Swat valley (Avari, 2006). This was the third major migration to India (Joseph, 2018). After its arrival in the Greater Punjab area the Old Indo-Aryan language was Indianized and grammatically innovated to become the Vedic Sanskrit (Witzel, 2001). Later, from Greater Punjab the language moved to the north Indian plains and by the time of Buddha (about 6th century BCE), the Indo-Aryan language had spread all over the northern half of the Indian subcontinent and had displaced almost completely the previously spoken languages of the indigenous people. Linguists have detected in the linguistic substrate of the Rigveda words which are not typical of Indo-European languages, but are borrowed from ancient Dravidian and Austroasiatic languages. There are about

three hundred clearly non-Indo-European words in Rigveda. This implies that these languages had been in contact three or four thousand years ago, and the Vedic people interacted with the non-Aryan original inhabitants. Peggy Mohan (2021) opined that the linguistic developments were of the nature of convergence and not of forcible subversion which suggests that the Indo-Aryan migrants did not suppress the native (?IVC/?Dravidian) population or force the latter to learn their language.

Relation between the Vedic Civilization and the Indus Valley Civilization

Some scholars, particularly a section of Indian authors, are of the view that the concept of Aryan migration is a colonial construct and has racial overtones. They hold that the question has to be revisited and they champion a contrary idea that the Aryans were indigenous to India (autochthonous hypothesis). According to the autochthonist viewpoint, the Indus Valley Civilization (IVC) and the Vedic Civilization (VC) are one and the same and are contemporaneous or the latter is older (Frawley and Rajaram, 1995).

The River Saraswati plays a pivotal role in this narrative and the term Sindhu-Saraswati Civilization or Saraswati Civilization has been coined for this civilization. Though most of the historical linguists accept the migration model of the Indo-Aryans, the advocates of the autochthonous hypothesis summarily dismiss the evidence for immigration that have been marshalled by the linguistic researchers. They are of the view that the Indo-European languages, at least the Indo-Aryan language, originated in India. Some go to the extent of asserting that Iranians and even all Indo-Europeans emigrated from the Punjab region (Out-of-India hypothesis). However, no rigor-

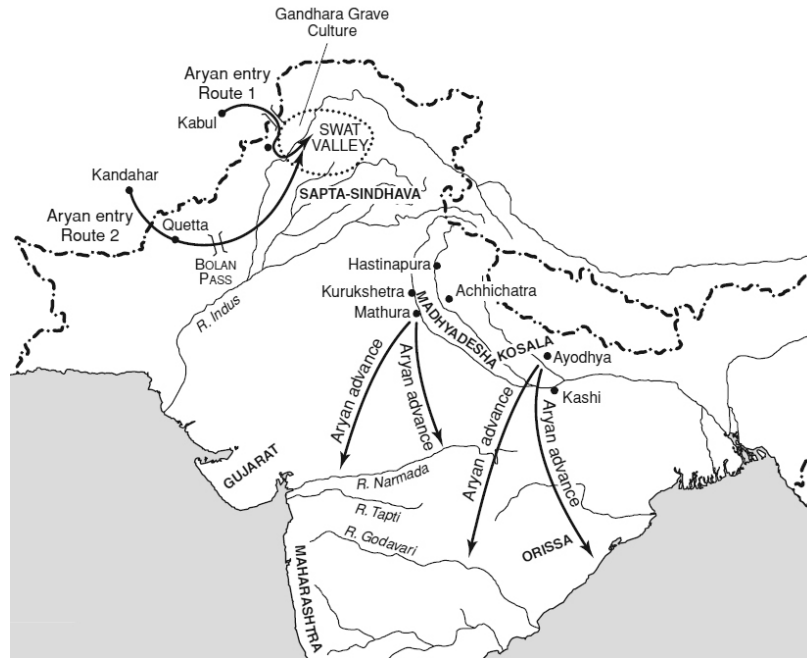


Figure 7: Migration routes of the Aryans (after Avari, 2005)

ous linguistic evidence is put forward for the development of Indo-European, Indo-Iranian or Old-Indo-Aryan/Vedic languages inside the subcontinent. On the contrary, the Iranian and Mitanni (Northern Syria and Southeast Anatolia) linguistic evidence contradicts this idea.

The autochthonist view is linked to the current of Hindu revivalism which was present even during our freedom movement and has gained momentum in recent years with BJP's coming to power in the Central Government. Contrary to the autochthonist view, many scholars have presented strong linguistic and cultural arguments in support of the idea of immigration of the Aryans into India. Michael Witzel (2001) and Romilla Thapar (2002) have summarized the arguments against the idea of autochthonist Aryans. The Harappan people were urban while the Vedic people were

pastoral and forest dwellers. The Rigveda does not know of large cities such as those of the IVC; it mentions only ruins and small forts. The IV Civilization is urban whereas the Indo-Aryans were nomadic pastoral people with limited agriculture. If the IVC and VC are contemporaneous, then why is there no mention of the IVC cities in the Vedic texts. The linguistic study indicates that the Indo-Aryan/Vedic branch of the Indo-Iranian has been Indianized and grammatically innovated after its arrival in the Punjab while the Iranian branch escaped this influence as it did not enter the subcontinent (Witzel, 2005). This supports the idea that the Old Indo-Iranian split into two branches, one moving to Iran the other migrating to India.

The autochthonists claim a continuous cultural evolution in India denying any discontinuity in archeological remains during

the period from 4500 to 800 BCE, and according to them an influx of foreign populations is not visible in the archeological record. However, though there is no archeological record of the early Vedic people, there is a clear discontinuity in material and spiritual cultures, in linguistics and genetics. Kenoyer (2005) had pointed out that there is evidence for significant cultural changes, like changes in burial practices and new decorative motif on potteries and discontinuation of the use of seals, weights and writing in the Late Harappan period (1900-1700 BCE); this may have some correlation with Vedic burial traditions and decorative arts but there is no evidence for the use of horse by the occupants of the Late Harappan cities and towns.

There are no early Vedic temples, monuments or distinctive sculpture. While the IVC people had a written script, the early Vedic people did not use a system of writing; there are no written records or inscriptions belonging to the Vedic era. However, it is to be noted the Harappan script disappeared during the Late Harappan phase (Kenoyer, 2020). The Aryans as described in the Rigveda represent something definitely new in the subcontinent, distinct from the Harappan people. The spiritual and much of their material culture is new. The Vedic people's culture and their language link the Indo-Aryans to the areas west and northwest of the subcontinent. The Aryans were horse riders and cultivated advanced philosophical thoughts. On the other hand, the horse was not known to the IVC people, and there is no evidence regarding the philosophical thoughts of the Indus Valley people. In 2002 the Hindutva ideologue Dr. N S Rajaram made the sensational announcement of the finding of a Harappan seal with the image of horse on it. Later this turned out to be a classic example of fraud. Rigveda does not mention international

commerce, which existed in the IVC. The IVC staple food is wheat, though barley and rice were also cultivated. In the Rigvedic period the principal cereal was barley and in the later Vedic period rice. It is to be remembered that the major cities of the IVC started to decline by about 1900 BCE, before or nearly at the same time as the inferred Aryan migration. Kenoyer (2005) mentioned that the time frame of the Late Harappans overlaps with the early Vedic period and it is 'not improbable' that some communities referred to in the Vedas were passing through or living in the regions inhabited by the Late Harappan people.

Vedic Society and Culture

In the absence of any archaeological remains, the socio-cultural state of the Vedic people can only be inferred from the linguistic and cultural data contained in their literary works, which were orally transmitted for many generations and were written down many centuries later. They were probably first written down in the 3rd century BCE. The earliest surviving manuscript is from 1040 AD. It is difficult to differentiate mythical and historical events in the Vedas, and naturally there is a lot of controversy about many aspects of the Vedic civilization. The early Aryans produced a large volume of orally composed and orally transmitted literature, which include the four Vedas which are divided into Samhita, Brahmana, Aranyaka and Upanishada. The oldest decoded scripts recorded from India are Brahmi and Kharosthi (developed in the Gandhara region) in the 3rd century BCE.

The Vedic Aryans were half-nomadic cattle-herders with domesticated cows, sheep, goats and horses, with a little agriculture on the side (principally 'yava' or barley). Cattle were the most valued possession; protection of cattle was an im-

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portant duty, and cattle raiders and thieves were described as evil people who needed to be destroyed. They used horse-drawn chariots for travel, warfare and sport. The geographic domain of the Rigveda or the Early Vedic period is the Greater Punjab area. There is no evidence that the Vedic people had large urban settlements. There is reference to many different types of artisans and craftsmen like cartwrights, potters, weavers, makers of bows and bow-strings. Agriculture became more prevalent after the migrants came to have a more settled life, and after the invention of iron-making around 1200-1000 BCE iron ploughs became common. It has been suggested that the artisans principally came from the indigenous non-Aryan population (Kulke and Rothermund, 2004).

The Vedic Aryans celebrated gods and chieftains in the poems of the Rigveda, and subsequently they spread their language, religion, rituals and social organization throughout the subcontinent. Their religion had a diverse pantheon: some were gods of nature, like, 'vayu' (wind god), 'agni' (god of fire), 'apah' (goddess of water), 'ushas' (goddess of dawn); others were moral gods, like, 'varuna' (guardian of moral law), 'mitra' (protector of truth, order), 'bhaga' (bestower of wealth), 'indra' (supreme warrior, killer of 'asura'). The gods fought their adversaries, the 'asuras'. There were elaborate rituals for the worship of the gods. In contrast, as mentioned earlier, the Indus Valley people did not seem to have any organized religion or temples. The Rigveda also contains speculations about the origin of the universe, the gods and the humans, and about the forces that keep the world moving. The Vedic religion developed into Brahmanical orthodoxy much later.

The Vedic people formed a patriarchal patrilineal society (Singh, 2009) with an incipient class or caste structure ('varna'),

organized in exogamic clans ('gotra'), tribes and occasional tribal unions. The Early Vedic people or the Rigvedic Aryans had a three-class society inherited from the Indo-Iranians, namely nobility (rulers), poets/priests and the common people (producers). The aboriginal people belonged to the third category. Distinct hierarchy of socio-economic classes were absent, and the Rigvedic verses suggest some degree of social mobility. The caste system (Varnashram), if at all present, was in an embryonic form; the rigid caste structure evolved much later. The priests and rulers consolidated their position and the producers came to be split into two groups; free peasants and traders became the third group, Vaishya, and the slaves, labourers and artisans were degraded into the fourth group, Shudra. In the Purusha sukta of the Rigveda it is stated about the origin of the varna that from the primal Purusha the mouth became the Brahman, the arms the Kshatriya, the thighs the Vaishya and the feet the Shudra. Manusmriti describes their occupations as follows: Brahmins — Vedic scholars, priests or teachers; Kshatriyas — rulers, administrators, warriors; Vaishyas — agriculturists, farmers, merchants; Shudras — artisans, labourers or servants. Those outside the pale of the varna system are the tribals and Dalits or untouchables or outcastes. There is some evidence that in the early Vedic society there was mobility between the Varnas. A person may move from one varna to another through personal choice and conduct. The society employed some sections of the local population (lower class, dasa/shudra) for agriculture, for washing, for pottery making and similar crafts.

Many tribes are named in the Vedas; two important tribes were the Puru and the Bharata. The tribes fought between themselves over land rights and cattle and

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water rights and also against Dasa and Dasyu. One important battle described in the Rigveda is 'The Battle of Ten Kings' which may be based on a historical event. There were no monarchical systems, but the Vedic tribes were led by chieftains ('rajan') and occasional Great Chieftains. The chieftains came from the high nobility, often from the same family. The autonomy of the chieftains was moderated by the tribal councils. Some tribes had no hereditary chiefs and were directly ruled by tribal councils. Some scholars argue that the words dasa and dasyu refer to aboriginal slaves and suggest enslavement of the aboriginal prisoners of war. Others contest this interpretation and suggest that they may represent early Indo-Aryan immigrants who arrived in the subcontinent before the Vedic Aryans (Singh, 2008). Later texts like Arthashastra, Smriti literature and Mahavarata confirm the existence of slave system. However, most agree that the slave system in India was milder than in ancient Greece. There were no slave markets and the production system was not geared to slave-slave master relation. It has also been suggested that the Shudras in the Varna system are akin to slaves.

After 1200 BCE the Indo-Aryan people transitioned from semi-nomadic life to settled agriculture in northwestern India. The small tribal units and chieftains started to coalesce into monarchical states or Janapadas, e.g., Kuru, Panchala, Kosala, Videha. In this period the well-defined 'varna', system emerged and the society got stratified into four classes based on division of labour, Brahmana, Kshatriya, Vaishya and Shudra castes or social groups.

Archeological records show that pre-900 BCE the most common form of pottery is Ochre-Coloured Pottery (OCP). After 900 BCE when the Aryan settlements had extended into the Ganga basin, a new type

of pottery appeared, Painted Grey Ware (PGW). It is possible that pottery was produced not by the Aryans, but by the indigenous non-Aryan population who occupied the bottom rung of the social ladder (Avaris, 2005).

The early Vedic people could not move into the Gangetic plains because of the thick forest cover. Only after 1200-1000 BCE, when they acquired iron tools, did the Vedic people extend their settlements to the east into the western part of the Ganga basin. Towards the end of the Vedic period at about 1000-600 BCE most of the settlements were small farming villages, though a few emerged as relatively large settlements that can be characterised as towns. After the Vedic period, at 600-300 BCE, we witness the rise of Mahajanapadas, that is, large kingdoms and republics. This was the period of second major urbanization in the subcontinent, the first being the IVC urban settlements.

No skeleton of the Rigvedic people has been found. Nothing is documented about their genetic make up, but geneticists have made some inferences from a study of the modern Indian populations.

Vedic Chronology

In view of the total absence of archeological records or human fossil remains, dating the events of the Vedic period must, of necessity, be based on indirect evidence. Linguistic researchers have estimated that the Indo-Aryan language split from the reconstructed Indo-Iranian root at about 1800-1600 BCE. It is believed that groups of nomadic people started migrating to Swat Valley at 1700 BCE, because in the archeological record a change is noticed in burial rites and ceramics (Avaris, 2005). Linguists place the date of the composition of the Rigvedic hymns at about 1500 BCE and the Rigveda took its final form by about

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1200 BCE. Many of the modern scholars are of the opinion that in the archeological record the gap between the late Harappan is not very clearly defined. On the one hand, in some regions the Late Harappan traits continue right up to the Early Vedic period, and on the other hand 'intrusive elements' which are ascribed to Early Indo-Aryan migration into South Asia are seen in some Harappan sites (Kulke and Rothermund, 2004). Such 'intrusive elements' comprise new burial rites and offerings of precious items and treasure, and also the presence of a new type of pottery. The Mittani documents of Syria/North Iraq that mention Rigvedic gods and some Old Indo-Aryan words are about 1400 BCE old, which fixes the age of the Vedic civilization at about ca. 1500 BCE.

The early Vedic period belongs to the Late Bronze age and corresponds to the Ochre Coloured Pottery culture in the archeological time scale. In Rigveda there is no mention of iron. Iron makes its appearance in South Asia only in 1200-1000 BCE. Hence Rigveda is earlier than this. Atharvaveda mentions iron, so it must be contemporaneous with or slightly later than 1200-1000 BCE. The Rigveda mentions horse and horse-drawn chariots with spoked wheels. Though there is evidence of horse riding in North Kazakhstan as early as 3300 BCE, horse-drawn, spoked wheel chariots were invented at about 2000 BCE in South Russia or Mesopotamia, and therefore the Rigveda cannot be older than 2000 BCE.. Horse was unknown to the Harappan people, and the Harappan carts had solid wheels, not the spoked type. Horse bones are not found in the subcontinent before ca. 1700 BCE. Hence the Rigveda cannot be older than this date. Buddha's precepts show that the Upanishadas precede the time of Buddha. The different estimates of the date of birth of Buddha vary from

624 BCE to 400 BCE. Based on the above considerations the general consensus on the range in age of the Vedic period, that is of the Vedic literature as a whole, is ca.1500-ca.600 BCE.

The other school of scholars who believe that the Aryans developed indigenously (autochthonists) assign a much older age to the Rigveda, 4000 BCE, or even 8000 BCE. However, instead of relying on scientific methods, their conclusions are based on their belief in religious texts like the Puranas, Mahabharata and Ramayana as historical documents, though the texts were written down many centuries later. The religious texts give the lists of kings and genealogies and they base their time frame on the basis of number of generations described. The autochthonists ignore the linguistic data and they argue on the basis of textual analysis of the Rigvedic texts and interpretation of astronomical data in the Rigveda, and other scriptures, like the position of some stellar constellations or events of solar and lunar eclipses. However, most linguists dispute their textual analytical interpretations as being subjective and running counter to accepted linguistic procedures. As an example of astronomical events it is argued that the Rigveda mentions vernal equinox when the sun is in the Mrigasiras constellation, which happened during 4500 BCE. The date of the war described in Mahabharata is regarded by them to be 3139/3138 BCE, based on some astronomical events described in the book. Combining evidence from astronomy, archeology and genealogies, Guha (2022) estimated that the Mahabharata war happened in 900 BCE. However, the problem with astronomical data is that the astronomical conclusions are based on subjective interpretation of symbolic statements in the Rigvedic hymns or in other texts and debatable identification of the stellar

objects. Moreover, there was no precise instrumental observation in those days and the inferred positions of the constellations are likely to be imprecise and are not suitable for precise dating. Moreover, such old age of the Rigveda would contradict other evidences mentioned earlier, such as presence of the horse and several linguistic data.

Genetic Evidence

There is no direct evidence of the genetic make-up of the Vedic people because no skeletal remains of these people have so far been found. However, some inferences can be drawn from genetic studies of the present day Indian population. Early work on the genetic make-up of the present day Indian population (Thangaraj et al., 2006) suggested on the basis of haplogroup M lineages that the mitochondrial DNA, which is always passed down from mothers, was unique to the subcontinent, suggesting that on the maternal line, the Indian ancestors had been largely isolated within the subcontinent for several thousand years, without mixing with neighbouring populations from west, east or north. On the contrary, a large proportion of Y chromosomes in the present Indian population, passed from father to son, showed closer relations to West Eurasians (Europeans, Central Asians and Near Easterners). The proportion of the West Eurasian-related component varies from 20% to 80%, suggesting mixture. Majumder (2018) showed that a deeper insight is obtained from a larger data set. The haplogroup U of the female-lineage mitochondrial DNA that is widely prevalent in India was initially thought to be brought into India by migrants from Western Eurasia. However, more extensive data collected later showed that the signature U comprised two sub-signatures, U2i and U2e. It has been shown that the

tribals of India possess exclusively the U2i sub-signature and that the age of the sub-signature predates the postulated time-period (4000-6000 BP) of the beginning of entry into India of migrants from Eurasia. The proportions of U2i and U2e in caste populations are 88% and 12% respectively, signifying that the caste populations are largely indigenous but also admixed with Eurasians.

David Reich (2013) and his co-workers showed that most of the modern ethnolinguistic groups in India descend from a mixture of two ancestral populations, ANI (Ancestral North Indian) and ASI (Ancestral South Indian). They called this the Indian Cline. Indians speaking languages related to the Indo-European family have more ANI ancestry than those speaking Dravidian languages who have more ASI ancestry. Groups which stand higher in the caste hierarchy, e.g. Brahmins, typically have a higher proportion of ANI ancestry than the Dalits or those who are lower in the caste hierarchy, though there are exceptions. The finding that mitochondrial DNA, passed down along the female line, is unique to India suggests that the migrants were mostly males and the gene flow from migrants do not show up in the mitochondrial DNA data. The mitochondrial DNA may have nearly all come from the ASI even in the north, while most of the ANI genetic input came from males. Later, Narasimhan and a team of geneticists (2019) demonstrated that ANI is a mixture of IVC and Yamnaya Steppe-pastoralist ancestry and ASI is a mixture of IVC with southeastern groups. These researchers have estimated a minimum of ~55% IVC ancestry for ANI and ~70% ancestry for ASI. Therefore it can be concluded that there was genetic mixing of the Harappan people and the Steppe pastoralists to give rise to the ANI, but at this time there was little mixing of

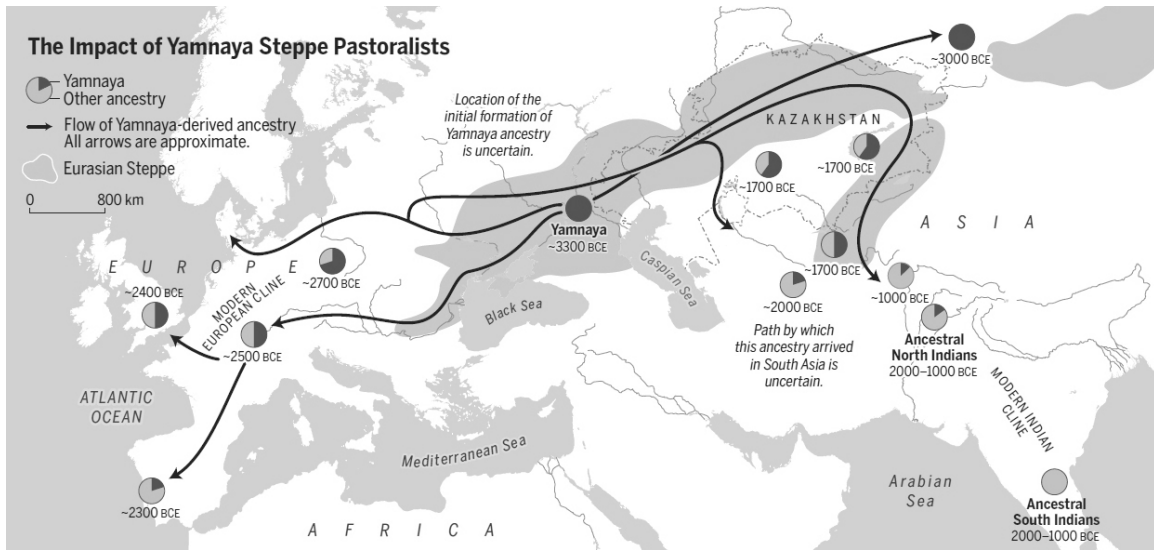


Figure 8: Migration routes of Yamnaya Pastoralists along with the strength of this ancestry in the migrant Population. Pie charts depict the proportion of Steppe ancestry. Dates indicate age of the earliest available ancient DNA with Steppe ancestry (after Narasimhan et al.)

the Steppe pastoralists with the ASI (Figure 8).

It is also interesting that Steppe ancestry is disproportionately high in present day Brahmins and Bhumihars of North India. From detailed studies of the genetic structure Moorjani et al. (2013) obtained ANI-ASI mixture dates to be between 4000 and 2000 years ago (2050-50 BCE). Narasimhan and his team have argued that it is plausible that formation of both ANI and ASI was after the decline of IVC, that is between 1900-1500 BCE. About 17.5% of the Indian male lineage belongs to haplogroup R1a; Pontic-Caspian steppe is regarded to be the point of origin of R1a from which it spread east, west and south. What is significant is that neither the 11 IVC-related outliers in the BMAC nor the Rakhigarhi IVC individual had any Steppe-pastoralist derived ancestry.. There is very little or no Steppe ancestry in ASI. The direct descendants of ASI now live as

some tribal groups of South India. Hence it can be concluded that the population structure of India before around 4000 years ago was profoundly different from what it is today. During the time frame of the collapse of the IVC and composition of the Rigveda there was convulsive mixture of populations. The rigid caste system and the practice of marriage within the same caste have helped to preserve the genetic signature of populations for thousands of years.

Therefore, the genetic evidence lends credence to the view that the IVC preceded the VC and the VC is related to Aryan migration. It belies the hypothesis that the VC is older than or contemporaneous with the IVC.

Conclusions

The Vedic Civilization was set up by the Indo-Aryan migrants entering from Afghanistan and Iran. The term Indo-Aryan

connotes a linguistic group belonging to the Indo-European family which split off from the Indo-Iranian (itself a branch off from Proto-Indo-European) early in the second millennium BCE.

The Rigveda is the oldest surviving literature composed by the Aryans who had no written script. The date of composition of the earliest part of the Rigveda is ca. 1500 BCE and it took its final form by about 1200 BCE. The range in age of the total corpus of the Vedic literature is ca.1500-ca.600 BCE, which can be considered as the time-span of the Vedic Age. The Vedic people did not build any cities which markedly differentiates it from the urban Indus Valley Civilization.

There were probably several waves of migration of the Indo-Aryan people and the time of the earliest migration (ca. 1700 BCE) overlaps with the time of the Late Harappan Phase of IVC. It is possible that the Early Vedic people and the Late Harappan people interacted, but definite evidence is lacking. A fair idea about the Vedic society and culture and its development may be obtained from a critical study of the Vedic literature, but it is difficult to assess how much the events described are historical and how much mythological and imaginative.

There is no genetic information on the Vedic population because of the absence of skeletal material. The significant genetic information is that in the IVC population (Mature Harappan) there is no admixture with Steppe Pastoralist component in the genetic make-up, whereas the reconstructed Ancestral North Indian component of the present day Indian population has a genetic make-up which is essentially an admixture of IVC component and Steppe Pastoralist component; the Ancestral South Indian component has no Steppe Pastoralist component. The genetic data are con-

sistent with the hypothesis that after the peak of the Indus Valley Civilization, the Indo-Aryan people (with Eurasian Steppe ancestry) migrated through Northwest India and intermixed with the indigenous people. The admixture took place between 2050 and 50 BCE. There is no linguistic, archeological or genetic evidence in support of the autochthonist hypothesis, or the Out-Of-India hypothesis or the hypothesis of contemporaneity of the IVC and the VC.

References

1. Avari, B. 2005. *India: The Ancient Past*. Routledge, London
2. Bryant, E. F. and Patton, L. L. 2005. *The Indo-Aryan controversy*. Routledge, London
3. Dange, S.S. 2002. Zoroastrianism and Hinduism: The RigVeda and the Avesta. In, P. Godrej and F.P. Mistree (eds), *A Zoroastrian Tapestry: Art, Religion and Culture*, pp. 185—191. Mapin, Ahmedabad.
4. Encyclopaedia Britannica, 2022. Indo-Aryan Languages. <https://www.britannica.com/topic/Indo-Aryan-languages>.
5. Frawley, D. and Rajaram, N.S. 1995. *Vedic Aryans and the Origins of Civilization: A Literary and Scientific Perspective*, World Heritage Press, Quebec.
6. Guha, B. 2022. Dating the Mahabharata war — A tale of eclipses, archaeology, and genealogies. <https://www.hindustantimes.com/books/dating-the-mahabharata-war-a-tale-of-eclipses-archaeology-and-genealogies-101666958664189.html>
7. Joseph, T. 2018. *Early Indians: The Story of Our Ancestors and Where We Came From*. Juggernaut, New Delhi.
8. Kenoyer, J. M. 2005. Culture change during the Late Harappan period at Harappa: new insights on Vedic Aryan issues. In, Bryant, E. F. and Patton, L. L., *The Indo-Aryan controversy*. Routledge, pp. 21-49.
9. Kenoyer, J.M., 2020. The Indus Script: Origins, Use and Disappearance, in: Zhao, H., (Ed.), *Dialogue of Civilisation: Comparing Multiple Centers*, Shanghai Guji Press, Shanghai, pp. 220-255.
10. Kochhar, R. 2000. *The Vedic People: Their History and Geography*. Orient Longman, Hyderabad.

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11. Kulke, H. and Rothermund, D. 2004. A History of India, 4th Edition. Routledge, London.
12. Majumdar, P.P. 2018. Understanding the Aryan debate : Population genetics concepts and frameworks. Current Science, Vol. 114, pp. 971-975.
13. Masica, C. P. 1991. The Indo-Aryan languages. Cambridge University Press, Cambridge
14. Mohan, Peggy. 2021. Wanderers, Kings, Merchants: The Story of India Through its Languages. Penguin Books, New Delhi
15. Moorjani, P. et al. 2013. Genetic evidence for recent population mixture in India. American Journal of Human Genetics. Vol. 93, pp. 422-438.
16. Narasimhan, V. M. et al. 2019. The formation of human populations in South and Central Asia. Science, 365, eaat 7487. doi: 10.1126/science.aat7487.
17. Reich, D. 2018. Who We Are and How We Got Here. Oxford University Press, Oxford.
18. Singh, U. 2009. A History of Ancient and Early Medieval India. Pearson Education India, New Delhi
19. Thangaraj, K. et al..2006. Origin of deep rooting lineages of Mitochondrial Macrohaplo group 'M' in India. BMC Genomics, 7 : 151
20. Thapar, R. 2002. Early India: From the Origins to AD 1300. Allen Lane, London.
21. Witzel, M. (1995). RigVedic history: Poets, Chieftains and Politics. In,
22. G. Erdosy (ed.), The Indo-Aryans of Ancient South Asia: Language, Material Culture and Ethnicity, pp. 307-352. Walter de Gruyter, Berlin.
23. Witzel, M. 2001. Autochthonous Aryans. Electronic Journal of Vedic Studies, 7-3, 1-118. <http://www.nautilus.shore.net/~india/ejvs>
24. Witzel, M. 2005. Indocentrism: autochthonous visions of ancient India, In, E. F. Bryant and L. L. Paton, (Ed.), The Indo-Aryan Controversy, 341-404. Routledge, London.

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