# Constructing a **Framework for theories of the** Brāhmī **Writing System**

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## Abstract

This paper identifies areas for research and consideration on the topics related to the Indic Brāhmī Writing System with a view to construct a framework which must be addressed by any theory on the emergence, development and functioning of its graphic and linguistic levels. These are short notes on the ancient Indian applied linguistic manuals, orality and the question of writing in ancient India, the issue of memory limitations, Indus script and the research on its Dravidian basis, conditions for the rise of the use of writing, specially in the context of Magadha during the sixth century BCE, decipherment of Brāhmī, and theory construction processes. The sources of the data and conjectures are archeological, epigraphic, and linguistic. The paper suggests that what is needed is the philosopher of science Paul Feyerabend's anarchic approach to theory construction and Charles Darwin's effort to create a consilience of facts with a focus on hypothesis formation and theory construction. Such an attempt may lead to a masterclass of facts and conjectures regarding the origin, development, and functioning of Brāhmī and the derivate scripts used in India, Sri Lanka, Myanmar, Tibet, Thailand and so on.

Key Words: Brāhmī Script, Akṣara, Pre-Historic Tamil Brāhmī

## Introduction

The script known as Brāhmī is not just the mother of the scripts used by the Indo-Aryan and Dravidian languages like Hindi, Bengali, Gujarati, Tamil, and Kannada spoken in present-day India. It is also used outside of India in the neighbouring countries like Sri Lanka, Myanmar, Thailand, and Tibet, among others (Salomon 1998; Coulmas 2003; Daniels and Bright 1996). Further, it has also been suggested that the minimal units known as the kanas in the Japanese writing system are derived from Brāhmī (Miller 1967).

The minimal unit in Brāhmī is known as akṣara, which is a theoretically interesting component of the syllable, that is, (consonant) (consonant) (consonant) vowel (vowel) or only the final consonant. It is interpretable in terms of current models of syllable structure in generative phonology: The ancient linguistic concept of the unit akṣara has modern currency.

The visual appearance of some akṣaras in the early form of Brāhmī matches the letter forms from the earliest foreign writing systems, specifically the Semitic scripts (Buhler 1959; Dani 1986; Sircar 1965. Hence, Upasak (1960, 2002) suggests that Brāhmī was adopted by the Indian merchants and the Vedic pho-

neticians and grammarians made it linguistically sophisticated. In his monograph
<u>Indian Paleography,</u> originally published in 1904,  Buhler (1959, p. 33) argued
that Brāhmī emerged during the 8th century BCE and it was derived from "the
Semitic Alphabet". He also observed that the formation of the akṣaras was lin-
guistically sophisticated, a contribution of the ancient phonetics, metrics and
grammar.

The creation of a theory is necessary for further advances towards an
adequate understanding of Brāhmī as a writing system. While the major experts
have so far preferred to depend only on empirical data in the rigid Baconian
sense , for example, (Goyal (1979, 2002) and Falk (2003), there is a sizeable
community of  scholars in the field ready to form hypotheses mainly on the basis
of the level of orthographic-linguistic maturity and inferences, particularly about
the rise of Brāhmī as a script and its use for commercial and administrative pur-
poses at least two hundred years before the time of Samrat Ashoka as well as the
possible connection between Brāhmī and the Indus script. With recent archaeo-
logical discoveries in Sri Lanka and Tamil Nadu, the scope of available data has
changed; these discoveries call for a comprehensive theory on the rise of the

Brāhmī script and its development into a writing system which is conspicuous by its absence at the moment. The available archaeological, epigraphic, and linguistic data can be synthesized to allow some important inferences to emerge, which can lead to interesting hypotheses, which can ultimately encourage theory construction.

**The Two Levels of the Indic Brāhmī Script**

In general, scripts have two levels: the visual-spatial forms and their linguistic counterparts. It is at the linguistic level that the graphic forms get connected with linguistic units: A given language can be represented this way through orthography. In the case of the Brāhmī script, the minimal unit is the akṣara. The akṣara has a phonological structure, which originated in an applied context of the practice of Vedic recitation which was carried out with utmost precision. The visuospatial configurations graphically represent the phonological units, namely, the akṣaras. Even though the alphabetic segments are observable in the akṣara forms, the akṣara is not an alphabetic unit like the phoneme. It is also not a syllable; the unit is not semi-syllabic either. An open syllable is an akṣara; the closed syllable is not. The open syllable has no consonant after the vowel.

How the word is segmented into syllables and akṣaras can be illustrated as follows:

| Words | Syllables | Akṣaras |
|-------|-----------|---------|
| Sharayu | sha ra yu | sha ra yu |
| Dahiben | da hi ben | da hi be n |
| Shakalya | sha kal ya | sha ka lya |
| mātrā | māt rā | mā trā |
| Shaunak | shau nak | shau na k |

In order to delineate the major aspects of the linguistic representation underlying the visuo-spatial relations of the Indic Brāmī script it is necessary to consider both Mauryan (Ashokan) Brāhmī and pre-historic Tamil and Sinhala pottery inscriptions discovered at Anurādhapūra. Also necessary is a consideration of the problem of the possibility of a link between Brāhmī and the earliest form of writing in India, namely, the Indus script.

**Ancient India: Linguistics, Writing and Orality**

Linguistics originated in India and reached maturity by the seventh century BCE. It originated in real applied contexts; it was given a sophisticated theoretical

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framework by the linguist Dakshaputra Pāṇīnī who was born during the fifth century BCE in NorthWest India in a village called Shalātura. There were important language scholars like Yaska, Shakalya, Shaunak, and Vyaḍi before Pāṇīnī. These pre-Pāṇīnīian linguists did applied work. They suggested many original ideas some of which were formalized later by Pāṇīnī. The application of phonetics, metrics, and grammar is clearly observable in the metrically composed Ṛgveda; the involvement of the applied linguists is also at the core of the practice of recitation.These orally composed hymns are the result of the creative genius of the new Indo-European settlers in India. It is generally believed that these invaders from the north attacked the well-developed Indus Valley Civilization which can now be seen mainly in the archaeologically excavated sites in Pakistan and some regions of the State of Gujarat in India. Specialists on ancient India argue that Indus Valley was inhabited by literate people: They have left behind a system of representation which can be considered writing. The main experts on Indus writing argue that the language underlying this writing is a form of pre-historic Tamil (Mahadevan 1977, Parpola 1994).

So far as the history of writing in India is concerned, there is a significant time lapse between the Indus script and the emergence of Brāhmī, that is, in the Gangetic Basin. Actually, the Vedic people who are hypothesized to have replaced the Harappan communities showed no interest in the use of writing: They were enthralled by the way speech could be modulated metrically accompanied by systematic hand movements in Vedic recitation. The interest of the Vedic society in speech science was to find ways to preserve the hymns and scholarly treatises they created orally. The earliest collection of these hymns is known as Ṛgveda.

It is necessary to keep in mind the differences between the Vedic society of Northern India and the Early pre-historic society of Tamil Nadu: The Tamil society was literate (Rajan, 2009). And literacy was not restricted to a small section of people as it was the case in Aryan North India. The Vedic priestly class strenuously opposed the use of literacy in Aryan India; for them speech was the cosmic cow. On the other hand, there was no priestly class in Tamil Nadu during the fifth century BCE to oppose the use of writing. The Brahmanas from North India arrived in Tamil Nadu during the early historical period and lived as out-

siders for some time (Sivasamy 2009). These differences need to be investigated in detail.

It should be noted that it is difficult to situate Brāhmī in the linguistic history of ancient India; the name Brāhmī did not occur until the time of the post-Pānīnian linguist Patanjali whose time period is 150 BCE (Puri 1990). The first known Tamil grammarian Toḷkappiyam was familiar with both Brāhmī and Pāṇinī'a grammar Aṣṭadhyāyī. The name Brāhmī in modern times was first used by Terrien de Lacouperie (Salomon 1998, p. 17), though the scripts listed by the ancient Jaina and Buddhist texts included the name Brāhmī.

**Vedic Applied Linguistic Manuals: Prātishākhyas**

Each Veda has associated with it the manuals which provide guidelines for phonetic articulation with proper prosodic movements (Chakrabarti 1996). These manuals are known as Prātishākhyas, the most cited of which is Shaunaka's Ṛgveda Prātishākhya (Verma 1972). Especially important for this paper is the way the phonological composition of the unit akṣara is defined: The consonant after the vowel is moved to the next vowel in the breath-group: The consonant before the vowel has no value in duration or quantity. Hence, the akṣara is (con-

sonant) (consonant) (consonant) vowel(short or long) : (C)(C)(C)VV. The Vedic phoneticians considered the breath group as a unit, which corresponds roughly with a phrase or an utterance; in the Vedic hymns the breath group is a line in a stanza: This may be described as a prosodic-grammatical unit. And the process of sandhi which joined words in utterances with linguistically definable changes at the end of the first word and the beginning of the following word produced continuous utterances. Hence, only the ends of utterances contained pure conso-nants; all other consonants were sequences of consonants + vowels. Hence, the phrase-final consonant was treated as akṣara. This was important because, as a general rule, consonants were assumed to inherently have the mid-central vowel known as 'schwa' attached.

The Vedic phoneticians studied the segmental sounds in great detail, how-ever, and constructed the phonetically organized inventory of the sounds of San-skrit known as varṇamālā. Kātyayana's <u>Vājasaneyi Prātishākya</u> (Verma 1987) contains the most complete varṇamālā; this is known as varṇasamāmnāya.

It is likely that Kātyāyana was involved in the creation of the orthographies for Sanskrit, Prakrit, and Tamil (Patel 2010, pp. 67-68). He is considered to be a

disciple of the grammarians Vyāḍi and Shaunaka (Mishra 1907, p. 29). Kā-

tyāyana's approach to language and grammar was philosophical, not descriptive-

prescrivtive. Kātyāyana was a dākṣinātya, a native of South India. He created the

concepts of shabdanityatva (word permanency) and vakya (sentence). Kātyāyana

defined vakya and specified the verb as the core in sentence-meaning; he also

considered the relationship between language and usage (Kulkarni 2004).These

are the characteristics associated with written language. With his non-descriptive

approach to grammar, Kātyāyana was the ideal possible candidate for the cre-

ation of the orthographies for Sanskrit, Prakrit, and Tamil.

The varṇamālā is exemplary in phonetic analysis in modern linguistics. The

sounds are categorized in terms of places and manners of articulation. The

varṇamālā matches the sound units discovered in the Brāhmi inscriptions. Keep-

ing links with the ancient tradition, most children in present-day India use the

varṇamālā.

**The Concept of Mātrā**

The Indian phoneticians divided the syllable following the principle of quantity

or duration measured in terms of the unit mātrā, which is the equivalent of the

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modern term 'mora' in linguistics and music. It cannot be asserted that these phoneticians defined the term syllabic quantity. However, it is clear that the division of the syllable was motivated in terms of the duration values of consonants and vowels. The Indians created the concept of mātrā as a unit of quantity, while the Greeks used the term 'kronos protos', both of which were created more or less at the same time without any borrowing from either side (Allen, 1974).

The Indian phoneticians quantified the scale (Fox Strangway, 1994): short vowel= one mātrā; diphthong= two mātrās; short consonant= half a mātrā; long consonant = one mātrā.

**Akṣara and Generative Models of Syllable Structure**

What W. S. Allen (1953), a well-known authority of ancient Indian phonetics-phonology, calls "the Indian Doctrine of Syllabification" requires that the consonant after the vowel be moved to the next akṣara; this consonant precedes the next vowel. Allen's doctrine can be termed 'the Indian Doctrine of Akṣara Formation. This principle of akṣara formation can be accounted for in terms of the Greek concept of syllabic quantity:

syllable:    (c) (c) (c) vowel (vowel)    and    (c) (c)

akṣara                          akṣara

The syllable is broken into two units: The consonant(s) after the vowel(vowel) has no value in quantity. It may be noted that the Ṛgveda Prātishākyam recognizes the difference between the pre-vocali (purvavarti) and post-vocalic (parivarti) consonants.

TheIndian primary unit of duration or quantity, the mātrā, provides the explanatory power for the mechanism of akṣara formation: the vowel and the preceding consonant(s) is separated from the consonant(s) following the vowel, known as coda in generative models of syllable structure. The model which divides the syllable into body (consonant(s)) and vowel(v) and coda (consonant(s) fits the akṣara. In generative phonology, the process of akṣara formation can be termed resyllabification. The metrical model of syllable structure also suits the phonological structure of the akṣara. Hayes (1995, p. 51) suggests that the pre-vocalic consonants in the syllable are "prosodically inert". Carstairs-McCarthy's (1999, pp. 141-142) analysis indicates that"the onset is always attached moronically to the nucleus".

**The Written Version of the Epics**

The written version of the epic Rāmāyaṇa was available around the year 250 BCE when Ashoka's edicts were inscribed (Pollock, 2003). Incidentally, Pollock is the only Rāmāyaṇa scholar who has properly studied this problem. This epic was composed orally "sometime between 750 and 500 BCE" (Bhatt et al., 1960-1965; Goldman, 1984, p. 23). The writing down of the Rāmāyaṇa in the middle of the third century BCE implies that the orthographies for Ashokan Prakrit and Epic Sanskrit were constructed more or less at the same time (Patel, 2010). The linguistic nature of the orthography for Rāmāyaṇa Sanskrit is a matter of re-search waiting to be undertaken. To my knowledge, the problem of the time pe-riod when the earlier epic Mahābhārata was written down has still not been tapped (Sukthankar et al., 1933-1966; Sharma, 1991; Bailey and Brockington, 2000)). V. S. Sukthankar, the editorial force behind the Critical Edition of the Mahābhārata, captures the difficulty: "Whenever and wherever the text was then written down- and it was probably written down independently in different epochs and under different circumstances..." (Dunham 2007, p. 14). In this re-gard, Pollock (2007, p. 80) makes an interesting statement. Without specifying

the time period, he suggests that the epic Mahābhārata was "transmitted entirely in writing (with the exception of a few books)", while the Rāmāyana "testifies to a transitional relationship to writing". This is a particularly interesting point, as the Mahābhārat is taken to be earlier than the Rāmāyaṇa. Does this mean that writing was used soon after the Mahābhārat was orally composed, as this epic is considered to be post-Vedic?

**The Issue of Memory Limits and Oral Composition and Storage**

The Indian pandits are well known for their oral memory. They can recite the whole of the Ṛgveda without looking at the written text. However, some of the ancient texts consist of complicated scholarly material. Hence, real scholarly pandits like, for example, Murti (1991), argue that, although the Veadas and Vedanga texts were composed and learnt orally, there must have been a script in existence. The Vedangas are really prosaic and almost impossible to memorize. How could works such as Pāṇinī's Aṣṭādhyāyī and Yaska's Nirukta have been possible without a tradition of writing. Pāṇinī's pratyaharas are like what Have-lock (1963, p.182) calls "Kantian imperatives, mathematical relationships, and analytical statements" which are characteristic of written language. Pratyaharas

are abbreviations. And Dharmadhikari (1992, personal communication) suggests that the padapāṭha of the Ṛgveda would have been impossible without the aid of writing. The padapāṭha is a sophisticated linguistic process of morphophonemic segmentation of the continuous text known as the Saṃhitapāṭha (Jha 1987).There are many other substantive arguments along this line (see Patel 2010 for references and discussion). W. S. Allen's (1973, pp. 13-14) remark on the history of writing in ancient India is worth noting: "… quite apart from the Vedic hymns, an extensive philosophical, ritual, and scientific (including grammatical literature in both verse and prose, with little to indicate its oral character."

**Research on Brāhmī: The Old Block and New Avenues**

Until the recent archaeological discoveries in Anurādhapurā in Sri Lanka and Tamil Nadu in South India (Deraniyagala, 1990; Conningham, Allchin, Batt, and Lucy, 1996; Deraniyagala and Abeyratne, 2000) were announced, there was an unassailable block in any advance in the research on Brāhmi as a writing system. It was assumed that Brāhmi as a script was a sudden invention carried out specifically for the edicts of the Mauryan Emperor Ashok (272-232 BCE) in the

middle of the third century BCE (Falk, 1993; Falk, 2007; Goyal, 1979, 2002).

Goyal emphatically asserts that "it is obvious that the inventors of Brāhmī were very well familiar with the rules of Sanskrit grammar and phonology" 1979, p. 7 and 15). At the other end, Sundera Rajan (1979) suggests that "Though no script was being mentioned, the situation was certainly pregnant with the great possibilities for written records also, and it would be quite legitimate to argue that Ashokan Brāhmī was not an instant miracle, but one that had been already in position and in shape, … (pp. 58-59).

Gupta (1979, p. xxi) rightly argues that so far as the question of the origin of Brāhmī as a script is concerned, "archaeology has to have the last word …" Script is, afar all, a visual transformation of an abstract idea and, therefore, it cannot escape the catch of archaeology." Archeology has indeed delivered the outcome that Gupta foresaw in 1979 (Gupta and Ramachandran 1979). The discoveries at Anurādhpura in Sri Lanka and the more recent excavations conducted by Professor K. Rajan and his team at many sites in Tamil Nadu, South India, have forcefully added the voice of archeology that Gupta (1979) expected to hear ( Rajan, K. and Yatheeskumar 2013).

The research methods in archeology are now so advanced that the results are scientifically dependable (Maschner and Chippandale 2005). Knappett (2005, p. 677) suggests that "archaeological pottery has probably most commonly been valued as a marker for something else, notably a period in time". This "capacity for dating evidence" has pushed the possible origin of Brāhmī into a time period at least two centuries before Emperor Ashoka's rock and pillar edicts with Prakrit Brāhmī. This makes sense: The Prakrit orthography in the Ashokan inscriptions  (is impressively advanced, which requires time. And more importantly, this form of Brāhmī is used to represent Tamil and Sinhala Prakrit. Professor Yellava Subarayalu, who is close to the archaeological team in Puducherry, observes that these two Southern scripts are similar epigraphically; that is they do not bear close resemblance to Ashokan Brāhmī (Subarayalu 2009). This body of evidence certainly turns around many basic questions.

**Brāhmī andArchaeology**

The archaeological discovery of the Ashokan edicts was accidental. On the other hand, the recent Tamil and Sinhala inscriptions on potshards were discovered systematically applying the up to date archaeological research methods. Arche-

ology in India began as what Alexander Cunningham preferred to call 'field archeology' (Allen 2012, pp. 235-236) which he pioneered in the middle of the nineteenth century. After he retired from the Indian Army, he went to England only to return to India as a major-general and archaeological surveyor at a salary of 450 rupees a month and a field allowance of 350 rupees a month. Cunningham now could conduct field surveys guided by Faxian and Xuanzang's travel accounts, which he carried with him all the time. When these Chinese travellers visited India in ancient times, they kept notes on the Ashokan edicts. Thus were discovered the edicts of Emperor Ashoka with Brāhmī inscriptions in Prakrit orthography.

It was in Sri Lanka that the Brāhmī script entered the scope of modern scientific archaeology under the leadership of Dr. Siran U. Deraniyagala, whose research was replicated by the team of the British archaeologists F. R. Allchin and Robin Coningham. This research on pre-Mauryan Brāhmī was bolstered by the findings on Tamil Brāhmī on the fifth century BCE potsherds unearthed by the Tamil Nadu archaeological team led by Professor K. Rajan. These recent archaeological findings at Anurādhapurā in Sri Lanka and Kodumanal and Porun-

tal in Tamil Nadu, South India, open up new avenues for possible hypotheses about the emergence of Brāhmī a script and the development of the linguistic organization of the unit akṣara as it was adapted for the representation of Tamil, Sinhala Prakrit, Ashokan Prakrit, Epic Sanskrit, and Classical Sanskrit. In this context the question of the role of the phonological structure of the Tamil words acquires central importance.

**Archeology and Epigraphy**

So far as the time period for the emergence of Brāhmi as a script is concerned, there is a disagreement between the archaeologists and the epigraphists.. In the case of the date for the pottery inscriptions for pre-historic Tamil in South India, the leading archaeologist K. Rajan opts for the fifth or the sixth century BCE, while the epigraphists Iravatham Mahadevan and Yellava Subbarayalu argue for a a later time period. The difference in the views might be due to the nature of the data considered by the two groups. The archaeologist looks at small samples of the script which may not indicate linguistic-orthographic features, while the epigraphist examines the mature level of the script.

## Archaeology, Epigraphy and Linguistics: Cross-Fertilization

In previous work, I made an attempt to show how the understanding of Brāhmī developed by Epigraphy and Archaeology be further advanced by cross-fertilizing them. The epigraphists like Johann Buhler, Sircar, Upasak, among others, have shown how some akṣara formations are not just graphic combinations, the topographic organization has linguistic significance. It has also been repeatedly pointed out how Brāhmī is so advanced phonologically (Allen 1953, Scharfe 1977). These attempts call for further research to delineate the major features of the linguistic level of the Brāhmī script, both pre-Ashokan and Ashokan. The orthographic features underling the use of Brāhmī to represent Prakrit and Epic Sanskrit of the third century BCE substantively indicate the role of ancient Indic linguistics which was available by the seventh century BCE.

## Akṣara Formation: The Role of Pre-Historic Tamil

The linguistic unit akṣara in present-day Indic languages may be represented as follows:

(consonant) (consonant) (consonant) vowel (vowel) and the word or utterance-final

- consonant. The basic principle is the natural association between the vowel (s) and the preceding consonant(s). A consonant by itself also can be an akṣara in some specific situations. The modern structure of the akṣara was formed as the Brahmī was used to create the orthographies for Prakrit, Rāmāyaṇa Sanskrit, and Classical Sanskrit for inscriptional as well as textual use. Inscriptions in Classical Sanskrit appeared only during the fourth century A.D. during the time of Emperor Samudragupta. Given the contribution of ancient Indic phonetics, metrics, and grammar in the development of the linguistic level of Brāhmī, it is not unlikely that an elementary orthographic system for Early Sanskrit was created. Due to the rise of Prakrit and the decline of the dominance of Vedic religious beliefs and culture, the first use of Prakrit orthography on a large scale occurred during the middle of the third century BCE. The orthography for Rāmāyaṇa Sanskrit was constructed during the same time period. According to Pollock (1984), this epic was transformed into a written version during the middle of the 3rd century BCE, that is, more or less simultaneously with the Ashokan edicts.

With the discoveries of Early Prehistoric Tamil inscriptions on pottery, the question of the role of the contribution of Tamil in akṣara formation attains a

critically important position (Patel 2015). Mahadevan's (2003) cave inscriptions contain single consonants and the puḷḷi. The puḷḷi is a dot associated with the consonant to indicate the absence of the mid-entrap vowel schwa. In the Indo-Aryan scripts, each consonant is assumed to contain the schwa. While the Indo-Aryan scripts allow joint consonants; the Dravidian scripts do not allow joint consonants; the puḷḷi marks the initial consonant as a vowelless sound.

The differences between the orthographic systems for Prākrit Brāhmī and Brāhmī for Early Tamil are significant and indicate a high level of linguistic so-phistication. Those who created the orthography for Early Tamil must be real phonological experts as they demonstrate a sound grasp of Tamil phonology.

**The Indus Valley Script and Early Tamil**

Iravatham Mahadevan has been working on the Indus Valley script and and its links with Early Dravidian for many years. On the basis of his arduous and meticulous data analysis he now concludes that the language underlying the In-dus script is Early Dravidian. In a paper entitled "Dravidian Proof of the Indus Script via the Ṛgveda: A Case Study" that he presented at the Roja Muthiah Re-search Library, Mahadevan suggests in definitive terms that the "Indus language

has been correctly identified" as an early form the Dravidian script" (2014). Mahadevan points out that the methodology followed "is to identify the ideograms, find the Dravidian roots with the nearest literal meanings and interpret them through the rebus technique to get at the intended meanings".

Asko Parpola's (1994) substantive research also presents such an argument. According to Parpola (1994, p. 52), the Indus writing was 'logo-syllabic' . And more importunely, the language underlying the Indus script belonged to the Dravidian family. Parpola (1994, p. 169) points out that "The Dravidian family is the best match for Harappan among the known non-Aryan language families of long standing in South Asia".

The Indus Valley Civilization emerged around 7000 or 8000 BCE: The cities of Mohanjo-daro and Harappa reached a mature level of functioning during 2500 to 2000 BCE (Pozzehl 1999).

**Kharoṣṭhī and Brāhmī**

Kharoṣṭhī was used during the reigns of the Indo-Greek, Indo-Sythian, Indo-Pathian and Kuṣāṇa kings from the first century BCE to the second century AD.

It was a derivative of Aramaic, but it was used to represent Prakrit for the Ashokan edicts located in Northwest India.

What is interesting is that the phonological organization of the akṣara is the same as in Prakrit Brāhmī. As Mangalam (1990, pp. 64-71) points out, "In spite of its direction from left to right, its nature is Indian, specially attaching anusvāra and medial vowels and in the formation of ligatures". The Kharoṣṭhi akṣara consists of (consonant) (consonant) (consonant) vowel. Mangalam's (1990, pp. 64-71) examples do not show the codaic , that is, final-consonant akṣarraScharfe (2002, p. 392) suggests that "The lack of differentiation of vowel length in the Kharoṣṭhi derives ultimately from the Semitic technique of writing …". The relationship between Kharoṣṭhi and Brāhmī is a certainly an important topic.

**Conditions for the Emergence of Literacy**

According to Deshpande (1993, p. 166), the processes of linguistic standardization of the oral texts in accordance with the norms of the Gangetic basin was called 'brāhmīkaraṇa'. In every linguistic community, the problem of the standardized language precedes the beginning of written texts. The phonological unit akṣara was available before the creation of Prakrit Brāhmī. The organization of

akṣarasamāmnāya, varṇamālā and Brāhmīkaraṇa were ready by the seventh century BCE. The rise of Buddhism and Jainism created the cognitive condition of doubt and dissent. It can be inferred that the sixth/fifth century was the time period for the emergence of societal literacy.

The newly emerged region of Magadha as a Mahājanapada was probably the site for the rise of literacy. The academically acclaimed historian R. S. Sharma suggests a hypothesis in this regard: "After the end of the Harappan culture, writing probably began a couple of centuries before Ashoka" ((Sharma 2005, p. 160). It is highly likely that Ashoka's grand father Chandragupta Maurya and his adviser Vishnugupt Chanakya used literacy for administrative and commercial purposes.This is known as the period of second urbanization; the Indus Valley cities Mohanjodaro and Harappa are associated with the period of first urbanization in India (2550-1900 BCE). This "Urbanization strengthened the state, increased trade, and promoted reading and writing" (Sharma 2005, p. 160). C. S. Upasak (2002, p17) pushes the beginning of Brāhmī to the time of the lexicographer Yāska who is associated with the 10th century BCE.

Interestingly in this context is the presence of the Harapans in the region of the Gangetic doab. The people of the Indus city of Harappa used writing for commercial purposes. The Harappans who moved to the Gangetic doab after the fall of their city are most likely to be merchants who used writing for business transactions. Perhaps these Harappans in the Gangetic Doab passed through Magadha and carried their skills in literacy to Tamil Nadu with the help of the Jaina monks who knew Tamil Nadu well at the time. It is generally believed that the Dravidians left the Zograb mountains in Northern Iran or Baluchistan and reached  Tamil Nadu by the coastal route. This calls for further research as well as a theoretical speculation.

**Decipherment of Brāhmī**

Brāhmī was deciphered by James Prinsep during the years 1834-1937 while he worked for the British East India Company. Prinsep was a young man without any formal education. What helped him were his scientific bent of mind and his personality, charming and enthusiastic. He regularly corresponded with the right people like Brian Houghton in Nepal and George Turnover in Sri Lanka. The linking thread amongst these individuals was familiarity with Buddhism. Also

helpful in the decipherment enterprise was Alexander Csoma de Kronos, who was known as a crazy Hungarian with a familiarity with Tibetan language and Buddhist texts. Charles Wilkins and Horace Hayman Wilson, the two Sanskrit scholars, were also associated with this group; Prinsep did not learn Sanskrit.

Sir William Jones' efforts to decipher Brāhmī were misdirected by his vast classical learning. The assets that Prinsep possessed were his ability for concentration and working habits. He completed his official duties at the Mint early in the morning: "From 10 o'clock the day is entirely my own" (C. Allen 2000, p. 143).

The theoretician for Brāhmī needs to be an energetic scholarly Prinsep, not a typical academic.This scholar must have a command of the research and scholarship in archaeology, epigraphy and linguistics, ancient Indian as well as current. She needs to be in touch with the working experts like Iravatham Mahadevan, Yellava Subarayalu, K. Rajan, C. S. Upasak, Siran Deraniyagala, Robin Conningham, Srimannarayana Murti, Helmut Scharfe, Harry Falk, Asko Parpola, Richard Salomon, and Florian Coulmas.

**Brāhmī and Cross-linguistic Orthography**

The alphabetic principle created by the Greeks has been used to create orthographies for all the languages used in the Western world. The Roman and Cyrillic scripts have different visuo-spatial features; however, the underlying principle is alphabetic. In the case of Brāhmī, the minimal unit akṣara allows it to be adapted to create orthographies for Tibetan Thai, and Burmese (Miller 1956; Danavivathana 1987; Jones and Khin 1953). The structures of Tibetan, Thai, and Burmese are highly different from those of the Aryan and Dravidian languages. It is this particular feature of Brāhmī's linguistic genius that has given India orthographic unity in the midst of linguistic diversity.

**Theory Construction Processes**

Perhaps the most practical way is to follow Charles Darwin's practice: Darwin showed great respect for Francis Bacon and paid attention to Bacon's ideas. Bacon was a pure empiricist, like some of the experts on Brāhmī. In his own practice, Darwin was focused on hypothesis formation and theory construction (Lewens, 2007, pp. 95-107). In this regard, Darwin's guiding principles were William Whewell's concept of "Consilience of Inductions" (Lewens, 2007, pp.

102-103). The short notes on some of the topics related to Brāhmī presented in this paper may be considered to follow Whewell's idea. Furthermore, it should be noted that "Darwin's scientific insights were far from solo efforts. He was a prolific correspondent, sending letters to all parts of the world" (Lewens 2007, p. 31).

The process of theory construction in the domain of the Indic Brāhmī Writing System needs what the philosopher of science Paul Feyerabend calls "a dose of theoretical anarchism". Feyerabend argues that theory construction is not a monic process; it is anarchic (Feyerabend 1995). Feyerabend demolished the ideas on hypothesis falsification proposed by the philosopher of science Karl Popper. Feyerabend also supported the philosopher Wittgenstein who, according to Feyerabend,"severely reduced the independence of theoretical speculation" (Feyerabend 1995, p. 93). The safest way is to let empirical data and theoretical speculation go hand in hand.

**Concluding Remarks**

This paper has touched the areas which can be brought together to construct a framework for hypothesis formation and theory building. There are shards of

hypothetical thinking in epigraphy and archaeology. As I have argued elsewhere (Patel 2010), what is necessary to find is a common thread to put these hypothetical efforts to construct a theory is a synthesis of the advances in epigraphy and archaeology with the contribution of ancient Indian phonetics, metrics, and grammar.

In ancient India before the time of Pāṇinī. that is, the fifth century BCE, there used to be 'parishads' (seminars) to discuss linguistic issues (Mahulkar 1990). It is appropriate now to have a parishad like this to assess the available empirical data and and hypotheses on the emergence and development of Brāhmī as a writing system.

**Acknowlegement**

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In management studies, systems theory is an underexplored construct consistent with the dynamic capabilities framework. The systems approach received attention from management scholars in the middle of the last century, but, since then, has been largely abandoned. Meanwhile, academic disciplines have continued to narrow their focus. The capabilities and systems frameworks both adopt a holistic view that calls for all elements of an organization to be in alignment, and both recognize the importance of some form of learning for the purpose of adaptation. Dynamic capabilities go further by recogn