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Typographical Investigation of Mauryan Brahmi

Origin, Evolution & Role in development of Indic and Southeast Asian Scripts

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Abstract: The paper analyses the typographic qualities of Mauryan Brahmi Script that remained the preferred mode of written communication over large swathes of the Indian Sub-Continent during the 4th – 2nd Century BCE and later worked as a pre-cursor for development of a host of Indian and South-East Asian scripts. Although Brahmi Script has historically aroused curiosity of Historians, Archeologists and Epigraphists, its many forms, structures & typographical specialties as a Script have largely been ignored and never been scrutinized. Script of Brahmi has historically been praised for (i) distinct and symmetric anatomy and (ii) accurate and logical phonetic arrangement (Edward Thomas, 1858), (Isaac Taylor, 1899), (David Diringer, 1968). These qualities have often made the outsiders to conclude it as a foreign import, however gradually a broad consensus has emerged. It is now believed that "Brahmi" is not a borrowed script, but an adopted one that indigenously evolved in a progressive manner (Richard Salomon, 1998). Brahmi as a typographic entity has many unique features; other than the scientific order of its alphabets and precise phonetics, Brahmi typeface is Simple yet Elegant; Bold yet Lyrical; Distinct yet easy to memorize; Symmetrical with high legibility even when scaled down; and relatively easy to recognize when touched upon with closed eyes.

Key words: Brahmi Script, Brahmi, Asoka, Edicts of Asoka, Panini, Ancient script, Indic script, writing systems, Mauryan Brahmi, Indian Epigraphy, Inscription, Pillar Art, Script

1. Introduction

Human fascination for scripts is primordial and deep-rooted in the cultural sophistication of any civilization. A perfunctory analysis of writing systems around the world provide us with plethora of information about the people who created them. It tells us about their – thought process (clarity and extent), level of sophistication, artistic inclination and aesthetic appeal. They also enlighten us about their faiths and beliefs. While some of these scripts are derived from pictorial representations, other use

logographic, syllabic or alphabetic framework to express themselves. The first sprouts of a comprehensive writing system took birth in the Sumerian civilization of southern Mesopotamia sometime around 3500 BCE. A little later came the Egyptian Hieroglyphics with its interesting set of symbols. Asia, an ancient cradle of civilization followed the trend; the Minoan script surfaced by the middle of 3rd Century BCE, while the Chinese had started to write a century.

The Indian-subcontinent, a land of antiquity, also gave birth to a civilization of grand proportions; covering more than 100 towns and villages, stretching from Shortugai on the northern extremities of modern day Afghanistan to Lothal in Gujarat; from Sutkagen Dor in Pakistan (near the Iranian border) to Rakhigarhi in Haryana, Indus Civilization took mankind to new heights of sophistication. The civilization that first surfaced through its urban sites of Harappa and Mohenjo-Daro, is still being unearthed through discovery of its numerous human settlements spread across the Indian peninsula. Indus Valley had a hieroglyphic script of its own that is still to be deciphered. Alexander Cunningham was first to publish symbols of Indus script found on a seal in 1875. Many feel this indigenous script of ancient India was the dominant inspiration behind Brahmi (Richard Salomon, 1998). Archaeologists are still looking around for a "Rosetta Stone" that would help them arrive at a decipherment. Although there are some significant differences between the two, a correlation cannot be ruled out. Brahmi that was known to germinate by the 6th Century BCE had flourished to become a regal script during the Mauryan era (c. 324 – 187 BCE) and prevailed over much of the Indian Sub-Continent reaching its zenith under Mauryan Emperor Asoka (r. 269–232 BCE).

2. Origin

Brahmi's origins are shrouded in mystery; both the name, timeline of creation, background of creators and its first usage. French Orientalist Terrien de Lacouperie suggested the name after a thorough study of ancient Chinese sources. Georg Buhler adopted the same bringing in credibility and recognition. Lacouperie's scholarship however was later supported by leads from old Jainism and Buddhism scriptures. If Buddhist literary epic, ***Lalitavistara***, mentioned Brahmi at the very top in a list of 64 ancient scripts, Jaina religious books - ***Samavayanga Sutra*** (300 BCE) and ***Pannavana Sutra*** (168 BCE) recorded ***Bhambhi*** (or Brahmi) in another list of 18 scripts. These concurrences surely indicate that Brahmi was probably the oldest and the most widely used script of ancient India. It was the first choice amongst the many prevailing scripts because of its sophisticated structure

and scientific phonetics. By Mauryan era, Brahmi was established as a superior script best suited for royal decrees and proclamations.

An alternative investigation into the origin of Brahmi was led by a team of epigraphists. Their methodology relied on analyzing the anatomy of Brahmi inscriptions. Despite the painstaking efforts, nothing could be established conclusively as no consensus was achieved. Village of Barli in Ajmer, Rajasthan provided one of these early Brahmi inscriptions. Ojha dated the inscription back to 5th Century BCE, however Sircar later placed the same around 2nd Century BCE. Same happened with Brahmi specimens from Piprahwa, Sohgaura and Mahasthan (Richard Salomon, 1998). The only Brahmi inscriptions that have been dated conclusively are the Asokan edicts etched on rocks and pillars. Buhler opines, “The characters of the Asoka edicts, which have to be considered first, prove very clearly that writing was no recent invention in the third century B. C. ... The existence of so many local varieties, and of so very numerous cursive forms, proves in any case that writing had a long history in Asoka’s time, and that the alphabet was then in a state of transition.” Treading cautiously Buhler concludes, “The results of a palaeographic examination of the most ancient Indian inscription fully agree with the literary evidence, which bears witness to the widely spread use of writing during the fifth century B. C. and perhaps even during the sixth.”

3. Timeline

Although, the Pre-Mauryan history of India’s ancient script is somewhat unclear, the ascent of Brahmi during the Mauryan era is well-established by the vast stockpile of inscriptions left by legendary Mauryan Emperor Asoka (r. 269-232 BCE). Mauryan Empire under Asoka, stretched from Mahasthan (in modern day Bangladesh) to Kandahar (in modern day Afghanistan) from East to West; from Shahbazgarhi (in Khyber Pakhtunkhwa region of Pakistan at the Himalayan foothills) to Brahmagiri (deep into the Indian peninsula in Mysore district of Karnataka) in North-South directions. For such an expansive stretch fragmented with interspersed unconquered tribal hinterlands, the empire chose just three imperial scripts – Aramaic, Kharosthi and Brahmi. Use of Brahmi in a mammoth share of inscriptions is a pointer towards its overwhelming popularity and acceptance. Out of the 39 total Asokan edicts, Lampaka and Laghman inscription are in Aramaic, while Kandahar uses a bilingual set of Aramaic with Greek. Shahbazgarhi and Mansehra inscriptions are in Kharosthi. The remaining 35 edicts are in Brahmi (Romila Thapar, 1997). During the reign of Asoka, Brahmi anatomy matured and evolved significantly attaining more uniformity. Figure.2 shows the location of Asokan edicts on a map, highlighting the script used. It is

evident from the map that Mauryan Brahmi was the script of the Indian Sub-continent as we know today.

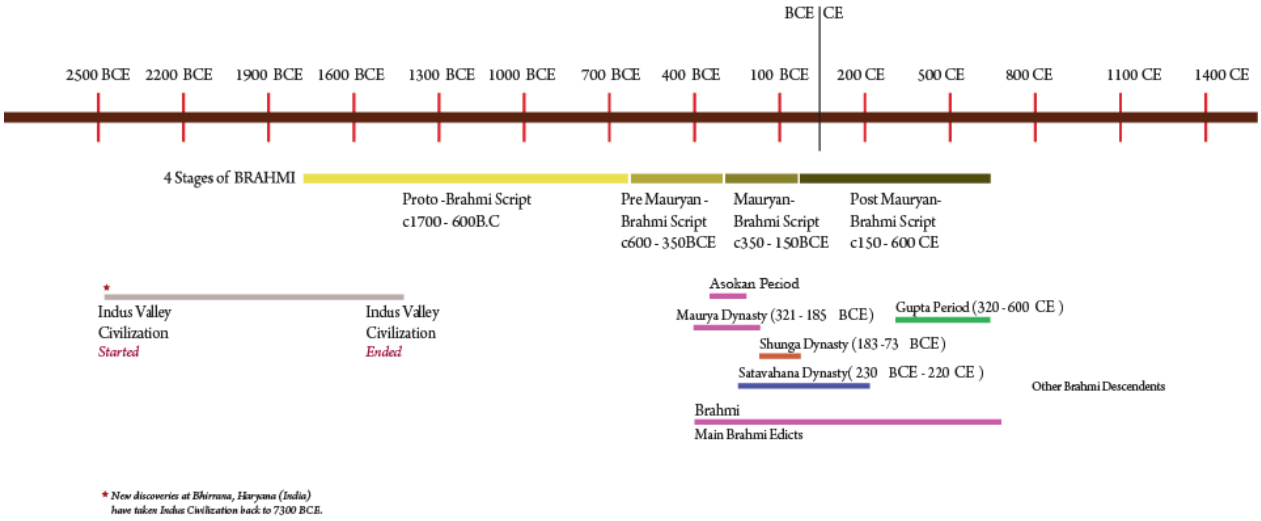

Figure 1. Timeline of Indian Writing Systems

Figure.2 Asokan Rock and Pillar Inscription in India & Abroad

4. Evolution

The elevated stature of being the Mauryan royal script brought-in a more streamlined, more evolved and disciplined anatomy. The many variations caused by local factors such as availability of skilled inscribers, tools and stone were ironed out gradually. Just like its inception, the inspiration behind Brahmi is still debatable. Opinions are divided over Brahmi being an indigenous creation, or borrowed from foreign lands. The native theory has its own share of supporters including luminaries of Indian Archaeology such as Alexander Cunningham, Christian Lassen, Dowson, R Shamasastri and A B Walawalkar. The majority however point towards a Semitic origin; backed by scholars like Georg Buhler, Sir William Jones, Prof Kopp, Prof Lepsius, Dr Geisler, Dr A C Burnell, M Emile Senart and others. Prof Benfey, Dr Stephenson, and Prof A Weber have proposed another theory of Brahmi being derived from the Phoenician Script. If most of the theories have tried to bring forth similarity of form in their support, few have resorted to parallels in phonetics. Brahmi's superior scientific arrangement of alphabets and accurate phonetics attest that even if, it evolved in company by foreign scripts brought in by torrents of trade, it germinated originally in India. It was not a borrowed script, but a progressive one that developed with time by incorporating new ideas.

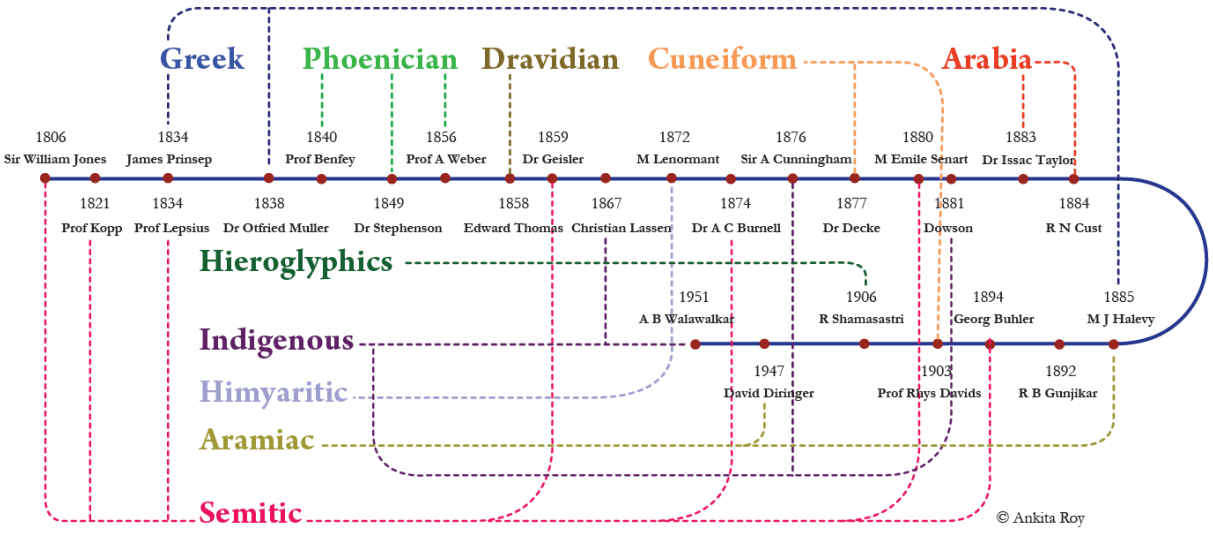

Figure.3 Derivation of Brahmi

5. Brahmi as Script

Scripts are usually classified as (i) Logographic (ii) Syllabic and (iii) Alphabetic. While the logographic employ symbols for a word, syllabic scripts use them for Syllables. Alphabetic scripts employ symbols for a specific phonetic sound known as Alphabets. Brahmi, because of its use of symbols for both the alphabets and the syllables, is categorized as Semi-Alphabetic or Semi-Syllabic. Brahmi script comprises of

(i) 33 Consonants derived from unique phonetical sounds and (ii) 10 Syllabic Vowels. With 10 matras, Brahmi consonant can have 11 medial forms. It also has 8 conjunct consonants to take care of nuances in pronunciation. Salomon feels, “The Indic system of writing is difficult to classify in terms of the traditional typology of writing systems which recognizes three main script types, namely, logographic, syllabic, and alphabetic. The Indian system is syllabic in the sense that its basic graphic unit is the syllable (***aksara***), but it differs from a pure syllabary in that the individual phonetic components of the syllable are separately indicated within the syllabic unit.”

Selection and arrangement of Brahmi consonants over the human vocal chords is unmatched; neither in the comprehensiveness of renditions possible by human vocal organs but also in the nuanced differentiation between the sounds produced. The compilation is complete for all perceivable pronunciation with minimum scope for error. Panini’s ***Asthyadhayi*** is believed to be the epic grammatical work behind this scientific selection. Figure.4 depicts the whole set of Brahmi consonants and their root in the human speech organ. Robert Needham Cust, one of the early Indian linguists rightly points out, “The Indian Alphabet is a marvellous and magnificent phenomenon quite unrivalled in the world. It presents a symmetrical combination of symbols designed by skilled grammarians to indicate various shades of sounds and is grouped in scientific order.” After a thorough analysis of its vowels and consonants, Buhler had remarked, “it is now possible to adduce the indisputable fact that the Brahmi alphabet has been formed by phonologists or by grammarians and for scientific use.” Brahmi is written from left to right. Because of a faulty coin from Eran, Buhler had declared the script to be “Boustrophedon,” but lately the Asokan edicts have helped us to established that it was originally written from left to right.

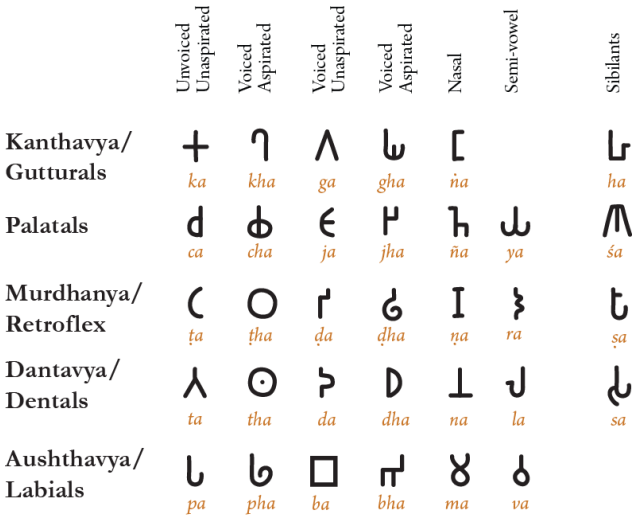

Figure.4 Phonetic Order in Panini Sutra

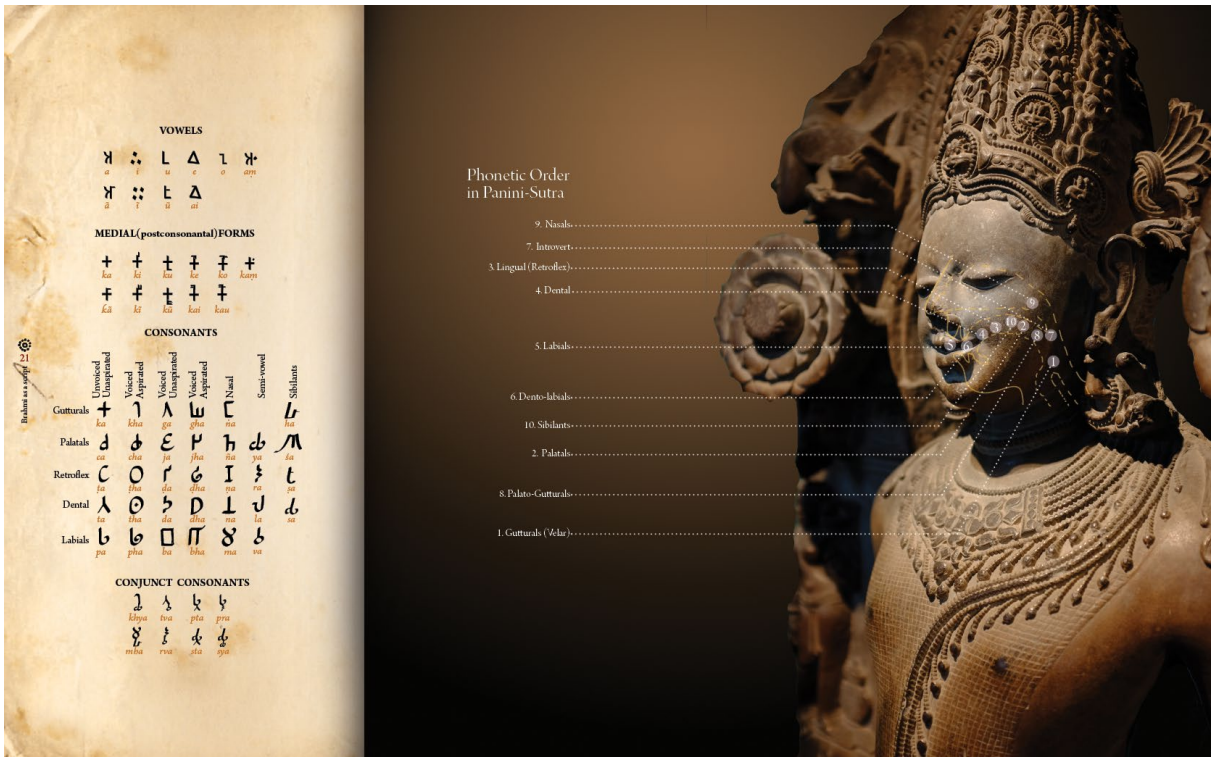

Figure.4 Phonetic Order in Panini Sutra

Typographically, Brahmi is stiff and symmetrical, crisp and clear, open-spaced and distinct; designed to be incised with chisels, stamps, stencils, and reed pens, not for swift writing by hand. Out of 33 consonants, only 19 can be written without lifting the pen. The remaining lot demand the pen to be lifted for completing the alphabet. If we compare Ka (𑀓) in Brahmi with (क) in Nagari, the suitability of Nagari for writing by hand becomes apparent. While the visibly more complex Nagari (क) can be written without lifting the pen, the seemingly easy, but stiff Brahmi (𑀓) needs two separate strokes in separate axes. Chandrika Singh Upasak has classified Brahmi symbols into “Basic/ Primary” and “Evolved/ Secondary” types. Out of 45 total, Upasak categorized 24 symbols as basic and remaining 21 as evolved, derived from basic symbols (Chandrika S Upasak, 1959). It is likely that the primary symbols were imported from outside but the script as a whole underwent a paradigm change under deep phonetical understanding of Indian Sanskrit grammarians. This transformation made the script more scientific, phonetically accurate and typographically balanced, thereby making it a role model for many scripts in and outside India.

6. Typographic Features

To arrive at the exact typographic form of the Mauryan Brahmi is somewhat challenging. The primary reason for this is their present state of preservation; specimens

that have survived the vagaries of time are sometimes faded beyond recognition. Even when they are readable, the nuances are mostly obliterated. However, by compiling a host of inscriptions, an approximation can certainly be arrived at. For doing this exercise, the anatomical variations have been collated from archival stampings and actual site photographs from the Asokan edicts spread over India. As a double check, the final forms have been cross-checked with the high resolution imagery from the inscription sites. Figure.5 shows Anatomy of Brahmi alphabet on a typographic skeleton. A close examination of the typographic features – Size, Structure, Simplicity, Form, Motion, Angles, Strokes, Thickness, Curvature, Endings, Flourishes, Baseline, X Height, Ascender, Descender, Horizontal and Vertical proportions, stroke complexity, etc. – provides us vitals leads. Let's investigate some of these features in details.

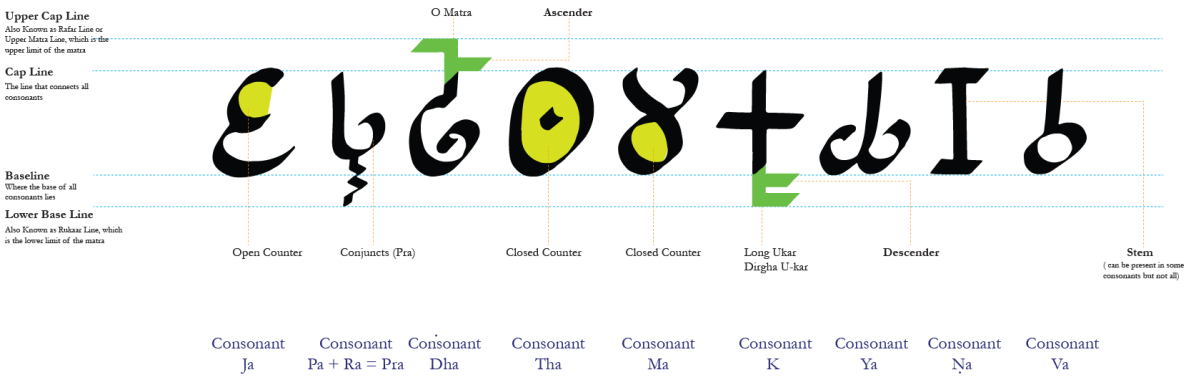

Figure.5 Anatomy of Brahmi

6.1. Ingenuity

The most conspicuous feature of Brahmi anatomy is the ingenuity of form. The inventiveness displayed in selecting symbols for Brahmi consonants is unparalleled. The challenging task of short-listing the most distinct yet memorable icons from a plethora of available symbols speaks about the logical reasoning and visual judgement of the ancient Indian linguists. The vowels and their matras are even more thoughtful. Making use of short yet distinct strokes in horizontal and vertical axes, the matras adorn the consonants in a neat uncluttered arrangement. Out of the ten composite ***matra*** forms, 3 use strokes only in horizontal axis, 6 adopt strokes in combination of vertical & horizontal and one form employs a dot (Refer Figure.6). The overwhelming use of horizontal strokes is logical and still relevant (just as horizontal swapping of fingers on smart phones); it is based on the thorough understanding of freedom and flexibility of our body parts. This seamless coming together of consonants with the matras present a balanced graphic representation.

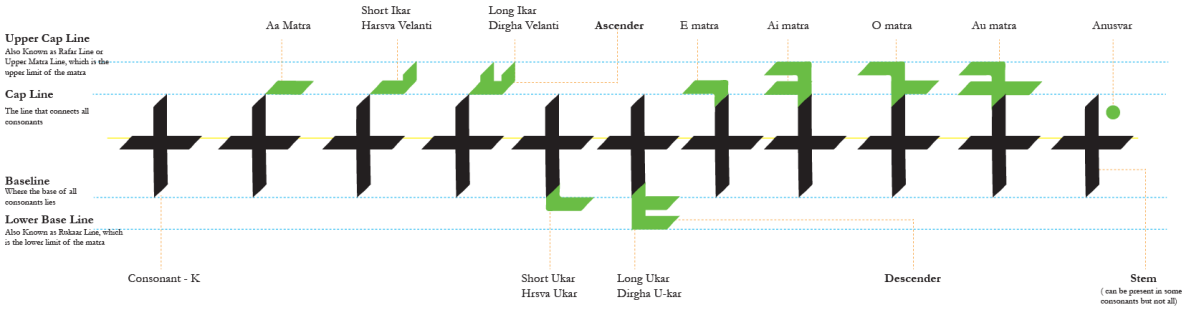

Figure.6 Matras and Medial (Post Consonantal) forms

6.2. Simplicity of Symbols

The symbols adopted for Brahmi script – Consonants, Vowels, Matras, and Numerals – are simple with minimal visual ambiguity. Bold and crisp, the symbols exhibit a high amount of symmetry. Out of 33 Brahmi consonants, 19 are symmetrical, 6 are symmetrical along both axes, 6 are symmetrical along X axis and 7 are symmetrical along Y axis. 14 characters do not display any symmetry of form (Refer Figure.7). Another striking feature is the use of straight lines instead of curved ones; 14 symbols are derived from combination of straight lines, mostly in horizontal and vertical axes, 4 has straight lines at inclined angles and 19 show curvaceous forms. Out of 10 numerals, 3 have curved profile while the others use straight lines. Vowels in their avatar of *Matras* are all flat – that too aligned along the principal axis. This simplicity was instrumental in making the script suitable for the inscriber's chisel. Writing with a chisel requires a lot of effort in driving the deep incisions; with straight lines, the task is significantly easy to accomplish. With curved trajectories, the force – both direction and magnitude – must be adjusted delicately to arrive at the final form.

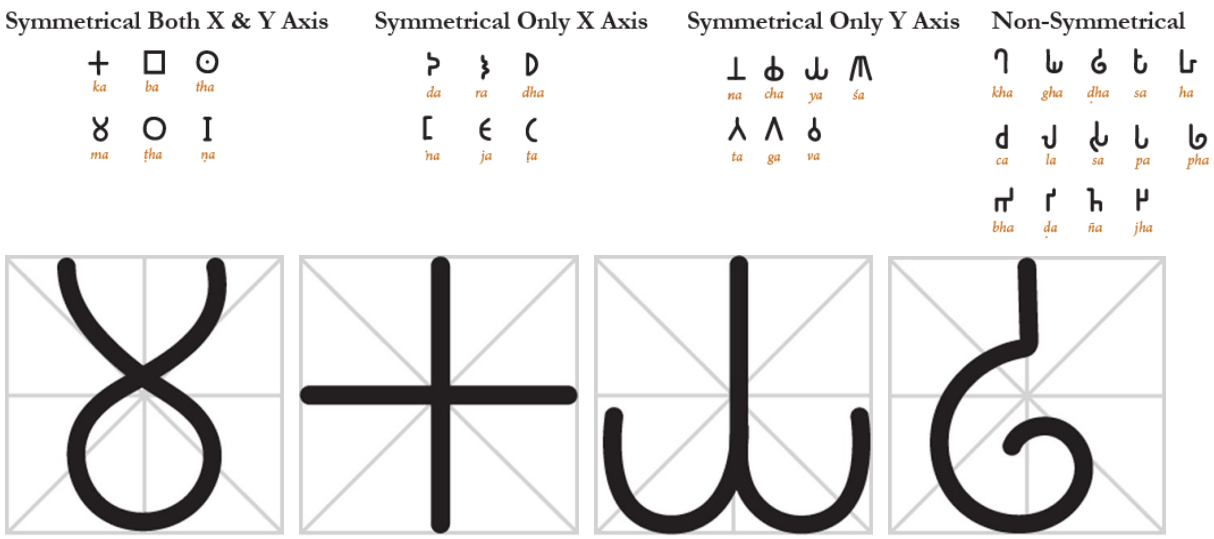

Figure.7 Symmetrical and Non-Symmetrical Brahmi letters

6.3. Distinct yet easy to memorize

Visual resemblance between two symbols could lead to delayed and incorrect comprehension resulting in malicious misinterpretations and chaotic confusions. The creators of Brahmi script took utmost care to mitigate such situations. We must not forget that the script was refashioned and used to inscribe edicts governing public life – an important area where any significant ambiguity, in usage of language and script, would have resulted in unwanted public issues. Tasked with finding 33 distinct yet simple symbols rooted in the Indian culture, the ancient typographers displayed outstanding vigor, vitality and visual understanding of the line and contours. Brahmi symbols are impactful, easy to remember, and difficult to mistake. Adoption of symmetric glyphs made the Brahmi script easier to memorize as Symmetry in form makes it easier for the human mind to grasp and memorize (Mermelstein, Banks, Prinzmetal,1979).

6.4. Scalability

Human ability to recognize graphic formations in varying sizes is well-known and that is why the Snellen's Eye Chart with differently sized arrangement of alphabets is used for measuring the correctness of human vision. However, the same chart can also be used for an altogether different application in a slightly different way for establishing the scalability of the Brahmi script. Figure.8 shows Brahmi characters adjusted in size as per the technical requirements of the Snellen's chart. If we compare the Brahmi Snellen's Chart with any contemporary or modern script, the superior scalability of Brahmi script can be easily acknowledged. On closer examination, many Brahmi symbols display graphic attributes characteristic of a logo or an icon - complete, balanced, crisp, clutter-free, and most importantly completely independent of scalability issues.

Figure.8 Snellen's Chart with Brahmi Characters

6.5. Universality Issue

Boldness of Brahmi characters along with their simple structuring also makes them perfect for use by a wide range of users including those with impaired vision. The flatness of Brahmi script helps in easy decipherment when touched upon with closed eyes while the well-spaced isolated glyphic composition provides ample time to the user. The intervening gap between the individual consonants (with or without matras) also augers well for weeding out misinterpretations. It is interesting to note that ELIA, a new font designed as an alternative for Braille by Andrew Chepaitis makes use of symmetrical blocks instead of dots. This new way of tactile reading is claimed to be highly effective and intuitive. Use of identical philosophy of deriving Brahmi symbols by ancient Indian Typographers is a suggestive of their astute psychological understanding of human needs.

7. Role in Development of Indic and South-East Asian Scripts

While its many contemporaries faded out, Brahmi kept on evolving. Kharosthi vanished by the 3rd century CE, while Brahmi was very much in use till the 6th Century CE. Even when the scriptural transformation swept much of the Indian Subcontinent, Brahmi provided the skeletal framework for the new scripts. Driven by change of writing medium and tool - from stone and chisel to paper and pen – Indic scripts underwent a paradigm shift. From Gupta Brahmi to the ***Siddhamatrika*** (or ***Kutila)*** and final culmination into the host of modern north Indian scripts, the Indian writing expanded like never before. If Nagari (or Devanagari), invented by the 11th Century CE took over the central mainland, Proto Bangla led to the creation of Bangla, Assamese, and Oriya scripts by the 15th Century CE. In the south, Tamil Brahmi provided the same impetus what ***Siddhamatrika*** did at the north. Many Dravidian scripts were formed that later flowed over to Hindu kingdoms in the South East Asia. Evolution of Pallava script and its role in development of Khmer script in Cambodia is of great interest (Roy & Malay, 2016).

8. Conclusions

The glorious scriptural journey of Mauryan Brahmi provided us with great insights about the deep intellectual prowess of ancient Indian typographers. Development of such an ingenious script by combining the phonetic and the graphic aspects is commendable. We have seen through this study how Brahmi's typographical superiority is not by chance but has been achieved through percipient selection of symbols for Brahmi Consonants, Vowels, *Matras* and Numerals with a focus on simplicity, visual clarity and boldness. The impactful glyphs were decided not only on their structural merit but also by understanding

the users, not only the body but also the mind. Consideration of ergonomics and psychological aspects in relation to retention by human mind is noteworthy.

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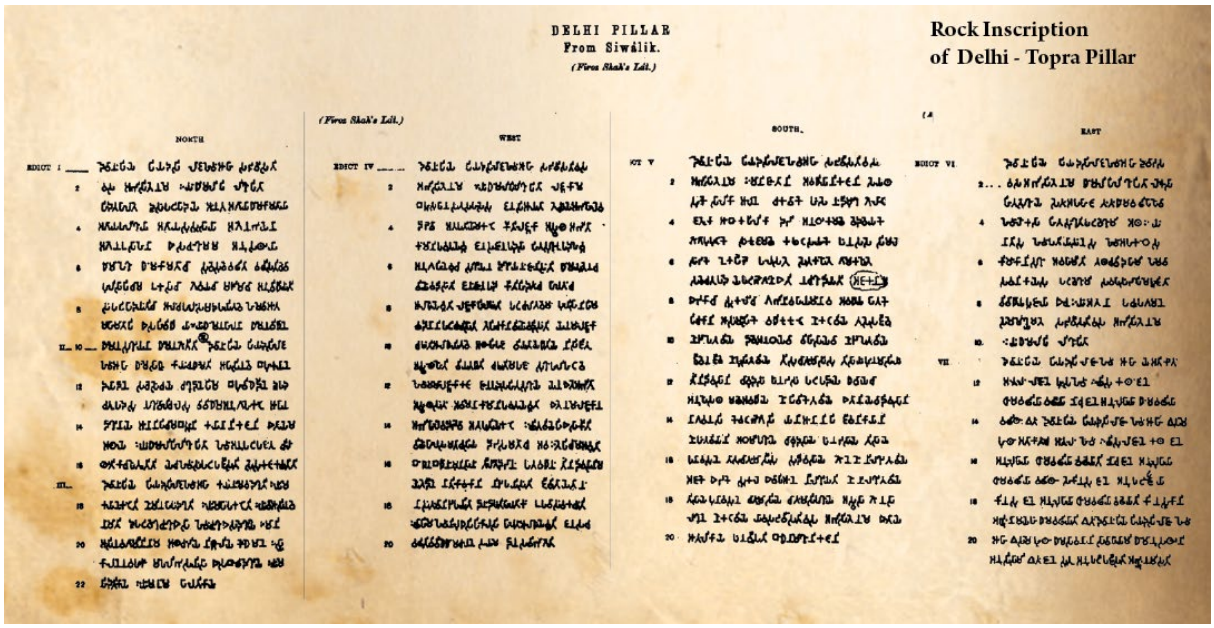

Figure 9. Brahmi Specimens

References

1. Taylor, Issac (1899) The history of the Alphabet. Charles Scribner's Sons, New York.

2. Thomas, Edward (1858) Essays on Indian Antiquities. John Murray, London.

3. Diringer, David (1968) The Alphabet: A Key to the History of Mankind. Hutchinson.

4. Salomon, Richard (1998) Indian Epigraphy. Oxford University Press, New Delhi.

5. Ibid.

6. Ibid.

7. Thapar, Romila (1997) Asoka and the decline of the Mauryas. Oxford, New Delhi.

8. Upasak, Chandrika S. (1959) The history and development of Mauryan Brahmi script. PhD thesis. SOAS University of London. DOI: https://doi.org/10.25501/SOAS.00029390

9. Mermelstein, R., Banks, W., Prinzmetal, W. (1979) Figural goodness effects in perception and memory. Available at <https://www.researchgate.net/publication/225342544_Figural_goodness_effects_in_perception_and_memory> [Accessed 15 Aug 2021]

10. Roy, Ankita & Mandal, Malay (2016) Brahmi-Rediscovering the Lost Script. Resurrect Books, Delhi.