Typography and Diversity
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Reviving a Manuscript Style:
The design process of Jaini

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Abstract: In this paper, we describe our process of reviving a unique manuscript calligraphy style as a contemporary Devanāgarī typeface. This style is found in the Jain Kalpasūtra manuscripts. Calligraphic revivals pose many challenges; we discuss these difficulties and the approaches we took to resolve them.

Keywords: Revival Typeface, Jain manuscript, Type design process, Devanāgarī type design.

1. Introduction

Indian scripts are known for their unique letter structures and calligraphic styles. These styles have been a source of inspiration for designers and researchers. Calligraphers have studied manuscript styles, but these studies seem to be limited to stylistic analysis (Joshi, 1983) (Naik, Dalvi 2015). We find few examples of usable typefaces which are revivals of such styles.

Revivals are common phenomena in type design, and letterpress revivals are popular in this field. If we consider Latin type design, manuscripts and even stone inscriptions have inspired type designers to design typefaces. A well-known example of this is Trajan—designed by Carol Twombly, based on the Roman capitals on the Trajan column. However, unlike Roman capitals, letters found in Indian manuscripts and on stone inscriptions have seen a larger structural transformation over time. A manuscript as recent as 16th century can have letters that are no longer familiar to contemporary readers. Further to this, manuscripts contain a large number of shape variations in characters. These, among other factors, add to the complexity of designing revivals based on Indian manuscripts.

There can be several processes to revive earlier styles as typefaces, some of these processes are documented in the Latin tradition. These processes, their approaches and hence the results vary according to the intention and the skill of designers. However, in the case of reviving a calligraphic style from a manuscript, especially in the case of Indian scripts, there aren't many processes that have been documented. In this paper, we describe the process we developed to design a Devanāgarī typeface, Jaini. Jaini is a revival of a unique calligraphic style found in Kalpasūtra manuscript. Our primary reference for the development of this font is a manuscript created in 1503 CE.

Figure 1. A folio from Kalpasūtra manuscript, created in 1503 CE

2. Calligraphy in Kalpasutra manuscripts

Kalpasūtra is an illustrated Jain text of the Śvetāmbara sect. It is read and recited by Jain devotees during the holy month of Paryushaṇa. Earlier Jain Sūtras were written on palm leaves, however a large number of extant manuscripts have been written on paper. These manuscripts are written in Devanāgarī script using ink and Boru, which is cut at an approximate angle of 35°— 42°. The calligraphic style in these manuscripts is unique both in terms of letter structure and visual features. These features are distinctly different from Bāḷbodh, which is one of the reasons for reviving this style. Some of the distinctive visual features of this style include (Figure 2):

Figure 2. A comparison of features of Kalpasūtra style and Bāḷbodh style

Disconnected Shiro-Rekhā with a triangular wedge terminal: In Bāḷbodh, a continuous shiro-rekhā covers every word, whereas in the Kalpasūtra style each letter is written separately with its own shiro-rekhā. Shiro-rekhās of adjacent letters do not overlap. At the start of each shiro-rekhā, the tool travels in three different directions to create pointed triangular terminal. This triangular wedge is a distinctive feature of this calligraphic style.

Letter Structures: Unlike Bāḷbodh, where the letters are circular in shape, the letters in Kalpasūtra manuscripts are squarish. Letter proportions are significantly different than Bāḷbodh. Base characters have a large kānā-height and short upper mātrās which results in small inter-line spaces.

Heavy knots: The treatment of the knots is also significantly different than Bāḷbodh. In Bāḷbodh, we encounter open and filled knots that come in multiple sizes. However, in the Kalpasūtra style, knots are large, heavy and filled.

These features combined with the absence of word space in the text impart a thick dark texture to the manuscript. This texture is further accentuated by the rhythmic stylized kānā, madhya, anta daṇḍa and pṛshthamātrā.

3. Revival of Kalpasūtra style

3.1 Calligraphic structure

To begin, we referred to 'Calligraphic analysis of the Jain Manuscripts' (Naik, Dalvi 2015). We also studied the visual features in several Kalpasūtra manuscripts to get a better understanding of the evolution of this style. These manuscripts were created from 13th century to 19th century. There were several visual features that were common across all the manuscripts, while some character proportions and their shapes varied. In order to maintain consistency within these, we restricted ourselves to a single manuscript, which was created in 1503 CE. The reason for choosing this particular manuscript was the presence of letterforms similar to contemporary letters. Moreover, this particular manuscript has many folios which made it easier for us to obtain multiple letter samples. After the analysis, we reproduced the significant visual features of the letters by drawing them with a Boru.

In the chosen manuscript, the angle of the Boru was in the range of 35°— 42°. The height of the base letter was 7—8 nib widths, however, at times the kana terminal was further extended by one nib width. We calligraphed the manuscript multiple times to understand the structure of letterforms, stroke movements, inner and outer spaces of characters, and texture of the text.

Figure 3. Reproducing calligraphy to understand letterforms

During this process, several variations of kānās, joineries, and triangular wedges were observed within similar characters. Some variations were common across characters, whereas some were specific to certain characters.

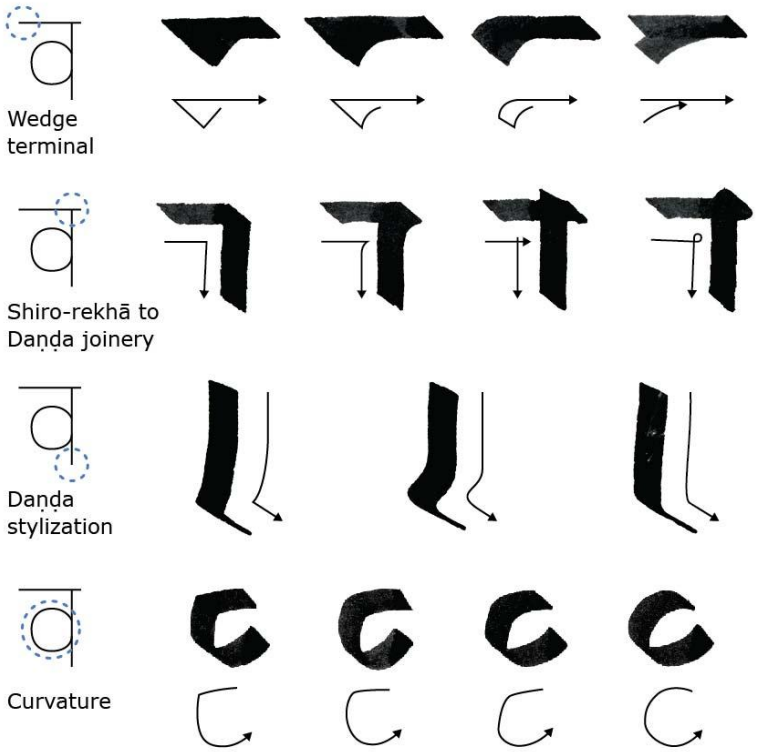

Figure 4. Multiple variations observed during calligraphy practice

3.2 Selection of letterforms

To understand features that were common to all letters and those which were specific to some letters, we extracted letters from the manuscript and compiled them. By doing so, we could compare all the letter variations on a single page. Since we selected letters with a specific intent, not all the letters were chosen for comparison, instead letters which had extreme structural variations were chosen. The text in the manuscript was justified and the Lahiya (calligrapher) had modified letters according to the context of each letter while writing within the allocated space i.e the Lahiya had in many places condensed or expanded letters towards the end of a line. We did not include such letters in the comparison.

Some letters from the manuscript are structurally different from contemporary Devanāgarī letters. These letters are not recognizable to the present day readers; hence, we omitted them from our analysis. A few characters which had visual similarities to the contemporary structures were included in the study.

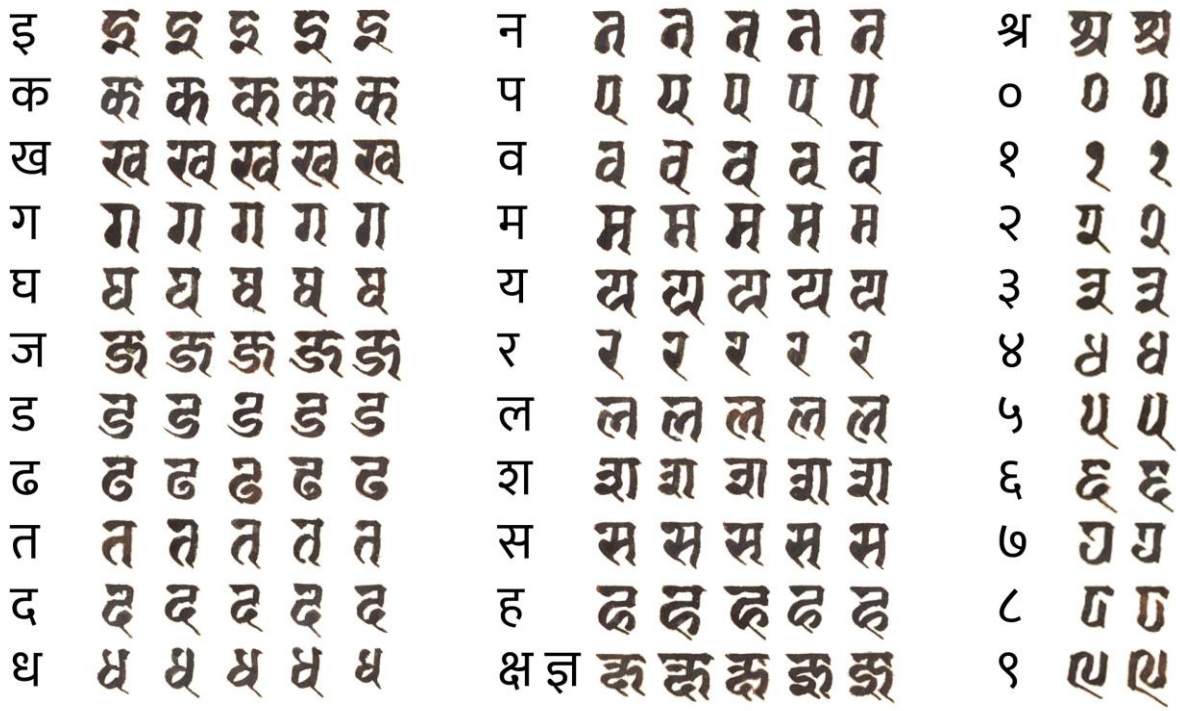

Figure 5. Selected multiple variations of letters found in manuscript

3.3 Setting parameters for the typeface

Since each letter had multiple variations, we had to filter the ones which were not appropriate for our typeface. Figure 6 depicts some variations of व from the manuscript.

Figure 6. Variations of व from the manuscript

We began by observing the structures and isolating common features within the variations. We noticed that the size and shape of the wedge varied significantly across letters. Furthermore, several variations of the shiro-rekhā to daṇḍa joineries and curvatures were also seen. After analysing the variations within the selected letters and isolating the recurring features, we extracted a list of common visual features.

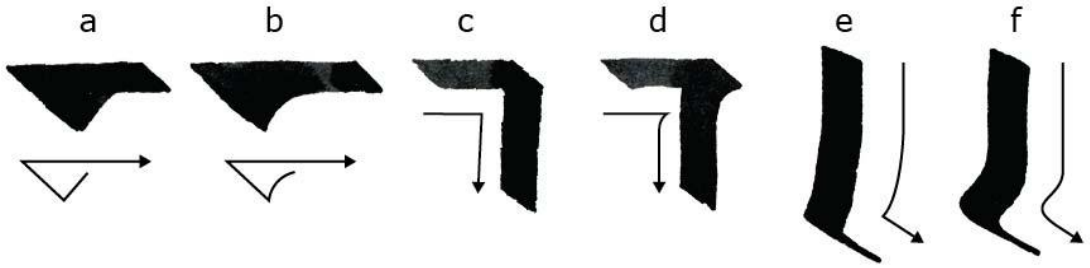

Figure 7. Examples of recurring features across multiple letters

Wedge terminals: Two types of triangular wedges were consistently found across letters. One with all three sides straight (Figure 7a) and the other with two sides straight and one side curved in (Figure 7b).

Shiro-rekhā to daṇḍa joineries: The shiro-rekhā and the daṇḍa are written as a continuous stroke from left to right and top to bottom (Figure 7c and 7d). In the first variation (Figure 7c) they join at an angle of around 80° — 90° imparting a slight oblique appearance to the letters. In the second variation, the shiro-rekhā travels from left to right and at the end of the horizontal stroke, the horizontal stroke travels back, i.e. from right to the bottom left creating a curve before it travels to the bottom (Figure 7d). In this variation, the horizontal and vertical lines create an angle of around 87° — 90°.

Terminals of kānā: In the manuscript, when the anta daṇḍa reaches the bottom, it turns towards left and then takes a sharp turn towards bottom right creating a thin angular terminal (Figure 7e). The angle of this terminal varies from 20°— 40°. In another variation when the anta daṇḍa travels to the bottom, it turns towards left and softly turns towards bottom right again forming a thin angular terminal (Figure 7f). The angle of this terminal again varies from 20°— 40°. This left turn also imparts an oblique look to the characters.

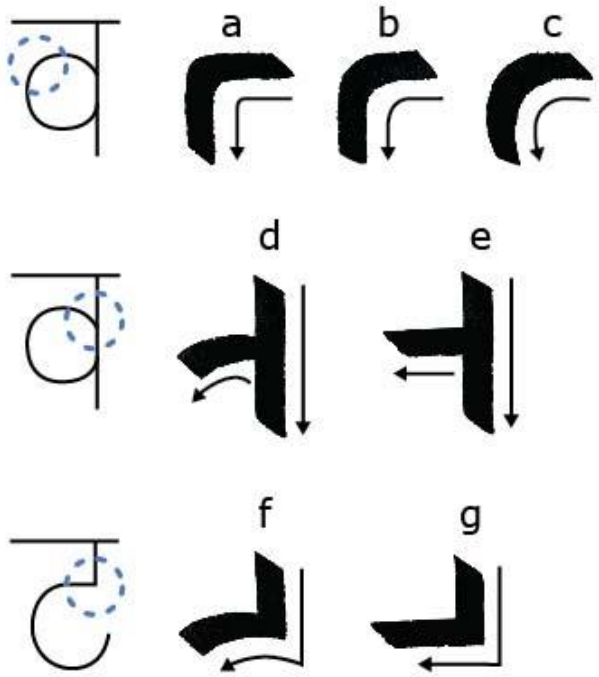

Figure 8. Curvatures and neck joineries in the manuscript

Curvature: The curves of letters in this manuscript are, by and large squarish in nature. There are exceptions to this. In some letters when the stroke turns to change its direction, the turn is sharp (Figure 8a) in some places and in some places smooth (Figure 8b). In a few instances, these turns are extremely smooth and we see a near circular treatment (Figure 8c) of the stroke.

Vertical to horizontal joineries: Two types of joineries were observed. The first, where both the vertical stroke and the horizontal stroke is straight (Figure 8e, 8g). The second, where the vertical stroke is straight and the horizontal stroke is a curve (Figure 8d, 8f).

After extracting the common visual features, we had to select features for the typeface such that its texture would be similar to the manuscript. In order to do so, we evaluated each of the options and compared its texture with the manuscript texture.

Figure 9. Explorations of व, its texture and its comparison with the manuscript texture

In figure 9, the first column shows four variations of व, each with different visual features.

In the second column, these letters are repeated to evaluate their texture. The third column contains letters from the manuscript in order to compare the texture. Features such as sharp triangular wedges, sharp squarish curves, straight horizontal to vertical joineries and flat daṇḍa, imparted a rigid look (Figure 9a, 9b, 9c) to the text. The slightly rounded-squarish structure (Figure 9d) came closer to the original manuscript texture.

A similar approach was adopted to evaluate other letters, which were then compared with the manuscript texture. Figure 10 shows some of the options that were explored while digitizing the letters. Multiple variations of the wedge terminals, horizontal to vertical joineries, curvature, stylized daṇḍa, knots etc. were investigated. We also explored the idea of a slanted daṇḍa (Figure 10a, 10b), so as to mimic the slightly oblique calligraphic

style. This idea was later abandoned as the letters appeared slanted in smaller sizes. Sharp straight strokes appeared rigid when digitized, we hence explored softer and rounder curves (Figure 10a, 10b, 10c). The texture achieved from such curves did not match the manuscript texture. We were able to achieve the manuscript texture with rounded squarish structures for the letters (Figure 10d) with small sharp wedge terminals.

Figure 10. Digital variations of letters

In the original manuscript, the main text style has a darker texture with high contrast while the marginal text has a lighter texture with low contrast. We intended to make the font usable at around 10 points which is close to the marginal text size in the manuscript. Since the kānā-height of the font was fixed at nine nib-widths; the font appeared lighter in larger sizes, but it worked well in smaller sizes. Figure 11 shows the final parameters for the typeface.

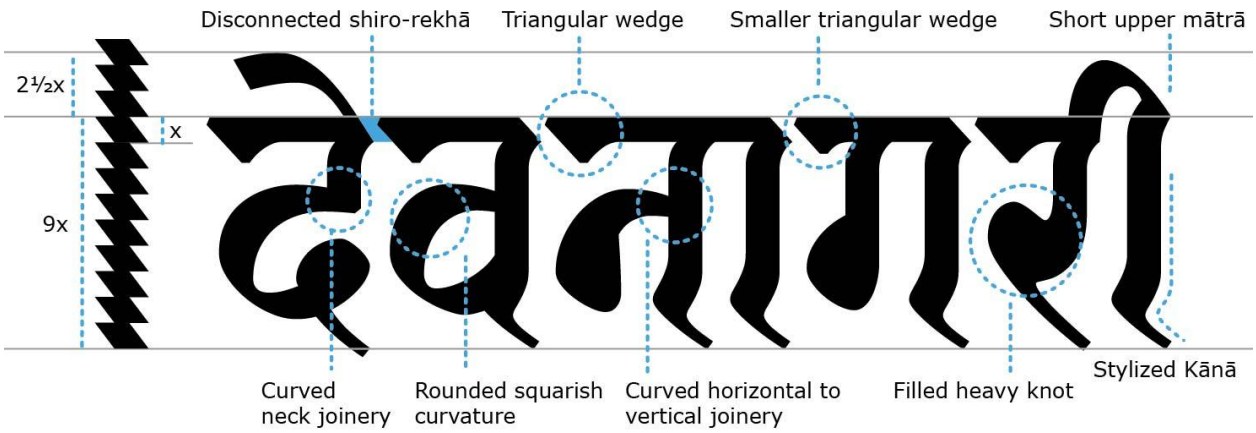

Figure 11. Parameters for the typeface

Once the parameters were set, we began drawing other letters by referring to the letters from the manuscript. We first traced letters manually and then modified them according to the above parameters.

3.4 Designing contemporary letters

Some contemporary letters are similar to their counterparts in the manuscript. Designing such letters was comparatively easy (Figure 12).

Figure 12. Letters from the manuscript similar to contemporary letters

A few letters in the manuscript were significantly different from contemporary letters, and characters such as European numerals, punctuations etc. had no predecessors in the manuscript. Designing such characters was especially challenging. We explored multiple variations considering the writing mannerism in the manuscript. It was difficult to design a

harmonious set of contemporary characters according to the predetermined visual grammar. These characters stood out in text, disturbing the overall texture. For example, in figure 13; ळ was designed according to the pre-decided visual grammar, but yet, in the first two options (Figure 13a, 13b) the letter stands out in the text, whereas in last option (Figure 13c) it blends in harmoniously.

Figure 13. Options of ळ

Similarly, multiple variations were designed for the remaining letters and the appropriate variation was selected for inclusion in the font (Figure 14).

Figure 14. Letters from the manuscript that are significantly different than contemporary letters

Various decisions were taken while designing these letters. Decisions such as adjusting the behavior of knots and loops, terminals and curvature were taken according to the context of the letters. In Bāḷbodh, ढ and ध are drawn with a closed loop, but in the manuscript ढ has been drawn with an open loop, and ध with a filled loop. Therefore, we decided to

draw an open loop for छ, and a filled loop for भ. We also drew क्ष, थ, श, श्र with an open loop (Figure 15).

Figure 15. Knots and loops

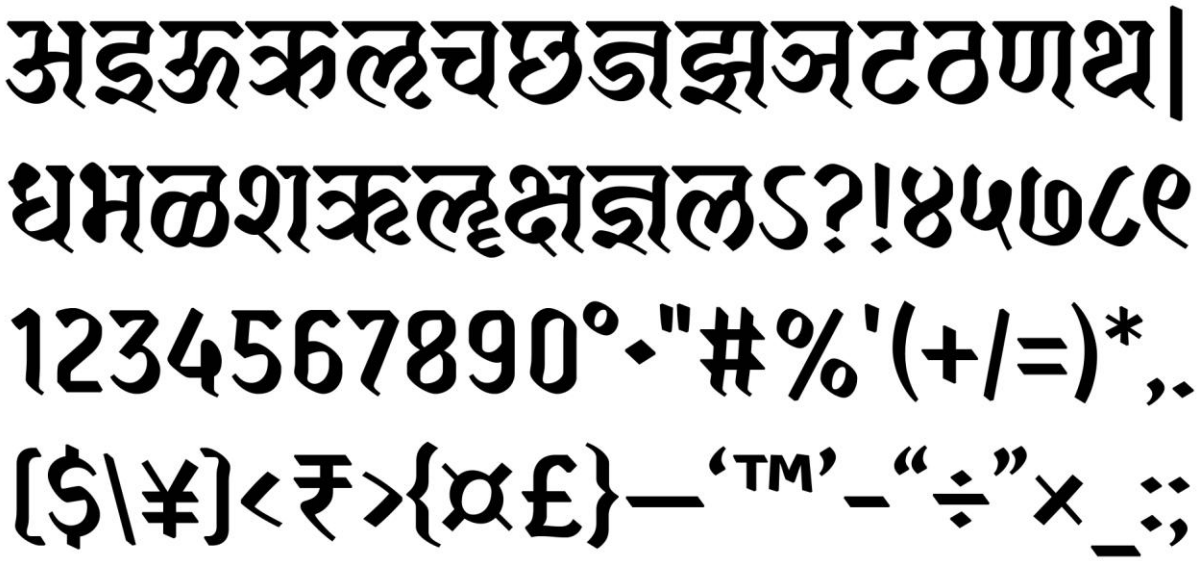

Figure 16. Glyphs from Jaini

4. Uniqueness of the style

Besides the aforementioned structural variations in letters; the Kalpasūtra manuscripts have several unique features that have been incorporated in the typeface. Following are a few significant features that need to be mentioned.

1. Integration of the lower mātrās within the kānā-height: Unlike Bāḷbodh, where lower Mātrās are below the kānā, in the Kalpasūtra manuscripts the lower Mātrās are integrated within kānā height. Letters are vertically compressed and then mātrā is written within the kānā height (Figure 17). This imparts a unique texture to the text.

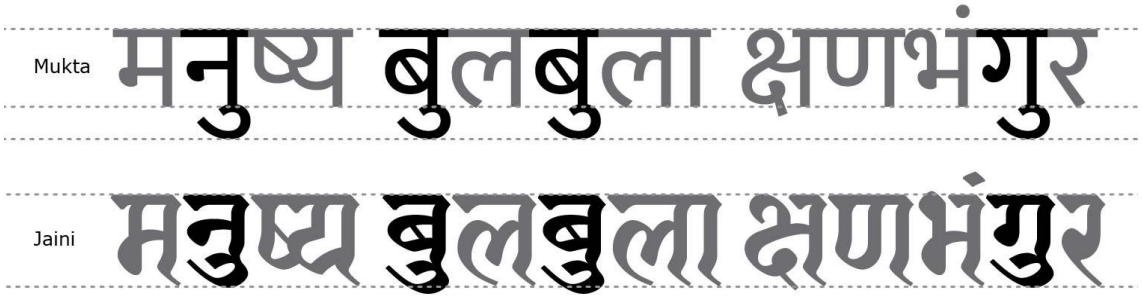

Figure 17. Integration of the lower mātrās in the kānā-height

2. Conjuncts: In the Kalpasūtra manuscripts, two styles of conjunct formations are seen—horizontal conjuncts and vertical conjuncts. Bāḷbodh also uses these two conjunct styles. But the Kalpasūtra manuscripts contain exquisite vertical conjuncts—the conjunction of such letters is unlike anything that we see in today's styles. These conjuncts are also integrated within the kānā-height (Figure 18). Letters written in manuscript have large filled knots, but when conjuncts are drawn for such letters, the behavior of their knots changes. For example, consider the vertical conjunct न्द, knot of न is smaller in the conjunct when compared to the knot of an unconjugated न, similarly in स्व, the स drawn without a knot. These conjuncts were designed to optimize space, while accentuating the beauty of letters.

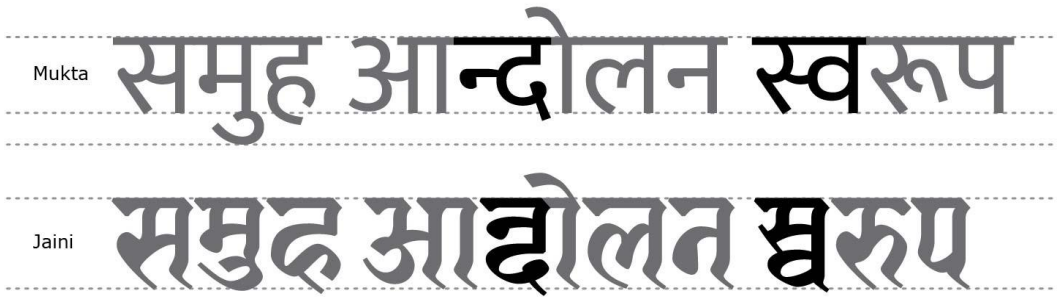

Figure 18. Conjunct behavior

3. Upper mātrās: The upper mātrās in this manuscript are by and large, shorter than Bālbodh. This isn't the case in all instances of upper mātrās. In the majority of the text, the inter-line space is quite small. But in the first line of the page, since more space is

available above the letters, the upper mātrās are drawn taller and the anuswār is also drawn bigger with hollow space inside it (Figure 19). The manuscript uses the prishthamātrā style which is now replaced by the upper mātrā style. We have applied this feature to the upper mātrās as well. This additional feature in the typeface is not seen in the manuscript.

Figure 19. Upper mātrās in Jaini

These features have been retained in the typeface and are rarely seen in present day Devanāgarī.

5. Legibility test

Once the font was developed and ready for use, a legibility test to evaluate the response of readers was conducted. We asked readers from various age groups to read a paragraph set in Jaini. Readers loved the texture and were happy to see the novel letter shapes. However, several readers—especially the younger generation had difficulty reading and recognizing the intricate vertical conjuncts. This is because; many present day publications render conjuncts in the horizontal style. A few readers had difficulty recognizing the letter ज. Senior readers were well versed with vertical conjuncts, and hence they could read them with ease, but they preferred horizontal conjuncts as they had become habituated to them.

The inability of our readers to recognize and read vertical conjuncts was a serious issue for us. Readers wanted us to remove vertical conjuncts—a feature which we loved the most and had invested a significant time designing. We believe that the role of a type designer is not limited to designing letters, but it necessitates the education of readers as well. Therefore, in order to address this issue, we designed two versions of the typeface—the first, 'Jaini Purva' with traditional vertical conjuncts and second, 'Jaini' with horizontal conjuncts and a ज closer to the contemporary form (Figure 20).

Figure 20. Two styles of Jaini with conjunct variants and an alternative ज

6. Conclusion

Letters from the past are a perennial source of inspiration for type designers. Walter Tracy reminds us that, “revivals … are still the essential source material for the understanding and appreciation of all type designs. If they did not exist, or were discarded, there would be no standards by which to verify our ideas of what good and bad”.

In the case of Devanāgarī, the letters we use today have evolved from Brāhmi to Devanāgarī. This transition makes the revival process exhilarating as well as challenging. Devanāgarī has also transformed due to the influence of technology. Each new technology, be it cold metal, hot metal or digital has moulded the shape of Devanāgarī letters. Several researchers have studied these transformations and their features, but we see few examples of such studies being translated into usable typefaces. We believe that such letters are exquisitely beautiful and have an inherent value, which have the potential to be appreciated across all ages. We hope that this document will encourage designers to appreciate the beauty of Indian calligraphic styles and help them create revivals of such styles.

Figure 21. Type Specimen

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