A comparative study of the development of the Gurmukhi script: from the handwritten manuscript to the digital typeface.

Emma Williams, September 2008

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Development of the printed character

This entire chapter is loosely organised upon the major technology developments over the past three hundred years: metal type, both hand and machine composed and the early and current digital format. Each will be elaborated upon when and where is necessary.

The first three sub-chapters refer to text typefaces which were designed in metal for hand composition, and are arranged by location: India, England and Europe. In Typology for Devanagari, Naik explains and illustrates the various typesetting systems: degree and akhand (figure 52).

The degree system is assembled in three steps. The character is divided into a total of four ems: one em for the superior and subscript diacritics and two ems for the base character, or in instances where a subscript character is not necessary, a three em base character can be used to create the required total of four ems (figure 52).

The akhand system uses as few components as possible to create the desired full character, resulting in a larger character set. Components (base characters and vowel signs) overhang their body (figure 53) to achieve improved kerning. The nature of this design, and the fragility of overhangs, caused the components to be broken (figure 52).

These two typesetting systems will be taken into consideration when analysing the following typefaces. It is common for the printed result to possess no evidence as to which system may have been utilised.

India

Serampore Missionary Press, Serampore

The Serampore Missionary Press (SMP) was established in 1800 by Williams Carey. With the help of William Ward, ‘a serious printer’, Joshua Marshman, a punchcutter, and ‘two able Indians, Panchanan Karmakar and Manohar’ whom helped cast the types, amongst others. Carey was able to reproduce bibles, dictionaries, grammar and historical

NOTE: It is important to remember that the dates provided are often only that of the publication date for the type specimen, and is unlikely to bear any relationship with the date of design and or casting.
books in a wide range of Indian scripts. In Anant Kakba Priolkar’s *The printing press in India*, Priolkar refers to a list made by a Mr Smith, which specifies the various scripts used for translating the New Testament over 30 years. Approximately forty scripts were covered. Punjab is dated 1815, referring only to the New Testament, and in 1822 Smith states that Historical books were also printed. In Priolkar’s book, plate 48 shows an extract from ‘The holy Bible in the Punjabi language’, published in Serampore in 1811 [figure 54]. This is the earliest example found of a Gurmukhi typeface, and seems to be identical to the typeface used in Carey’s Grammar of the Punjabi language, published in 1812 [figure 55]. Another specimen is shown in the SMP’s Brief View of the Baptist Missions and Translations, with specimens of various languages in which the Scriptures are printing at the Mission Press, Serampore, published in 1815, which appears to be the same typeface again [figure 56].

Looking at the three examples from the SMP [figures 54–56], could lead one to believe that they are of three separate designs. Considering the close proximity of which the publications are dated, and the length of time in which it takes to design, cut and cast an entire metal typeface, this seems unlikely. The printing quality of each example varies, making it difficult to formulate a valid evaluation, especially as figures 54 and 56 are facsimiles themselves.

However, one can see that similarities can be drawn between each [figure 57]. In figure 54 the colour appears considerably even overall, and the line is fine, with few dark points, noticeably so on those characters with knots, such as ਸੀ ਬੀ ਟੀ ਹੀ ਲਾਈ ਅਕਸਰਾ ਅਕਸਰ. Comparing figure 54 to figure 55, the colour appears much darker in the latter and both are examples of poor typesetting [figure 58]. This effect is evident more so in figure 56: the difference in colour could be the result of a number of factors: the reproduction of samples; the choice of stock and ink used; the metal sorts would have attained some level of wear-and-tear, resulting in a defective print.

Assuming that the facsimiles were reproduced from the original publication, and then have since been photocopied and re-printed for the use in this dissertation: quality will have decreased at each point of reproduction. 

Figure 54. Plate 48: The Holy Bible in the Punjabi language, Serampore 1811. 
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Figure 55. carey, williams. Grammar of the Punjabee language 1812; page 42.

Figure 56. A specimen from the SMP’s Brief View of the Baptist missions and translations or various languages ... 1815, page 42.

Figure 57. Forms share similar qualities between the three SMP examples [scale 201%], [see figures 54–56; page 40].

Figure 58. Differences in quality are apparent [see figures 54 and 56; page 40].
In each example the individual characters share similar proportions, an approximate baseline is visible [figure 57; page 41]. Generally one of the widest characters appears far too wide [figure 59], and there are inconsistencies between identical characters: appears with a different form on more than one occasion, again, this could be a printing defect.

The vowels signs are short and stumpy, except for which appears narrow, tall and connected to the headline (reflecting a handwritten trait), whereas the rest sit apart. It is possible that smaller characters such as the vowels signs could have been adjusted, refined or even re-cut at a later date, a process of which would not require as much time as the entirety of the original typeface. It would have also been common practice to borrow such characters from another typeface (different script).

**Ludhiana Missionary Press, Punjab**

The Ludhiana Missionary Press (LMP) was the first press in the Punjab, arriving in 1835. There is not any record to say when printing commenced but in 1837 ‘printing materials were still in short supply and more paper and types (Persian, Roman and Gurmukhi) were duly ordered from Serampore and Calcutta.’ 1838 was ‘the year in which Devanagari and Gurmukhi founts were employed for the first time.’ St Matthew’s Gospel and the Old Testament had been produced using the SMP typeface: one assumes it was an SMP rather than a Calcutta import as no evidence has been found to suggest that Gurmukhi typefaces were available from foundries located from the latter.

In 1845 a fire broke out at the LMP destroying everything apart from a Gurmukhi typeface which was in situ in the original press. Nevertheless, John Marshman of the SMP had ‘cast an improved fount of Panjabi type.’ The date is unknown, but one can see it is of a similar design, even if smaller in size than that of the SMP’s typeface [figures 54–56], visible in the 1851 publication, A Grammar of the Panjabi language, with appendices, by the Rev. John Newton [figure 60 and 61].

The quality of printing has greatly improved from the facilities at the

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**For further reading see:**

- Shaw, Graham. The first printing press in the Punjab 1794. pages 161–72
- Shaw, Graham. The first printing press in the Punjab 1794. page 164
- Shaw, Graham. The first printing press in the Punjab 1794. page 164
- Son of Joshua Marshman, one of the original pen cutters of the SMP
- Shaw, Graham. The first printing press in the Punjab 1794. page 170
- No publications have been found prior to this one, to suggest that the SMP typeface had definitely been in use at the LMP
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SMP, which emphasises the newly refined characters. Each character is either identical in form or a development is clear from one to the other: curved strokes appear refined as do the vertical and horizontal strokes; inconsistencies between identical characters still exist [figure 62].

The superscript vowel signs are of a similar characteristic to the SMP typeface, whereas those that sit beneath the characters, appear to have no design: they are small horizontal, monolinear dashes, which have a slight curve to their form and appear to be set both ways, curve arched and curve dipped [figure 62]. The addak \( \ddot{a} \), introduced in the nineteenth century, looks as if it appears in this sample: its purpose is to remove the occurrence of a double consonant, yet on two occasions, it sits above a pair of identical consonants\(^6\) [figure 62].

Characters constructed predominantly by curves, stress a handwritten quality, with an emphasis on the horizontal movement. Conjuncts are not visible in this sample. Punctuation is a combination of the Gurmukhi danda and a selection of basic Latin components [figure 62].

Sudarshan Printing Press, Amritsar

Only one reference was found to mention the Sudarshan Printing Press (SPP), Varinder Walia’s article A proud legacy lies in dust, published online in 2006. It is worth discussing as the SPP’s ownership is mentioned, Dhani Ram Chatrik, who supposedly ‘was the first to standardise the Gurmukhi type … using modern technique at his SPP’.\(^6\) Assuming this is true, for someone, Chatrik, who had established a standard form for a particular script, it seems odd to find so little reference to his name; one would have expected to find Chatrik and his SPP mentioned in multiple publications. Ranjit Singh Freed proclaims that Chatrik was ‘the father of Gurmukhi printing … the first to print saroops of Sri Guru Granth Sahib at his SPP’.\(^6\) No dates are declared in Walia’s article regarding the SPP’s existence, but one can assume it is likely to have been around the 1900s.\(^6\) The SPP’s location is not mentioned, but again one will assume that it is of the same location or within close proximity to Chatrik’s house in Amritsar. One of Chatrik’s sons still possesses, at his father’s house, ‘parts of the Gurmukhi

\(^{66}\) Familiarity with the Punjabi language would be of great use.

\(^{67}\) Walia, Varinder A proud legacy lies in dust August 2006; online

\(^{68}\) Freed, Ranjit Singh A celebration of Gurmukhi May 2008; online

\(^{69}\) Dhani Ram Chatrik: 1876–1954
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Figure 63. Extract from a dictionary printed by Munshi Gulab Singh & Sons: Singh, Maya Bhai ed. The Panjabí dictionary 1895.

Figure 64. Extract from a dictionary printed by Wazir-i-Hind Press: Singh, Jawahir ed. English to Punjabi Dictionary, Roman & Panjabi characters 1905.

Walia, Varinder A proud legacy lies in dust August 2006; online

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letters prepared by Chatrik… These letters, made of metal, are worth keeping in a museum.28

In his biographical note,21 Chatrik gives interesting information about the Gurmukhi type and his contribution in its modification. He writes that Christian missionaries brought Punjabi letters from England in the year 1875 and published the Bible in Gurmukhi at the Mission Press, Ludhiana. But the type, invented by the Christian missionaries, was not up to the mark and required modification.22

Contribution implies that Chatrik did not work alone. Walia continues: Lala Hira Nand improved the type with the help of writers from Amritsar and published beautiful books in Lahore by 1880.23 Again, one could find no other reference to a Lala Hira Nand. Via Madra of the UKPHA, one was provided with contact details for Walia, but no response was received regarding references and resources he used regarding his article.

The last paragraph of Walia’s article mentions two presses which were not directly referenced to Chatrik himself:

‘Later, Munshi Gulab Singh & Sons, Lahore, prepared another Gurmukhi type with the help of a Muslim worker, Munshi Noordin, who was instrumental in introducing the Gurmukhi letters in different parts of Punjab. He was later employed by the Wazir Hind Press, Amritsar, and more varieties of the Gurmukhi type were introduced.24

Specimens could not be traced regarding the typefaces used at the Munshi Gulab Singh & Sons (MGS), in Lahore and the Wazir Hind Press (WHP), in Amritsar. A publication25 from each shows an improved development in the design and reproduction of Gurmukhi typefaces.

The Panjabi dictionary prepared by MGS (figure 63), uses a typeface of substantial quality. The heavy appearance does not deter you from the use of consistent, well-balanced forms. The र is unusual, the left stem flares drastically beneath a rather heavy knot. Counters are open and spacing is fair. The character इ, has a smaller projection, closer to its contemporary representation. Vowel signs are even in colour but light in comparison with the base characters. The ओ appears

Walia, Varinder A proud legacy lies in dust August 2006; online

21 Found no reference to Chatrik’s bibliographical note, and no response was received.
22-24 Walia, Varinder A proud legacy lies in dust August 2006; online
25 The Gurmukhi characters can only be considered in small clusters rather than running copy, as only dictionaries could be found with this type in use.
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Figure 65. Specimen page for Gurmukhi types, displaying four variants, including an italic, using the American point system. Gujarati Type Foundry’s Book of Typefaces 1930

The WHP’s 1905 English to Punjabi Dictionary, Roman & Panjabi characters [figure 64] does not share the same quality regarding printing, and choice of typeface as the MGS’s dictionary. This may suggest that Noordin (one is only assuming that it was he who had an affect upon the quality of reproduction) had not yet been employed by the WHP or just a reflection upon the variation of printing standards and/or capabilities.

Gujarati Type Foundry, Bombay

The Gujarati Type Foundry (GTF) was founded in 1900. Its purpose was to manufacture typefaces of high quality which were required by the Gujarati Printing Press. The American point system and standard type height were adopted by the GTF and featured in their specimen books [figure 65]. The system would enable coherence and understanding between western and eastern typefaces.

The specimen page displays four Gurmukhi typefaces: two at twenty point and two at ten point. All of a fairly light colour and appearance, an italic variant appears slightly darker. The impression is even with regards to the larger typefaces. The proportions are now standardised, and characters appear consistent, as if they have been adapted from the same forms [figure 65]. The cursive characteristics have almost disappeared, has a structured form compared to earlier variants seen in manuscripts and the SMP [figure 65].

The colour of the knots are balanced with that of the bindi’s weight; a characteristic which is lost in the smaller size, where knots, vowels and conjuncts appear oversized [figure 65]. Types were cast using the Akhand system, yet they kern neatly alongside their base character, due to a shortened headline strokes [figure 65]. The consonant conjunct only used once in the specimen, sits neatly, even if detached from the base of its corresponding character: the distance from the base character could vary depending upon the vertical strokes of each component, and whether they are broken or not [figure 65].

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76 Gujarati Type Foundry Book of Typefaces 1930: page 5.
77 Osowan, Geoffrey ‘An Unusual Type Specimen Book from India’ Matrix 2; page 100.
78 Point size falls outside of defined boundaries, however is considered due to its quality.
79 The only occurrence found of a metal italic Gurmukhi typeface.
80 Naik, Bapurao S. Typography of Devanagari 1971; page 314.
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Figure 69. Dates of the Stephen Austin & Sons' specimens and their typefaces.

Figure 70. Specimens of oriental and other types in use at the office of Stephen Austin & Sons, Hertford 1870

Figure 71. Translation of the Adi Granth 1877; page cxxiii

Figure 72. Evidence of the akhand system is visible with the vowel signs [scale 300%].

Stephen Austin & Sons, Hertford

Stephen Austin & Sons (SAS), the leading Oriental printers,63 was the appointed printer for publications in use at the nearby East India College. Seven specimens were found, of various dates [figure 69], all included a small text sample of Gurmukhi; no character synopses were discovered.

The earliest specimen, dated 1870, is identical to one published fifteen years later in 1885: the Punjabi typefaces will be referenced as one and referred to as SAS 1 [figure 70]. An example of SAS 1 is provided so one can see it in extended use: an 1877 translation of the Adi Granth [figure 71].

The overall texture is uneven: the colour is patchy where knots appear heavy. The curves are fine in comparison to the general strokes, likely with the intention of increasing legibility by increasing the whites of the counters. Vertical strokes end with a diagonal cut, and the majority are of a monolinear fashion, with few that express contrast. Those that do appear lighter in comparison could be an effect of poor printing.

Character proportions are tolerable amongst themselves, but forms in which one would expect a similarity do not always exist. Few characters are reminiscent of the handwritten forms, with a strong cursive quality, in particular, फ and ब. The superscript vowels are tall and narrow, whereas the tops of फ and ब appear too shallow: a peculiarity which may suggest they have been borrowed from another typeface [figure 71].

It is possible to see that the akhand system was used: the vowels द and द appear as two separate components and this would further explain their visible breakages [figure 72]. Another element to suggest this system was used is the appearance of the vowel द as a full-length vertical stroke, rather than the half-length which is of standard practice [figure 71].

Conjuncts sit neatly under their base characters, even if a little odd in shape. The use of Gurmukhi numerals and punctuation is evident, as well as basic Latin characters [figure 71].

The 1928 and 1932 specimens use a typeface which appears to be identical to SAS 1, referred to as SAS 2, with only minor differences that determine it otherwise [figure 73]. The type size is referred to as pica, with twelve points in regards to the point-system which we are familiar with today. The colour appears more even than before, likely due to improved

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63 For further reading see: Reek, Talbot Baines A history of the old English letter foundries 1887
64 Moran, James Stephen Austin of Hertford 1968; page 23
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Figure 75. Three SAS 3 metal sorts from the collection at the British Library.

What appeared broken in the 1870 specimen appears fixed.

Figure 76. SAS reference Monotype in their specimens: not done so for Panjabi. Stephen Austin and Sons Continental and oriental types Hertford 1972.

Top-view, showing overhang.

Figure 77. When comparing SAS 3 with MTC 1, there are obvious differences: widths, proportions and weight (scale 100%).

Figure 78. SAS reference Monotype in their specimens: not done so for Panjabi. Stephen Austin and Sons Continental and oriental types Hertford 1973.

A shorter top has replaced the original, over-extended version [figure 75].

The origins of all SAS Gurmukhi typefaces is still unknown, but one is aware that the later typefaces for other non-Latin scripts were attained from Monotype [see Monotype Gurmukhi; page 69] and referenced accordingly in their specimens [figure 76]. This does not appear to be the origin for the SAS 3: their designs are similar at a glance but a closer inspection proves their differences [figure 77].

An introduction of extra characters to SAS 3 could have been a direct influence from their familiarity with Monotype’s character synopses. These additional characters, ॥, ॥, ॥, ॥, are not visible until 1964: Monotype’s Gurmukhi 601 and 604 is dated 1963. This may or may not be coincidental, and rather a sign of the times: the necessity to adhere to the language alterations and additions, providing what the user requires.

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The character to the left appeared in the later SAS 2 specimen, but seems to be an incorrect development?

The akhand system is visible: the vowel appears as two separate components [scale 300%]

characters are crude and oversized

few characters are drawn well: controlled proportions and weight

possible that the superscript vowel is re-used as a subscript: halant, consonant conjunct?

dotted characters are visible

identical characters, one with broken end strokes? or borrowed from above as not enough

identical to SAS 2, appearing in this specimen 55 years beforehand

dotted characters are visible

Figure 78. Dates of the Gilbert & Rivington and William Clowes & Sons’ specimens and their typefaces. Those highlighted with grey are of display size and not considered.

Specimens

<table>
<thead>
<tr>
<th>Year</th>
<th>Typeface</th>
</tr>
</thead>
<tbody>
<tr>
<td>1873</td>
<td>GAR 1</td>
</tr>
<tr>
<td>1875</td>
<td>GAR 2</td>
</tr>
<tr>
<td>1878</td>
<td>GAR 3</td>
</tr>
<tr>
<td>1891</td>
<td>WCS 1</td>
</tr>
<tr>
<td>1915</td>
<td>WCS 2</td>
</tr>
<tr>
<td>1931</td>
<td>WCS 3</td>
</tr>
<tr>
<td>1981</td>
<td>WCS 4</td>
</tr>
<tr>
<td>1995</td>
<td>WCS 5</td>
</tr>
<tr>
<td>1992</td>
<td>WCS 6</td>
</tr>
<tr>
<td>1931</td>
<td>WCS 7</td>
</tr>
<tr>
<td>1931</td>
<td>WCS 8</td>
</tr>
</tbody>
</table>

Gilbert & Rivington and William Clowes & Sons, London

Gilbert & Rivington’s first specimen to include Gurmukhi was published in 1873, and repeated in 1875 and 1878 [figure 78]. The short duration between the three leaves no surprise that no alterations were made during each edition. This Punjabi typeface, referred to as GAR 1, hardly seems worth mentioning as it is an extremely poor representation of the Gurmukhi script [figure 79]. The appearance is clumsy and random, with what seems a medley of characters from various scripts. A direct comparison can be made to the Marathi typeface above [figure 79], in which a selection of characters, both vowels and base consonants, can be identified in the Gurmukhi specimen beneath. Some have no relation to the Gurmukhi characters.**

The remaining characters which appear to be Gurmukhi, are either well-drawn (in comparison to the borrowed or remaining) or are oversized, crude depictions of what they should in fact be. The vowel signs are faint, except for which looks out-of-place.

The akhand typesetting method is used, which should have improved kerning has proven otherwise here: the baseline is uneven to avoid the superscript and subscript vowels clashing. This is resolved by altering only the baseline of the affected character. A similar situation occurs in the Marathi sample above, but enough leading has been provided to avoid a messy result [figure 79].

Appearing only in the 1873 specimen was another Gurmukhi typeface, GAR 2, which had been used for the Sindhi language. It is a far better representation of the Gurmukhi character compared to that of GAR 1. Its origins are unknown, but it appears to be identical to SAS 2. GAR 2 makes no other appearance with GAR, but re-appears in the 1928 and 1932 SAS specimens, only with different characters [figure 80]. The size, slightly smaller than GAR 1, appears to be of improved printed quality compared to that of the SAS 2. The characters are darker and more refined, detail is greater.

In GAR’s 1891 and 1905 specimens another, entirely different typeface occurs, GAR 3 [figure 81; page 56]. It is a type size that sits between GAR 1 and GAR 2. An improvement on GAR 1, it lacks the coherence and balance achieved in GAR 2. The counters appear at various sizes: the knots are oversized, a combination causing distraction; the vowels signs lack consistency and the tippi is barely visible. A particular oddity is the reversal in stroke length with regards to the vowels फ, च and ङ.

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The vowel is barely visible, and the vowel signs lack consistency regarding their size and forms.

The vowel, normally of full-length, appears more often in GAR 3 as half . Whereas the vowel frequently appears at full-length, incorrect, but an indication that the akhand system was used, this may have been to ensure that the number of characters required was kept to a minimum.

It does not seem likely that the akhand system was used in GAR 3, as spacing is often a little too wide. Character proportions vary in width and depth. A clear development can be seen with the , in GAR 2 the design is closer to the handwritten form, whereas in GAR 3 the curves are achieving structure, evolving into a character which could appear in a contemporary typefaces. It seems unlikely that GAR could have attained their typefaces from the same origin, as each is an example with great variation in design, skill and knowledge with regards to the Gurmukhi script itself.

William Clowes & Sons (WCS) took over GAR in 1908. Their 1915 and 1931 specimens display the same eight Gurmukhi typefaces (figure 82). WCS 1-8 vary in size from as large as forty eight point to as small as twelve point. With the intention of only considering text typefaces for this dissertation five will be discarded leaving three point sizes: twelve (WCS 1), fourteen (WCS 2) and sixteen (WCS 3) (figure 83).

WCS 1 is merely GAR 3, and WCS 2 is GAR 3 but cast on a fourteen point body (figure 83). Small differences are visible: the tippi appears larger and the WCS 2 sample shows the use of consonant conjuncts as well as the half form , and unusually, a half form of , (first seen in SAS 1 [see figure 71; page 50]) (figure 83).

WCS 3 is of no improvement. The size has increased, but the inconsistencies of WCS 1 and 2 are still apparent. If the knots alone had been reduced in colour the improvement could have been vast. The height of the vowel signs appear more consistent, all follow a shallow depth. Two characters stand alone due to the addition of small exit strokes, and . One is assuming that these may be characters which have been cast with conjuncts attached, reminiscent of handwritten forms, or maybe they represent the .

Oxford University Press, Oxford

The Oxford University Press’ specimen clearly dates the casting of its Gurmukhi typeface, OUP 1, at 1876 [figure 84; page 58], and for the
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specific use in The Gospel according to St. John⁹⁹ [figure 85]. One should have not considered OUP I in this analysis as its size is paragon (twenty point), falling outside of the predefined boundaries. Despite this, the OUP I design deviates immensely from all previously, and any further considered typeface designs.

The foremost anomaly is that of the stroke contrast [figure 86]: it varies greatly between thick and thin, a style that is not common in Gurmukhi typefaces or the handwritten form. The manuscript, Add. 26,525 [see Appendix; page 109 (no image available)], one of the examples studied at the British Library, expressed a similar characteristic to that of OUP I, suggesting that the punchcutter whom designed OUP I had a manuscript written in a similar hand that would have been the model. However, the stroke formation is questionable: referring back to how a designer may wish to reflect the mark of a specific tool in their design may have been the intention for OUP I, but without any understanding with regards to how the original tool would have been handled, one is almost apprehensive to accept that these are true marks; further analysis would be required.

Another viable suggestion could be that of style. The OUP was renowned for its classic preference, and glancing through the specimen book⁹⁹ one can see a relationship between the majority of scripts and their designs: they appear of similar texture, contrast and all with an expanded character synopsis. With a distinctive ideal in mind, the OUP could have been aiming their collection at a specific customer or publication.

Whether the strokes are a true representation of the tool or not, the handwritten essence is controlled and the result is uniformed. The characters appear balanced and are well-proportioned. Looking closer at particular characters reveal crude forms, but they work together without distraction – the intention of any text typeface.

The character synopsis is large: casting numerous combinations of base character plus consonant conjuncts or half-form. Peculiarities exist: ṭ, ṭh and ᴮ either have no headline or no extension. ṭ has an odd entry stroke, which could represent a combination the vowel ṭ. Vowels also appear to be supplied in their inverse, [see figure 39; page 18]. The specimen describes that ‘numbers 49–54, 56–8, 132, and 135–9 are cast on a pearl (five point) body’, suggesting that the degree system was in use [figure 86].

⁹⁹ Oxford University Press List of ancient and modern Greek and oriental founts at the University Press Oxford 1899; page 12.
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Vincent and James Figgins (VJF), were given their father's, Vincent Figgins, business in 1908. They published their first type specimen book in 1858. A Gurmukhi typeface, Pica Panjabi, VJF, could not be found until the VJF specimen, Specimens of type – printing materials, published in 1895. An undated character synopsis for VJF, was found, listing approximately 150 characters according to their body size, offering base characters alone and cast with the subscript vowel signs. The general colour is pleasant, and the base characters and vowel signs work well together. The monolinear stroke is not out of the ordinary but the characters themselves stress an unusual personality: the expanded characters look as though they have been simplified, achieving a geometric design: corners which are normally constructed with a curve are barely visible, with shallow forms; the strokes finish rounded rather than flat, and the vertical strokes appear nonexistent. The handwritten quality is disappearing, apart from an unusual flared exit stroke to the vowels and , which can be seen in the B–40 Janamsakhi [see Manuscripts; page 24].

The degree system is evident: the specimen explains 'letters are cast on Pica (twelve point) and Bourgeois (nine point), Top points on Minikin (superscript vowels on three point); making with the Bourgeois, Pica Body. All Bottom Points (subscript vowels) are cast on the characters.' Kerning of the vowels and was possible, as the headline had been removed. It seems by choice, that loose kerning was preferred as the white space appears with consistency.

An advertisement for an Indian 'letter founders' was found in the journal The element of letterpress printing, published in 1895; page 63]. It is for P. Arbolamunth & Sons, who advertise their affiliation with VJF, suggesting that VJF was a desirable typeface for Indian consumers at this time.

Reed writes in A History of the Old English Letter Foundries, that the last of the Figgins died in 1907, when a new firm was established by his nephew, Mr R. H. Stevens. Evidence of only one Gurmukhi typeface for R. H. Stevens & Co., Ltd, could be found as an undated specimen page [figure 91; page 62] and a separate character synopsis.

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Figure 87. Dates of the V & J Figgins and R. H. Stevens & Co. Ltd. specimens and their typefaces. Highlighted with grey are of display size and not considered.

Figure 88. V & J Figgins specimen

Figure 89. V & J Figgins character synopsis [above: scale 150%]

Figure 8a. V & J Figgins character synopsis [above: scale 150%] [left: scale 75%]
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RHS 1 is only mentioned as it previously appeared in the 1915 WCS specimen as WCS 4, [see figure 82; page 57].

Dating the RHS foundry’s existence between 1908 and the early 1930’s does not suggest that either foundry may have been the typeface’s point of origin. Yet the resemblance of WCS 4 and RHS 1 to that of WCS’s 1, 2 and 3 is very strong; the same feature of large knots exists between all of WCS Gurmukhi typefaces and could merely be enlargements of WCS 1, suggesting that WCS is the point of origin for the WCS and RHS 1 typefaces with the likelihood of WCS exploiting the ‘practices of electrotyping and stereotyping’. Not elaborated any further as its size, twenty-four point, renders it outside the text typeface boundaries.

Ross, Fiona. The Printed Bengali Character and its Evolution 1999; page 100

Figure 90. Advertisement found at the back of Frizzia, T. The elements of letterpress printing, composing and proof reading. Madras 1895; page 299 [full page detail; top: scale 25%]
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Europe

No evidence of Gurmukhi typefaces were found in specimens from the prominent European type foundries. Only two examples were found, suggesting that the Gurmukhi script was not of great demand compared to the more dominant Indian scripts such as Devanagari and Bengali.

K. K. Hof- und Staats-Druckerei, Vienna

The Austrian Kaiserlich-Koenigliche Hof- und Staats-Druckerei (KKH) of Vienna dates from the early-nineteenth century, known predominantly for their plagiarised designs. In 1841, Alois Auer was appointed as the KKH’s director. Auer came with eleven years of typographic experience and was responsible for the reformed establishment, yet the KKH was re-built upon a re-stock of brought typefaces which were reproduced by the method of stereotyping.

The first occurrence of the KKH’s Gurmukhi typeface, KKH 1, appears in Karl Faulmann’s Das Buch der Schrift enthaltend die Schriften und Alphabete aller Zeiten und aller Völker des gesammten Erdkreises, published in 1878 and reproduced in 1910. KKH 1 is titled Sikh, and a character synopsis is provided as a table of six columns [figure 93]. Aware that the KKH was notorious for plagiarism, one was initially doubtful as to KKH 1’s authenticity, and the tabular method of display could have easily enabled the KKH to fudge the characters by carving them in wood as six line blocks, or one with six columns. However, with the later find of a KKH specimen dated 1910, the KKH 1 has been set as a small sample of running text, and one can see that the two examples barely differ [figure 94].

The size is Pettit (eight point), no numerals or punctuation are used. An immediate, and only difference between the two is that of the superscript vowel signs, especially which now appears defined with even colour. Basic proportions of alike forms are missing, and [figure 95] and the character synopsis displays characters with a dash.

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For further reading see: Southall, Richard, Printer’s type in the twentieth century 2005

Development of the printed character

beneath: either representing conjuncts, the halant or perhaps the additional dotted consonants. The half character of $\text{ਹ}$ is combined with $\text{ਚ}$ resulting in a compressed, almost illegible form. The consonant conjunct $\text{ਚ}$ is an exaggerated cursive form, likely borrowed [figure 93].

Der Reichsdruckerei, Berlin

Reichsdruckerei was founded in 1876, yet a Gurmukhi typeface did not appear until Reichsdruckerei’s 1924 specimen (re-printed in 1969), Alphabete und Schriftzeichen des Morgen- und des Abendlandes. A table of three columns display a set of Gurmukhi characters, DRB 1. One would have the same assumptions with DRB 1 as one had with KKH 1 regarding the authenticity of design and impression. However, it appears that the majority of characters are identical, and with different structures to their tables it is likely that the characters were metal [figure 95].

Comparing directly with KKH 1, numerous differences occur with their design and transliteration system [figure 95]: the general impression is darker, resulting in poorer legibility, the likelihood of too much ink or pressure on the press. The character synopsis is smaller, missing the ten characters suspected to represent the additional sounds. It has composed base character-consonant conjunct combinations and no numerals. The vowel signs are alike and they represent the second example of KKH 1, as the vowels appear with stronger form. Four characters, $\text{ਹ}, \text{ਹ}, \text{ਟ} and \text{ਤ}$, have evolved dramatically: increasing in size, the forms are crude, and generally appear out of place. $\text{ਹ}$ and $\text{ਤ}$ appear over incorrect vowel bearers [see The writing system; page 17], indicating that this table had been composed by someone without knowledge of the Punjabi language [figure 95].

Hot metal to early digital type

The end of the nineteenth century saw the transition from hand-composed type to that composed by a machine. There are two predominant systems to consider: the Monotype system developed by Tolbert Lanston and J. S. Bancroft in 1890 and the Linotype system of 1885, developed by Ottmar Mergenthaler. The introduction of these machines improved the speed and cost of the manufacturing process, but they also caused constraints of their

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100 For further reading see: Southall, Richard Printer’s type in the twentieth century 2005
The following sub-chapter provides a brief description of each system and development, but predominantly describes the design of the typeface, and when necessary the technical details will be mentioned. To discuss the processes in any greater detail would be beyond this dissertation.

Also, one should note that an entire process has been skipped, film-setting. No evidence was found, unless misinterpreted, to suggest that any of the Gurmukhi typefaces analysed used this process (which occurred between hot metal and early digital). Monotype were contacted regarding their Gurmukhi versions, as one is aware that their other non-latin typefaces existed in this format, but no response was received

Monotype Gurmukhi
The Monotype system consisted of two components, a keyboard that punched character codes into a paper ribbon, which drove the casting machine, consisting of a matrix case holding the matrices (metal sorts), with an equal number in each row/column. Type, composed as individual characters meant that kerning could still occur, reminiscent of the akhand typesetting method.

The first Monotype Gurmukhi typefaces can be found in the Specimen book of ‘Monotype’ non-Latin faces, dated 1963. Titled Gurmukhi Bold 601 and Gurmukhi Light 604, referred to as MTC 1a and MTC 1b respectively.

They are essentially of the same design, just a variation in weight [figures 96 and 97]. The character set is large, a possibility with the Monotype system as the matrix cases were of two standard sizes, the smallest of capacity was sufficient for Gurmukhi, providing space for a maximum of 225 characters. The MTC 1a and MTC 1b were comprised of 183 characters: along with the basic synopsis were a wide variety of composed conjuncts, along with their base characters or superscript vowels, numerals both Gurmukhi and Arabic and the inclusion of standard Latin punctuation.

The texture is balanced: knots have enough colour, and are not a distraction. Counters are large, and legibility is just as successful in MTC 1a as it is in MTC 1b. The typesetting is neat, both headline and baseline run smoothly, with only minor gaps when considered at a close proximity [figure 98]. Kerning is visible with the vowels and , their top strokes are open. There seem to be no discrepancies regarding diacritics clashing, (at least not in the sample provided). The vowel sign which has frequently appeared oversized, now fits within the width of the base
characters, which appear of a similar, if not the same width. A feature constrained by the size of the matrix case,

‘the width of every character, … had to be equal to a multiple of one-eighth of the width of a selected em quad, five eighteenths being the minimum, eighteen the maximum.’

This has not had a negative effect upon the design. It is a constraint which is likely to have encouraged constructive improvements to the design and consideration of each character.

Monotype’s specimen Library of Non-Latin Typefaces, c.1994, displays two Gurmukhi typefaces, Monotype Gurmukhi Bold and Monotype Gurmukhi, referred to as MTC 2a and MTC 2b respectively [figure 99 and 100]. ‘Typeset on a Monotype Papermaster at 600 dpi resolution’ informs one that these are examples of early digital typefaces. Another indication is the unbroken headline, which had always been a common feature of hand and machine composed type [figure 100].

MTC 2a and MTC 2b appear to be direct replicas of the MTC 1a and MTC 1b respectively, with minor revisions which are not necessarily direct improvements, but a sign of adjustment. Superscript vowels now sit attached to the headline, including the tops of ई and ऊ which curve over to meet the headline, frequently aligning so as to continue into the stroke below; a refined cursive feature that was evident in the early handwritten manuscripts. The clashing of vowel signs may be a result of this new technology, software may not have provided support for improved kerning at this point [figure 101]. The stems of the consonant conjunct ‘’ have been shortened, creating an improved relationship with its base character.

Monotype’s current Gurmukhi typeface, still named Monotype Gurmukhi, appears on their website, monotypeimaging.com. The image is of poor quality, (not available to download), but one can see that it is very much like the MTC 2’s with an additional third weight [figure 102]. The text sample is small, therefore difficult to make a valid comparison. It is very likely that this typeface is again a direct replica of MTC 2, only with the addition of the Unicode standard and OpenType font format [see Digital type; page 77].

Monotype also licence typefaces from ITR (Institute if Typographical
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Linotype Gurmukhi

The Linotype system consisted of four components, ‘a keyboard, a magazine containing matrices, a casting and a distributing mechanism.’ In comparison to the Monotype system, it was now possible to set type as an entire line rather than individual characters. The combination of previous separate methods such as casting and typesetting into one system meant that the production rate was increased. However, it became evident that the system was not suited to the complicated nature of non-Latin scripts, such as Devanagari and Bengali, regarding the difficulty of kerning numerous subscript and superscript characters. Non-Latin scripts required refining, resulting with what was to become acceptable as legible typography.

There seems no evidence that a hot-metal Gurmukhi typeface existed.

The first Linotype Gurmukhi typeface, LTG 1, appears as an early digital format. ‘Developed in conjunction with Tribune Trust Publications in Chandigarh, it is available in Light and Bold for the Linotron 200.’ Held in the Linotype collection, in the Typography Department at the University of Reading, are the original drawings and correspondences to-and-fro between the designers and the Tribune Trust; much of the process can be traced through these papers, dated from as early as 1984.

Linotype Gurmukhi Light and Bold, LTG 1a and LTG 1b respectively were designed by Fiona Ross, Georgina Surman & Donna Yandle. The character synopsis is substantial, supporting all of the necessary characters plus extra: a benefit of digital technology meant that a character synopsis need not be constrained to a particular figure [figure 105; page 74].

The design is very much a revival, ‘based on traditional foundry...’

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It was not a revival of any one particular typeface but rather an improvement upon the features which had been successful during the end of the nineteenth and early twentieth centuries: possibly taking into consideration previous designs such as GTFs, SAS 3 and MTC 1 typefaces which were reaching standards that are visible in LTG 1.

The two designs, LTG 1a and LTG 1b, are very much alike and differ only by weight. The large, open counters are a benefit to the bold weight of LTG 1a, ensuring that legibility is not lost if used at smaller sizes [figure 106]. Consistency is the prominent feature of LTG 1, and is clearly visible when regarding the proportions, which benefit from the consistent use of recurring forms [figure 107; page 76]; widths have been controlled, along with the height and depth of vowel signs; and the monolinear stroke is accompanied by ‘swelling vowel signs, which imbue it with liveliness’.[18]

Attention to typesetting was improved with the capabilities of specialised software, designed specifically with consideration for the correct placement of superscript and subscript vowel signs. Alterations and decisions made can be seen amongst the drawings in the Linotype Collection [figure 109; page 76].

In 1992 Linotype Gurmukhi Light and Bold were revised and released using the PostScript technology. The new technology meant an increase in resolution size, resulting in improved quality of outlines.
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Digital type: Unicode and OpenType features

With the introduction of digital typeface design in the 1980’s, the entire method of production changed from what had been a process of combined efforts in the nineteenth and early twentieth centuries to a process which one could approach single-handedly, feasible for those whom were and are not professional designers.

Each technology development has improved the design process and introduced new constraints which were considered and, more than often, rectified. The digital revolution is no different. Positive aspects have been the introduction of the Unicode standard, and the application of the OpenType font format:

The Unicode standard

Introduced in the 1991, by the Unicode Consortium, who created a system by which all scripts could be organised and identified in defined groups. Scripts are assigned a range of numerals and each character is given its own numerical value, creating a system which functions universally across computer systems and software.

The Gurmukhi Unicode range is between 0A00–0A7F [see Appendix; page 110] and consists of 77 characters, covering the majority of the writing system, along with the addition of the pre-composed vowel-bearing and vowel-sign combinations. However, it seems odd not to have included the Gurmukhi punctuation marks as a standard.

By means of the Unicode Consortium, additions or alterations to the Unicode tables can be proposed within reason; a process which takes time and consideration. A proposal was made by the Technology Development for Indian Languages (TDIL), for the introduction of the punctuation marks: changes which are awaiting acceptance [see Appendix; page 111].

The OpenType font format

The OpenType font format was developed by Microsoft and Adobe in 1996 and is based upon the Unicode system, enabling the combination of multiple scripts in any one typeface. A typeface including OpenType ‘enables support for ligatures, positional forms, alternates, and other substitutions’, particularly beneficial for non-Latin scripts [figure 110].
Figure 111. Specimen of Arial Unicode: Gurmukhi. ascendercorp.com [scale 50%]

A negative aspect of the digital era is plagiarism. A result of growth in software development with the combined possibilities of the internet: only so much control can be provided with a copyright licence, and not enough to stop illegal adaptation and distribution of typefaces. Ensure of their whereabouts, it is not uncommon to come across an identical design under alternate names and supplied from various locations. With this in mind, the following sub-chapters describes three digital designs briefly.

Ascender Corporation: Raavi

Ascender Corporation display two Gurmukhi fonts on their online catalogue, Arial and Raavi115 [figures 111 and 112]. A discussion, via email with Ali Basit, one was informed that 'Microsoft only ships one font Raavi with Gurmukhi support.' For this reason, Raavi is discussed alone.

Designed by Raghunath Joshi and Apurva Joshi, the exact date for Raavi's creation is unknown. Basit mentioned that he 'inherited the ownership of the Indic fonts a few years ago... and that Raavi had been licensed more than ten years ago, with this in mind, one will apply a circa date of around the end of the nineties.

Raavi is an OpenType font, 'targeted for the screens used in today's digital world.' The character synopsis consists of approximately 265 characters, which is substantially larger than the Unicode standard, supplying extra characters such as the Arabic numerals and Gurmukhi punctuation marks [figure 113].

A firm monolinear design supports the moderately proportioned characters; possibly a little wide. Most follow the general practice of repeated forms, encouraging consistency as seen in LTG. A few characters break the consistency with uneven counter sizes. Ek Onkar is extremely subtle: the top stroke normally appears overly exaggerated, especially so in handwritten manuscripts. The vowels vary between connecting and not connecting to the headline, and the dots of punctuation marks [figure 113].

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Dr K. S. Thind: GurbaniLipi and AnmolLipi

GurbaniLipi and AnmolLipi, referred to as GL and AL respectively, are almost identical digital typefaces: one could assume that whichever had been the first design of the two, could have then been manipulated, ever so slightly to create the other [figure 114]. With a character synopsis of approximately 200, their main differences are their intended purposes: GL is used for traditional texts, the user is provided with Gurmukhi numerals; AL is aimed at everyday use, with Arabic numerals and a variety of weights.

Designed by Dr K. S. Thind in the early 1990’s, they are freely distributed and can be sourced from numerous online locations, and are of great preference by users. Dr Thind has since adapted AL, introducing the Unicode standard and under a new name of AnmolUni. As GL and AL are very much alike, AL will only be considered in this analysis [figure 115]:

In a discussion via email, Thind explained that existing materials, such as books had initially been evaluated and that ‘Gurmukhi fonts tend to be monolinear’ with no further explanation with regards to why. The quality of drawing is adequate, a few minor bumps, but Thind expresses a moderate understanding for constructing characters in the digital format [figure 116]. The character synopsis includes some peculiar additions: floral ornaments and Arabic numerals, which have a high stroke contrast, suggesting that they may have been sourced from another typeface, as they share no relation to the design of the Gurmukhi characters. Three variants for the Ek Onkar symbol are provided, one of which has a similar terminal ending to the VJF design. Overall, there is little consistency between the common repeated forms [figure 115].

Punjabi Computing Resource Centre: Saab

‘Saab’ is the first ever freely available, Unicode 4.0 compliant, OpenType, Gurmukhi font, designed by Bhupinder Singh, with technical support from Sukhjinder Sidhu, completed in 2004 [figure 117; page 82]. Models used were Microsoft’s Raavi [see Digital type; page 79], the Unicode chart [see Appendix J; page 110] and Dr. Kulbir S. Thind’s Anmol Lipi [see Digital type; page 81].

When the author asked the Sewader of the SMS which digital font he used, AnmolLipi was of preference due to its free cost and satisfactory character synopsis. There seemed no concern regarding the design and quality of it, as it does the job.

Sukhjinder Sidhu currently works with Thind, providing technical support for his designs.
The design of Saab appears almost as an amalgamation of the MTC and LTG typefaces (figure 118): it has the monolinear stroke which seems of standard practice for Gurmukhi typefaces, yet the vowels differ in weight, as do LTG 1s. The character synopsis has 138 characters, including Latin punctuation and Arabic numerals. It seems peculiar that the additional Latin characters have been taken directly from another typeface, rather than designed in coherence with the Gurmukhi. If not, one would assume that a Latin typeface of a similar style would have been preferable.

The texture is balanced and the colour even, however the quality of the line is poor (figure 119). The dots of the additional characters align with each other, yet all under the right side as if they were conjuncts: a consistent placement, but peculiar when regarding all other typeface designs considered throughout this dissertation. The Ek Onkar and Khanda appear out of proportion, either far too large or too small, and not designed with consideration of the base character size and height. The numerals are well proportioned, however the zero is oversized, introducing too much white space.

Despite the inconsistencies and poor line quality, the characters appear alike where necessary and perform satisfactory when set as small as eight point [figure 117].
Conclusion

The Gurmukhi script has made a clear development from the early nineteenth century metal types to its contemporary digital format. The most prominent being that of a standardisation of the characters’ proportions and repeated forms, achieving consistency and balance [see Linotype Gurmukhi, page 76]. Surprisingly, the standardisation took some time, where one would have expected such a method to have been implicated earlier, providing a solution to saving materials etc. resulting in cheaper production. Rather than to swap and borrow characters between other typefaces, they could have been achieved by sharing alike forms within one script.

Through this process there has been a reduction of the traditional handwritten qualities that were once visible in the first metal types, a feature that only ever occurred with a small selection of characters. The Oxford University Press’ typeface was the unique, with the handwritten quality overtly evident in all characters: a peculiarity that had very little presence throughout the research. Without the preliminary investigation of the Gurmukhi’s traditional and contemporary written forms one could not have deciphered many of the early representations of the various characters and combinations. Highlighting the importance of such research, can suggest the choices made for the early designs. One is aware that there may be occasions of incorrect judgement regarding particular characters; therefore an understanding of the Punjabi language and Gurmukhi script would have been of great use.

The Gurmukhi characters are very much of a monolinear fashion, a characteristic which had been predominantly visible in the handwritten manuscripts, and is in existence in the contemporary digital format. One is still unclear with regards to which tool and method had been utilised, yet with further investigation one would hope to decipher this so that the transition between paper and screen could be understood a little more.

Technology has evolved immensely over the past four centuries, yet it has not had a great effect upon the design of the Gurmukhi script. It seems to have steadily evolved between each transition, improving the typesetting at each point. No reference has been found to suggest that there had been a film-set Gurmukhi typeface, further investigation could be made.


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Appendix

98 Appendix A. Tree diagram: A Handbook of Asian Scripts
99 Appendix B. Tree diagram: Typography of Devanagari
100 Appendix C. Tree diagram: The alphabet: a key to the history of mankind
101 Appendix D. Tree diagram: History of printing and publishing in India: a story of cultural re-awakening
102 Appendix E. Tree diagram: The world’s writing systems
103 Appendix F. Tree diagram: A history of writing
105 Appendix G. Letter dated 18th April 1845, discussing the Gurmukhi script
107 Appendix H. Illustration of mouth and location of articulation
109 Appendix I. Gurmukhi manuscripts seen at the British Library
110 Appendix J. U+0A00 – U+0A7F Gurmukhi Unicode chart
111 Appendix K. Unicode standard for Indian scripts (Gurmukhi)
A comparative study of the development of the Gurmukhi script


Appendix B. Naik, Bapurao S. Typography of Devanagari. Directorate of Languages, Govt. of Maharashtra, Bombay 1971; facing page 11 [scale 75%]
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A comparative study of the development of the Gurmukhi script

Appendix

Letter dated 18th April 1845, discussing the Gurmukhi script:

My Lord,

I have the pleasure to return your Indian volume with such brief notice of its contents as my imperfect acquaintance with them enables me to offer.

The language is Khandak - that of the Pathan and other tribes of the Punjab. The character is called Gurmukh,mukhi, having been derived by the Gurmukh,Mukhi, from the Harari or Persian alphabet. The chief peculiarity of which is an alteration of the powers of the forms of the letter. This I think a very important discovery.

Appendix G. Letter dated 18th April 1845, discussing the Gurmukhi script. British Library Mss Eur CY20; page one of four
A. Position of the vowel cords
B. Pharynx
C. Uvula

1. Velum (soft palate)  a. Back of tongue
2. Hard palate        b. Middle part of tongue
3. Hard palate        c. Middle part of tongue
4. Teeth, upper       d. Blade and tip of tongue
5. Lip, upper         e. Lip, lower

Appendix H. Based on an illustration found in Gray, J. E. Sanskrit Grammar SOAS in-house publication, date unknown: illustration of mouth and location of articulation.
A comparative study of the development of the Gurmukhi script

Appendix I. Gurmukhi manuscripts seen at the British Library, London

MSS Panj. C 6: 7+44 folios; 280x200mm; 19 lines; well-written Gurmukhi; 1930
Or. 2754: 281 folios; 152x235mm; 17 to 21 lines; written by different hands; c.19th century
Add.26,525: 212 folios; 64x51mm; 6 lines; c.19th century
279.31.1.7a: 320x240mm (lithography)
Mss Panj. B 40.239: 239 folios; 250x140mm; 16 lines; 1780
MSS Panj. A 4: 507 folios - as two volumes; 110x150mm; 8 lines; c.19th century

note: Illustrations are scaled 25% of their original size, along with an A4 page for a direct comparison. The amount of lines are shown to provide an idea of the density of copy (approximately drawn). They share similar qualities to the manuscripts shown in figures 33–37.

for scale: A4 page

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A comparative study of the development of the Gurmukhi script

Proposed changes in the Unicode Standards for Indic Script - Gurmukhi

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
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<tbody>
<tr>
<td>E</td>
<td>F</td>
<td>G</td>
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</tr>
</tbody>
</table>

The background color notation used in these charts are as follows, also a remark has been given for accepted changes.

- Indicates proposed characters/symbols/signs addition in the existing standard
- Indicates the change in the annotation/explanation of that particular code point
- Indicates proposed characters/symbols/signs shape change in the existing standard

Appendix K. 'Unicode standard for Indian scripts (Gurmukhi)’ [URL] <http://tdil.mit.gov.in/pchangeuni.htm> [scale 75%]

Appendix J. 'U+0A00 – U+0A7F Gurmukhi Unicode chart’ Unicode <http://www.unicode.org/charts/> [scale 75%]