

Linotype Bengali and the digital Bengali typefaces

*With an enquiry into the current state
of Bengali typesetting*



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Abstract

The *Linotype Bengali* typeface for digital typesetting was designed at the end of the 1970s for Anandabazar Patrika, the biggest publishing house in Kolkata. Although Linotype terminated production of this typeface in the early 1990s, today it very nearly monopolizes Bengali typesetting. This essay investigates the reasons behind this. It focuses on the making of Linotype Bengali and illustrates how local industry has copied it, without exploring new design possibilities, and how the typesetting technology used for Bengali also shares responsibility for this situation. An overview is provided of currently available Bengali type designs that have been produced in very recent years.

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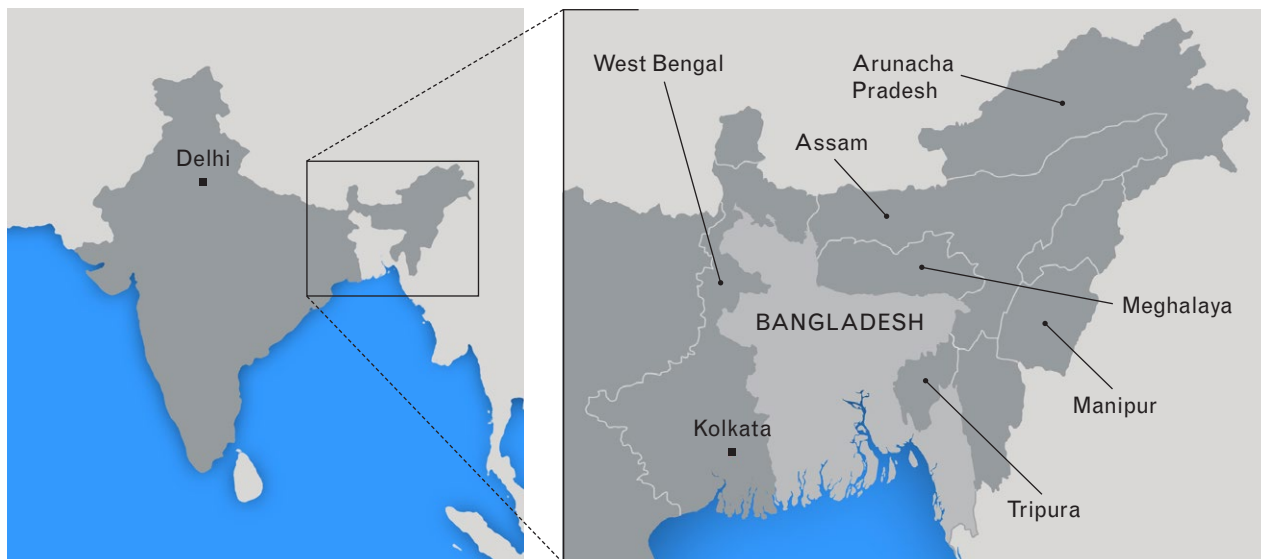


Figure 1.1. The regions where Bengali is the official script. In the Indian states of Meghalaya, Tripura and Arunachal Pradesh Bengali is used along with other scripts, mainly Latin. In Manipur the traditional script Meetei Mayek has been reintroduced in the 1980s. Source www.omniglot.com

1. Introduction

Since the 16th century the European production of non-Latin typefaces has been defined mainly by limited knowledge of the scripts and little respect for the readers. One exception took place in the English branch of Linotype¹ in the 1980s, where an extensive agenda of new typeface design for Arabic and Asian scripts was undertaken, gathering language experts, designers and programmers in the same team. This new approach led to some remarkable type design, such as *Linotype Bengali*. From 1981, when it was released, Linotype Bengali went through prepress technology mutations without any changes, till today. A quick glimpse of Bengali typography today would reveal the ubiquity of Linotype Bengali, and the astonishing absence of competitors.

The aim of this research is to outline the story of Linotype Bengali, investigate its legacy in contemporary Bengali typography, understand the reasons for its incredible spread, and provide an overview of currently available Bengali type designs. With an eye to the technology involved, and the constraints that designers had to face. As the subject is recent, the investigation is mainly based on opinions and memories of the people involved, thus the reliability of some information could be questioned. I have tried to extensively apply cross-verification from different sources, but the task is difficult in particular because ‘India is a very complex object. Everyday, every minute, everything is changing’².

Finally, I’ve appended an investigation into Bengali typesetting on personal computers at the present time, as its limits will help us to grasp a more precise picture of the current situation of Bengali typography.

1.1. Bengali script: an overview

The Bengali alphabet (বাংলা হ্রস্ব) is used in the north-eastern part of India and in Bangladesh and with about 250 million users, it is one of the most widely-used writing systems in the world³.

1. Located first in London and then in Cheltenham, Gloucestershire.

2. R.K. Joshi (note 5 § 4.1) interviewed by Shruti Agarwal and Chetan Shastri, Mumbai, November 2007. www.designinindia.net

3. Simon Ager, *Omniglot: a guide to writing systems*. www.omniglot.com

Vowels

| | | | | | | |
|---|----|---|----|---|----|---|
| অ | আ | ই | ঈ | উ | ঊ | ঋ |
| a | aa | i | ii | u | uu | r |
| এ | ঐ | ও | ঔ | | | |
| e | ai | o | au | | | |

The transliteration of the letters follows the character names established by the Unicode consortium.

Consonants

| | | | | | | | |
|-----|-----|-----|------|-----|------|-----|-----|
| ক | খ | গ | ঘ | ঙ | চ | ছ | জ |
| ka | kha | ga | gha | nga | ca | cha | ja |
| ঝ | ঞ | ট | ঠ | ড | ঢ | ণ | ত |
| jha | nya | tta | ttha | dda | ddha | nna | ta |
| থ | দ | ধ | ন | প | ফ | ব | ভ |
| tha | da | dha | na | pa | pha | ba | bha |
| ম | য | র | ল | শ | ষ | স | হ |
| ma | ya | ra | la | sha | ssa | sa | ha |

Vowel signs

| | | | | | |
|-----|-----|-----|----|-----|-----|
| া | ি | ী | ু | ূ | ্রি |
| -aa | -i | -ii | -u | -uu | -ri |
| ে | ৈ | ৌ | ী | | |
| -e | -ai | o | au | | |

Figure 1.2. Bengali script, basic alphasyllabary and attaching vowel signs.

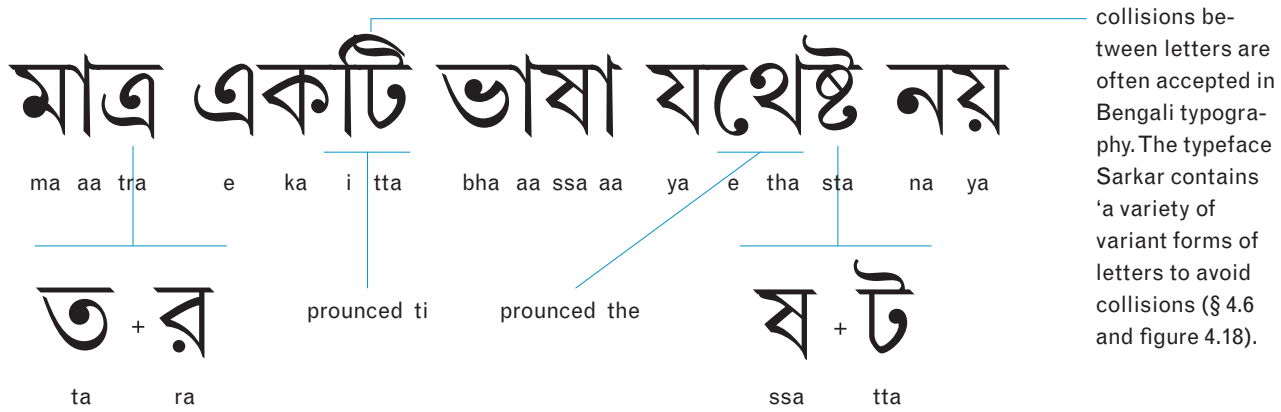


Figure 1.3. Orthographic analysis of a Bangla phrase with transliteration, notes and disclosing the consonant conjuncts. The meaning is 'one language is never enough'. www.omniglot.com

Like all the Indian scripts, each consonant carries an inherent vowel sound. Thus the consonant **k**, ক, is actually pronounced as the syllable *ka*.

All the vowels are written in two forms: an independent vowel and an attaching sign. The vowel signs can be attached above, below, to the left or to the right of a consonant to modify the inherent vowel sound and therefore the consonant **k** can be pronounced *ki* (কি), *kii* (কী) or *ku* (কু). A sign called hasanta is positioned close to the bottom of the consonant when the inherent vowel sound is suppressed: ক্ will be pronounced *k* instead of *ka*.

When two or more consonants form a sequence (with no intervening vowels), the letters are substituted by a consonant conjunct, a single character with shapes that often do not resemble the original consonants. For instance, the conjunct **jba** জ্ব is composed by **ja** জ and **ba** ব, or the conjunct **kssa** ক্‌ষ by **ka** ক and **ssa** ষ. There are several hundred conjuncts in Bengali script and they probably represent the most complex aspect for transcribing Bengali writing into typography.

Bengali script and its orthography are still undergoing rationalization and reform, thus sometimes we find two different shapes representing the same conjunct. For instance the conjunct **sta** (ষ+ট) can be written both with the traditional form ষ্ট and with the more recent form ষ্‌ট. This topic is discussed in section 3.3.

Bengali is considered a complex script⁴ and requires some character re-ordering and glyph processing for proper display on a layout software, and this is discussed in chapter 2.

4. The term complex script refers to any writing system that is keyed in a different sequence to that in which it appears. In Bengali, for instance, the inherent vowel **i**, ি, is written on the left (before) the consonant that it follows, thus কি is pronounced *ki*.

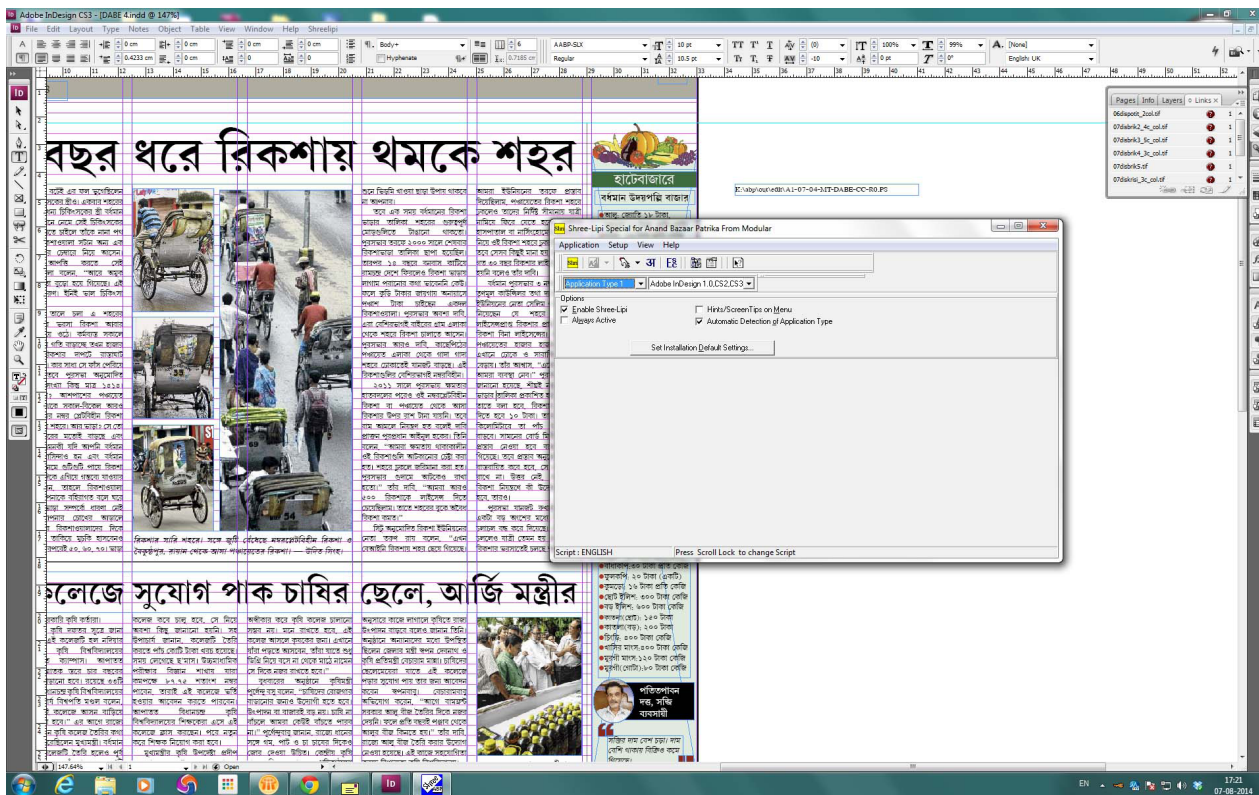


Figure 2.1. Interface of Shree Lipi on a PC of ABP group. Screenshot by Surit Doss, August 2014.

2. Current Bengali typesetting

With its 22 official languages¹ plus hundreds of dialects, India is the modern Babel, where the most widely spoken language, Hindi, is used by roughly half of its population. For this reason most marketing communication and advertising, in primis, is set in English. However, the changes that are taking place today are mainly due to the spread of mobile phones: the telecommunication companies are trying to reach people in the countryside, and they are usually poorer and less fluent in English than city people. This means a huge market of hundreds of millions of possible customers. To reach them the companies need to communicate in local languages and their printed material has to be set in local scripts.

Given this, the traditional communicators like design agencies and graphic designers generally work with layouts in English, while the Indic scripts are the prerogative of publishing companies for setting books, magazines and newspapers.

This chapter focuses on the implications of typesetting a Bengali text on a personal computer, analyzing the technology involved and its many problems, the strategies developed by local people and the services developed by Indian software companies to address those weaknesses.

2.1. Typesetting with Western software

To get the correct shaping of complex scripts², like Bengali, we need three elements to work in unison: the font (with well-formed typographic layout features), the text engine and the text itself (i.e. how the character data is encoded). If one of the three elements is not in accordance with the rest, the text output will fail.

Typographic layout features were introduced with the OpenType format, a cross-platform font format developed in the 1990s by Adobe and Micro-

1. As listed on the Constitution of India, Eighth schedule, Articles 344(1) and 351. The languages are: Assamese, Bengali, Bodo, Dogri, Gujarati, Hindi, Kannada, Kashmiri, Konkani, Maithili, Malayalam, Manipuri, Marathi, Nepali, Odia, Punjabi, Sanskrit, Santali, Sindhi, Tamil, Telugu, Urdu.

2. See § 1.1 for the definition of complex script and an overview of the Bengali writing system.

soft together. They are commonly called *OpenType features*, basically tables of information embedded in the font file that specify how the glyphs can be modified by applying certain commands. The modification usually consists of the substitution of one glyph with another (e.g. lowercase *a* with small cap *a* previously designed and stored in the font) or of a group of glyphs for a single one (such as the *f-i* ligature) that is activated by a command in the layout software. OpenType features are essential for proper rendering of complex writing systems like Arabic and Indian scripts, where glyph substitution (in Bengali, for instance, substituting a group of consonants for a consonant conjunct), glyph reordering (the vowel sign *i* is attached on the left of the consonants that it follows), positioning of superscript and subscript marks are frequently required. Another format that can produce the same typographic features as OpenType is the *Apple Advanced Typography* (AAT) that works only on Apple-based software. Outside OpenType and AAT no glyph substitution is possible on modern personal computers and therefore no complex script can be rendered properly³.

However, only a few software platforms support OpenType features and only a tiny group among these support the features needed for complex scripts. For instance, Adobe *InDesign* has been supporting GSUB and GPOS features (instructions for glyph substitution and glyph positioning) only since Creative Suite 3 was released in 2007. Even fewer programs support AAT, given that almost no software vendors, apart from Apple, have released applications that are fully conversant with AAT font formats. This means that *Bangla MN*, the native Apple Bengali font (see § 4.3), will render properly on *Page* and *TextEdit*, both Apple's software, but it will fail on Adobe *InDesign* (even if it is run on the same Apple computer) because Adobe software does not support AAT.

Moreover, a font with well-formed layout features will not be enough if the complex script text is not shaped by the text engine. David Lemon of Adobe wrote: 'A layout application needs to know a lot about the writing system(s) it is using; each script has its own requirements, [...] even something as "normal" as Greek can be surprisingly tricky if you are including polytonic and using small caps'⁴. The biggest software houses have developed their own text engines: Apple uses *Core Text*, Microsoft *UniScribe*, Adobe uses the *World-Ready Composer* while many applications (*Firefox*, for instance) use the open source engine *HarfBuzz*. A text engine

3. For Arabic *DecoType* achieves a similar result (somebody would say: a much better result) with a different system, that does not involve layout features.

4. David Lemon. Email to the author, 12 August 2014.

Figure 2.2. Examples of GSUB and GPOS lookups.

1. GSUB: typing the sequence **ka, hasanta, ssa:**



the software substitute the sequence with the conjunct **ksa:**



2. GPOS: typing the sequence **ta, i-sign:**



the software moves the **i-sign** before the consonant:



and the cluster of letters is pronounced *ti*.

like UniScribe processes Indic text in stages: 1) analysis of the text sequence, breaking it into syllable clusters; 2) reordering of the characters as necessary; 3) GSUB processing to get the correct glyph shape; 4) GPOS processing to position glyphs or marks⁵.

All this technology is very recent and software houses are implementing it day by day. Today Microsoft is using a new version of OpenType script tags for Indian scripts, called *v2 tags* (the script tags identify the writing systems represented in an OpenType typeface), where some previous problems were solved. But *v2 tags* are not supported by Apple while Adobe softwares support them for some Indian scripts but not for others. For instance *Nirmala UI*, a Microsoft user interface multi script font (see § 4.4), does not properly render any script on an Apple-base software like Textedit, while on InDesign (even the latest version) Devanagari, Odia and Malayalam are properly rendered but Bengali is not⁶.

2.2. The role of DeskTop Publishing operators

A recent research trip to Kolkata revealed that most of the users (comprising offices and agencies) were working on old versions of layout software unable to support complex scripts, and often using unlicensed fonts that lack typographic layout features. Their work could only result in failure. To avoid this, Bengali people have developed certain strategies and Indian software houses have developed services that will sound strange to a native Latin user.

Since the second part of the 1990s, some people have been offering typesetting services on a personal computer for printed matter to both private citizens and companies. The reason for this was that when DeskTop publishing spread in India only a few people had a PC and, more than that, the Western layout programs were not able to render a Bengali text properly.

Despite the strong limits of the layout software, often an obsolete version of *PageMaker*, the work of the DTP operator (from DeskTop publish-

5. GSUB means 'shape glyph sequences', and GPOS is for 'position glyph sequences'. From Microsoft's *Developing OpenType Fonts for Bengali Script*. www.microsoft.com

6. Apart from this, InDesign 2014 CC still has some bugs in shaping Bengali text. The most serious is, as Paul Hunt of Adobe pointed out, 'conjuncts beginning with the consonant **ta** are broken by following (in the text stream) vowel signs that should reorder from the beginning (visually) of the syllable cluster: instead these vowel signs will be inserted after the initial consonant **ta**, visually in the middle of the syllable.' Email to the author, 22 August 2014.

ing), as they are called, is to type texts, usually provided as manuscripts: typing letters, selecting conjuncts one by one and sometimes, as the type-faces in use are often incomplete, building conjuncts out of pieces taken from existing letters⁷.

DTP operator skills consist of a comprehensive knowledge of the script (grammar and orthography) and the ability to type very quickly; no typographic expertise is required as the profession has more to do with the traditional figure of a secretary rather than with a typographer or a designer.

This is probably the main reason why in India we often see an astonishing difference in design between a local script layout and a layout in English. The editing of local script layouts is in the hands of people who are not aware of typographic conventions and the layouts are done with no knowledge of the craft of typography.

2.3. Indian typesetting software

Today we find the DTP operators in printing offices, small publishers or marketing companies and their work is simplified by the many local typesetting softwares available on the market. Vaibhav Singh⁸, type designer and PhD researcher at the University of Reading, wrote ‘There is a multitude of softwares for typesetting Hindi, but these are usually bundled with “services”, so basically people often know of the companies offering typesetting services rather than the software itself. Most companies have developed proprietary systems (often with TeX, Linux or other open-source platforms) but they are not very transparent about their workings’⁹. The same situation is applicable to all the Indian scripts.

Probably the most widespread among these typesetting softwares is *Shree Lipi*, a multi-script font package and keyboard handler, that can count on more than 600.000 users and about 450 newspapers in the Indian sub-continent¹⁰. Shree Lipi contains different language packages, which give

7. This information was kindly provided by Eva Gupta, from Kolkata, who has been working at home as a DTP operator for many years.

8. Singh has worked as a typographer, graphic and exhibition designer in Bombay, Delhi and Panjim and is presently based in Reading, where in addition to developing typefaces, he has been researching aspects of the typography of Devanagari.

9. Vaibhav Singh. Email to the author, 9 August 2014.

10. M. N. Cooper, chairman of Modular Infotech. Email to the author, 7 August 2014. Dr Cooper claimed that about three times that number of users are using their pirated software.

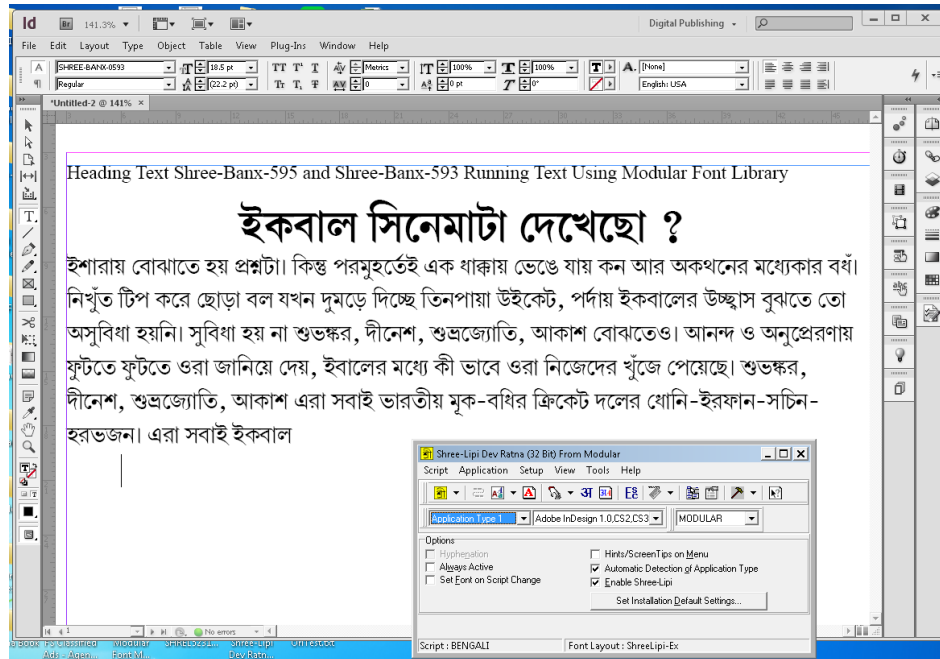


Figure 2.3. Interface of Shree Lipi on Windows. Screenshot by Dr M.N. Cooper, August 2014.

more stress to a particular script, while still supporting the other scripts. It is the flagship product of Modular InfoTech Ltd, a private limited company, established in 1983 by a group of engineers in Pune.

In the 1980s, Modular InfoTech first developed a CRT phototypesetter¹¹ supplying Devanagari and other Indian script fonts and then DTP solutions for the DOS environment. Launched in 1993, Shree Lipi today is basically a keyboard manager equipped with a large collection of Indian script fonts, that can run on both Microsoft and Apple operative systems. With about 3800 fonts, they claim to have the largest library of Indic fonts in the world.

The font department of Modular InfoTech consists of Dr Cooper and his two assistants who have been working together for about 20 years, although they do not do any design work themselves. They outsource the design to various designers located all over India, who send artwork of individual letters (either on graph paper or more recently in CorelDraw format) while the font department, working on the in-house font editing

11. In 1985 they launched PRS100, the first phototypesetter totally developed in India using digital techniques without any external collaboration. It consisted of a microprocessor based front-end data entry terminal with multilingual editing facility. From the Company Profile. www.modular-infotech.com

| Font No. | Font No. |
|----------|--------------------------------|
| 0550 | ভারত আমার দেশ। সব |
| 0552 | ভারত আমার দেশ। সব |
| 0553 | ভারত আমার দেশ। সব |
| 0554 | ভারত আমার দেশ। সব |
| 0556 | ভারত আমার দেশ। সব |
| 0557 | ভারত আমার দেশ। সব |
| 0558 | ভারত আমার দেশ। সব |
| 0560 | ভারত আমার দেশ। সব |
| 0562 | ভারত আমার দেশ। সব |
| 0564 | ভারত আমার দেশ। সব |
| 0566 | ভারত আমার দেশ। সব |
| 0568 | ভারত আমার দেশ। সব |
| 0570 | ভারত আমার দেশ। সব |
| 0572 | ভারত আমার দেশ। সব |
| 0574+ | ভারত আমার দেশ। সব |
| 0576+ | ভারত আমার দেশ। সব |
| 0578+ | ভারত আমার দেশ। সব |
| 0580 | ভারত আমার দেশ। সব ভারতীয় আমার |
| 0582 | ভারত আমার দেশ। সব ভারতীয় আমার |
| 0584 | ভারত আমার দেশ। সব |
| 0586 | ভারত আমার দেশ। সব |
| 0588 | ভারত আমার দেশ। সব ভারতীয় আমার |
| 0589 | ভারত আমার দেশ। সব ভারতীয় |
| 0590 | ভারত আমার দেশ। সব |
| 0592 | ভারত আমার দেশ। সব |
| 0594 | ভারত আমার দেশ। সব |
| 0593 | ভারত আমার দেশ। সব |
| 0595 | ভারত আমার দেশ। সব |
| 0597 | ভারত আমার দেশ। সব |
| 0596 | ভারত আমার দেশ। সব |
| 0598 | ভারত আমার দেশ। সব |
| 1500 | ভারত আমার দেশ। সব |
| 1502 | ভারত আমার দেশ। সব |
| 1504 | ভারত আমার দেশ। সব |
| 1506 | ভারত আমার দেশ। সব ভারতীয় |
| 1508 | ভারত আমার দেশ। সব |
| 1510 | ভারত আমার দেশ। সব |
| 1512 | ভারত আমার দেশ। সব |
| 1514 | ভারত আমার দেশ। সব |
| 1516 | ভারত আমার দেশ। সব |

+ Fonts Available in Shree-Lipi - Ex Layout only

Figure 2.4. Font library of Shree Lipi, by Modular InfoTech, page 1 of 4. www.modular-infotech.com

| Font No. | Font No. |
|----------|-------------------------|
| 1518 | ভারত আমার দেশ । |
| 1520 | ভারত আমার দেশ । |
| 1522 | ভারত আমার দেশ । |
| 1524 | ভারত আমার দেশ । সব |
| 1526 | ভারত আমার দেশ । সব |
| 1528 | ভারত আমার |
| 1530 | ভারত আমার দেশ । সব |
| 1532 | ভারত আমার |
| 1534 | ভারত আমার দেশ । |
| 1536 | ভারত আমার দেশ । |
| 1538 | ভারত আমার দেশ । সব |
| 1540 | ভারত আমার দেশ । সব |
| 1544 | ভারত আমার |
| 1542 | ভারত আমার |
| 1545 | ভারত আমার দেশ । সব |
| 1546 | ভারত আমার দেশ । |
| 1548 | ভারত আমার দেশ । সব |
| 1550 | ভারত আমার দেশ । সব |
| 1552 | ভারত আমার দেশ । সব |
| 1555 | ভারত আমার দেশ । সব |
| 1598 | ভারত আমার দেশ । সব |
| 1556 | ভারত আমার দেশ । সব |
| 1557 | ভারত আমার দেশ । সব ভার- |
| 1558 | ভারত আমার দেশ । সব |
| 1559 | ভারত আমার দেশ । সব |
| 1597 | ভারত আমার দেশ । সব |
| 1563 | ভারত আমার দেশ । সব |
| 1565 | ভারত আমার দেশ । |
| 1567 | ভারত আমার দেশ । সব |
| 1570 | ভারত আমার দেশ । সব |
| 1571 | ভারত আমার দেশ । সব |
| 1572 | ভারত আমার দেশ । সব |
| 1573 | ভারত আমার দেশ । |
| 1574 | ভারত আমার দেশ । সব |
| 1575 | ভারত আমার দেশ । সব |
| 1576 | ভারত আমার দেশ । সব |
| 1577 | ভারত আমার দেশ । |
| 1578 | ভারত আমার দেশ । সব |
| 1579 | ভারত আমার দেশ । সব |
| 1599 | ভারত আমার দেশ । |

Figure 2.5. Font library of Shree Lipi, page 2 of 4. www.modular-infotech.com

software, ‘normalizes the glyphs, removes unnecessary nodes, makes corrections wherever necessary and assigns encoding following the internal format. Decisions are made for widths, left- and right-sidebearings and anchor-points, equalizing vertical-stems and the font is saved in our internal format.’¹². The designers involved do not follow the design process, they only send the artwork while all the rest is done by the font department, which frequently makes changes in the shapes of the artwork.

Another firm involved in Indian typesetting is Summit, a Delhi-based company, ‘today the leading Media industry software solution provider in the Indian sub-continent with major newspapers and magazine publishers as its clients.’ As they claim on the company website, their Indian language solutions are ‘widely used in India by over 100,000 users’¹³. Summit has developed *Indica Unicode*, a typesetting software that provides a variety of keyboard layouts and a library of Indic fonts that can run both on Microsoft and Apple operative systems.

Unlike Modular InfoTech, Summit has a group of in-house designers that might follow the production process of the typefaces they design¹⁴. Despite this, the choice of letterforms, care of outlines and the quality of spacing of Summit’s Bengali typefaces do not seem to be of better quality than the Modular InfoTech products.

More importantly, neither of them credit the artists involved in the design. The lack of design attribution is a sign of the secondary role design has in most commercial ventures based on these solutions. Vaibhav Singh pointed out: ‘The development of typesetting has been tackled largely by the IT/engineering/math departments of technical institutions and the problems have been defined mainly in computing terms, so there is no real place for considering designers or typographers’¹⁵.

The result, as we can see from the analysis in § 3.4, is a tendency towards cloning outfits: as people who work in these companies are often not concerned with design, typographic research will be subordinate to economic options. ‘This may also have to do with copyright issues, since not claiming to have designed a cloned font would seem to be generally safer’¹⁶.

12. M. N. Cooper. Email to the author, 16 July 2014.

13. Company profile, www.summitindia.com

14. There is no information about the workflow. People from Summit refused to share their internal processes because of the company’s policy of confidentiality.

15. Vaibhav Singh. Email to the author, 9 August 2014.

16. Ibid.



Figure 2.7. Ananda Equal, the custom typeface of Response India. Courtesy: Response India

2.4. A report on the current practice in Kolkata

One venture from the author's recent research trip in April 2014 reveals clearly the customary practices of West Bengal native script typography. Response India is an advertising agency founded in 1987 by Ram Ray¹⁷ and today one of the most important companies for corporate, product and brand strategy in Kolkata.

Response – it is usually called – is located in the centre of Kolkata and employs about 40 people, most of them graphic designers. Mr Arindam Nandy, the project manager, introduced me to the agency, showing the most important jobs, explaining the workflow and the main troubles designers find in typesetting Bengali script¹⁸.

Like most of the Indian advertising agencies, Response deals much of the time with English advertising, employing Bengali only in a limited range of jobs. A common task is to design bilingual advertisements (English and Bengali) with a given Latin typeface, therefore they draw a typeface to match the Latin as colour and general flavour (figure 2.8). Actually, talking about typeface in this context is not precise, because the designers draw only the needed letters, in Adobe Illustrator, and space them by hand.

In many jobs Response employs its in-house typeface, *Ananda Equal*, a display monolinear, rather crude, Bengali face, that has been developed over the years by several designers of the agency. Again, this is not a prop-



Figure 2.8. Bengali translation of an existing English ad, for *Safed*, detergent powder. Bengali lettering by Response India, 2014

17. A influential publicist who earlier worked for J. Walter Thomson in US and worldwide. Source: Ajanta Sen, *Bengal Tiger (on designer Deborani Duttagupta's typography)*, The International Design Magazine, New York, Jan-Feb 1998.

18. Mr Nandy provided all the information of this section.

er typeface: the letterforms are designed in Illustrator and the designers compose the needed words, placing one letter after the other. Apart from headlines, the only typeface Response designers set body copies and long texts with is Summit *Geetanjali* (§ 3.4); they have several versions of it that work with the different computer models used in the agency¹⁹.

The agency does not employ DTP operators, most of their tasks are relative to small body copies and graphic designer take care of that, usually selecting glyph by glyph from the pop chart, the Apple character viewer²⁰. But they still keep functioning an old Microsoft machine with some typesetting software for long text, to convert into pdf and import in the layout, usually designed with Adobe Indesign.

The case of Response India is important for providing the appropriate perspective for this chapter. Problems of typesetting Bengali script will still be around for many years because if even an established advertising agency like Response does not employ the latest versions of the layout software, how can we expect smaller agencies and freelance designers in India to do it?

19. Mr Nandy claimed that the latest versions of Apple operative systems do not support some Bengali typefaces they often use, that is why in Response they still use many iBooks or old iMacs that run with *Mac OS Classic*.

20. Mr Nandy noticed that ‘you can become very fast in typing through the pop chart if you use it frequently.’ But typing with the pop chart often causes problems in spacing that have to be fixed by hand.

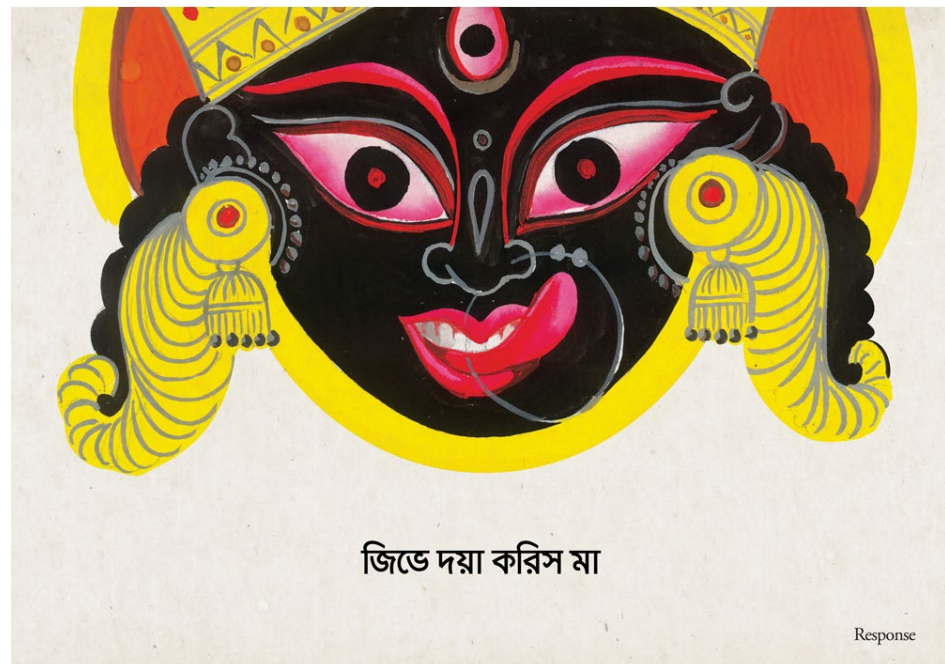


Figure 2.9. Poster for Kali Puja set in Ananda Equal, 2013. Courtesy: Response India



Figure 3.1. Linotron 202, ca. 1980. Frank Romano personal collection, photographer unknown.

3. Linotype Bengali and its descendants

When Fiona Ross was employed as research assistant at the firm of Linotype-Paul¹ in 1978, the Typographic Department ‘was converting existing type designs such as *Yakout*, or implementing new designs like *Badr*, for film composition’².

Soon after her appointment, the newspaper group and book publisher Anandabazar Patrika (ABP) asked for a Bengali text face in two weights for its daily newspaper. The ABP group was still setting its newspaper text in *Bengali no.2*, the hot-metal Linotype font produced in the 1930s, while the new font was meant to work on the Linotron 202³, a relatively cheap and fast digital phototypesetter that Linotype released that same year.

3.1 The hot-metal Linotype Bengali

This chapter does not aim to cover the history of the Linotype hot-metal typesetting in Bengali nor the attempts, the people involved and the processes to achieve an acceptable typeface⁴. The credit for converting Bengali characters into Linotype hot-metal technology is due to Siresh Chandra Majumdar, proprietor of the daily newspaper Anandabazar Patrika. From the mid-1930s Majumdar worked together with the US Mergenthaler Linotype Company to produce a Linotype Bengali font for high-speed

1. The Linotype company based in UK.

2. F. Ross, *Non-Latin Type Design at Linotype*, first annual Friends of St Bride conference, 2002.

3. Linotron 202, released in 1978, was a third-generation phototypesetter, ‘one which does not in fact expose type directly from photographic masters but reproduce them electronically on the face of the cathode ray tube.’ (John W. Seybold, *The World of Digital Typesetting Paperback*, 1984). In other words the outline of a character, stored on a magnetic disk drive, was transmitted to the character generator, which set the right type size and instructed the CRT to fill in the outline with scan lines. Jonathan Seybold, *Linotron 202: better than anybody anticipated*, the Seybold Report, 7, no. 21 (July 17, 1978) p.13.

4. For further information see F. Ross, *The printed Bengali character and its evolution*, 1999. The book – the most thorough research on Bengali typography in English – is the main source for this chapter. The book is out of print and hard to find. It was re-printed in Kolkata from Sahitya Samsad publisher in 2009, with some additions, but neither is this edition available.

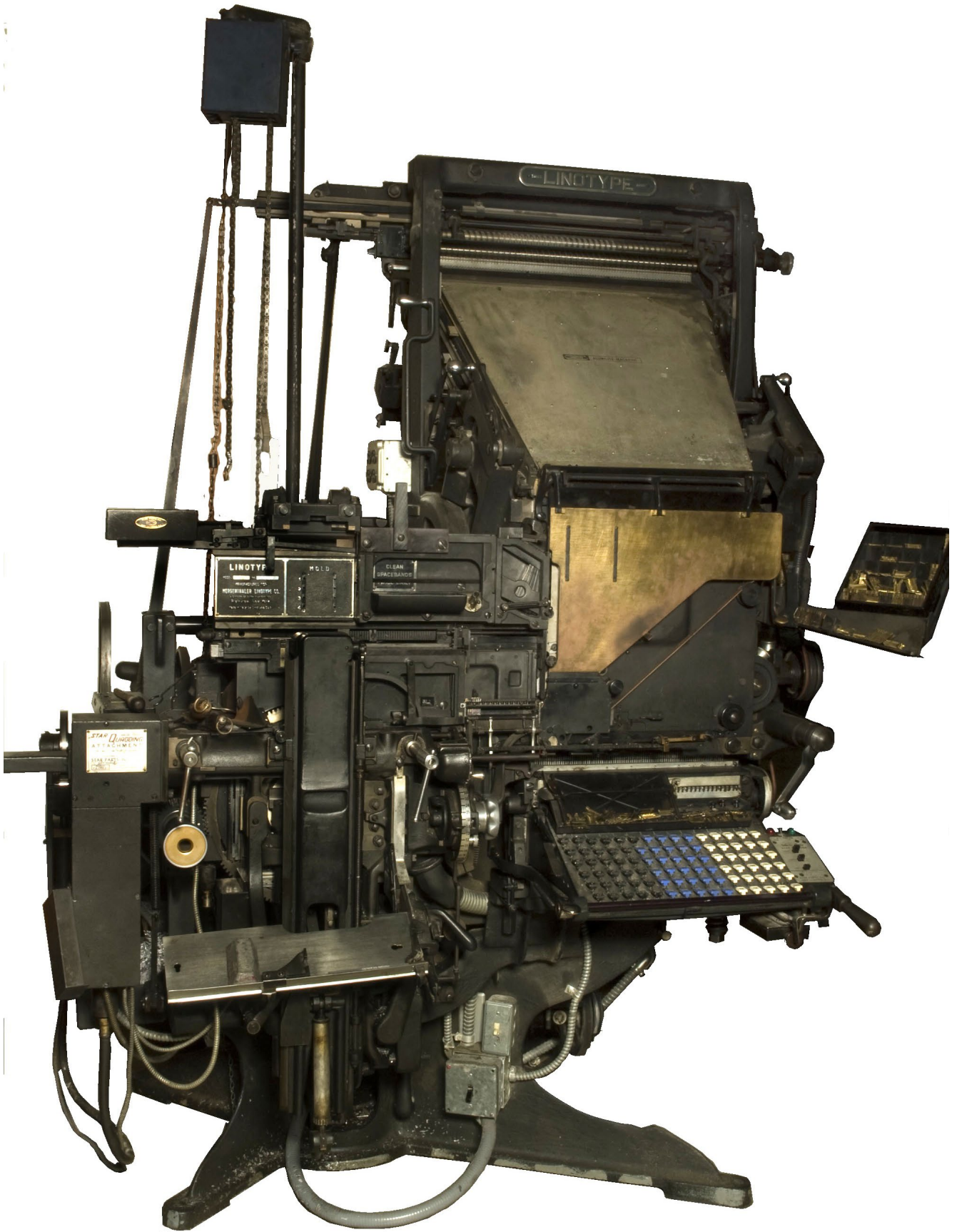


Figure 3.2. A linecaster machine: Linotype Model 8, ca. 1950. Frank Romano personal collection, photographer unknown.

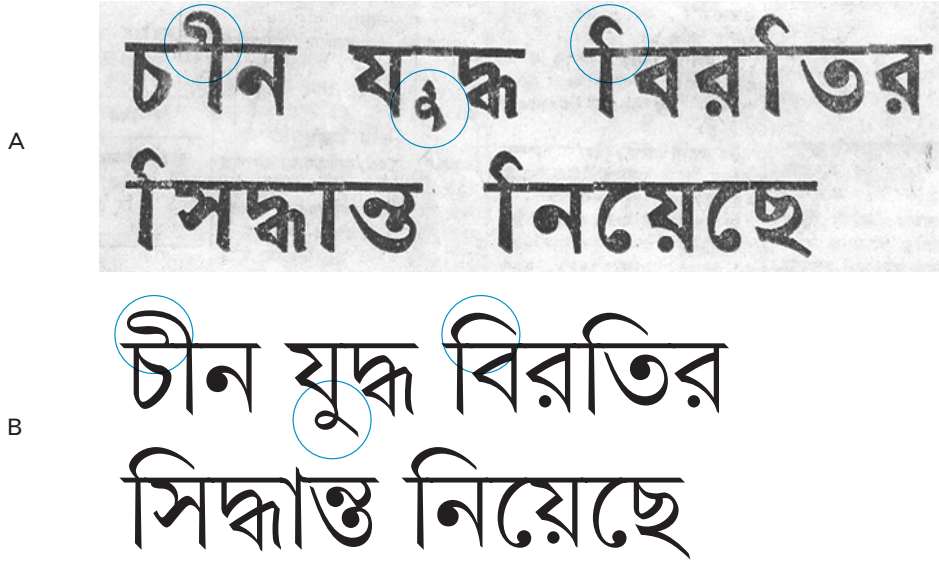


Figure 3.3. Comparison of hot metal Linotype Bengali (A) and digital photocomposition Linotype Bengali (B), where the problems of kerning and superscripts alignment were solved. The digital photocomposition Linotype Bengali is discussed in § 3.2.

rotary printing presses, thereby enabling efficient newspaper composition and printing in the Bengali script.

The Linotype linecaster is a typesetting machine that produces lines of letterpress composition in a single operation – the tasks of type casting, setting and justifying are covered by the same machine – and it pushed setting speeds to unprecedented limits. But the machine was designed for Latin script and it had considerable disadvantages for the non-Latin typesetting, notably Bengali. Due to mechanical limitations, the character set had to be reduced to 90 sorts², and some characteristics of the Bengali writing system such as the kerning vowels and the placing of subscript and superscript marks could not be achieved.

Figure 3.3 shows the deficiencies of the Linotype typesetting in Bengali script, compared with Bengali handwriting. The main problems are with the vowel signs **i**, **ি**, and **ii**, **ী**, that do not kern, and with the subscript vowel markers like **u**, **ু**, that cannot be placed in the right position.

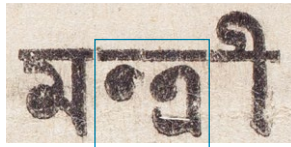
To overcome the considerable reduction of the character set, only a few conjuncts (the most frequent ones) were placed on the keyboard while all the rest were created by the use of components, or as they are called, ‘half-forms’. A half-form is usually a reduction of the initial element of a con-

5. There was a 1 to 1 correspondence with the keyboard, that had 90 keys. This was a severe limitation. By comparison, Bengali local foundries from the mid-nineteenth century onwards could produce 500 sorts for one metal font.

Figure 3.4. Front page of the daily Anandabazar Patrika printed with the linecaster, ab. 1979. 15% of actual size (cm 42 x 60). Photographer Ben Mitchell. Non-Latin TC, DTGC.

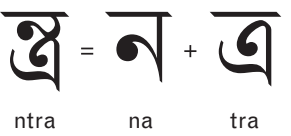


Figure 3.5. Example of conjunct **ntra** build up with components in hot-metal typesetting:



Close up of figure 3.6. 200% of actual size.

The same conjunct with the traditional shape from Linotype Bengali digital fonts:



in turn **tra** is a conjunct:



sonant conjunct, with no space on the right, to place against the following glyph that could be a letter or another half-form.

The result was often dramatically different from the handwritten Bengali and from the previous foundry type. First because most conjuncts in Bengali are distant in shape from the original consonants; then, if a conjunct is built out of the original consonant forms, it is done by subscribing one consonant to another. But subscribing was not possible with Linotype half-forms that could be placed side by side only. Figure 3.5 shows conjunct **ntra** created with half-forms, in comparison with the traditional shape⁶.

As Fiona Ross pointed out: ‘the new technology signified that the mass production of printing vernacular literature had become commercially viable, but the cost in typographic terms amounted to the greatest divergence from handwritten Bengali character since Charles Wilkins and a future readership unable to recognize orthodox letterforms’⁷.

After many attempts, in 1938 Linotype was able to release Linotype Bengali no.2, in light and bold (figure 3.6), that was approved by Calcutta University and used in their books. The keyboard was revised many times and the final scheme released in 1949 (figure 3.19). Anandabazar Patrika employed this typeface until 1981 when it was replaced by digital photo-composition Linotype Bengali.

6. Half-forms conjuncts – better ‘component conjuncts’ – has become an orthographic issue in modern Bengali script. See § 3.3 for further discussion.

7. F. Ross, *The printed Bengali character*, p. 161. Charles Wilkins was an English type founder who is reputed to have cut the first successful Bengali font of type in 1770 (See Ross *The printed Bengali character*, p.3).



প্রতিটি কোঁটাই পুষ্টি যোগায়।

কোয়ো-কার্বিন

কেশ তেল

Deva

বেঙ্গল মেডিকেলের ডেপুটি

বাংলাদেশ থেকেই অবৈধভাবে লোক যাচ্ছে ভারতে : দেশাই

চুয়ার পশ্চিম : ঢাকা, ১৭ এপ্রিল—
প্রধানমন্ত্রী মোরারজী দেশাই আজ
এখানে বঙ্গভবনে বাংলাদেশের সর্ব-
রাষ্ট্র মন্ত্রী সামসুল হক ও তথ্যমন্ত্রী
হাবিবুল্লা খানের উপস্থিতিতে এক
সাংবাদিক সম্মেলনে বলেন, বাংলাদেশ
থেকে ভারতে অবৈধভাবে লোক চলা-
চল হচ্ছে। তিনি এই সংশ্লিষ্ট জোর দিয়ে
এটাও জানিয়ে দেন যে, অন্যদিক থেকে
লোক চলাচল হচ্ছে না। দুর্ভাগ্যের
বিষয়, এই লোক চলাচল এক তরফা।
আপনারা অবশ্যই বুঝতে পারছেন এর
অর্থ কী। দেশাইয়ের মতে, ভারতে
অবস্থা মূলত আরও ভালো—এটা ওই
দেশত্যাগের কারণ হতে পারে।

দেশাই এটাও স্পষ্ট করে জানিয়ে দেন
যে, বাংলাদেশের প্রেসিডেন্ট জিয়াুর
রহমানের সংশ্লিষ্ট তাঁর শীর্ষ বৈঠকে
বেশ বিস্তারিতভাবেই সংখ্যালঘুদের
সঙ্গে জড়িত বিভিন্ন প্রশ্ন নিয়ে
আলোচনা হয়েছে। এই আলোচনার
তিনি সন্তুষ্ট। দেশাই অবশ্য একথাও
বলেন যে, কোন কিছু নিষ্পত্ত না
হওয়া পর্যন্ত কারণ সন্তুষ্ট হওয়া
উচিত নয়। আর আপনারা তো জানেন
কোন কিছু নিষ্পত্ত করে তোলা সহজ
নয়।

দেশাই মনে করেন, ভারত ও বাংলাদেশ
যদি তাদের নিজ নিজ দেশের সর্ব-
সাধারণের জন্য সমান আধিকার ও
সুযোগ সুবিধার দীর্ঘত কড়কাড়িভাবে
মেনে চলে তাহলে এই অবৈধ লোক
চলাচল বন্ধ হতে এবং ভাবনাচিন্তার
আদানপ্রদানও বাড়তে পারে। যদি
কোন সম্প্রদায় নিরাপত্তার অভাববোধ
করেন তাহলে আমরা তাতে গভীর-
ভাবে উত্থাপন হই।

দেশাই বলেন, ভারত এমন একটি দেশ
যে সব ধর্মের প্রতি সহনশীল। প্রতিটি

সম্প্রদায়কেই ভারত সমান আধিকার,
সমান নিরাপত্তা ও সমান সুযোগ-
সুবিধা দিয়েছে। তিনি মনে করেন,
বাংলাদেশ সরকারও তার সব
নাগরিককে সুনিশ্চিতভাবে সমান
আধিকার ও সমান সুযোগসুবিধা দিতে
চান।

আজ সকালে প্রধানমন্ত্রী মোরারজী দেশাই
ও প্রেসিডেন্ট জিয়াউর রহমানের মধ্যে
নব্বই মিনিটের আলোচনার দু'দেশের
সহযোগিতার ক্ষেত্রে বিস্তৃত করার
ব্যাপারে ব্যাপক একমত হয়। প্রধানমন্ত্রী
সাংবাদিক সম্মেলনে ওই আলোচনা
সম্পর্কে সংক্ষেপে প্রকাশ করেন। তিনি
বলেন, আমরা এ ব্যাপারে একমত যে,
পারস্পরিক সাহায্য ও সহযোগিতার নতুন
নতুন রাস্তা খুঁজে বার করা এক দু-
দেশের যোজনার উপযোগী উন্নয়নের
উৎস গড়ে তোলার বিরাট সুযোগ রয়েছে।

নিজেদের সহায়সম্পদ সবচেয়ে উপযুক্ত
উপারে কাজে লাগানোর চিন্তাটিই
তাদেরকে একমতের দিকে এগিয়ে নিয়ে
গিয়েছে।

দুই দেশের সহযোগিতার ক্ষেত্রে
এখনও নির্দিষ্ট কথা না হলেও প্রধান-
মন্ত্রী অভ্যন্তরীণভাবে বাংলাদেশে যৌথ
শিক্ষাপ্রদানের সম্ভাবনার কথা এক
শব্দসা-বাগিচা বিস্তৃত করার কথা
বলছেন। তিনি ভারতের জানিয়েছেন,
বাংলাদেশে উৎসাহ প্রবৃদ্ধির জন্য ভারত
ব্যাকার দিতে পারে।

আরেকটি প্রশ্নের জবাবে দেশাই বলেন,
ভারতের সঙ্গে বাংলাদেশের বাণিজ্যিক
ভারসাম্য কিশোর অনুকূল নয়। ভারতকে
এর জন্য সর্বাধিক উচিত হবে না।
বাংলাদেশের বা পেওয়ার আছে ভারত তাই
কিনতে রাজি। এমনকি বাংলাদেশের
উৎসাহের সুযোগ ব্যর্থের জন্য ভারত
সাহায্য করতে প্রস্তুত।

পঞ্চম পৃষ্ঠার প্রথম

বাংলাদেশ-ভারত সম্পর্ক চিড় ধরে ১৯৭৫-এ

এম জে আকবর

[ঢাকায় বাংলাদেশের বিদেশমন্ত্রীর সংশ্লিষ্ট
সাপ্তাহিক সানডেজের জন্য বিশেষ
সাক্ষাৎকার]

প্রশ্ন : ভারত-বাংলা সম্পর্ক খারাপ হল
কেন ?

উত্তর : ১৯৭৫-এর আগস্ট এবং নভেম্বর
বরের ঘটনার পর সম্পর্ক খারাপ হয়,
তবে আমি ব্যক্তিগত ভাবে মনে করি এসব
ঘটনার কলে সম্পর্ক খারাপ হওয়া উচিত
ছিল না। কেননা ভারত এবং বাংলাদেশ
এই দুই দেশই জোট নিরপেক্ষ
আন্দোলনের সদস্য। আমরা উভয়েই মনে
করি, রাষ্ট্রগুলির অন্যান্য জাতির জন-

সাধারণের ইচ্ছার প্রতি প্রাথমিক হওয়া
উচিত। আমরা উভয়ে এটাও মনে করি,
অন্যদেশের জনগণের নিজেদের ইচ্ছামত
যে কোন ধরনের সরকার, রাজনৈতিক,
আর্থিক এবং সামাজিক গঠন বেছে
নেওয়ার অধিকার রয়েছে। তবে, আমার
মনে হয়, এর পর জনতা সরকার ক্ষমতার
আসার তঁরা এই বাস্তব অবস্থা উপ-
লব্ধি করেছিলেন, এবং তারপর ভারত
এবং বাংলাদেশ এই দুই দেশের মধ্যে
সম্পর্কের উন্নতির চেষ্টা উভর তরফ
থেকেই হওয়ার কলে রুমশ সেই প্রচেষ্টা
ক্রমবর্ধমান ভাবে কলপ্রসূ হয়েছিল।

প্রশ্ন : আপনি কি বলতে চান জনতা সরকার
দু'দেশের সম্পর্কের মধ্যে একটা ভারসাম্য
আনতে চেয়েছিলেন বা অস্তিত্ব আগে
ছিল না ?

উ : খারাপ সম্পর্ক মেরামত করার প্রচেষ্টা
হয়েছিল। এই প্রচেষ্টা হয়েছিল পারস্প-
রিক প্রাধান্য, এবং জাতিগুলির মধ্যকার

বিহারে ১৩ জন মন্ত্রী

স্বাগত

সংবাদসভা : শ্রীহরত্যা
নিয়ে তদন্ত কমিশন গঠন
কমিশনের সামনে হাজির
নয় নোটিশ দেওয়ার বৈধতা
গঠন তুলে সিদ্ধান্তধর্মকর রায়
র হোসেন সংবিধানের ২২৩
অনুসারে কলকাতা হাই-
কোর্টের কাছে
এই
মনুসারে বিচারপতি সব্যাসাচী
একটি রুল ও জন্মতর্ভর্তী
রি করে একপক্ষকালের জন্য
আইনিক কমিশনের শুনানি
খার নির্দেশ দিয়েছেন।
গণপ্রসূ পঠায় প্রথম

পাঁচালি

পোরটার : সত্যজিৎ রায়ের
নালি বারালিনে পারানো হচ্ছে।
চলচ্চিত্র সংগ্রহশালায় এই
সংরক্ষিত হবে। বারালিনের
নাল ইনসার্টিটিউট জফ ইয়ং
পথের পাঁচালি ছবিখানি
সংগ্রহশালায় রাখবার জন্য



Figure 3.6. Detail of the front page of the daily Anandabazar Patrika, printed with the linecaster, 17 April 1979. Actual size.

3.2 The digital Linotype Bengali

For Linotype-Paul the convenient, logical choice was to base the new typeface on the original drawings of hot-metal Linotype Bengali no.2. But Ross (who had a postgraduate degree in Sanskrit) and her colleagues were conscious that the quality of hot-metal Bengali no.2 was not satisfactory⁸ and were able to convince ABP to ‘re-evaluate the design of all the letterforms to achieve quality comparable to that of Latin fonts typeset from the same device’⁹.

The hot-metal typeface remained the starting point and Ross became involved in deep research into old Bengali manuscripts and printed books. Her aim was to discover models for a new, fresh design and to identify the misinterpretations in the construction of the letterforms due to ignorance¹⁰ and to technological limits. Ross also asked for samples of foundry fonts Anandabazar Patrika had used in the past and she received a batch of specimens, like the *Bengali foundry type n.2* (figure 3.7).

Part of Ross’s research was devoted to the choice of the character set. She reintroduced letters that had fallen out of use with the custom of the hot metal machines¹¹. After deciding on the direction to take with the new

8. See the Bengali hot-metal section, § 3.1, for more details.

9. F. Ross, *The printed Bengali character*, p. 203.

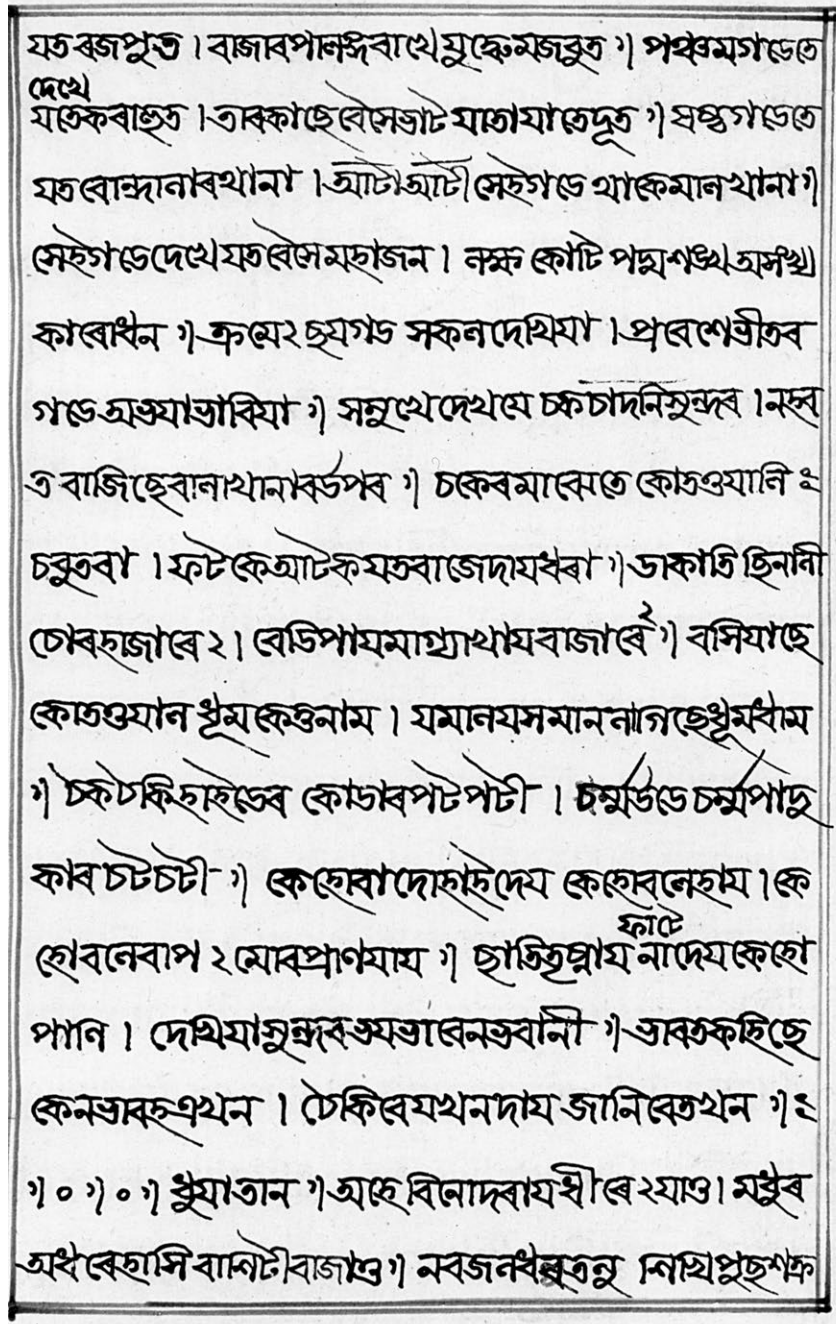
10. Part of the Bengali typefaces of the 19th and 20th centuries were cut by European foundries with little awareness of the Bengali script.

11. See the Bengali hot-metal section, § 3.1 for more details



Figure 3.7. Part of the font synopsis of Bengali foundry type n.2, still employed by ABP for headlines at the end of the 1970s. Author and date unknown. Non-Latin TC, DTGC.

Figure 3.8. the *Vidyasundara*, Bengali manuscript of the 18th century studied by Ross. BL British library MS Add.5593. The calligrapher stressed the diagonal movement, distinctive of Bengali script.



design, Linotype employed Tim Holloway, an English freelance designer, a former employee of the company, to work closely with Ross and take care of the artwork. Additional advice on the letterforms and the character set were given by native Bengali speakers as the members of the ABP group and Dr Tarapada Mukherjee, from SOAS (the India Department of the School of Oriental and African Studies at London University), who was also checking the artwork before the digitizing.

A team of Linotype programmers, specialized in non-Latin support work, were working side by side with the typographic department because



Figure 3.9. Fiona Ross (first from the right) and her team, ca.1983. Photographer unknown. Non-Latin TC, DTGC.



Figure 3.10. Examples of subscribing vowel marks with accurate positioning.

‘film composition was giving way to digital photocomposition and Arabic and South Asian software requirements were energetically discussed [...]’¹². A big achievement of the software engineers was the positioning tool providing X and Y coordinates for vowel marker placement, ‘rather than requiring them to be systematically centred, subscripts and superscripts could now be positioned with greater accuracy’¹².

The design process enjoyed a broader degree of freedom compared to previous technology but some technological constraints were still in place. All the characters had to be drawn on a grid of 54 units that covered the em-square, plus 9 additional units that were left for kerning. But this amount of kerning was not enough for vowel signs **i** and **ii**, so it was decided to offset the *ikar* (vowel sign **i**) by 9 units in addition to the 9-unit kern. Tests were conducted in Frankfurt at Stempel A.G. (part of the Linotype group) where the artwork would have been digitized. ‘In consequence, the position and the amount of kerning of the vowel signs *ikar* and *iikar* determined the positioning and maximum width of the non-kerning characters, and thereby the dimension of the typeface’¹⁴. The workflow for

12. F. Ross, *Non-Latin Type Design at Linotype*, 2002.

13. A. Savoie, *International cross-currents in typeface design: France, Britain and the USA in the phototypesetting era*, unpublished P.h.D. thesis, Department of Typography & Graphic Communication University of Reading, 2014; p. 237.

14. F. Ross, *The printed Bengali character*, p. 206.

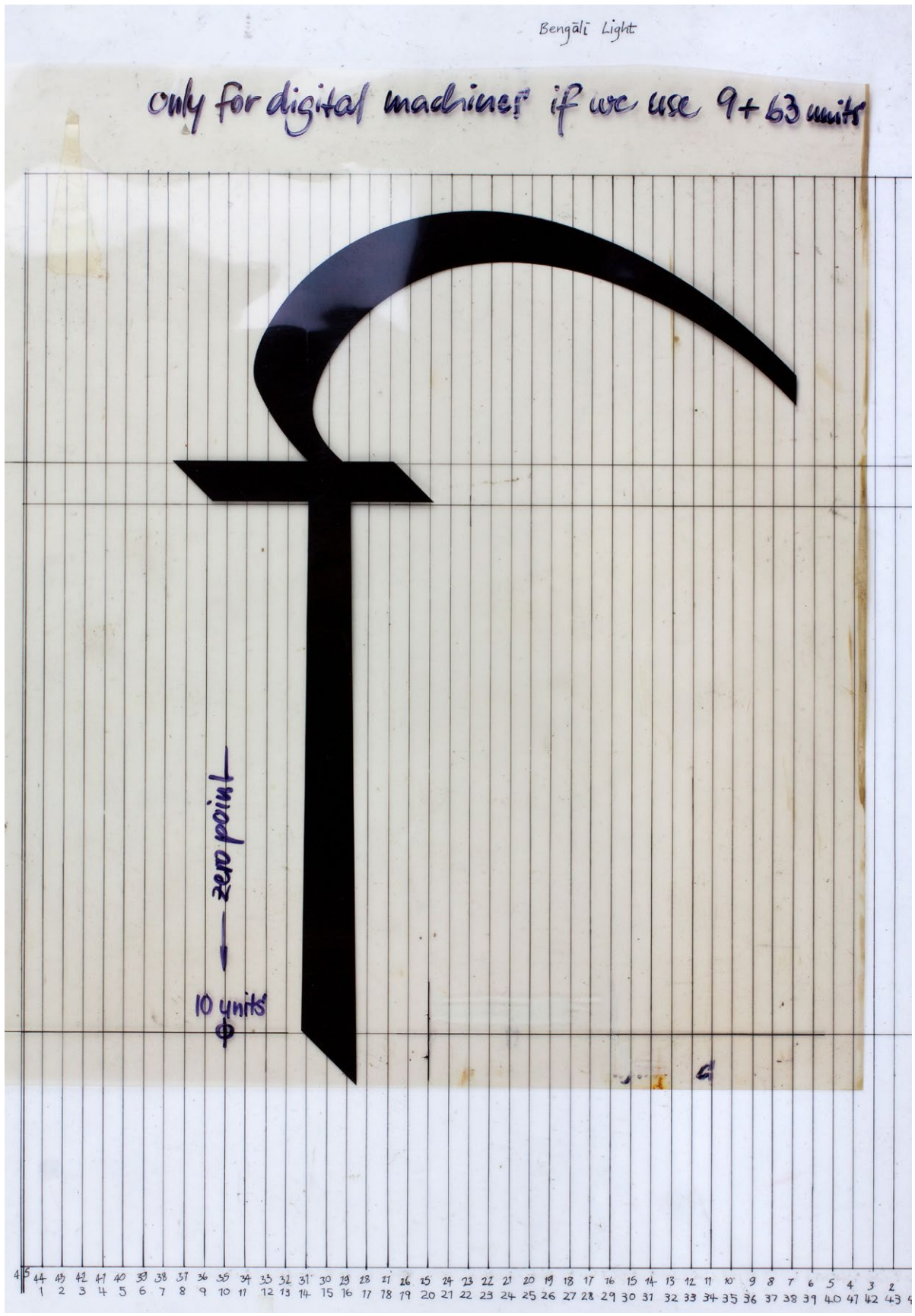


Figure 3.11. Finished inked letter-drawing on film for vowel sign i of Linotype Bengali; on the back the 54 units grid; ca. 1980. 70% of actual size. Non-Latin TC, DTGC.



Figure 3.12. Finished inked letter-drawing on transparent paper for Linotype Bengali by Tim Holloway, ca. 1980. 80% of actual size. Non-Latin TC, DTGC. The letter is turned 90° counterclockwise.

প্রথম কাজ আরম্ভ করিয়াই উলাপুর গ্রামে পোস্ট-
মাস্টারকে আসিতে হয়। গ্রামটি অতি সামান্য।
নিকটে একটি নীলকুঠি আছে, তাই কুঠির সাহেব
অনেক জোগাড় করিয়া এই নূতন পোস্টআপিস

প্রথম কাজ আরম্ভ করিয়াই উলাপুর গ্রামে পোস্ট-
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অনেক জোগাড় করিয়া এই নূতন পোস্টআপিস

Figure 3.13. Linotype Bengali justified text, samples, 36 pt. 1991. Non-Latin TC, DTGC.

spacing was, as Tim Holloway explained, the following: ‘once the position of the kerning vowels was fixed, characters 123 ব and 116 ত were drawn as spacing guides for other alphabet characters (the spacing is a compromise between what looks well in the middle of ব...ব and ত...ত)’¹⁵.

The design took more than two years¹⁶, the light style was completed first and Anandabazar Patrika started using the new typeface in the Spring of 1981. ABP group was pleased with the result though the difference with the previous hot-metal Bengali no.2 was such that we need to talk of an entirely new design. As Ross remembers, ‘the overall design was intended to overcome the aesthetic deficiencies of Linotype’s hot-metal Bengali

15. note by Tim Holloway enclosed with some drawings sent to Linotype for frisket cutting on 10 February 1981. F. Ross, *The printed Bengali character*, p. 207.

16. But the Typographic Department was working on a Devanagari font at the same time and half the team were devoted to Arabic font development and support. Fiona Ross, talking in general about her work in Linotype, wrote: ‘The design and typographic development of each writing system comprising two typestyles (usually a light and a bold weight) took around nine months.’ F. Ross, *Non-Latin Type Design at Linotype*, 2002.



Figure 3.14. Inked letter-drawing on paper for Linotype Bengali by Tim Holloway, 1979. Non-Latin TC, DTGC.

fonts and to incorporate the elegance and vibrancy visible in manuscripts that pre-date printed Bengali typeforms'¹⁷.

Looking at the details of the letterforms, the most notable difference with the previous hot-metal face is probably in the design of the vowel signs. Not only the hooked ascendent parts of *ikar*, ি, that benefit from a

17. F. Ross, *Digital Typeface Design and Font Development for Twenty-First Century Bangla Language Processing*, 2013, p. 3-4.

| | | |
|--------------|-------------------|-------------------|
| ক + ক = ক্ক | ঙ + ম = ঙ্ম | ণ + ঠ = ণ্ঠ |
| ক + ট = ক্টি | ঙ + খ = ঙ্খ | ণ + ড = ণ্ড |
| ক + ত = ক্ত | চ + চ = চ্চ | ণ + ড + র = ণ্ঢ় |
| ক + ব = ক্ব | চ + ছ = চ্ছ | ণ + ণ = ণ্ণ |
| ক + ম = ক্ম | চ + ছ + ব = চ্ছ্ব | ণ + ব = ণ্ণ্ব |
| ক + ন = ক্ন | চ + ঞ = চ্ঞ্ | ণ + ম = ণ্ম |
| ক + র = ক্র | চ + ছ + র = চ্ছ্র | ণ + ঢ = ণ্ঢ |
| ক + ল = ক্ল | ছ + র = ছ্র | ত + ত = ত্ত |
| ক + স = ক্স | জ + জ = জ্জ | ত + ত + ব = ত্ত্ব |
| ক + ষ = ক্ষ | জ + জ + ব = জ্জ্ব | ত + থ = ত্থ |
| খ + র = খ্র | জ + ঝ = জ্ঝ | ত + ন = ত্ত্ন |
| গ + গ = গ্গ | জ + ঞ = জ্ঞ্ | ত + ব = ত্ত্ব |
| গ + ধ = গ্ধ | জ + ব = জ্ভ | ত + ম = ত্ত্ম |
| গ + ন = গ্ন | জ + র = জ্র | ত + র = ত্ত্র |
| গ + ব = গ্ব | ঞ + চ = ঞ্চ | থ + ব = ত্থ্ব |
| গ + ম = গ্ম | ঞ + ছ = ঞ্ছ | থ + র = ত্থ্র |
| গ + র = গ্র | ঞ + জ = ঞ্জ | দ + গ = দগ |

Figure 3.15. Table of conjuncts of Linotype Bengali, ca. 1990. Non-Latin TC, DTGC.

generous kerning possible in photocomposition, but even *aakar*, া, that was restored to its traditional form, with an upstroke above the headline. The same upstroke appears throughout the typeface in all the characters that share the same structure on the right-hand side; the loop of *iikar*, ি, was designed so that its tail connects with the upstroke of those characters, imitating a common calligraphic practice.

Furthermore many conjuncts were revised, some because they had been wrongly shaped, some because they were too condensed (for instance, the

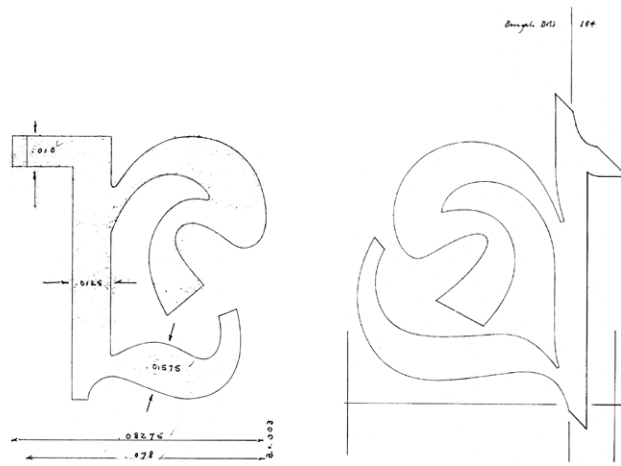


Figure 3.16. Conjunct **pra** letter-drawings: hot metal (left), ca. 1936, and the reviewed version for digital phototypesetting, ca. 1980. Reduced. Scanned from F. Ross, *The printed Bengali character*, p. 215.

raphala¹⁸ in the conjunct **pra** প্রা needed to be harmonized with the rest, fig. 3.16) others because they needed a better distribution of colour.

Many more conjuncts were added and a character set of over 300 glyphs was reached – the hot-metal Bengali no.2 had only 90 glyphs.

Once the artwork was ready, it was scanned and digitized on a Linotype proprietary format specifically made for Linotron 202, where the character outline was described by a series of straight-line segments (not curved as in Postscript format) then stored on a magnetic tape¹⁹. The characters were printed as a dot-matrix pattern with a *Verstac* printer (a common electrostatic printer) and carefully checked by letter-drawers that were marking the problems for font editing.

The resolution was low compared to what we are used to nowadays and the raster was too coarse compared with the fineness of the artwork. Thus there was frequently a loss of fine details in the digital font. Ross and her colleague soon found that the subtle flaring of the vertical strokes, that we see in most of the Linotype Bengali letters, was vanishing at small sizes, creating a lump in the stem that was exaggerated at large sizes²⁰. These were the same kind of problems that Herman Zapf encountered when he adapted his *Optima* to digital composition; Zapf wrote ‘the answer to this problem is that *Optima* was never designed for digital storage. If I had been asked, I would have done a new design...’²¹ During the development of Linotype Bengali printing tests of the digital adaptation of *Optima*, typeset at a size equivalent to Bengali newspaper text, was used by the Linotype Typographic department to understand if it was worth keeping the flaring of the vertical strokes in the new Bengali font.

18. Raphala is the weavy line at the bottom of many conjuncts. It usually occurs when the final consonant of the conjunct is ra.

19. Mike Fellows. Email to the author, 22 July 2014.

20. F. Ross, *The printed Bengali character*, p. 205.

21. H. Zapf, *Future tendency in type design*, Visible Language XLX, no. 1, Winter 1985, p.29.

মোজাম্বিকে দঃ আফ্রিকার বিমান হানায় নিহত পাঁচ আহত ত্রিশ

মাপুটো, ২৩ মে—দক্ষিণ আফ্রিকার এক ঝাঁক জঙ্গিবিরমান আজ সকালে অতর্কিতে মোজাম্বিকের রাজধানী মাপুটোর উপর হানা দেয়। তাতে ৫ ব্যক্তির মৃত্যু ঘটেছে, আহত হয়েছে অন্তত ৩০ জন। মোজাম্বিকের সরকারি সূত্রে একথা বলা হয়েছে।

দক্ষিণ আফ্রিকাও ঘোষণা করেছে যে, জেট বিমানগুলি মোজাম্বিকে অবস্থিত আফ্রিকান ন্যাশনাল কংগ্রেসের (এ এন সি) ঘামটিগুলির উপর আক্রমণ চালায়। এই আক্রমণের কারণ—গত শুক্রবার প্রিটোরিয়ায় দঃ আফ্রিকা বিমানবন্দরের প্রধান কার্যালয়ে সেই বিধবৎসী বোমা বিস্ফোরণ, যার পরিণামে ১৭ জনের মৃত্যু ঘটেছে।

ওদিকে দার-এস-সালাম থেকে আজ এ এন সির তরফে বলা হয়েছে, সেই বোমা বিস্ফোরণে দক্ষিণ আফ্রিকার বিমানবহরের সদর কার্যালয় উড়িয়ে দেওয়া হয়েছে সেটা এ এন সিরই কাজ। এ এন সির যেসব গেরিলা এই কাজটি এমন সূচারুপে সম্পন্ন করেছে এ এন সি তাদের বৈশ্বিক অভিনন্দন জানিয়েছে।

দক্ষিণ আফ্রিকার বিমান আক্রমণে মাপুটোয় আজ যে ৫ ব্যক্তি মারা গেছে, তাদের মধ্যে তিনজন তখন একটি জ্যাম ও জেলি তৈরির কারখানায় কর্মরত ছিল। মৃতদের মধ্যে একটি শিশুও আছে—তার বয়স ছয় বৎসর। মৃতরা সবাই মোজাম্বিকের নাগরিক। সাতটি মিরেজ জঙ্গিবিরমান থেকে জ্যাম-ম্যাক্সিমাম উপর গুলিবর্ষণ করা হয়।

দক্ষিণ আফ্রিকার প্রতিরক্ষামন্ত্রী ম্যাগনাস মালান আজ কেপ টাউনে সন্তোষপ্রকাশ করে বলেন, এখনো পর্যন্ত ধ্বংসের যে খবর পাওয়া গেছে তাতে একথা বলা চলে যে, বিমান আক্রমণ সম্পূর্ণরূপে সফল হয়েছে। তিনি বলেন, এই আক্রমণে মোজাম্বিক বিমানবহরের একটি ক্ষেপণাস্ত্র ঘাঁটি এবং এ এন সির পাঁচটি গোপন আভা একেবারে নিমূল করে দেওয়া হয়েছে। মোজাম্বিককে আগেই সতর্ক করে দেওয়া হয়েছিল যাতে এ এন সিকে কোনরকম প্রশ্রয় না দেয়। এই বিমান আক্রমণে এটাও আবার পরিষ্কার করে দেওয়া হল যে, প্রয়োজন হলে দঃ আফ্রিকা কিছুতেই পিছপা হয় না।

লুসাকা থেকে অপর এক ঘোষণায় এ এন সি বলেছে, দঃ আফ্রিকার অন্তত দশটি জঙ্গিবিরমান এই আক্রমণে অংশ নেয়। ওই বিবৃতিতে আরও বলা হয়েছে যে মোজাম্বিকে বা মাপুটোয় এ এন সির কোন গুণ্ডাটি নেই, কোনদিন ছিলও না।

মোজাম্বিকের বেসামরিক বিমানবহরের তরফে আজ ঘোষণা করা হয়েছে যে, আগামী অন্তত ২৪ ঘণ্টার জন্য মাপুটো বিমানবন্দর বন্ধ রাখা হবে।

দঃ আফ্রিকার প্রতিরক্ষামন্ত্রী মালান আরও বলেন, আমাদের প্রতিরক্ষা বাহিনী প্রতিটি রক্তবিন্দুর বদলা নেবে। মাপুটোয় আজকের আক্রমণে কেবল মামুলি রকেট এবং ক্ষেপণাস্ত্র ব্যবহার করা হয়েছে। দঃ আফ্রিকার শত্রুদের জেনে রাখা উচিত যে, প্রয়োজন বুঝলে আমরা আরও মারাত্মক অস্ত্রশস্ত্র ব্যবহার করতে কিছুমাত্র কুষ্ঠাবোধ করব না।

কিন্তু ডারবানের একটি প্রভাবশালী মহিলা সংগঠনের নেত্রী শীনা ডানকান বলেছেন, প্রিটোরিয়ার বোমা বিস্ফোরণ থেকে এটা স্পষ্ট হয়েছে যে হিংসা এখন আরও ছড়িয়ে পড়বেই। প্রতিশোধ নিয়ে একে বশ করা যাবে না। প্রিটোরিয়ার স্বেচ্ছাসেবক সরকারকে তিনি অবিলম্বে এ এন সির সঙ্গে একটি রাজনৈতিক সমঝোতায়াত আসবার পরামর্শ দিয়েছেন।

রিফর্মড চার্চের রেভারেন্ড অ্যালান বেসাক বলেছেন, প্রিটোরিয়া সরকারের উচিত খুব বেশি বিলম্ব হয়ে যাবার আগেই মুক্তিযোদ্ধাদের সঙ্গে আলোচনা শুরু করা। —এ পি, পি টি আই

কাজের ধারা পাণ্টাচ্ছে

লর কয়েকটি জায়গায় জল চিত্র।

নান

বর্বাদিকদের বলেন, বাঁকড়ায় এম
মাহাতোকে মারধরের সঙ্গে কোন

ট্রেন-ট্রাক সংঘর্ষে হত ৬

নয়াদিল্লি, ২৩ মে—এখান থেকে প্রায় ২০ কিলোমিটার দূরে বদলি ও কালুঘরি রেল স্টেশনের মাঝে একটি লেভেল ক্রসিংয়ের ওপর গতরাতে ট্রেন-ট্রাকের এক ভয়াবহ সংঘর্ষে ৬ জন প্রাণ হারিয়েছেন। আহত হয়েছেন ৩ জন। তাঁদের অবস্থাও আশংকাজনক। ওই দুর্ঘটনার পর প্রায় বারো ঘণ্টা ওই লাইনে ট্রেন চলাচল কার্যত বন্ধ ছিল। দুর্ঘটনার জন্য গেটম্যানই দায়ী বলে অভিযোগ; কারণ লেভেল ক্রসিংয়ের গেটটি ছিল খোলা। এই ঘটনার পরই রতিরাম রামে ওই গেটম্যান গা চাকা দিয়েছে। রেল সূত্রে জানা যাচ্ছে দুর্ঘটনাটি ঘটে গতকাল রাত দেড়টার সময়। ওই লাইন ধরে ছুটে আসছিল নয়াদিল্লি শোনপথ শাটল প্যাসেঞ্জার ট্রেনটি। ইনজিনের হেডলাইট জ্বলছিল না, এদিকে গেটম্যান লেভেল ক্রসিংয়ের গেট বন্ধ করেনি। গেট খোলা পেয়ে একটি ট্রাক ও একটি ট্রাক্টর ট্রলি ওই লাইন পেরোতে যায়। অন্ধকারে কিছু বোঝা যাচ্ছিল না। ট্রাক ও ট্রাক্টরটি যখন লেভেল ক্রসিংয়ের উপর ঠিক সেই সময় ঘাড়ে এসে পড়ে ছুটন্ত ট্রেনটি। নিমেষে প্রচণ্ড ধাক্কায় টুকরো টুকরো হয়ে যায় ট্রাক ও ট্রাক্টরটি। ওই অবস্থাতেই বিধবৎসী ট্রাক ও ট্রাক্টরটিকে ট্রেনটি প্রায় এক কিলোমিটার অবধি টেলে নিয়ে যায়। এই এক কিলোমিটার লাইনের পাশে পাশে ছড়িয়ে পড়ে রক্ত-মাংস



খেরা কালান গ্রামের কাছে ট্রাক ও ট্রাক্টরের ট্রলির সঙ্গে দিল্লি—শোনপথ ট্রেনের সংঘর্ষের পর ট্রাক-ট্রলির ধ্বংসাবশেষ।

—জগদীশ

মাথা ভাঙা কাঠ ও লোহার টুকরো। দুর্ঘটনাটি ঘটে খেরাকালান গ্রামের গায়ে। সংঘর্ষের প্রচণ্ড শব্দে গ্রামবাসীরা ছুটে এসে দেখেন এই মর্মান্তিক কাণ্ড। ৫ জন মারা যান ঘটনাস্থলেই। ষষ্ঠজন মারা যান তাঁকে হাসপাতালে নিয়ে যাওয়ার সময়। গ্রামবাসীদের হৃদয়বিচলিত। এই দুর্ঘটনা ট্রাকের দক্ষ দর্শন ব্যবস্থা

Figure 3.17. Front page of the daily Anandabazar Patrika typesetted on Linotron 202, 4 June 1983. Actual size. Non-Latin TC, DTGC.

3.2.1. The phonetic keyboard

Figure 3.18. Opposite page.
The Linotype scheme for
composing Bengali on the
Macintosh, ca.1991.
Non-Latin TC, DTGC.

An essential ingredient for the development of Linotype Bengali was the phonetic keyboard, invented by Ross and Fellows in 1978. ‘The font-handling and typesetting software, devised by Dr Mike Fellows at Linotype-Paul specifically for Bengali composition on the 202, was fundamental to the realization of the typesetting scheme. The scheme formed the essence of the design concept and can claim to have revolutionized keyboarding procedures for Bengali and all Indian scripts by the introduction of the phonetic keyboard’²².

The main characteristic of the hot-metal keyboard, used at ABP for more than 40 years, was the direct connection between keys and characters: one key code corresponds to one character output. The idea that lay behind the phonetic keyboard was that only the basic alphasyllabary, the punctuation and the numerals were on the keyboard, while the rest of the conjuncts were created combining the characters with a special key, the conjunct key.

The keyboard was an internationally common 104/105 key keyboard and the distribution of the characters was arranged according to frequency and to the phonetic conventions of Bengali script. Figure 3.18 show the Linotype scheme for composing Bengali on the Macintosh, ca.1991, an operating instruction that illustrates how the phonetic keyboard operates. The conjunct key was essential in the operation: the shift status of the key informed the software that the following sequence of simple consonants was to be replaced by a consonant conjunct. The logic of the keyboard was based on the Indian phonological writing system, after Bengali Linotype created the Devanagari keyboard, as Anandabazar Patrika asked²³; furthermore ‘the typesetting scheme devised for Bengali formed the blue-print for Linotype-Paul’s development of [...] all the other Indian scripts’²⁴.

Linotype-Paul did not patent the phonetic keyboard and it was soon adopted by the Indian government. In the following years the scheme went through some changes, two of them were quite relevant and became the standard today in use in Indian keyboards.

The Linotype phonetic keyboard required the operator to type the vowel sign **ি** (for instance) as he had written it – *ikar* is written before the consonant it follows²⁵; the scheme was accused of not being entirely phonetic

22. F. Ross, *The printed Bengali character*, p. 206.

23. ABP group requested a three-language keyboard: Bengali, Devanagari and English.

24. F. Ross, *The printed Bengali character*, p. 220.

25. This was the same practice as for the hot-metal keyboard so that compositors could switch to this keyboard without changing a lifetime habit of lettersequencing.

Linotype

Indian PostScript® Faces

The Linotype Scheme for Composing Bengali on the Macintosh

The *Phonetic Keyboard* forms the basis of this scheme which is applicable to all the scripts of the Indian Subcontinent. The Linotype Indian system software is employed for composing Bengali.

Description

1. With the exception of a small number of keys, each key has its own phonemic value.
2. The great majority of the characters of the syllabary are in the unshift mode.
3. The most frequent consonants occupy the centre of the keyboard and the left-hand keys; the most frequently used vowels being situated on the right.
4. Conjuncts are accessed by means of the *Conjunct Key*.
5. The simple consonants have been placed in such a way that certain common sequences which form conjuncts can be easily typed.
6. The aspirates have been placed along the top row in relation to their more common unaspirated counterparts.

The *Phonetic Keyboard* (first devised by Linotype in 1978) when used with the *Conjunct* routine removes the need for a large keyboard without impairing the quality of output. It enables the operator to touch-type phonetically and s/he will no longer have to recognize and memorize a great number of forms.

N.B. All keys except the *Conjunct Key* are explained in the Macintosh Operation Manual.

Method of Operation

1. All characters of the syllabary are keyed directly, usually in the unshift mode.
2. All superscripts and subscripts are keyed directly after the character they affect.

3. Punctuation and numerals are keyed directly.
4. Conjuncts are keyed phonetically via the *Conjunct Key*; the sequence is as follows:
 - a) Conjunct formed of two consonants:
Conjunct Key ক + ক = ক্ক
 - b) Conjunct formed of three consonants:
Shift Conjunct Key ন + দ + র = ন্দ্র
5. Vowel signs (e.g. ি and ু) are keyed directly from the keyboard where they are required.
6. Special forms of consonants combined with vowels should be treated as conjuncts,
e.g. গ + ু = গু
7. Compound characters shapes such as ি̃ can be keyed directly using the appropriate components. (e.g. ি followed by ̃)

When a subscript is required below ্, please use the *Conjunct Key* to ensure good fit, e.g. ্ ্

পোস্টমাস্টার

প্রথম কাজ আরম্ভ করিয়াই উলাপুর গ্রামে পোস্টমাস্টারকে আসিতে হয়। গ্রামটি অতি সামান্য। নিকটে একটি নীলকুঠি আছে, তাই কুঠির সাহেব অনেক জোগাড় করিয়া এই নূতন পোস্টআপিস স্থাপন করাইয়াছে।

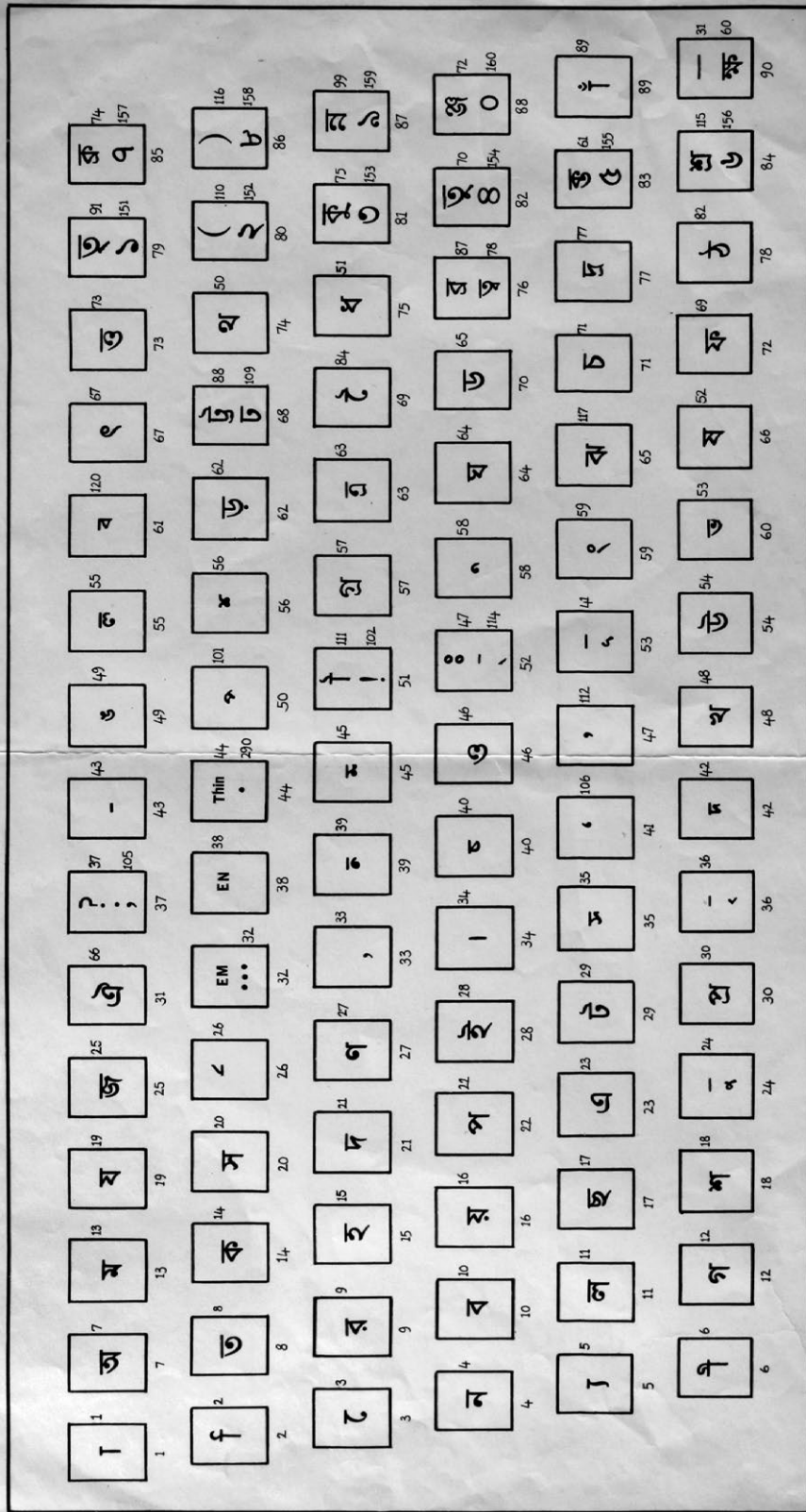
আমাদের পোস্টমাস্টার কলিকাতার ছেলে। জলের মাছকে ডাঙায় তুলিলে যেরকম হয়, এই গণ্ডগ্রামের মধ্যে আসিয়া পোস্টমাস্টারেরও সেই দশা উপস্থিত হইয়াছে। একখানি অন্ধকার আটচালার মধ্যে তাহার আপিস; অদূরে একটি পানাপুকুর এবং তাহার চারি পাড়ে জঙ্গল। কুঠির গোমস্তা প্রভৃতি যে-সকল কর্মচারী আছে তাহাদের ফুরসত প্রায় নাই এবং তাহারা ভদ্রলোকের সহিত মিশিবার উপযুক্ত নহে।

(রবীন্দ্রনাথ ঠাকুর)

Created on a Macintosh™ II using the Linotype Indian Script System with Ready,Set,Go!™ 4.0. Typeset on a Linotronic 200P imagesetter. Proofed on an Apple LaserwriterII NTX.

Linotronic is a registered trademark of Linotype AG and its subsidiaries. PostScript is a registered trademark of Adobe Systems Inc. Macintosh is a trademark of Apple Computer Inc. Ready,Set,Go! is a trademark of Manhattan Graphics Corp.

LINOTYPE BENGALI 90-Channel Keyboard



MAY 1965

Figure 3.19. Layout of the hot metal Bengali keyboard, 1949. Scan by Vaibhav Singh. Non-Latin TC, DTGC.

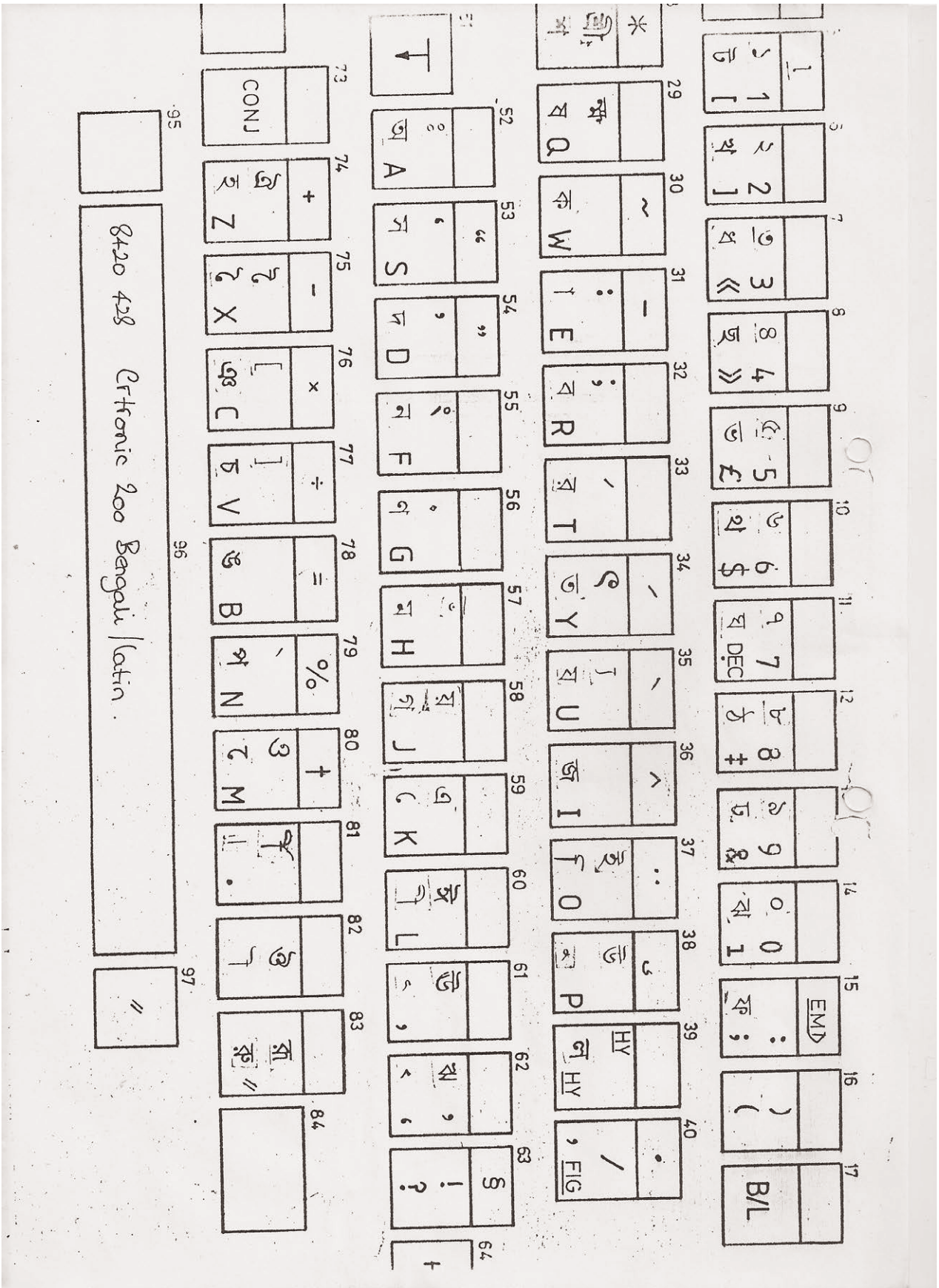


Figure 3.20. Layout of the Bengali Phonetic keyboard, ca. 1980. Scan from the Non-Latin TC, DTGC.

Figure 3.21. Opposite page. Sample of PostScript Linotype Assames – a regional variant of Bengali script – for Apple software. 1993. Non-Latin TC, DTGC.

and changed following the way people speak, so the *ikar* is now typed after the consonant and the software takes care of the glyph reordering (shifting the vowel sign before the consonant)²⁶. This operation can be an excess load for the typesetting softwares and it caused many troubles to PC users across India (see § 2.1). The second change was removing the conjunct key, using instead the hasanta key to type in between each character that forms a conjunct.

Linotype phonetic keyboard was the first attempt of this kind and it can be considered the ancestor of contemporary Indic keyboard layouts, like the InScript keyboard, today the most used keyboard layout for local scripts in India.

3.2.2 Linotype Bengali in PostScript format

Despite predictions, the lifespan of photocomposition was much shorter than hot-metal composition, and during the 1980s and the first half of the 1990s it was replaced by digital methods; the advent of PostScript²⁷ and the consequent DeskTop revolution radically transformed the market of typefaces.

Linotype began production of PostScript typefaces in 1987 and soon started converting its non-Latin library into PostScript, using an in-house font editing software, after licensing the proprietary production tools from Adobe. The starting point for PostScript format was a high-resolution bitmap derived from the original scan of the artwork: Ross and her colleagues consequently re-evaluated all the aspects of the newly digitized typefaces, because the new workflow allowed greater accuracy. Hinting was also added in the manufacturing process so that the fonts performed optimally on laser printers²⁸.

26. The same is true of all the other vowel signs that are written before the consonants they follow.

27. 'First, we had many different formats for digital fonts, none of which were standardized. Then Apple adopted the Adobe PostScript page description language (PDL) for its Apple LaserWriter printer in 1985. This, combined with the introduction of PageMaker, the first desktop publishing software, sparked a revolution in page layout technology.' Thomas W. Phinney, *TrueType, PostScript Type 1, & OpenType: What's the Difference?*, 2004.

28. Mike Fellows, senior programmer and later marketing director at Linotype from 1976 to 1993. Email to the author, 14 August 2014.

Typefaces from Linotype-Hell

Indian PostScript Faces : Linotype Assamese Sample.

Linotype Assamese Light

“অ’ মোৰ আপোনাৰ দেশ
অ’ মোৰ চিকুগি দেশ
এনেখন শুরলা
এনেখন সুফলা
এনেখন মৰমৰ দেশ
.....”
—বেজবৰুৱা —

Linotype Assamese Bold

“অ’ মোৰ আপোনাৰ দেশ
অ’ মোৰ চিকুগি দেশ
এনেখন শুরলা
এনেখন সুফলা
এনেখন মৰমৰ দেশ
.....”
—বেজবৰুৱা —

The Assamese language uses the Bengali script. Linotype Bengali was designed by Tim Holloway and Fiona Ross in tandem with a new typesetting scheme which included the invention of the *Phonetic Keyboard* for Indian scripts (Linotype Limited 1978). This text face in two weights exploits the capabilities of digital font format and software to reflect the elegance of the Bengali script. Attention has been paid to the fitting of characters with kerning and floating vowel signs. The Bengali fonts were inspired by early foundry types and decorative manuscript forms. The Assamese characters were designed and added to the fonts in conjunction with the development of a special Assamese keyboard layout. Linotype Assamese has become as popular as Linotype Bengali for newspaper setting and quality bookwork.

Please note: these fonts will only operate in conjunction with Apple Macintosh system software that has been modified using the Linotype-Hell Installer. GM:V1.0, attributes 27/01/93R Issue3, IDSV2.05. (7/7/93). Typeset on a Linotronic imagesetter. Linotype, Hell, and Linotronic are registered trademarks of Linotype-Hell AG and/or its subsidiaries. Linotype Assamese is a trademark of Linotype-Hell AG and/or its subsidiaries. PostScript, Macintosh and Indian Design Studio are registered trademarks of our licensors.

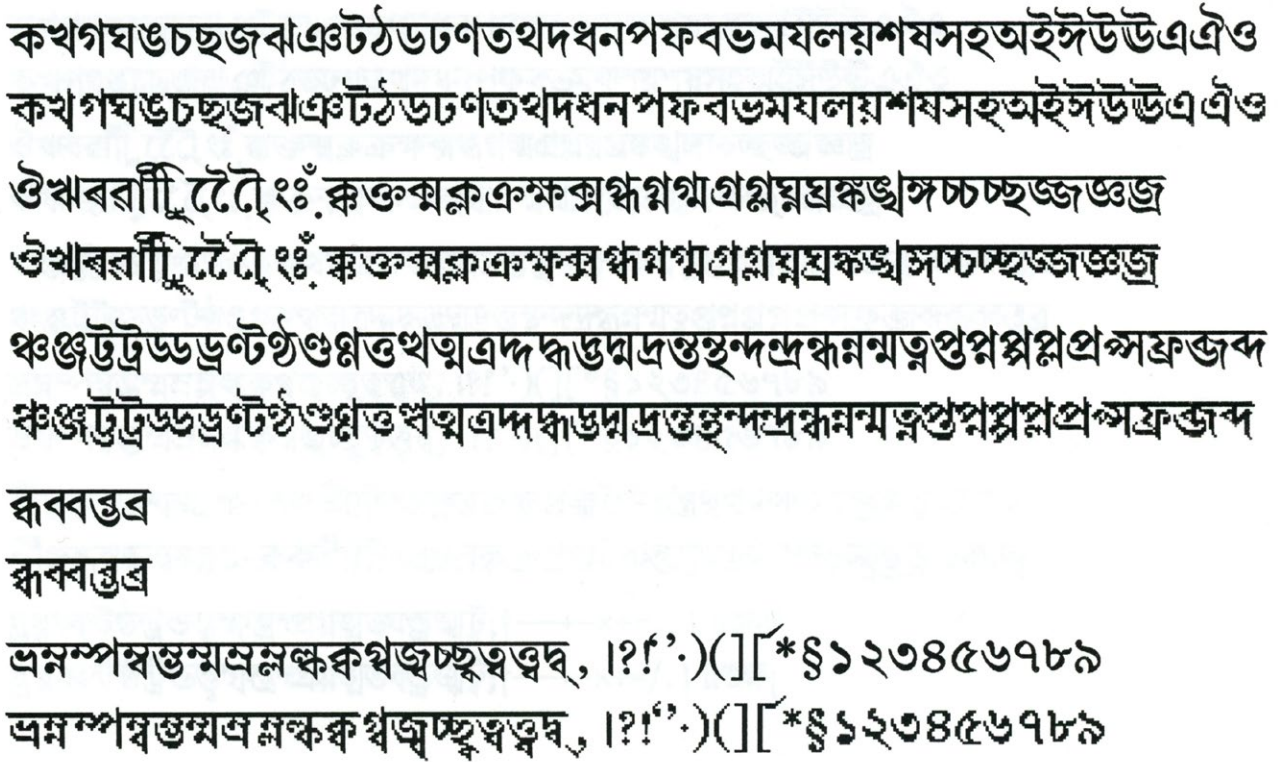


Figure 3.22. Printing test of coordinated screen fonts, 1995. Non-Latin TC, DTGC. In the 1990s screen images were not rendered from the actual fonts thus screen fonts had to be designed separately with dot matrices. For editing purposes, the widths of the dot-matrix letterforms had to co-ordinate with those of the actual digital font forms.

Linotype Bengali in PostScript format was sold on a floppy disc, divided into two font units (two PostScript type 1 format files) that, thanks to in-house software included in the disc, worked as a single font once installed on the computer: the 8-bit PostScript format cannot store more than 254 glyphs in a single font file, not enough for most of the Indian script fonts²⁹.

We do not have information about the sales of PostScript Linotype Bengali, and the entire story of the Linotype companies in the 1990s is confused and poorly documented. However, before the mid-1990s, Linotype-Hell[1] transferred the responsibility for the Middle-East and Asian sales from Cheltenham, UK, to Germany. The staff was dramatically reduced and the London sales office was closed³⁰.

29. In 1990 Linotype AG merged with Hell, another prepress company
30. Mike Fellows in an email to the author, 19 August 2014. Fiona Ross in several talks, confirmed by analysis on the Seybold archives, volumes 1988–1996.

| | | | | | | | | | | | | | | | |
|---------------------|--------------------|-----------------|--------------------|-----------------|-----------------|--------------------|-----------------|-----------------|--------------------|-------------------|-----------------|-----------------|--------------------|--------------------|--------------------|
| .notdef 0 x00 | c170 1 x01 | c610 2 x02 | c172 3 x03 | c618 4 x04 | c335 5 x05 | c173 6 x06 | c176 7 x07 | c175 8 x08 | .notdef 9 x09 | .notdef 10 x0A | c178 11 x0B | .c651 12 x0C | .notdef 13 x0D | c686 14 x0E | c180 15 x0F |
| | ক | ঙ | ক্ত | ক | ক | ক | ক | ক | | | ক | খ | | গ | ধ |
| c181 16 x10 | c337 17 x11 | c182 18 x12 | c184 19 x13 | c185 20 x14 | c186 21 x15 | c188 22 x16 | c189 23 x17 | c190 24 x18 | c191 25 x19 | c689 26 x1A | c687 27 x1B | c942 28 x1C | c194 29 x1D | c197 30 x1E | c339 31 x1F |
| | ম | থ | গা | ত্র | গ্ন | য় | য | ক | জ | ঙ্গ | জ | জ | জ | চ | ছ |
| space 32 x20 | c657 33 x21 | c619 34 x22 | c658 35 x23 | c199 36 x24 | c415 37 x25 | c691 38 x26 | c200 39 x27 | c338 40 x28 | c202 41 x29 | c205 42 x2A | c386 43 x2B | c206 44 x2C | c628 45 x2D | c207 46 x2E | c692 47 x2F |
| | স্থ | স্থ | স্থ | স্থ | স্থ | স্থ | স্থ | স্থ | স্থ | স্থ | স্থ | স্থ | স্থ | স্থ | স্থ |
| c210 48 x30 | c213 49 x31 | c215 50 x32 | c217 51 x33 | c218 52 x34 | c219 53 x35 | c659 54 x36 | c655 55 x37 | c220 56 x38 | c652 57 x39 | c660 58 x3A | c222 59 x3B | c341 60 x3C | c223 61 x3D | c249 62 x3E | c340 63 x3F |
| | ট | ড | ড | ট | ঠ | ণ্ড | ড | ণ | ধ | গা | ত | ত | থ | ত | ত |
| c225 64 x40 | c227 65 x41 | c648 66 x42 | c626 67 x43 | c662 68 x44 | c232 69 x45 | c663 70 x46 | c233 71 x47 | c413 72 x48 | c343 73 x49 | c234 74 x4A | c664 75 x4B | c235 76 x4C | c236 77 x4D | c665 78 x4E | c666 79 x4F |
| | অ | ত্র | থ | ত্র | দঘ | দ | দ | দ | দ | দ | দ | দ | দ | দ | দ |
| c612 80 x50 | c667 81 x51 | c669 82 x52 | c668 83 x53 | c670 84 x54 | c690 85 x55 | c238 86 x56 | c647 87 x57 | c671 88 x58 | c646 89 x59 | c239 90 x5A | c240 91 x5B | c414 92 x5C | c241 93 x5D | c242 94 x5E | c408 95 x5F |
| | ধ | ট | ট | ঠ | ড | ড | ড | ড | ড | ড | ড | ড | ড | ড | ড |
| c244 96 x60 | c410 97 x61 | c245 98 x62 | c654 99 x63 | c645 100 x64 | c250 101 x65 | c251 102 x66 | c252 103 x67 | c256 104 x68 | c255 105 x69 | c257 106 x6A | c258 107 x6B | c613 108 x6C | c259 109 x6D | c261 110 x6E | c262 111 x6F |
| | ন | ষ | ন্ | স | প | প | প | প | প | প | প | ফ | ফ | জ | ব |
| c263 112 x70 | c264 113 x71 | c265 114 x72 | c614 115 x73 | c267 116 x74 | c269 117 x75 | c270 118 x76 | c681 119 x77 | c672 120 x78 | c271 121 x79 | c272 122 x7A | c673 123 x7B | c273 124 x7C | c275 125 x7D | c276 126 x7E | c279 127 x7F |
| | ব | ভ | ব | ব | ভ | ম | ম | ম | ম | ম | ম | ম | ম | ম | ক |
| c416 128 x80 | .notdef 129 x81 | c364 130 x82 | c363 131 x83 | c366 132 x84 | c367 133 x85 | c368 134 x86 | c369 135 x87 | c370 136 x88 | c371 137 x89 | c372 138 x8A | c373 139 x8B | c806 140 x8C | c351 141 x8D | c321 142 x8E | c812 143 x8F |
| | % | ১ | ২ | ৩ | ৪ | ৫ | ৬ | ৭ | ৮ | ৯ | ০ | — | ! | ক | / |
| c803 144 x90 | c656 145 x91 | c111 146 x92 | c102 147 x93 | c119 148 x94 | c107 149 x95 | c124 150 x96 | c117 151 x97 | c104 152 x98 | c112 153 x99 | c114 154 x9A | c109 155 x9B | c122 156 x9C | c350 157 x9D | c363 158 x9E | .notdef 159 x9F |
| | † | ড | ট | থ | ধ | ছ | ভ | থ | য | ঠ | ঢ | ঝ | ফ | ? | § |
| conjunct 160 xA0 | c113 161 xA1 | c177 162 xA2 | .notdef 163 xA3 | c418 164 xA4 | c800 165 xA5 | c359 166 xA6 | c611 167 xA7 | c605 168 xA8 | .notdef 169 xA9 | c140 170 xAA | c142 171 xAB | c417 172 xAC | c354 173 xAD | c362 174 xAE | .notdef 175 xAF |
| | | ড | ক্ষ | : | ; | ' | ং | ্য | | ই | উ | - | . | * | |
| c322 176 xB0 | .notdef 177 xB1 | c131 178 xB2 | c101 179 xB3 | c156 180 xB4 | c123 181 xB5 | c127 182 xB6 | c116 183 xB7 | c126 184 xB8 | c108 185 xB9 | c157 186 xBA | c159 187 xBB | c128 188 xBC | c348 189 xBD | .notdef 190 xBE | .notdef 191 xBF |
| | রা | ষ | ক | । | ব | র | ত | য | জ | ি | ু | ল | , | | |
| c807 192 xC0 | c814 193 xC1 | c167 194 xC2 | c352 195 xC3 | c353 196 xC4 | c166 197 xC5 | c169 198 xC6 | c168 199 xC7 | c129 200 xC8 | c144 201 xC9 | c141 202 xCA | c143 203 xCB | c152 204 xCC | .notdef 205 xCD | .notdef 206 xCE | c820 207 xCF |
| | + | . | ঃ | ' | ' | ং | . | ং | য় | এ | ঈ | উ | ঝ | | । |
| c808 208 xD0 | .notdef 209 xD1 | c138 210 xD2 | c132 211 xD3 | c118 212 xD4 | c120 213 xD5 | c115 214 xD6 | c125 215 xD7 | c103 216 xD8 | c163 217 xD9 | c158 218 xDA | c160 219 xDB | c165 220 xDC | c821 221 xDD | .notdef 222 xDE | .notdef 223 xDF |
| | - | অ | স | দ | ন | ণ | ম | গ | ে | ী | ে | ে | ৥ | | |
| c809 224 xE0 | .notdef 225 xE1 | c145 226 xE2 | c162 227 xE3 | c397 228 xE4 | c358 229 xE5 | .notdef 230 xE6 | c347 231 xE7 | c146 232 xE8 | c147 233 xE9 | c381 234 xEA | c593 235 xEB | c356 236 xEC | .notdef 237 xED | .notdef 238 xEE | .notdef 239 xEF |
| | × | ঐ | ট |] | [| | | ও | ও | ষ | শ্রী | (| | | |
| c810 240 xF0 | c811 241 xF1 | c133 242 xF2 | c640 243 xF3 | c110 244 xF4 | c106 245 xF5 | c105 246 xF6 | c121 247 xF7 | c161 248 xF8 | c164 249 xF9 | c349 250 xFA | c130 251 xFB | c355 252 xFC | .notdef 253 xFD | .notdef 254 xFE | .notdef 255 xFF |
| | ÷ | = | হ | ট | ঞ | চ | ঙ | প | ে | ে | । | শ |) | | |

Font: LinotypeBengali-LightOne 15:09 13/7/90 Encoding: bengaliOne.enc EncodingScheme 2 (lof2) 14:16 13/7/

Figure 3.23. Encoding layout of PostScript Bengali, 1990. The characters in the marked box are keyed directly from the keyboard. From them all the conjuncts can be generated. Non-Latin TC, DTGC.

50 pt

আমাদের বঙ্গসাহিত্যে নানা অভাব A

আমাদের বঙ্গসাহিত্যে নানা অভাব B

30 pt

আছে সন্দেহ নাই; দর্শন বিজ্ঞান এবং বিবিধ শিক্ষণীয়
বিষয় এ পর্যন্ত বঙ্গভাষায় যথেষ্ট পরিমাণে প্রকাশিত হয় A

আছে সন্দেহ নাই; দর্শন বিজ্ঞান এবং বিবিধ শিক্ষণীয়
বিষয় এ পর্যন্ত বঙ্গভাষায় যথেষ্ট পরিমাণে প্রকাশিত হয় B

15 pt

A

B

আমাদের বঙ্গসাহিত্যে নানা অভাব আছে সন্দেহ নাই;
দর্শন বিজ্ঞান এবং বিবিধ শিক্ষণীয় বিষয় এ পর্যন্ত
বঙ্গভাষায় যথেষ্ট পরিমাণে প্রকাশিত হয় নাই; এবং সেই
कारणे रीतिमते शिक्षालाभ करिते हईले विदेशीय
ভাষার সাহায্য গ্রহণ করা ব্যতীত উপায়ান্তর দেখা যায়

আমাদের বঙ্গসাহিত্যে নানা অভাব আছে সন্দেহ নাই;
দর্শন বিজ্ঞান এবং বিবিধ শিক্ষণীয় বিষয় এ পর্যন্ত
বঙ্গভাষায় যথেষ্ট পরিমাণে প্রকাশিত হয় নাই; এবং
সেই কারণে রীতিমতো শিক্ষালাভ করিতে হইলে
বিদেশীয় ভাষার সাহায্য গ্রহণ করা ব্যতীত উপায়ান্তর

Figure 3.24. Comparison of Linotype Bengali (A) and ABP font (B). Linotype Bengali was converted into PostScript by Ross and her colleague in the end of the 1980s. The original PostScript Type1 file was saved in the Non-Latin TC, DTGC. ABP font comes from the PostScript conversion done by Summit and Deborani Dattagupta in 1995.

Meanwhile in 1991 the ABP group turned from the Linotron 202 to Linotronic 530, the new PostScript imagesetter from Linotype, employing the PostScript Linotype Bengali. Five years later ABP changed prepress technology again³¹ and assigned Summit (§ 2.3) to provide the keyboard manager and plugins to typeset Bengali text with Microsoft Word and QuarkXpress. As they were not able to retrieve the outline from the digital files of the Linotronic, a Bengali type designer, Deborani Dattagupta was employed to re-trace the font. Starting from scans of big printout letters and working on Fontographer, in 1996 Dattagupta released TrueType fonts that could run on Summit software, called ABP regular and

31. 'There is one sure thing about the future of newspapers: The way we produce them will continue to change.' Lawrence J. Goodrich, *The Journey, from Linotype to Macintosh*, Christian Science Monitor, November 24, 1993.

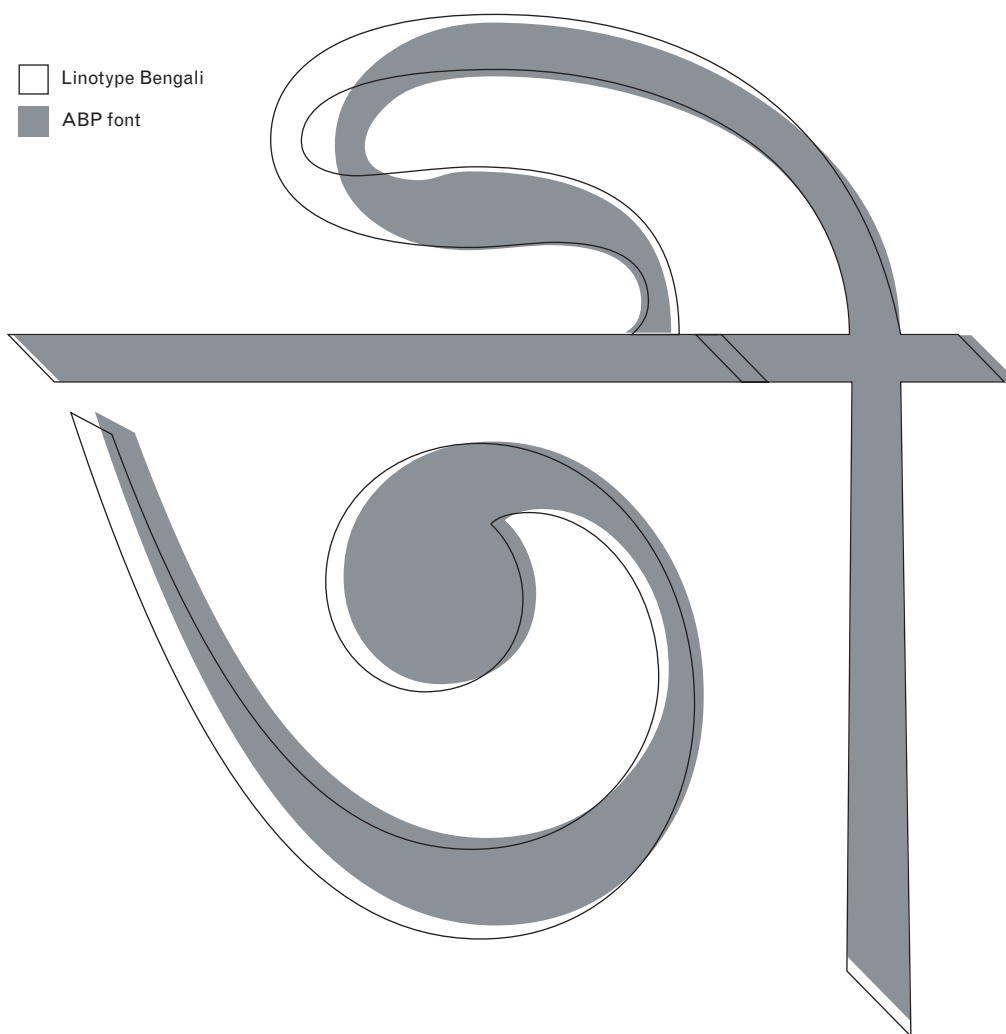


Figure 3.25. Enlarged letters (tii), comparison of ABP font (grey) and Linotype Bengali (outline). The ascent of vowel sign ii is one of the biggest differences between the two fonts. At an average text size the differences are almost undetectable.

ABP bold. She worked for ABP until 1999, designing a new family called ABP Expanded, that was rarely used since it was too wide for newspapers³². In 2013 the six TrueType files (three files per weight), currently used in Anandabazar Patrika were combined together in two OpenType fonts by Modular Infotech (§ 2.3).

Part of Summit and Deborani's work was to implement an additional number of conjuncts in the PostScript version of Linotype Bengali³³. The 1981 Linotype Bengali font for Linotron 202 contained about 300 glyphs

32. Surit Doss, Editor Information for ABP Group. Email to the author, 22 July 2014. Ananda Expanded has not been used for many years and neither the designer nor the company were able to provide it.

33. There is no finite list of conjuncts in a Bengali fonts. The increasing use of loan words and the need to transliterate names into Bengali, mean that newspapers like Anandabazar Patrika have a constant need to add new conjuncts each year.

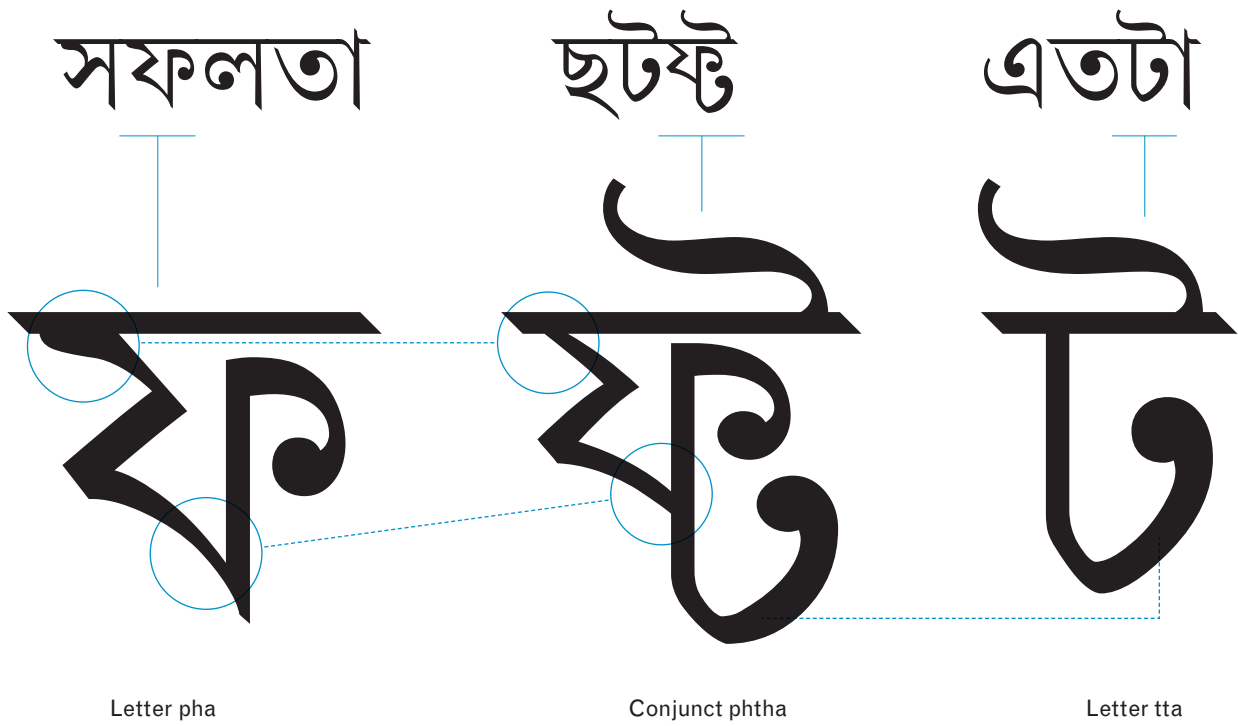


Figure 3.26. Example of poorly drawn conjunct in the later additions to Linotype Bengali adapted by ABP: comparison of the conjunct **phtha** (in the middle) and its original consonants reveals how the details of the conjunct were not crafted with care. The most problematic details are highlighted.

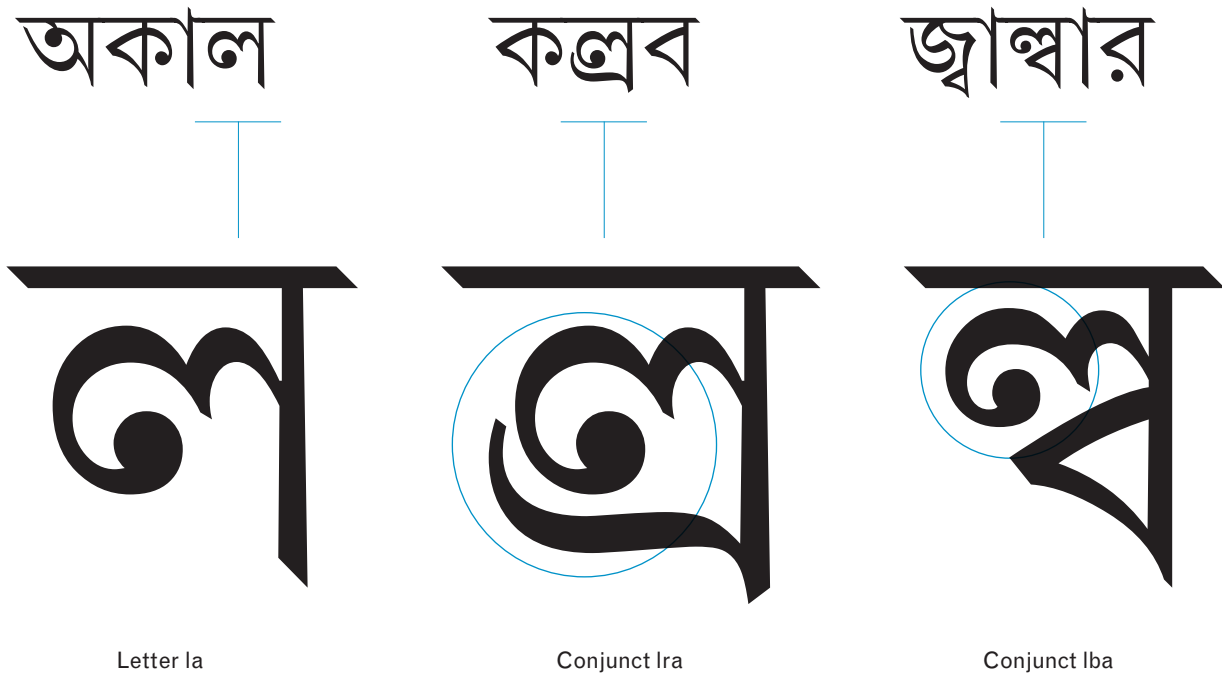


Figure 3.27. Example of poorly drawn conjunct in ABP font, **Ira** (in the middle): the main shape of letter **la** should have been resized to fit in the space above the raphala, like it was done for conjunct **Iba** – with little care, in the case of **Iba**, considering the poor quality of the outline.



Figure 3.28. Another example of poorly drawn conjunct in ABP font: comparison of nra (in the middle) with other conjuncts which should share the same construction in the lower part of the letterform, where the raphala joints the stem.

while the OpenType font used today in ABP contains more than 550. We do not know how many later additions were done after Deborani's contribution, nor do we know who were the people involved.

The diagrams of this spread display some conjuncts now in the ABP font that were not designed by Linotype's typographic department. All of them should be created using elements from the original consonants and harmonizing them. In figure 3.26 I compare the conjuncts with their original consonants, and it stands to reason that the consonants are far better designed than the corresponding strokes in the conjunct. Figure 3.27 shows another problem, the main stroke – taken from **la** ল – has not been scaled down to leave enough space around the raphala³⁴. Finally, in figure 3.28 the choice of the designer to keep the lower part of the vertical stroke as the original consonant nna ঞ, is not consistent with the rest of the typeface.

These few examples show the lack of quality in the later additions to the font where neither the designers in charge nor the people in ABP who were evaluating the work realized the difference with the original letterforms designed by Holloway and Ross.

34. Raphala is the weavy line at the bottom, see note 18, § 3.2.

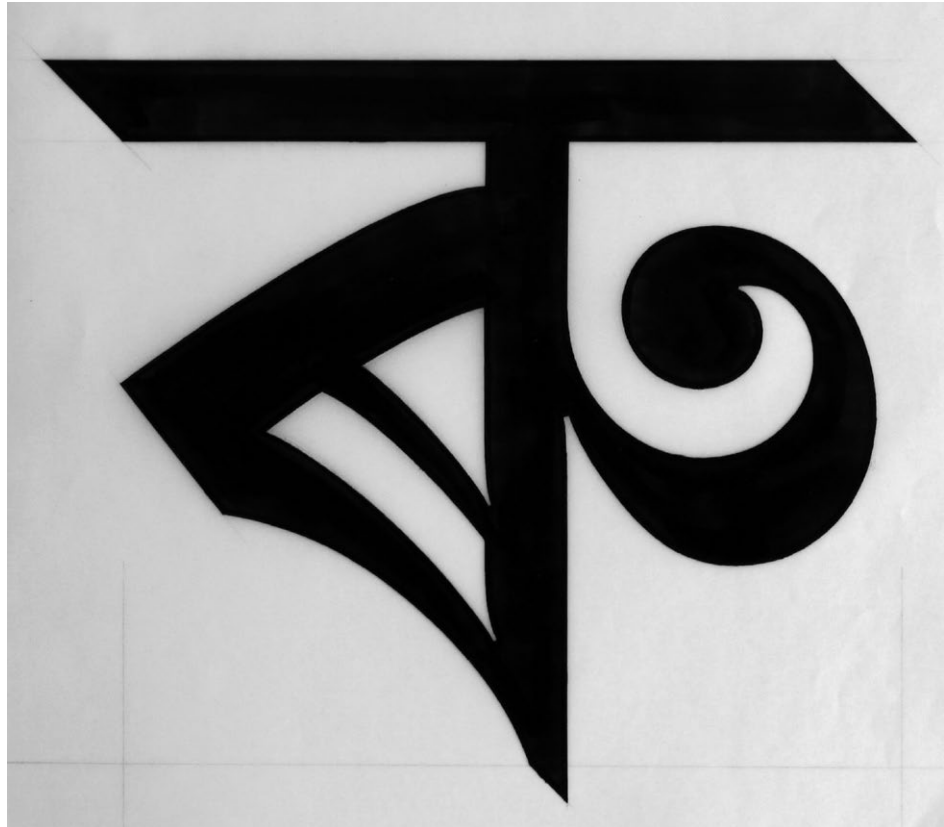


Figure 3.29. Finished inked letter-drawing on transparent paper for Linotype Assamese by Tim Holloway, 1992. 65% of actual size. Scan by Vaibhav Singh. Non-LatinTC, DTGC.

The last act of the Linotype Bengali story took place in London at the end of the 1990s³⁵. Gate Seven Computers Ltd is a web design and engineering company specialized in multilingual computing³⁶, and at the time they were selling Indian script fonts to the London councils to produce multi-script literature. Their Bengali font was a copy of Linotype Bengali but it was not working properly so they approached the German Linotype GmbH. Bruno Steinert, managing director, arranged a meeting with them and Fiona Ross in London where it was agreed that Gate Seven was receiving the original Tim Holloway's artwork free of charge in exchange for producing the OpenType masters for the font, while Ross was art-directing and reviewing as Linotype consultant. Gate Seven hired Tim Holloway to add some new characters and they went on adding many characters, comprising traditional manuscript forms, but the overall result was not good, the quality of the production was poor and the spacing was awful. In Fiona Ross's

35. The information for this paragraph was provided by Fiona Ross. I emailed Gate Seven several times but I never received a reply.

36. From the corporate website, www.gateseven.net

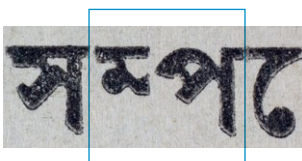
opinion the character was unusable. Linotype GmbH was unhappy about the delay and later everyone lost contact: for some unknown reason, Gate Seven lost contact with Ross, Holloway and Linotype GmbH. Thus the original drawings Tim Holloway made at the turn of 1980s have vanished but for few Assamese characters that Gate Seven was not interested in, these are kept in the Non-Latin Type Collection of the University of Reading.

In 2006 Linotype GmbH was acquired by Monotype and the Linotype library, comprising all the non-Latin fonts became part of Monotype GmbH (as it was newly named in 2013). Monotype has not published a retail version of Linotype Bengali and seems to have no intention of doing so in the near future³⁷.

3.3. Criticism of Linotype Bengali and the current orthographic standardization³⁸

When it was released Linotype Bengali received some criticism for being rather traditional. The reasons were that the great simplification – due to the limits of the line-caster (see § 3.1) – that many Bengali readers had experienced in daily newspapers and magazines for more than 40 years, could have been kept in the digital photocomposition font because it had the advantage of employing far fewer sorts, and many readers had become accustomed to this. The release of the digital photocomposition Linotype Bengali was seen by these critics as a wasted chance in the process of simplifying Bengali script, as Ross and her colleagues did not use components³⁹ and reintroduced letters that had fallen out of use in the hot-metal period.

Figure 3.30. Example of conjunct mpa build up with components in hot-metal typesetting:



From Anandabazar Patrika 17 April 1979. 200% of actual size. The same conjunct with the traditional shape:



The conjunct is formed by ma and pa:



37. Daniel Rhatigan. Email with the author, 13 August 2014.

38. This chapter is the result of several discussions with Palash Baran Pal, senior professor at the Saha Institute of Nuclear Physics, Kolkata. In contrast with the opinions of ABP publisher and academics based in literary disciplines, Professor Pal was one of the critics of Linotype Bengali for photocomposition – that he called ‘retrograde’. His interest in Bengali linguistics led him to design a Bengali digital font at the end of the 1980s, using Metafont. This font employs component conjuncts and has been used among the Bengali scientific community. It runs on TeX and, even if it was later converted into PostScript, it is not compatible with the InScript keyboard layout and is therefore very hard to use on a layout software. With accurate use of component conjuncts, Professor Pal was able to reduce the number of glyphs to about 170.

39. The term half-forms conjuncts is reductive and limited to the hot metal period. There were graphic elements, or better ‘components’ used to build up full conjuncts. Some of them were half characters while others were just bits or fragments that were not recognizable as half characters.

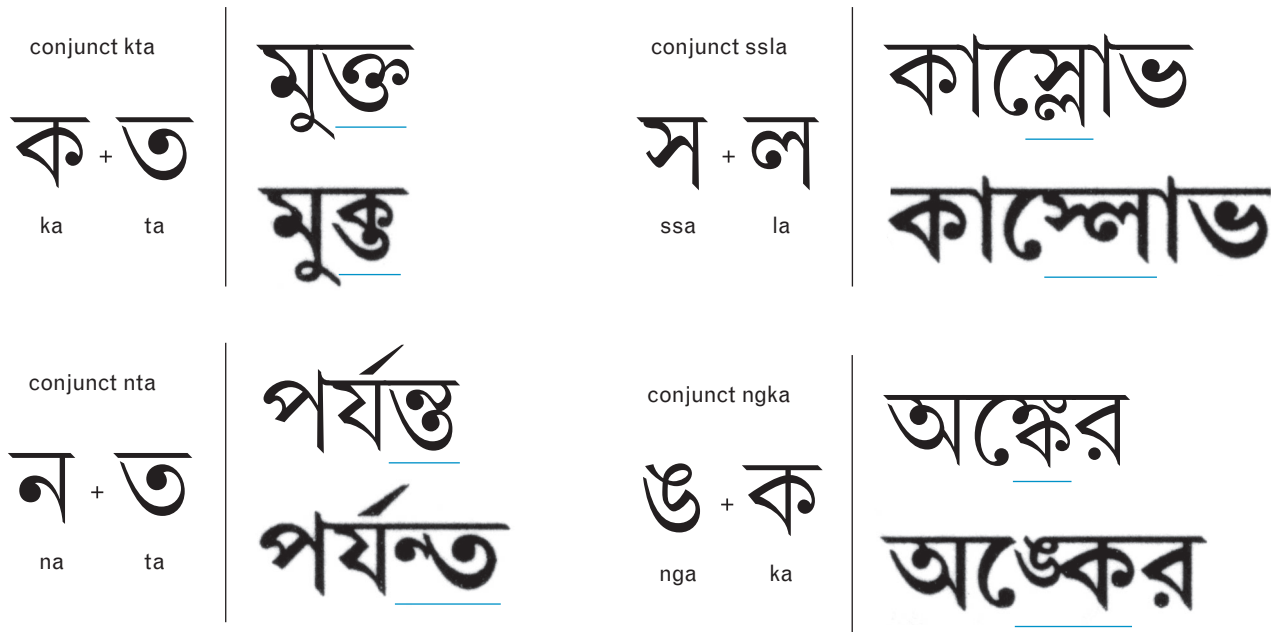


Figure 3.31. Comparison of the traditional conjuncts from Linotype Bengali (first line of every chart) and the component conjuncts from Bidisha font (second line), a clone of Linotype Bengali designed by Deborani Dattagupta for CDAC in 1994 (§ 4.1) scanned from a printout of 1994.

Conjuncts built from components can be both horizontal and vertical (the latter covers most Bengali conjuncts). The former, often called linear conjuncts, were introduced with hot metal typesetting and according to Dattagupta they ‘have larger counter space and work better in small point sizes’⁴⁰. Vertical component conjuncts could not be achieved by the line-caster but are accessible to computer typesetting. Vrinda is the only digital font analyzed in this essay (§ 4.2) that follows this method⁴¹.

With component-conjuncts readers usually understand more easily which are the original consonants – while the traditional conjunct forms often do not resemble them. Thus components conjuncts are often called ‘transparent conjuncts’ and the Paschimbanga Bangla Akademi (the official regulatory body of the Bengali language in West Bengal, they have been making efforts in standardizing Bengali orthography) a few years ago published its own typeface to set Bengali school books, where they made large use of components-conjuncts⁴².

However, the current situation is far from being standardized, and

40. Deborani Dattagupta. Email to the author, 24 August 2014.

41. In West Bengal more fonts with components conjuncts are available but they all are clones of Linotype Bengali.

42. I could not access the font as the Akademi never answered my requests. From the little to be found on Internet the font seems to be another Linotype Bengali clone.

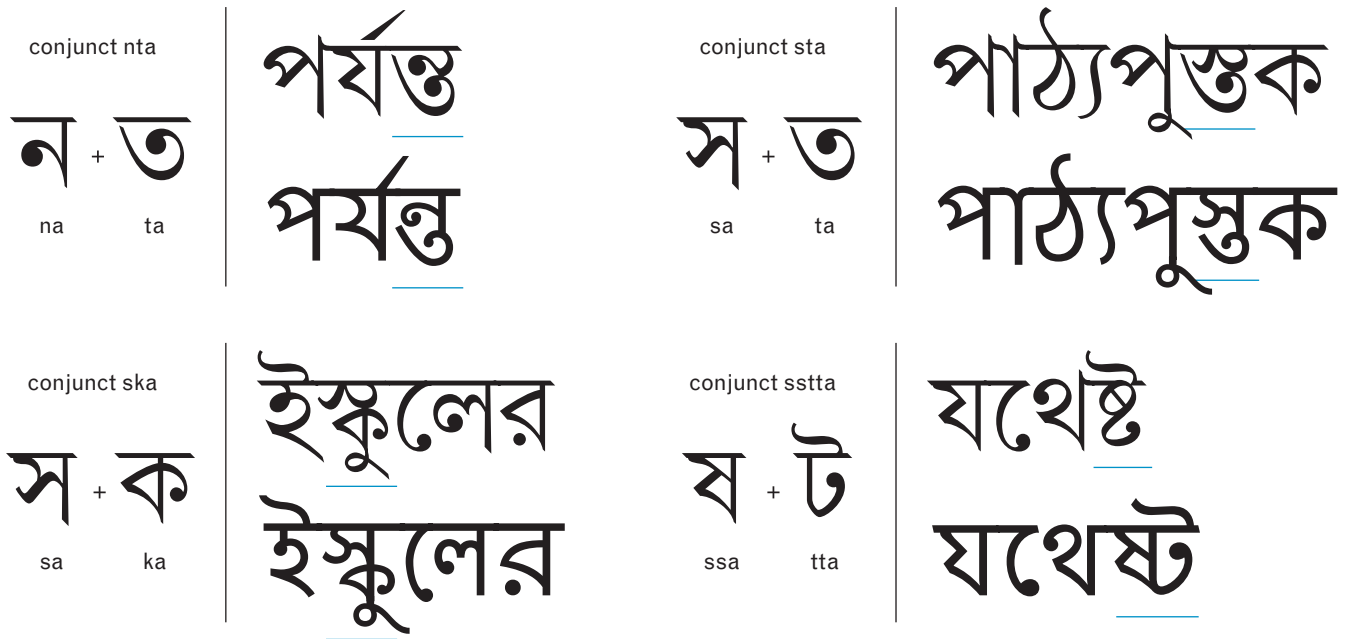


Figure 3.32. Comparison of conjuncts from Linotype Bengali and contemporary digital fonts Vrinda (§ 4.2), and Sarkar (§ 4.6) in the bottom right corner. Sarkar, designed in 2012, usually displays traditional conjuncts but **ssta** has been established in current writing practice.

in Kolkata many designers⁴³ and prestigious publishers do not like this ‘simplification’. From a design perspective their doubts are easy to understand: the use of a limited range of components that automatically build up full conjuncts cannot assure a reasonable design, it rather drives to clumsy lettershapes that stand out from the lines of text (Figure 3.31).

Given that rescaling and changing weight to the components is not enough to achieve a good design, the solution could be to treat them as parametric models⁴⁴: a set of variables can be associated to one or more strokes so that the designer can modify them separately, according to their specific combination in the character. But programming parametric models is a complex engineering task and, as Bengali conjuncts amount to about 400 glyphs, it would be much more time consuming than designing every glyph from scratch.

43. For instance, Ajoy Gupta, a renowned author and calligrapher of Kolkata (now in his seventies) is a strong supporter of traditional conjuncts. He has designed primary school books where the use of components was mandatory (see figure 3.41).

44. ‘A parametric model is a computer representation of a design constructed with geometrical entities that have attributes (properties) that are fixed and others that can vary. The variable attributes are also called parameters and the fixed attributes are said to be constrained. The designer changes the parameters in the parametric model to search for different alternative solutions to the problem at hand.’ K. Kavi Sumi, *Parametric Design, A New Paradigm In Architecture*, 2013.

3.4 Later clones of Linotype Bengali

A quick glimpse at the font libraries of the biggest Indian typesetting software vendors (see figure 2.4 and 2.5 for example) shows the discrepancy between a large number of display typefaces (sometimes linked to the calligraphic or the sign-painters tradition) and a tiny number of continuous text ones. At a closer look it is surprising to see that the few Bengali typefaces for continuous text are pretty similar between them, and all look like the digital Linotype Bengali.

Two have been chosen for analysis here to evaluate the degree of similarity with Linotype Bengali: *Shree Lipi 550* and *Summit Geetanjali*. A comparative analysis has been employed displaying line of texts, big size letters and superimposing the letterforms when necessary.

Shree Lipi 550 was the first Bengali typeface produced by Modular InfoTech, back in 1990. It was designed by an uncredited Bengali artist and it went through many modifications and upgrades as result of continuous feedback from customers and Bengali scholars. Dr Cooper, chairman of Modular InfoTech, makes no mystery of their starting point: ‘In developing these fonts we took inspiration from ABP fonts and some hot-metal fonts’⁴⁵.

There is no information about *Summit Geetanjali*, it was designed more than 20 years ago by a team of designers none of whom is still working for Summit.

The comparative analysis displayed in figures 3.33 and 3.34 shows how the letters of both the typefaces are close to Linotype Bengali. When set in a small type size the differences between the clones and the original are almost undetectable, but at large sizes the clones reveal a lack of quality in the outline⁴⁶: the curves are not as harmonious as in the original Linotype Bengali.

The same results can be achieved analyzing many other digital typefaces available on the market as licensed fonts, for instance *Bidisha* (figure 3.31 and § 4.1) and *Satyajit* of the CDAC library and *SolaimanLipi* from

45. M. N. Cooper. Emails to the author, 16 and 18 July 2014. What many people in India call hot-metal was actually metal type, composed by hand.

46. The quality of the outline – as understood in this essay – is not a matter of taste: its lack of quality derives from the Beziér nodes not being placed in the best positions, thereby producing tcurves and transitions between straight strokes and curves that are disharmonious. This causes accidental lumps in the outline that are evident at big point sizes.

50 pt

কেহ বা মনে করেন আমি শুদ্ধমাত্র A
কেহ বা মনে করেন আমি শুদ্ধমাত্র B
কেহ বা মনে করেন আমি শুদ্ধমাত্র C

30 pt

পর্যন্ত এ দেশে সাহিত্য সম্পর্কীয় কোনো কাজ কমিটির A
দ্বারা সুসম্পন্ন হইতে দেখা যায় নাই।

কিন্তু এ পর্যন্ত এ দেশে সাহিত্য সম্পর্কীয় কোনো কাজ B
কমিটির দ্বারা সুসম্পন্ন হইতে দেখা যায় নাই।

কিন্তু এ পর্যন্ত এ দেশে সাহিত্য সম্পর্কীয় কোনো কাজ C
কমিটির দ্বারা সুসম্পন্ন হইতে দেখা যায় নাই।

15 pt

A
আমাদের বঙ্গসাহিত্যে নানা অভাব
আছে সন্দেহ নাই; দর্শন বিজ্ঞান
এবং বিবিধ শিক্ষণীয় বিষয় এ পর্যন্ত
বঙ্গভাষায় যথেষ্ট পরিমাণে প্রকাশিত
হয় নাই; এবং সেই কারণে
রীতিমতো শিক্ষালাভ করিতে হইলে

B
আমাদের বঙ্গসাহিত্যে নানা অভাব
আছে সন্দেহ নাই; দর্শন বিজ্ঞান
এবং বিবিধ শিক্ষণীয় বিষয় এ পর্যন্ত
বঙ্গভাষায় যথেষ্ট পরিমাণে প্রকাশিত
হয় নাই; এবং সেই কারণে
রীতিমতো শিক্ষালাভ করিতে হইলে

C
আমাদের বঙ্গসাহিত্যে নানা অভাব
আছে সন্দেহ নাই; দর্শন বিজ্ঞান
এবং বিবিধ শিক্ষণীয় বিষয় এ
পর্যন্ত বঙ্গভাষায় যথেষ্ট পরিমাণে
প্রকাশিত হয় নাই; এবং সেই
কারণে রীতিমতো শিক্ষালাভ

12 pt

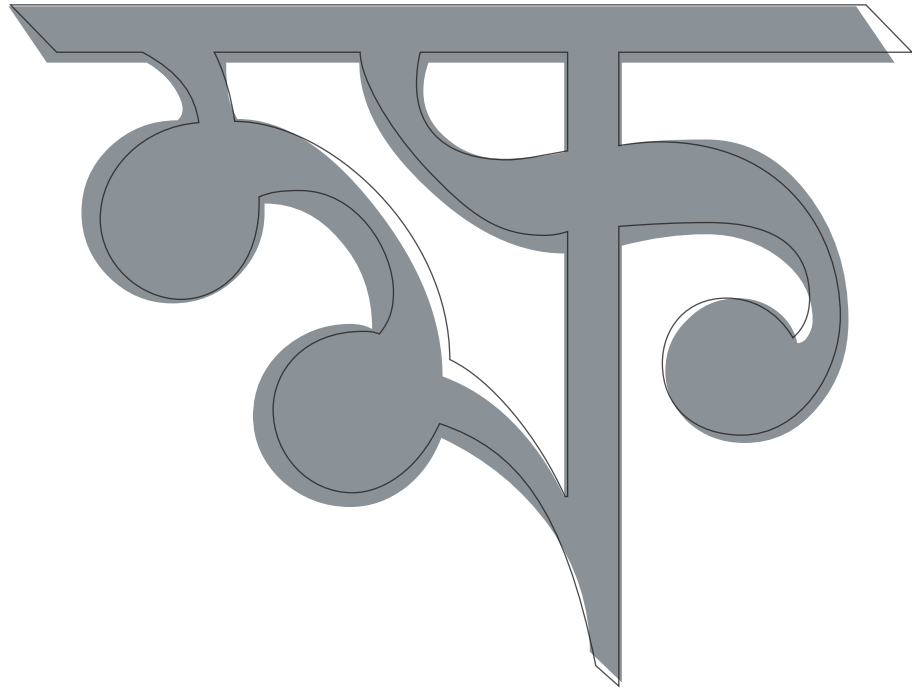
আমাদের বঙ্গসাহিত্যে নানা অভাব আছে স
ন্দেহ নাই; দর্শন বিজ্ঞান এবং বিবিধ শিক্ষণীয়
বিষয় এ পর্যন্ত বঙ্গভাষায় যথেষ্ট পরিমাণে
প্রকাশিত হয় নাই; এবং সেই কারণে
রীতিমতো শিক্ষালাভ করিতে হইলে
বিদেশীয় ভাষার সাহায্য গ্রহণ করা ব্যতীত
উপায়ান্তর দেখা যায় না। কিন্তু আমার

আমাদের বঙ্গসাহিত্যে নানা অভাব আছে
সন্দেহ নাই; দর্শন বিজ্ঞান এবং বিবিধ
শিক্ষণীয় বিষয় এ পর্যন্ত বঙ্গভাষায় যথেষ্ট
পরিমাণে প্রকাশিত হয় নাই; এবং সেই
কারণে রীতিমতো শিক্ষালাভ করিতে হইলে
বিদেশীয় ভাষার সাহায্য গ্রহণ করা ব্যতীত
উপায়ান্তর দেখা যায় না। কিন্তু আমার অনেক

আমাদের বঙ্গসাহিত্যে নানা অভাব আছে
সন্দেহ নাই; দর্শন বিজ্ঞান এবং বিবিধ
শিক্ষণীয় বিষয় এ পর্যন্ত বঙ্গভাষায় যথেষ্ট
পরিমাণে প্রকাশিত হয় নাই; এবং সেই
কারণে রীতিমতো শিক্ষালাভ করিতে হইলে
বিদেশীয় ভাষার সাহায্য গ্রহণ করা ব্যতীত
উপায়ান্তর দেখা যায় না। কিন্তু আমার

Figure 3.33. Comparison of Linotype Bengali (A), Shree Lipi 550 (B) and Summit Geetanjali (C). It is indisputable that the the other two fonts are clones of Linotype Bengali.

□ Linotype Bengali
■ Shree Lipi 550



□ Linotype Bengali
■ Geetanjali

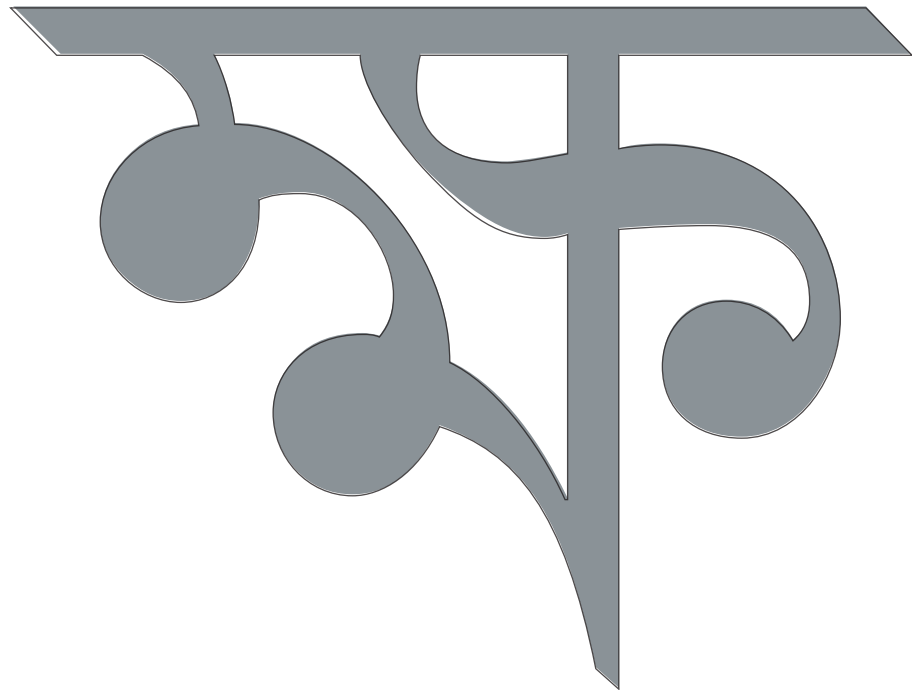


Figure 3.34. Enlarged conjunct kssa: overlapping the outline of Linotype Bengali with Shree Lipi 550 and Geetanjali (both in grey). The Shree Lipi 550 outline is unrefined comparing to the model (a sign that the letter-drawing was loosely based on the actual outline of Linotype Bengali, the typeface might not be a proper retrace of it) while Geetanjali follows carefully the model. A general difference of Shree Lipi 550 from Linotype Bengali is the thickness of the headline, definitely thicker than the model (when the other strokes do not thicken as much).

অলিন্দে
যার নিচে

Figure 3.35. *Debangi*, a
seriffed Bengali typeface
from the Summit font
library.

Ekushey. All these fonts have been multiplied by dozens of unlicensed copies that are easy to find online.

The software vendors do not seem to realize the futility of most of the typefaces that fill up their libraries. Display faces, that often imitate some calligraphic style or handwriting custom show little consistency and little care for details. Like that particular kind of typeface (common in all the font libraries I have seen, as figure 3.35) where the designer added a serif at the end of the stroke. Serifs come from the Latin tradition and are produced by the tools and the movements employed in writing in Europe – something that is completely different from writing practices in India. To a well-trained calligrapher (there are many of them in India) such letterforms would probably look offensive.

All these often weird display typefaces have very marginal use – mostly on wedding cards and more rarely on shop signs. So, despite all of this, the few Bengali fonts employed for continuous texts in West Bengal are the clones of Linotype Bengali.

3.5. The incredible spread of Linotype Bengali (and its many clones)

At a close look we can see that almost all print in West Bengal⁴⁷ – regardless of medium of paper quality – is set in a clone of Linotype Bengali. Not only the immense production of the ABP group (that is set in the ABP font, the legitimate heir of Linotype Bengali⁴⁸), but all the rest of the newspapers, magazine and books, most of the billboards, posters, public signs, and marketing brochures, postcards, maps, etc printed in Bengali script are set with a descendant of Linotype Bengali.

Few people I met realized this. The rich variety of handwritten signs in public spaces (on walls, buses, cars) a lively tradition in Bengali culture, hide the fact that 99% of the printed material is set with only one font. Only a few people with whom I discussed this matter realized this. Swapan Chakravorty, professor at Jadavpur University complains that in past decades everything was printed in a similar fashion, thus peoples' lack of discrimination in book shops, for instance, between different kinds of

47. The same situation seems to be repeated in Bangladesh too, but my research focused on the Indian part of Bengal.

48. Actually ABP converted the typeface from one technology to the other without granting royalties to Linotype.



বুলা রিপোর্ট
দিলে সাজা,
ঈশিয়ারি
রাকেশের
বাবে নিবাচন
যি, ডুল বা পক্ষ
মছেন, তা হলে
ধাকুনি। স্মরণকালে
এটাই কড়া

লর সঙ্গে
ব্য খতিয়ে
করা হবে



বিপ্লব চক্রবর্তী
বিশ্বনাথ পাল
রমেশনারায়ণ দে
বিজ্ঞান
নটরাজনীতির আত্মীয়ের খোঁজে



সঙ্গে মিশিয়ে
মাস্ত তিনদিন কনু
রে লাগান। আধ
দিয়ে ধুয়ে ফেল

Figure 3.36. Examples of publications by ABP group, all set in ABP font, the legitimate heir of Linotype Bengali, April 2014. 20% of actual size and close up of actual size. ABP is one of the biggest media groups in India, with dailies, periodical, television channels and publishing houses.

publishing. “Typefaces are semiotic markers. We do not want the same fonts for a publicity brochure, a film poster, a scientific journal and a popular novel. [...] Bengali metal types and calligraphy (as evident in cards, publicity and book covers) had reached a high stage of development during the last century as did illustrations. [...] However, the growth of large media meant standardization of fonts and appearances. This was true of the days of Bengali Linotype. With the advent of computerized composition this problem has been accentuated, with copyright violations and the homogenized look of publications. The semiotic value is all but lost, misleading buyers and readers’⁴⁹.

49. Swapan Chakravorty. Email to the author, 26 August 2014.

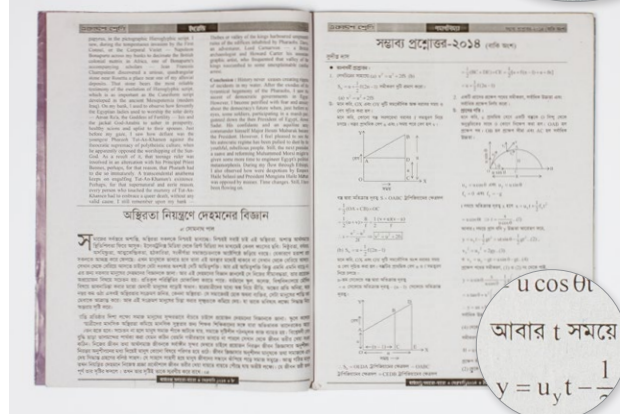


Figure 3.37. Examples of popular newspapers and magazines from Kolkata, April 2014. All set with clones of Linotype Bengali. 20% of actual size and close up of actual size.



Figure 3.38. Examples of use of Linotype Bengali's clones outside publishing: curry powder tin box (photographer Jo de Baerdemaeker), 2008 – today still in use – and ticket for the *Victoria Memorial Hall*, Kolkata, April 2014. 33% of actual size and close up of actual size.



Figure 3.39. Billboards from Kolkata, all set with clones of Linotype Bengali, April 2014.

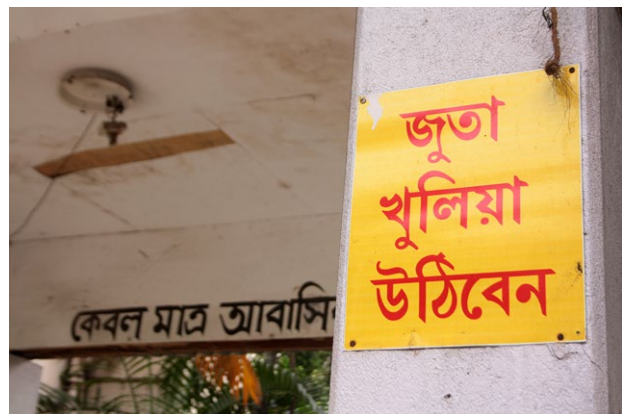


Figure 3.40. Billboards and signs from Kolkata, all set with clones of Linotype Bengali, May 2014. Photographer Arka Gupta.

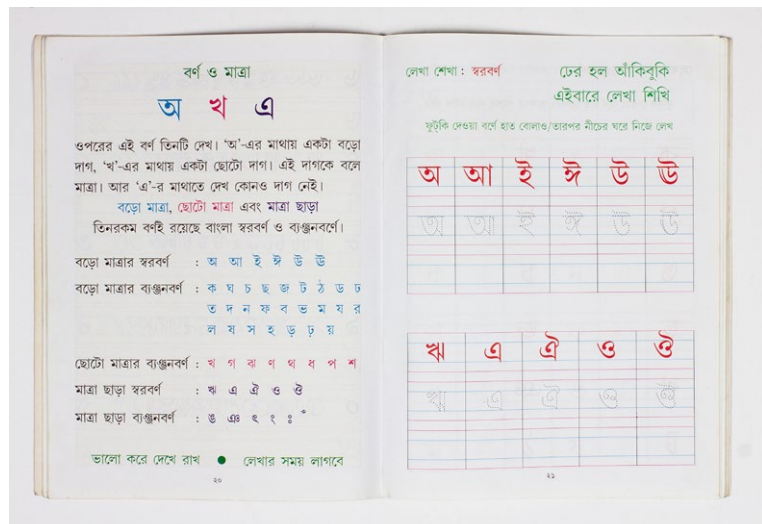
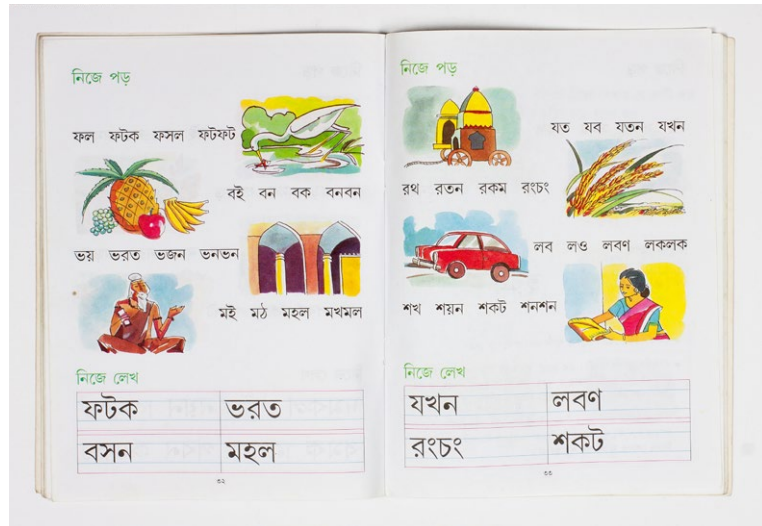
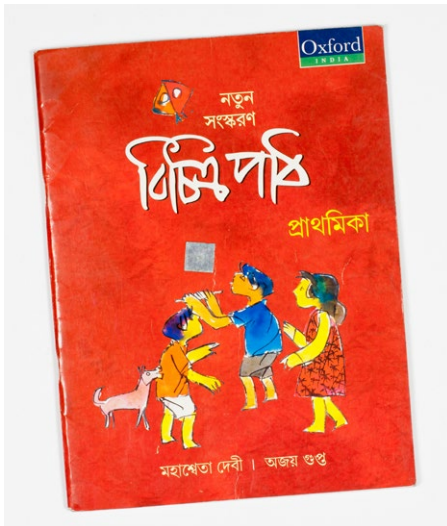
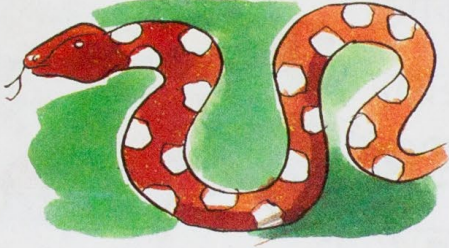


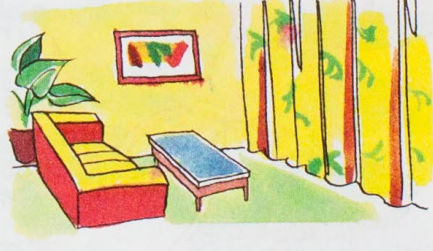
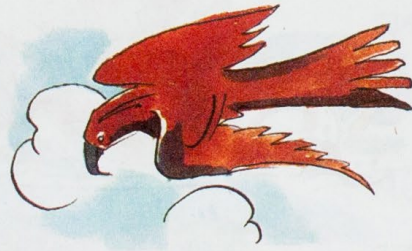
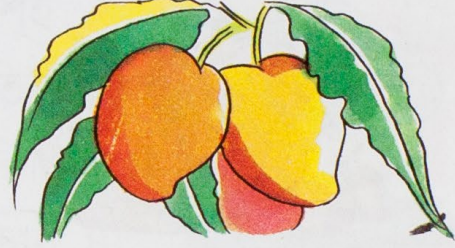
Figure 3.41. Primary school book typeset in *Satyajit*, another clone of Linotype Bengali. Thus Linotype Bengali is also taught at school as model for learning to write in Bengali script. Designed by Ajoy Gupta (see note 43 § 3.3) for Oxford University press, 2009. 25% of actual size (this page) and actual size (opposite page).

ছবি দেখে লেখা

কোনটা কিসের ছবি বল। তারপর নীচের লেখায় যে বর্ণটি বাদ
পড়েছে সেটি খোপে বসিয়ে ছবির নাম পুরো কর।



| | | | | | |
|---|---|---|---|--|--|
| অ | জ | র | আ | | |
|---|---|---|---|--|--|



| | | | | | |
|--|--|---|---|---|--|
| | | গ | ল | ঘ | |
|--|--|---|---|---|--|



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| দ | ক | | প | | |
|---|---|--|---|--|--|

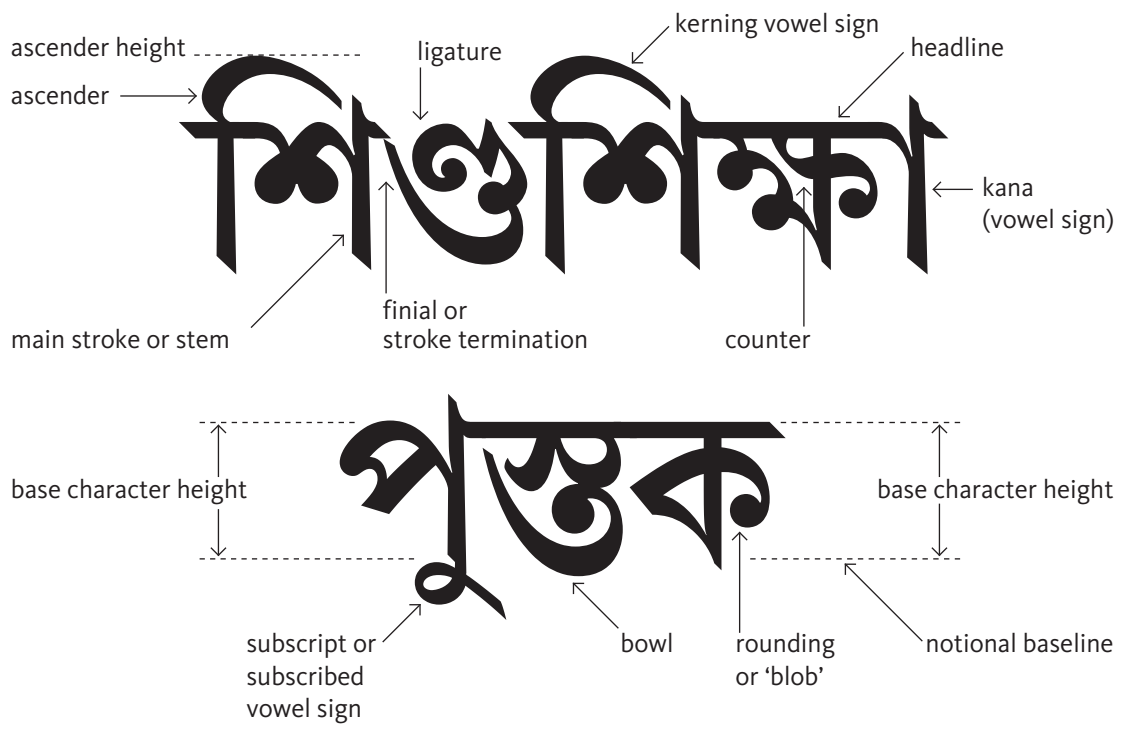


Figure 4.1. Typeface nomenclature for Bengali script, F. Ross, *The printed Bengali character*, revised.

4. The digital Bengali typefaces

This chapter is intended to be a comprehensive, annotated list of the digital Bengali typefaces produced since the advent of Desktop publishing. The list does not include the many Linotype Bengali clones nor the typefaces packaged with the typesetting software by local ventures – as discussed in § 3.4 These are not really worth analyzing.

The list includes typefaces conceived for different media, notably fonts for printing, and user interface fonts that need to follow stricter restrictions in the design to be properly rendered on a large number of screens¹.

The most relevant graphic aspects of Bengali letterforms, that recur in many of the analyzed fonts, are the depth of the letterforms and the predominance of diagonals and spiralling strokes. The vertical depth was a challenging issue in several of the typefaces (see *Nirmala UI* § 4.4 and *Sarkar* § 4.6): Bengali letterforms tend to develop vertically and, more than that, many conjuncts are traditionally made up by subscribing a consonant to another. To such a construction, a subscribed vowel mark can be adjoined, adding another tier to the letter (see figure 4.2). The predominance of diagonals and spiralling shapes could be problematic too: it gives the letters a greater density than most of the other scripts and makes the design of low-contrast letters difficult to achieve. Circles, verticals and horizontals (the main strokes of many scripts, like Latin or Devanagari) can expand more easily than diagonals and spirals.

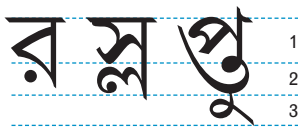


Figure 4.2. Examples of Bengali conjuncts with 2 and 3 tiers.

4.1. Type design at CDAC

The Centre for Development of Advanced Computing (CDAC) was launched as a research and development centre by the Department of Electronics, Government of India, in August 1988². The GIST (Group for Intelligence-based Script Technology) division, located in Pune, was pioneering multilingual solutions and language standardization long before Unicode became the standard. Part of their task was to design digital fonts and the

1. In brief, the most evident differences in design between the two groups are that UI fonts have a bigger x-height and reduced stroke modulation.

2. From CDAC Corporate Profile, www.cdac.in; other sources state that CDAC was operating from the 1970s, and in 1988 became a government body.

বটতলার বই

সুকুমার সেন

অনেকদিন আগে বটতলার বই প্রসঙ্গে প্রবন্ধ লিখেছিলুম 'বিশ্বভারতী পত্রিকায়'। প্রবন্ধটি অনেক পাঠকের দৃষ্টি আকর্ষণ করেছিল। আবার বটতলার বই প্রসঙ্গে লিখছি। ভয় নেই, জাবর কাটব না। তবু কিছু কিছু পুনরুক্তি হতে পারে। তার জন্যে পাঠকদের কাছে আগাম ক্ষমা চেয়ে রাখছি।

বটতলার বই কথাটি মনের মধ্যে একাধিক ভাব জাগায়। কারো কারো মনে হবে সস্তা দামের ধর্মের বই, কারো কারো মনে হবে যাত্রার পালা বই, আবার কারো কারো মনে হবে 'হরিদাসের

Figure 4.3. Kaali, designed by Dattagupta for CDAC,1993. Scan from Dattagupta portfolio, Non-Latin TC, DTGC.

বটতলার বই

সুকুমার সেন

অনেকদিন আগে বটতলার বই প্রসঙ্গে প্রবন্ধ লিখেছিলুম 'বিশ্বভারতী পত্রিকায়'। প্রবন্ধটি অনেক পাঠকের দৃষ্টি আকর্ষণ করেছিল। আবার বটতলার বই প্রসঙ্গে লিখছি। ভয় নেই, জাবর কাটব না। তবু কিছু কিছু পুনরুক্তি হতে পারে। তার জন্যে পাঠকদের কাছে আগাম ক্ষমা চেয়ে রাখছি।

বটতলার বই কথাটি মনের মধ্যে একাধিক ভাব জাগায়। কারো কারো মনে হবে সস্তা দামের ধর্মের বই, কারো কারো মনে হবে যাত্রার পালা বই, আবার কারো কারো মনে হবে 'হরিদাসের গুপ্তকথার মতো গোপনে

Figure 4.4. Kailash, designed by Dattagupta for CDAC,1993. Scan from Dattagupta portfolio, Non-Latin TC, DTGC.



Figure 4.5. The font team of CDAC in 1993. Dattagupta is the first from right, Mohanty is standing on her left. Scan from the CDAC GIST Bulletin, Vo. 2, Issue 2, 1993. Non-Latin TC, DTGC.

design team was lead by S.K. Mohanty, a well-known Indian calligrapher. Deborani Dattagupta was also part of the team from 1993 to 1995, before working at Anandabazar Patrika (§ 3.2.4). Recently graduated from IIT (Indian Institute of Technology Bombay),³ Dattagupta worked on the standardization of Bengali script – the task of the team was to build a uniform platform for all the Indian scripts – and designed three Bengali typefaces, still available on the CDAC font library: *Bidisha*, *Kaali* and *Kailash*⁴. Apart from the first one, that is a clone of Linotype Bengali (see figure 4.6), the others are script typefaces based on calligraphic experimentation. The focus is not much on the quality of the outlines (figure 4.4 and 4.5) and both the typefaces can only be used for display purposes, following the tendency described in § 3.4.

3. One of her teachers was R.K. Joshi, see note 5.

4. All the information comes from a letter sent by Dattagupta to Linotype in October 1994. Non-Latin TC, DTGC.



দূরত্বের সীমারেখা

দেবাশিস বন্দোপাধ্যায়

নোবেল ও বুকায়ের মতো আন্তর্জাতিক বড়ো অঙ্কের কোনও পুরস্কার পাননি বহুমিল হ্রাবাল। ভবিষ্যতে পাবেন এমন সম্ভবনা আছে বলে মনে হয়না। তাই তাঁকে নিয়ে কোনোও

Figure 4.6. Bidisha, a clone of Linotype Bengali designed by Dattagupta for CDAC,1993. Scan from Dattagupta portfolio, Non-Latin TC, DTGC. The headline reveals some poor positioning of the subscribing mark in the first letter **da**: the joint of the mark should not be visible.

ISFOC Bengali Type Face

BN-Abhijit *
20 pt. Normal, Bold, Italic
& Bold Italic available

অ

72 pt. Bold

ভারত আমাদের দেশ। আমরা ভারতবাসী।
এক বিশাল ভৌগোলিক পরিধি জুড়ে ছড়ানো এই দেশ।

BN-Amrut
22 pt. Normal, Bold, Italic
& Bold Italic available

অ

72 pt. Bold

ভারত আমাদের দেশ। আমরা ভারতবাসী।
এক বিশাল ভৌগোলিক পরিধি জুড়ে ছড়ানো এই দেশ।

BN-Anand
20 pt. Bold & Bold Italic
available

অ

72 pt. Bold

ভারত আমাদের দেশ। আমরা ভারতবাসী।
এক বিশাল ভৌগোলিক পরিধি জুড়ে ছড়ানো এই দেশ।

BN-Arbindo
22 pt. Normal, Bold, Italic
& Bold Italic available

অ

72 pt. Bold

ভারত আমাদের দেশ। আমরা ভারতবাসী।
এক বিশাল ভৌগোলিক পরিধি জুড়ে ছড়ানো এই দেশ।

BN-Asavari
22 pt. Normal, Bold, Italic
& Bold Italic available

অ

72 pt. Bold

ভারত আমাদের দেশ। আমরা ভারতবাসী।
এক বিশাল ভৌগোলিক পরিধি জুড়ে ছড়ানো এই দেশ।

1

Figure 4.7. TrueType font library of CDAC, page 1 of 6. www.cdac.in

CDAC produced many other typefaces, the most interesting for analysis is probably *Raghu Bengali*, released in 2005, designed by a group of well-known calligraphers, led by R.K. Joshi⁵.

Raghu is a multi script family⁶ that, at least in Bengali, shows that some basic typographic issues, such as spacing and optical adjustments, were not fully resolved. The density of this type on the page looks uneven,

5. R.K. Joshi (1936–2008) was a calligrapher, teacher, poet, communication guru and a spectacular speaker. After retiring from a long career in teaching, in 1997 he became the type director of NCST (National Centre for Software Technology), in Mumbai, that was absorbed by CDAC in the beginning of the 2000s to become CDAC Mumbai.

6. It includes nine Indic scripts.

কিন্তু তাকে আমি পাঠ্যপুস্তক
শিশুশিক্ষা এবং নীতিপুস্তকে
জন্য অনেকখানি স্থান রাখা
যতটুকু কেবলমাত্র শিক্ষা অর্থাৎ অত্যাৱশ্যক
তাহারই মধ্যে শিশুদিগকে একান্ত নিবদ্ধ রাখিতে
কখনই তাহাদের মন যথেষ্ট পরিমাণে বাড়িতে

আমাদের বঙ্গসাহিত্যে নানা অভাব আছে সন্দেহ নাই; দর্শন বিজ্ঞান এবং বিবিধ শিক্ষণীয় বিষয়
পর্যন্ত বঙ্গভাষায় যথেষ্ট পরিমাণে প্রকাশিত হয় নাই; এবং সেই কারণে রীতিমতো শিক্ষালাভ
দোদুল্যমান করিয়া শুদ্ধমাত্র বেত হুজুম করিতেছে, মাস্টারের কটু গালি ছাড়া তাহাতে আর কে
কিন্তু আমার অনেক সময় মনে হয় সেজন্য আশ্চর্য পরে করিলেও চলে, আপাতত শিশুদের পা

Figure 4.8. Raghu Bengali 50 pt, 30 pt and 15 pt.

the glyphs need a better distribution of colour: mostly because the headline is too heavy compared with the rest, while the oblique and spiralling strokes are too light. One of the biggest problems is the shape of the vowel sign **ে**, that terminates with a thin stroke instead of the traditional swelling, thereby literally leaving a blank hole in its place. But even the spacing is inconsistent. Some letters are jammed against each other and others are carelessly wide. The unbalanced fitting emphasizes the bumpiness of the design.

The Devanagari part of the Raghu family was awarded a prize at bukva:raz!, an international type design competition that took place in Moscow in 2001, later published in the publication review *Language, Culture, Type* (Graphis, 2002).

তখন কাহার দোষ দিবশ
শক্তিটা সকল দিক হইতে
কাজেই বিধির বিপাকে বাঙালির ছেলের
ব্যাকরণ অভিধান এবং ভূগোলবিবরণ ছ
আর কিছুই অবশিষ্ট থাকে না। বাঙালি

Figure 4.9. Vrinda regular and bold, 50 pt and 30 pt.

4.2. Vrinda

While working on Raghu, R.K. Joshi was the Indian scripts consultant for Microsoft; helped by other Indian calligraphers he produced different typefaces for the *Windows XP* user interface⁷ while the character sets and the shapes of the conjuncts were determined by TDIL, the Technology Development for Indian Languages, another Indian government body.

When it was the time for Bengali typeface development, Joshi worked together with Vinay Saynekar, his long time assistant in NCST, who attended Bangla classes to study the Bengali language and script. The font was shipped with *Service Pack 2 (XP SP2)* in 2004, but before releasing it Microsoft developers had to scale all the glyphs down to fit into the UI constraints (a problem encountered by other UI fonts, like Nokia Pure Bengali, § 4.5), and they claimed that was the reason why a Bengali text set with Vrinda is hard to read at small point sizes⁸.

Vrinda has received severe criticism in West Bengal. Abhijit Gupta, director of Jadavpur University press, finds it ‘difficult to use and aestheti-

7. Microsoft and R.K. Joshi licensed besides Vrinda, Mangal (Devenagari), Latha (Tamil), Gautami (Telugu), Raavi (Gurmukhi), Shruti (Gujarati), Tunga (Kannada) and Kartika (Malayalam).

8. Ali Basit, software engineer in Microsoft. Email to the author, 13 August 2014.

যতটুকু অত্যাৱশ্যক কেবল তাহাৰই মতে
কাৰাৰুদ্ধ হইয়া থাকা মানবজীৱনেৰে ধ
আমরা কিয়ৎপৰিমাণে আৱশ্যকশৃঙ্খলে ব
থাকি এবং কিয়ৎপৰিমাণে স্বাধীন। আ
সাড়েতিন হাতেৰে মধ্যে বন্ধ, কিন্তু তাই
ঠিক সেই সাড়েতিন হাত পৰিমাণ গৃহ
কৰিলে চলে না। স্বাধীন চলাফেৰাৰ জ
অনেকখানি স্থান ৰাখা আৱশ্যক, নতুব
স্বাস্থ্য এবং আনন্দেৰে ব্যাঘাত হয়। শি
এই কথা খাটে। যতটুকু কেবলমাত্ৰ শি
নিবন্ধ ৰাখিলে কখনই তাহাদেৰে মন যা

কিয়ৎপৰিমাণে স্বাধীন। আমাদেৰে দেহ
সাড়েতিন হাতেৰে মধ্যে বন্ধ, কিন্তু তাই
ঠিক সেই সাড়েতিন হাত পৰিমাণ গৃহ
কৰিলে চলে না। স্বাধীন চলাফেৰাৰ জ
অনেকখানি স্থান ৰাখা আৱশ্যক, নতুব
আমাদেৰে স্বাস্থ্য এবং আনন্দেৰে ব্যাঘাত
শিক্ষা সম্বন্ধেও এই কথা খাটে। যতটুকু
কেবলমাত্ৰ শিক্ষা অৰ্থাৎ অত্যাৱশ্যক ত
মধ্যে শিশুদিগকে একান্ত নিবন্ধ ৰাখিলে
না। অত্যাৱশ্যক শিক্ষাৰে সহিত স্বাধীন
না মিশাইলে ছেলে ভালো কৰিয়া মানু

Figure 4.10. Vrinda regular and bold, 15 pt.

cally displeasing. The font is poorly designed and is virtually unreadable on webpages⁹. From a design point of view, Vrinda has many problems. First, as the blobs are tiny, in letters like **na** ন and **ta** ত the stroke has to make a complete loop, a turn before the blob – to cover more space – and this is inconsistent with the rest of the typeface (see for instance **a** অ, **e** এ, **la** ল). Then the diagonal movement is almost absent because many diagonal strokes are replaced by a crescent shape we see in **Ba** and in all the letters that share that triangular form. The raphala, as we see in letter **e** এ for instance, is always quite stiff and the movement is too subtle: but letter **e** is more problematic; it is too open compared with the other letters, creating white spots in the middle of words. There is also some inconsistency in the height of some vowel signs (**aa** া, **e** ে, **i** ি) that are deeper than the other letters. The font is vertically quite compact, the vertical conjuncts do not extend much below the baseline, though there would be enough space as the subscripting marks are quite deep. Finally the spacing is inconsistent and a balanced optical distance between the letters is not achieved, as we see in figure 4.10.

Due to the software compatibility reasons, Vrinda is still shipped with the latest versions of Windows, despite the presence of Nirmala UI, a more recent Bengali user interface typeface (§ 4.4).

9. Abhijit Gupta. Email to the author, 8 September 2014.

4.3 Bangla MN

Designed by Muthu Nedumaran in 2009, Bangla MN has been the user interface font for Apple since Snow Leopard (Mac OS X 10.6). This is probably the most appealing feature of this typeface: the proportions and the shape of most of the letters resemble Linotype Bengali but the distribution of colour is quite rough and the spacing is uneven (figure 4.11). Whether or not it was Nedumaran himself who designed the typeface remains unknown: Apple and the designer refuse to provide any details. Nedumaran is a Malaysian developer that has been working for nearly three decades on typesetting software for Indian scripts¹⁰. In June 2014 he released *Sellipi*, a new input method for Bangla script that is compatible with any Android applications. From some screenshots available online, Sellipi seems to be set with a typeface that is very similar to Bangla MN.

10. Karthik Subramanian, *You've got text*. In *Tamil*, The Hindu, January 27, 2014.

আমাদের বঙ্গসাহিত্যে নানা অভ
পাঠ্যপুস্তক এবং অপাঠ্যপু

অতএব, কমিটিকে একটি অবশ্যম্ভাবী অদৃষ্টবিড়ম্বনায়
সাধারণত বিদ্যালয়ে ব্যবহার্য পুস্তকগুলিকে পাঠ্যপুস্ত
বিবরণ এবং নীতিপাঠ পৃথিবীর পাঠ্যপুস্তকের মধ্যে গ
যতটুকু অত্যাৱশ্যক কেবল তাহারই মধ্যে কারারুদ্ধ
আৱশ্যকশৃঙ্খলে বদ্ধ হইয়া থাকি এবং কিয়ৎপরিমাণে
ঠিক সেই সাড়েতিন হাত পরিমাণ গৃহ নির্মাণ করিলে

সর্বপ্রকার সাহিত্যরসবর্জিত হইয়া দেখা দেয়
ইক্ষু দণ্ড বাহির হইয়া আসে তাহাতে কেহ রসের
অতএব, কমিটিকে একটি অবশ্যম্ভাবী অদৃষ্টবি
করিলেও সাধারণত বিদ্যালয়ে ব্যবহার্য পুস্তক
ব্যাকরণ, অভিধান, ভূগোল-বিবরণ এবং নীতি
কেবলমাত্র শিক্ষাপুস্তক।

Figure 4.11. Bangla MN regular and bold, 50 pt and 15 pt.

A কেহ বা মনে করেন আমি শুদ্ধমাত্র পরিহাস করিতেছি
B কেহ বা মনে করেন আমি শুদ্ধমাত্র পরিহাস করিতেছি

Figure 4.12. Comparison of Bangla MN (A) and Linotype Bengali (B). Though the stroke modulation is less, as it is for user interface, Bangla MN follows closely the scheme of Linotype Bengali, with letterforms much less carefully drawn.

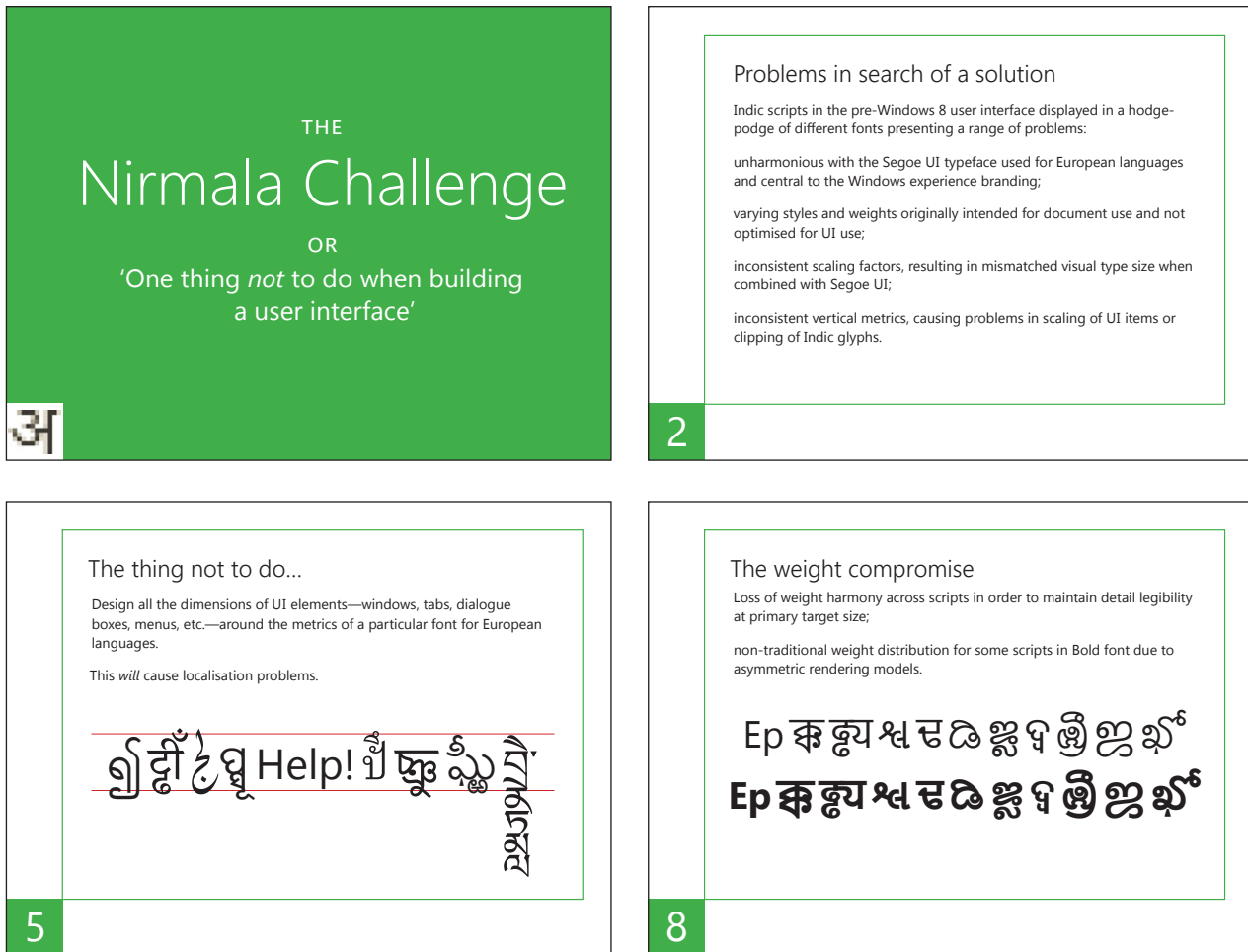


Figure 4.13. Nirmala Challenge by John Hudson, slides for the presentation of Nirmala to Microsoft localisation group, which is responsible for translating the Windows and Office user interface into various languages. September 2012. Unpublished document supplied by John Hudson.

4.4. Nirmala UI

Nirmala UI is a large multi-script type family – comprising ten Indian scripts – designed for the user interface of Microsoft *Windows 8*. The development took about two years and was a Tiro Typeworks project with many designers involved¹¹; Fiona Ross was art director and John Hudson took care of the production and coordination of the designers.

The task was to design low contrast Indian scripts to match (for colour and general dimensions) *Segoe UI*, the new version of the popular typeface, restyled and optimized for Microsoft user interface.

11. The designers involved were: Jo de Baerdemaeker (Bengali), David Březina (Gujarati), Valentin Brustaux (Kannada, Telugu), John Hudson (Gurmukhi, Oriya, Sinhalese) and Fernando Mello (Malayalam, Tamil). Devanagari was co-designed by Hudson and Ross.

কিন্তু আমার অনেক স
শিশুদের পাঠ্যপুস্তক দুই
পর্যন্ত বঙ্গভাষায় যথেষ্ট পরিমাণে প্র
কারণে রীতিমতো শিক্ষালাভ করিতে হই
ব্যতীত উপায়ান্তর দেখা যায় না। কিন্তু অ

Figure 4.14. Vrinda regular and semi-light, 50 pt; Nirmala bold, regular and semi-light, 30 pt.

The first script Hudson and Ross worked on was Devanagari, and it became the benchmark for all the others. The Bengali script was assigned to Jo de Baerdemaeker, a Belgian designer experienced in Tibetan typefaces with a Ph.D. from the University of Reading.

Baerdemaeker had to face stringent limitations, first of all the coarseness of the pixel grid that was 12 pixels per em¹², due to the characteristics of the interface¹³. Even worse, there was restricted vertical space because, being a screen font, Nirmala UI had a big x-height leaving insufficient vertical space for the deep conjuncts¹⁴.

Ross was following Baerdemaeker step by step and Sukanta Chaudhuri, a well known Bengali scholar was consulted as a native speaker. The hinting was done by Ross Mills, partner of Tiro Typeworks, and Bengali revealed some complications, as only a few details, among all the details within the letters (that cause the high density of Bengali letters) could be

12. An em is a typographic unit, equal to the current point size: on screen, the number of pixels per em depends on the resolution of the output device.

13. The target core was Windows UI text size, 9 pt at a resolution of 96 ppi (pixel per inch), i.e. 12 ppem (pixel per em). From *Nirmala Challenge slides* by John Hudson, September 2012.

14. Jo de Baerdemaeker. Email to the author, 24 July 2014.

আমাদের বঙ্গসাহিত্যে নানা অভাব ও দর্শন বিজ্ঞান এবং বিবিধ শিক্ষণীয় বি বঙ্গভাষায় যথেষ্ট পরিমাণে প্রকাশিত কারণে রীতিমতো শিক্ষালাভ করিতে ভাষার সাহায্য গ্রহণ করা ব্যতীত উপ কিন্তু আমার অনেক সময় মনে হয় (পরে করিলেও চলে, আপাতত শিশু চারিখানি না পাইলে নিতান্ত অচল হই বর্ণবোধ, শিশুশিক্ষা এবং নীতিপুস্তকে তাহাকে আমি শিশুদিগের পাঠ্যপুস্তক পৃথিবীর পুস্তকসাধারণকে পাঠ্যপুস্তক

উপায়ান্তর দেখা যায় না। কিন্তু আমনে হয় সেজন্য আক্ষেপ পরে ক আপাতত শিশুদের পাঠ্যপুস্তক দুই পাইলে নিতান্ত অচল হইয়া দাঁড়াই বর্ণবোধ, শিশুশিক্ষা এবং নীতিপুস্তক কিন্তু তাহাকে আমি শিশুদিগের প পৃথিবীর পুস্তকসাধারণকে পাঠ্যপু অপাঠ্যপুস্তক, প্রধানত এই দুই ভা যাইতে পারে। টেকসট বুক কমিটি গ্রন্থ নির্বাচিত হয় তাহাকে শেষোক্ত করিলে অন্যায় বিচার করা হয় না

Figure 4.15. Nirmala regular and bold, 15 pt.

hinted. The choice of what to hint and what not to hint concerned linguistics rather than design, thus Fiona Ross flew to Vancouver to follow the process.

As its Latin partner Sagoe UI, Nirmala Bengali is definitely not an outspoken design, plain enough to be used on a mass scale as user interface and for marketing material. There seem to be problems of thickness in some strokes, especially in the regular weight – for instance **e** এ is too dark – and the descending oblique strokes of letters **ba** ব, **tha** থ, **na** ন, etc do not shrink as they should, to balance the pointing counters¹⁵. From a design perspective when it is used in printing – as often happens – Nirmala is barely more than acceptable. But it was never intended for that output due to severe design constraints: a grid of 12 units that covers x-height, ascenders and descenders – among all.

Nirmala UI, in regular and bold weights, was released with Windows 8 in August 2012. The semi-light weight was added later, for use at larger sizes, and was designed by John Hudson in collaboration with Neelakash Kshetrimayum¹⁶, while they were both working on Sarkar (§ 4.6)

15. But it could be limited by visualization on Apple computers, as the font was conceived for the Windows environment.

16. See note 22 § 4.6.



Figure 4.16. Macro detail of the poster series Dalton Maag produced to display The Nokia Pure family. 200% of actual size. Courtesy Dalton Maag.

4.5. Nokia Pure Bengali

In July 2010 Nokia approached Dalton Maag, a London type design company, with the request to design a new multiscript typeface family for their mobile phone user interface. Originally the project had to include Latin, Greek, Cyrillic, Arabic, Hebrew, Thai and Devanagari, but it soon grew much bigger and in January 2014, when the last scripts were released, the count reached 19¹⁷.

In 2012 Amélie Bonet, a senior designer at Dalton Maag, was appointed to design Bengali. The design brief was the same as the others in the Nokia Pure family: ‘The primary purpose of the fonts was to serve in the UI of Nokia’s new smartphone devices running Nokia’s own operating systems. [...] The fonts also needed to work for text in office and print environments, and a refined range of weights was created for usage at large sizes’¹⁸.

Bonet was supported by Marc Foley for the OpenType production and they had 6 months to deliver a complete family in 3 weights (light, regular and bold) – working from scratch. Bonet was also supported by consultants since she had never designed a Bengali typeface before: Fiona Ross and Neelakash Kshetrimayum in the beginning and Jo de Baerdemaeker during the later stage of the project.

17. After the first group, the scripts released were: Armenian, Ethiopic, Georgian, Bengali, Kannada, Khmer, Malayalam, Sinhala, Tamil, Telugu, Chinese and Klingon (a fictional alphabet used in the Star Trek movies to write the Klingon language).

18. Bruno Maag interviewed by Michele Patané, *Nokia Pure. A multiscript system*, Abitare, 534, July 2013.

To balance Bengali with Nokia Devanagari that she had previously designed Bonet had to draw it slightly lighter, due to the high density of Bengali letters compared with the more open and squarish Devanagari. There were some problems with the interface restriction. In the beginning Nokia could not provide any device to test the font, thus there was no information concerning the height restrictions for characters, dictated by the phone's software. When Nokia announced the font had to work for the *Series 40* (S40) mobile phones the letters turned out to be too big and, to avoid clipping, Foley had to scale them down to the right size¹⁹.

As a design the typeface is fairly well balanced though the letters are quite wide. In fact, due to the restriction in height of the interface, Bonet tended to expand the letters horizontally and the generous spacing emphasizes the width; the blobs are tiny and the loops consistent throughout the font.

According to Microsoft China²⁰, responsible for the sale of Nokia in Asia, in April 2013 the font was released on the Nokia S40 mobile phones produced for the Indian market²¹.

19. Information provided by Bonet in a conversation with the author, June 2014.

20. In April 2014 Microsoft completed its acquisition of the Nokia devices and services business. www.microsoft.com

21. Datao Zhang. Email to the author, 1 September 2014.

অতএব, কমিটিকে একা
তৎসম্বন্ধে কোনো প্রসঙ্গ
অতএব, কমিটিকে এব

কেহ বা মনে করেন আমি কেহ বা মনে করেন আমি কেহ বা মনে করেন আমি
অনেক ভালো হইতে পারে অনেক ভালো হইতে পারে অনেক ভালো হইতে পা
বারোয়ারি-পূজা কমিটির বারোয়ারি-পূজা কমিটির বারোয়ারি-পূজা কমিটি
দেশে সাহিত্য সম্পর্কীয় বে দেশে সাহিত্য সম্পর্কীয় ে এ দেশে সাহিত্য সম্পর্কী

Figure 4.17. Nokia Pure Bengali light, regular and bold, 50 pt and 15 pt.

4.6. Sarkar

In 2009, three decades after Linotype Bengali, Fiona Ross was assigned to design a new Bengali typeface for Anandabazar Patrika. Aveek Sarkar, chief editor of the ABP Group, asked for a monolinear typeface for headlines, in two weights, to add variety to their newspaper layouts. Ross involved Tim Holloway for the artwork and John Hudson on the OpenType production.

The main design task was to limit the natural tendency of vertical development of the letters. The request was a low contrast (thus the modulation could not help much in expanding the strokes), headline (therefore generous interlinear space had to be avoided) typeface. But the expansion (i.e. the ‘boldness’) could not be achieved by much horizontally, as a display font should look rather compact to set more words in a line of text.

Under Ross’s art direction, Holloway worked on the outline starting with sample characters in the regular and bold and then, upon design approval from ABP, continued with the bold, the most problematic, by drawing the letters on a large scale (figure 4.21 to 4.23). It took almost one year and, when it was almost finished, Holloway fell ill and could not carry on the work. Neelakash Kshetrimayum²², a former student of the Reading MATD, was involved; he finished the few letters left in the bold and the remainder of the regular weight, i.e. almost all conjuncts and many contextual variants, discussing every letter with Ross. For about a year they were working around the clock, Ross in Europe, Hudson in Vancouver and Kshetrimayum in India. The typeface was released in September 2012 with the launch of ABP’s new daily newspaper Ebela, a tabloid for young readers²³.

Sarkar includes text layout features (figure 4.18) that are innovative in Bengali script. ‘The font contains a several variant forms of letters with trimmed, shortened, lowered or raised above-line features that provide tidier, more legible combinations’²⁴ and avoid collisions between letters above the headline, all too frequently accepted in Bengali typesetting. Because Bengali script is, in the words of Aveek Sarkar, ‘a house with too many tenants in the upper storey’²⁵. The font also includes contextual final forms of some letters, ‘so that when they occur at the end of a

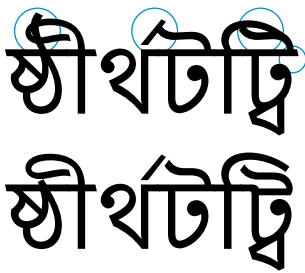


Figure 4.18. A sequence of letters (not a proper word) that shows how in Sarkar problems of adjacency were solved using OpenType features. Some letters also have final forms.

From the slides of John Hudson’s presentation in TypeCon 2014.

22. Kshetrimayum is native in Bengali script as he was born and raised in Manipur, a State on the east of India.

23. Information provided by Kshetrimayum and Ross in several conversations with the author, April and July 2014.

24. John Hudson, from the slides of his presentation in TypeCon 2014

25. Ibid.

26. Ibid.

আমাদের বঙ্গসাহিত্যে নানা অত্যাধুনিক
 যথেষ্ট পরিমাণে প্রকাশিত হয় ন
 তাহার ফল হয় এই, হজমের শক্তিটা সকল দিক হইতে
 খেলাধুলা এবং উপযুক্ত আহারাভাবে বঙ্গসন্তানের শ
 যতটুকু অত্যাধুনিক কেবল তাহার কিয়ৎপরিমাণে স্বাধীন। আমা
 কারারুদ্ধ হইয়া থাকা মানবজীবনে দেহ সাড়েতিন হাতের মধ্যে বন্ধ

Figure 4.19. Sarkar regular and bold, 50 pt, 30 pt and 20 pt



Figure 4.20. Headline in Sarkar from *Ebela*, the daily tabloid for young people of ABP group. 19 March 2014. Actual size.

word they drop the connecting head line stroke on the right, for a cleaner shape'²⁶. But some of these features do not work properly on InDesign CS6 (the latest version tested by John Hudson) employed on ABP computers, due to bugs of Adobe's World-Ready Composer (see § 2.1 for a complete discussion and Appendix B for the guidelines Hudson prepared for ABP designers).

From a design perspective Sarkar is probably the most innovative among all the Bengali digital typefaces: the quality of its design reveals great expertise, clear ideas on proportions, and a distance (difficult to find elsewhere) from the model of Linotype Bengali.



Figure 4.21. Artwork for Sarkar, pencil and black markers on wall lining paper, by Tim Holloway, 2010. Actual size. Non-Latin TC, DTGC. The letters are turned 90° counterclockwise.



Figure 4.22. Artwork for Sarkar, pencil and black markers on wall lining paper, by Tim Holloway, 2010. Non-LatinTC, DTGC. The red pencil signs are Fiona Ross's feedback.



Figure 4.23. Artwork for Sarkar by Tim Holloway, 2010. Non-Latin TC, DTGC. This picture shows a feature of Sarkar: to leave more space for the flourish of *ka* inside the kerning ascender of *ika*, the headline is moved slightly down.

আছে সন্দেহ নাই বিজ্ঞান এ

যতটুকু অত্যাৱশ্যক কেবল তাহারই মধ্যে কা: কয়ৎপরিমাণে স্বাধীন। আমাদের দেহ সা
হইয়া থাকা মানবজীবনের ধর্ম নহে। আমরা হাতের মধ্যে বদ্ধ, কিন্তু তাই বলিয়া ঠিক
কয়ৎপরিমাণে আবশ্যকশৃঙ্খলে বদ্ধ হইয়া থা সাড়েতিন হাত পরিমাণ গৃহ নির্মাণ করিলে
এবং কয়ৎপরিমাণে স্বাধীন। আমাদের দেহ না। স্বাধীন চলাফেরার জন্য অনেকখানি

Figure 4.24. Tulika regular, 50 pt; Tulika regular and bold, 15 pt.

A কেহ বা মনে করেন আমি শুদ্ধমাত্র পরিহাস করিতেছি
B কেহ বা মনে করেন আমি শুদ্ধমাত্র পরিহাস করিতেছি

Figure 4.25. Comparison of Tulika (A) and Linotype Bengali (B). Apart from few letterforms (**pa** for instance) and the shape of the blobs, Tulika follows closely Linotype Bengali.

4.7. ITF Bengali typefaces: Tulika, Tatsam and Akhand Bengali

Indian Type Foundry (ITF) was started in 2009 by Satya Rajpurohit and Peter Bilak stating that it was ‘the first company to develop and directly distribute digital fonts in India’²⁷. The following year Rajpurohit asked Jyotish Sonowal, a young graphic design student at the NID (National Institute of Design, Ahmedabad) to design a Bengali typeface. Sonowal come from the state of Assam where the official script is Bengali, and he appreciated the task so much, that he took it as his graduation project.

ITF had never released a Bengali font before²⁸, so with Tulika Sonowal it set a standard (for character set and shape of conjuncts) for the ITF Bengali type designs that followed. It took about two years and Sonowal himself worked on the OpenType production. Tulika, a typeface for newspaper and magazine usage, in its basic shapes is very similar to

27. ITF *Starting up*, press release. Mumbai, The Hague, 4 September 2009. According to Peter Bilak (email to the author, 7 August 2014) when ITF was founded there was no retail font market in India, but now it is improving year by year. Bilak left the company in 2012.

28. Satya Rajpurohit started designing Kohinoor Bengali before involving Sonowal, but the project was abandoned, so Tulika was the first Bengali typeface released by ITF.

আমাদের বঙ্গসাহিত্যে নানা যথেষ্ট পরিমাণে প্রকাশিত

আমাদের বঙ্গসাহিত্যে নানা অভাব আছে সন্দেহ
নাই; দর্শন বিজ্ঞান এবং বিবিধ শিক্ষণীয়

যতটুকু অত্যাবশ্যিক কেবল তাহার কয়ংপরিমাণে স্বাধীন। আমাদে
কারারুদ্ধ হইয়া থাকা মানবজীবনে দেহ সাড়েতিন হাতের মধ্যে বন্ধ,

Figure 4.26. Tatsam book and bold, 50 pt, 30 pt and 20 pt

Linotype Bengali (see figure 4.25): the main difference is in the design of the blobs, but such a subtle calligraphic flavour does not seem enough to make a distinction.

Tulika was Jyotish Sonowal's first type design; later he published two new display typefaces in 2013. Tatsam (and its partner Tatsam Rounded) were both conceived as a headline faces for magazines. They seem to follow the idea of 'neutrality', or an absence of stylistic associations, typical of some European sanserifs like Helvetica. Sonowal wrote: 'In recent decades, many new typefaces were based on existing letters drafted by engineers. Their consistent stroke thicknesses referenced an industrial past. Tatsam is a Bengali family in this tradition'²⁹.

The colour distribution is quite well balanced but the overall impression is of a rigid, mechanical typeface. One of the reasons for this is the lower joints of **ba** ব, **ka** ক, etc – a very common stroke in Bengali script – which looks crude and rather stiff, probably a touch of the 'engineer' taste that Sonowal refers to. The spiralling shapes are soft and rounded, the movement is not abrupt; all the letters are quite open (with some exception such as **e** এ) and the overall design is vertically compact. Some letters are

29. Tatsam overview, www.indiantypefoundry.com



Figure 4.27. Tatasam and Tatsam rounded. Courtesy Jyotish Sonowal.



Figure 4.28. Akhand Bengali from the specimen. Courtesy Jyotish Sonowal.

problematic: letter **i** ই has a tail that appears to be cropped and letter **na** ন looks weak and needs a darker blob to balance the lightness of the letter. **Na** is also a problem in Tulika.

Sonowal's third typeface is Akhand Bengali, a compact geometrical face that belongs to a multi-script family, including Devanagari, Malayalam and Tamil, each the work of a different designer. With the Akhand family, ITF tried a geometrical synthesis of very differently constructed Indic scripts – an experiment that recalls some 20th century European modernist ideas: all the scripts are built out of a small group of geometrical shapes, basically orthogonal straight lines and squared arches. The first script was Devanagari and – as it is composed mainly of horizontal and vertical strokes – following a strict modular system was not difficult to achieve. But when Sonowal had to translate the same concept into Bengali, a script where diagonals and spirals predominate, the task was extremely challenging³⁰.

All Jyotish Sonowal's typeface families are designed in a wide range of weights, in contrast to the tendency in Bengali type design of limiting the weight variety to two – or more seldom three – weights.

30. Jyotish Sonowal. Email to the author, 25 August 2014.



Figure 4.29. A sample of Star Bengali from Internet. Designed by Noopur Datye in 2012.

4.8. WhiteCrow Bengali typefaces: Star and Vodafone Bengali

WhiteCrow is a Mumbai based collective of type designers specialized in customized Indian script typefaces. It was founded in 2005 by Sarang Kulkarni, who worked as type designer at NCST, in the early 2000s, assisting R.K. Joshi. Kulkarni stated: ‘What sets the ensemble of WhiteCrow apart is the strong calligraphic base that reflects well in the work’³¹.

In the past few years WhiteCrow was commissioned to design two Bengali typefaces that cannot be displayed in this essay due to confidential contracts signed with the clients. Figure 4.29 to 4.32 are images taken from Internet, the only images of the typefaces that could be found.

Vodafone Bengali was designed in 2008 by Vinay Saynekar, the co-author of Vrinda, and is part of the multi-script family (including 10 scripts) WhiteCrow designed for Vodafone India³². The typeface has some resemblance to Vrinda, especially the shape of **ba** ব, but a further analysis is impossible with such poor visual material. We have no further information on this typeface.

Star Bengali is a monolinear typeface designed in 2012 by Noopur Datye for *Star Jalsa*, the Bengali channel of STAR India. It was conceived for television broadcasting and print applications such as billboards and was designed in three weights (demi, medium, bold) and the development took about six months. Datye comes from Mumbai; she is not native in Bengali but learned the script as part of her graduation studies. She worked on other type design projects for WhiteCrow, comprising a Devanagari font for *Life Ok*, another television channel controlled by STAR India³³.

31. Sarang Kulkarni. Email to the author, 18 March 2013.

32. Sarang Kulkarni. Emails to the author, 17 and 22 July 2014.

33. Noopur Datye. Emails to the author, 26 and 27 August 2014.



Figure 4.30. Samples of billboards set with Star Bengali from Internet.

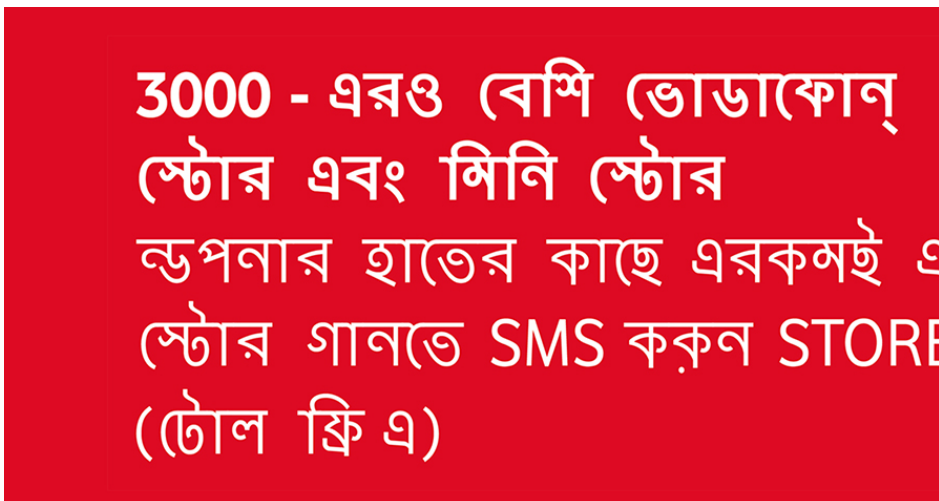


Figure 4.31. A sample of Vodafone Bengali from Internet. Designed by Vinay Saynekar in 2008. From the little we can see the typeface shows similar odd shapes (**ka**, **ra** and **ta**, for instance) and strange proportions as Vrinda.



Figure 4.32. The 10 scripts (11 languages) that form the family WhiteCrow designed for Vodafone India. Picture from Internet.

4.9. Adobe Bengali

At the end of 2012 Adobe Inc. decided to commission a Bengali-script typeface to complement their Devanagari, employing Fiona Ross as their consultant. *Adobe Devanagari* was designed a few years before by Ross herself in collaboration with Tim Holloway and John Hudson³⁴. Following the fruitful collaboration with Neelakash Kshetrimayum on Sarkar, Ross recommended him to Adobe.

As for Devanagari, the design brief was to design a typeface with moderate stroke contrast ‘for modern business communications’ in Bangla and other languages, ‘to be legible both in print and on screen’ and ‘to be highly readable in a range of situations including quite small sizes in spreadsheets and in continuous text setting, as well as at display sizes’³⁵.

Kshetrimayum noticed the flaring of some out strokes of Adobe Devanagari (figure 4.33) and decided to keep it in Bengali, giving consistency to penmanship through the two scripts. This is the main feature of Adobe Bengali, a detail never seen in typography, but pretty common in Bengali sign painting: the out strokes of the spirals are flaring instead of shrinking, as the tradition would demand. It is a matter of movement in writing: the stroke follows through the pen – while flaring out, the pen makes a little turn.

The design is clean and well balanced, the letters are beautifully drawn, and in the spirals the distinctive flarings are counterbalanced by the rest of the stroke, thus it becomes a subtle feature at small point sizes. My only criticism of Adobe Bengali is that it is too similar to Linotype Bengali in general proportions and construction of the letterforms.

The development took up the whole of 2013, the OpenType production was done internally by Paul Hunt and the final fonts were delivered to Adobe in December even though Adobe Bengali has not yet been released (september 2014) due to bugs in the World-Ready Composer (see § 2.1 note 6)³⁶.

34. Adobe Devanagari was commissioned to Tiro Typeworks in 2005 and officially released in 2010. It was designed in two weights plus italic (actually sloped Roman) and fully OpenType functioning. From the corporate website www.adobe.com

35. Ibid.

36. Adobe Bengali has not been released yet, probably this is the reason for some inconsistency in the spacing.



Figure 4.33. Adobe Devanagari with the flaring of the out stroke highlighted.

Figure 4.34. When letter **ya** follows a consonant without the inherent vowel, it is substituted by the *Yaphala*:



that is formed typing the sequence consonant, **hasanta, ya** for instance:



In Adobe Bengali (figure 4.35) the *Yaphala* is not formed by the shaping engine, leaving the sequences **hasanta, ya** in the page.

ভূগোলবিবরণ ছাড়া
সম্পূর্ণরূপে আয়ত্তগম
কাজেই বিধির বিপাকে বাঙালির
নবোদগত দস্তে আনন্দমনে ইক্ষু
কিছুই অবশিষ্ট থাকে না। বাঙা
কোঁচাসমেত দুইখানি শীর্ণ খর্ব
কেহ বা মনে করেন আমি শুদ্ধমাত্র পরিহাস করিতে
তেলের-কল, সুরকির-কল, রাজনীতি এবং বারোয়া
তেলের-কল, সুরকির-কল, রাজনীতি এবং বারোয়ারি
এ পর্যন্ত এ দেশে সাহিত্য সম্পর্কীয় কোনো কাজ কমি

তাহার ফল হয় এই, হজমের শক্তিটা সকল দিক হই
আহারাভাবে বঙ্গসন্তানের শরীরটা যেমন অপুষ্ট থা
করিতে পারে না। আমরা যতই বি. এ; এম. এ. পাস
তেমন বেশ বলিষ্ঠ এবং পরিপক্ব হইতেছে না। তেমন

গালি ছাড়া তাহাতে আর কোনোরূপ মসলা মিশ
তাহার ফল হয় এই, হজমের শক্তিটা সকল দিক
উপযুক্ত আহারাভাবে বঙ্গসন্তানের শরীরটা যেমন
পরিণতি লাভ করিতে পারে না। আমরা যতই বি

Figure 4.35. Adobe Bengali regular and bold, 75 pt, 50 pt, 30 pt and 15 pt. We can see in action another bug in the Adobe shape engine that Paul Hunt pointed out (note 6 § 2.1): the dissolution of *Yaphala*, the succeeding *ya* (see figure 4.33).

ঐ নীতিপু ক দ ম অ সে র ল শ

LT Bengali

ঐ নীতিপু ক দ ম অ সে র ল শ

Raghu

ঐ নীতিপু ক দ ম অ সে র ল শ

Vrinda

ঐ নীতিপু ক দ ম অ সে র ল শ

Bangla MN

ঐ নীতিপু ক দ ম অ সে র ল শ

Nirmala UI

ঐ নীতিপু ক দ ম অ সে র ল শ

Nokia Pure

ঐ নীতিপু ক দ ম অ সে র ল শ

Sarkar

ঐ নীতিপু ক দ ম অ সে র ল শ

Tulika

ঐ নীতিপু ক দ ম অ সে র ল শ

Tatsam

ঐ নীতিপু ক দ ম অ সে র ল শ

Adobe

5. Conclusion

One of the reasons for the **ubiquity of Linotype Bengali** is definitely the quality of its design and production¹. Fiona Ross has often pointed out that the secret came from a great amount of teamwork. Without the help of Mike Fellows and his group of programmers at Linotype (who specialized in non-Latin scripts), without the advice of the ABP group – that led a team of Indian typographers to check the letterforms – and without the consultancy of Dr Tarapada Mukherjee from SOAS, Linotype Bengali would have never seen the light.

In particular the support of programmers was fundamental. For instance, with the help of the Typographic Department they were able to implement the typesetting software of Linotron 202 (1978) with layout features similar to present-day OpenType features.

This **collaborative work** between designers and programmers seems to be missing in the Indian typesetting ventures of today that are responsible for most of the typefaces available in India.

The case of Modular InfoTech is illuminating. Since the very beginning of the digital era (1980s) they sold typefaces together with the typesetting machines, and later with DeskTop Publishing as a part of the software². Modular InfoTech is certainly brilliant in programming, but they have underestimated the importance of the typefaces. They did not consider (Bengali) typefaces as a core element in their typesetting systems. They found it worthwhile to propose a great number of them, but they did not involve designers in the production processes, they did not question the current model and the designers remained as the unrecognized creators of letter drawings. Hence the typesetting software companies do not seem to be interested in type design research.

But upstream **the lack of proper native script typesetting** through the customary, Western, tools is a more serious problem. Software for typesetting like Shree Lipi is the prerogative of printers and publishers.

1. Neelakash Kshetrimayum suggested that Holloway and Ross captured the letterforms so well that they reached an archetype of Bengali script, a perfect combination between letterforms and linguistic knowledge.

2. Indeed for many Indian companies working in marketing and publishing, today the typeface is still provided by the printer – and in Bengali there are no choices: it will be a clone of Linotype Bengali.

Everybody else tends to use what they find on personal computers for their professional or personal texts.

Most of the computer users I met during my research trip were fighting with their machines to render a proper Bengali text. These difficulties have been overcome in recent years – or they are close to being overcome, as in the case of Adobe – but the general situation in India is unlikely to change for many years³.

The impression – that would need further investigation – is that the lack of proper native script typesetting software has **slowed down the development of typography** and type design (to an even greater extent). Bengali typography and document production is often plain text with little hierarchy and without elements that enhance the text such as charts, captions, non-linear use of the texts, etc. This is often in discordance with the layout quality of the English output designed by the same local ventures.

In this context, type design cannot find a fruitful environment for development. It seems it still has not found its own way forward within the context of the sparkling milieu of Indian letter production in the areas of calligraphy and sign painting.

However, there is a positive outlook. The Sarkar typeface is a good example of how valuable OpenType features could broaden the typographic palette for Indian scripts. *Positional forms* and *contextual alternates* can be used intensively both to avoid the inherent typographic problems of Bengali script – too often accepted by local users – and to give more tools for typographers. Some examples of possible implementations are listed below.

Playing with letter spacing is one possibility. Among local typographers there is a habit of over-spacing (increasing the spacing between letterforms) in a title, for instance, following the practice of calligraphers. But unlike the calligraphic custom, (where the headline connects the over-spaced letters), over-spacing a regular Bengali typeface means separating the letters and breaking the headlines that should connect the letters – with disagreeable results. With the help of OpenType features this could be avoided, by substituting letterforms with more widely spaced alternate glyphs that will still connect with the headline where appropriate⁴.

3. Akhilesh Gupta, a typographical engineer, wrote: ‘We should remember that most Indians live below the poverty line and it is not feasible for most organisations in India to keep upgrading!’ www.softfonts.com

4. Kshetrimayum was the first to suggest this, in a conversation with the author, Delhi, March 2014.

আমি বাঙালী হিসাবে খুবই গর্বিত। আমাদের বাংলা ভাষা বিশেষ চতুর্থ কথা
 এই ভাষায় যে অক্ষর বা বর্নমালা আছে তা অতি বর্নময়। আমাদের বাংলা বর্ন মাল
 পঞ্চাশটা বর্ন বা অক্ষর আছে, এছাড়াও আকার, ইকার ও হুইকার এবং বিভিন্ন
 যুক্তাক্ষরগো আছেই। তাই এই অক্ষরশুন্নি লেখার সময় আমাদের যে মত

Figure 5.1. Sample of contemporary calligraphic hand.

এক কৃষক মরণ
 আমার দুঃস্বপ্ন
 লে, তাহার অ
 য়া গুপ্ত ধন পা
 ন স্থানে ধন
 য়া কহেন নাই;

Figure 5.2. *Bengalee Type n.3* from Specimen of printing types in use at the Baptist mission press. Circular road, Calcutta 1826 (Angus Library, Regent's Park College, Oxford)

Achieving a curved headline is another consideration. In Bengali handwritten headlines are usually not straight, like in Devanagari, but slightly arched and curved, with organic connections between letters (figure 5.1). There are a few examples of metal types from the past with an arched headlines, like *Bengalee Type no.3* from the Baptist Missionary Specimen (printed in Kolkata, 1826), cut by an unknown punchcutter (figure 5.2). *Bengalee Type no.3* is not a well-balanced and pleasing typeface, and the connections between the letters are imprecise, mainly because of the severe restrictions of metal type and hand composition. Today with contextual alternates one could develop fully functioning typefaces that connect curved headlines, modifying the connection according to the letters that follow.

Contextual alternates also offer the possibility of **designing more than one shape for a conjunct**. With the stylistic set features the designer could include alternative shapes of conjuncts, so that the typeface could be used both by those who prefer traditional conjuncts and others who are in favour of linear ones.

These are just few examples which OpenType enables designers to play around with letters and to escape from the restrictions that metal typography and early digital typography (both conceived exclusively for the Latin alphabet) forced onto Bengali script for centuries⁵. The typographic palette could be opened up even further, giving a richness to Bengali typographic texts, similar to, or even going beyond work done by trained calligraphers.

5. Actually there are many examples of Bengali foundries from the past that supplied printers with admirable metal types that were able to express the richness of the script. Nonetheless, to achieve this the foundries had to cut an astonishing number of sorts for a single fount.

Appendix A

Guidelines for the preparation of artwork for digital systems, with particular reference to the Bengali script that Fiona Ross sent by fax to Aveek Sarkar (8 June 1983). On page 6 Ross answers Sarkar's queries after a meeting they had on 27 May. Pages 3, 4 and 5 are scanned from the original sheets, the rest is scanned from photocopies as the original sheets are missing. Non-Latin TC, DTGC.

GUIDELINES FOR THE PRODUCTION OF ARTWORK FOR DIGITAL SYSTEMS

1. NATURE OF ARTWORK

Artwork should be produced on good quality dimensionally stable paper, and may take the form of either opaque black images or pencil outline drawings. (See note i of Replies)

2. MATERIALS

Registration punch, metal pin bar, drawing mask, light table, french curves, selection of pens, pencils. (If the required materials cannot be obtained, please contact Linotype-Paul, Cheltenham).

3. 1. USE OF DRAWING MASK

A drawing mask is provided as a working grid from which to produce the drawings. The reference lines shown on the mask represent horizontal unit values and a standard base-line or Z-line. The zero-point is at the intersection of the unit value 0 and the base-line (Diagram 1). (See notes ii + iii of Replies)

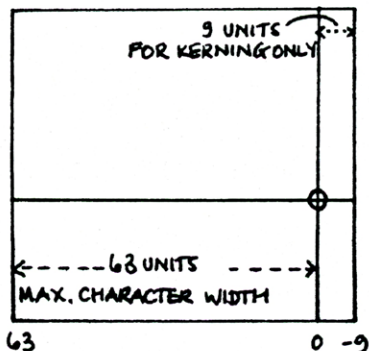
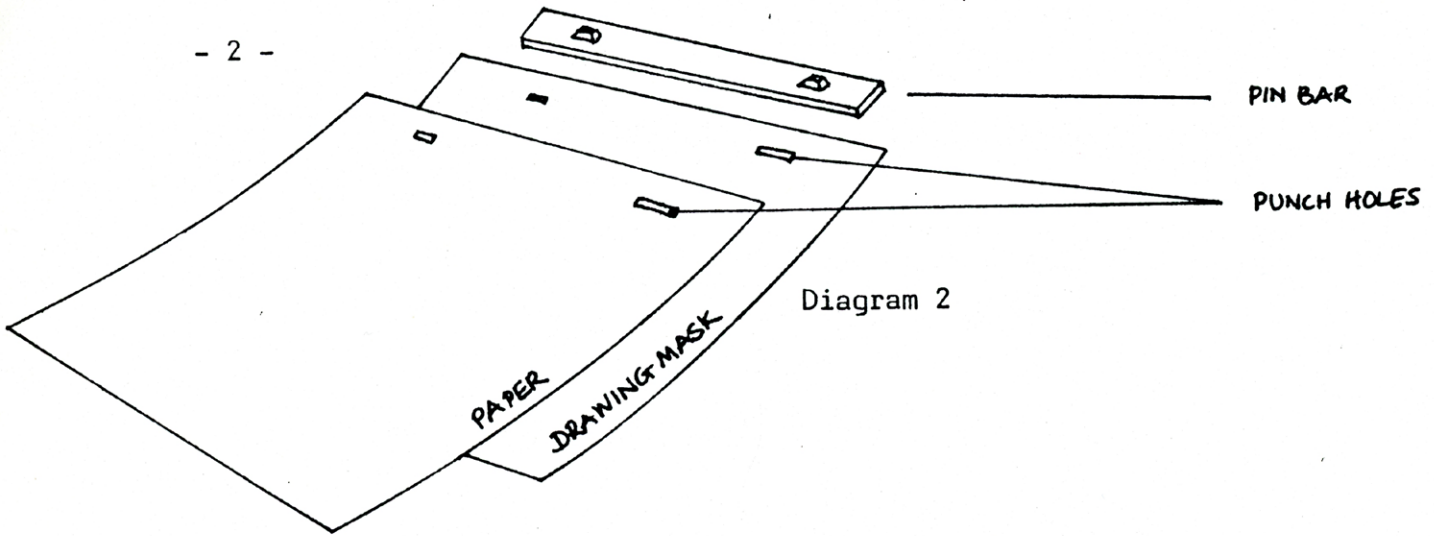


Diagram 1

2. REGISTRATION OF DRAWING ON MASK

The paper on which the finished outline of the character is to be drawn is laid over the drawing mask and held in position by registering the punch holes in the mask and in the paper with the pin bar. The larger punch hole is positioned to the right side (Diagram 2).



4. HEIGHT AND DEPTH OF CHARACTERS

The headline is fixed at a constant height and should always have the same stroke thickness.

The depth of a character should be kept within the limits of the EM square.

The typesize should be determined by the dimensions of the tallest, deepest and widest characters which have been properly fitted within the EM square. (See note iii of Replies : re width of up to 63 units)

5. WIDTH OF CHARACTERS

The width of a character includes both the width of the image (and the appropriate space on either side of the character, if it is a non-joining character). A minimum headline overlap of 3mm must be allowed for on all joining characters (see enclosed drawing). A width must be defined in a number of whole units, as drawn on the mask. The two vertical lines which show the width of character are called the 'left side bearing' and the 'right side bearing' (Diagram 3).

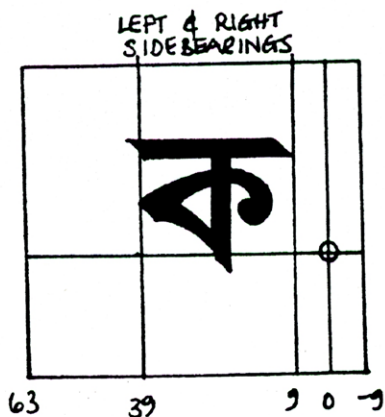


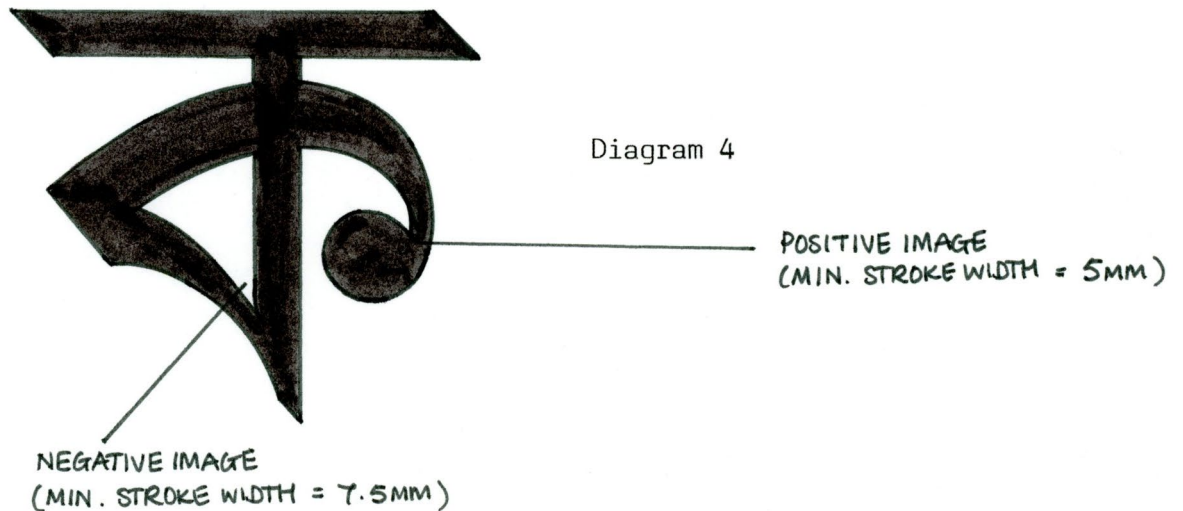
Diagram 3

CHARACTER WITH A WIDTH OF 30 UNITS

6. STROKE WIDTH OF CHARACTERS

Minimum stroke widths have to be observed in order to prevent the character shape from breaking up when digitized.

The minimum stroke width for a positive image is 5mm, and for a negative image, 7.5mm (Diagram 4). (See note iv of Replies)



SUGGESTED METHOD OF WORKING

1. Choose typeface for enlargement and establish the character set.

2. ROUGH DRAWINGS

Enlarge to maximum character size within the mask, remembering to allow for vowel signs, e.g. \hat{f}

3. Refine the rough drawing with the use of french curves until a satisfactory shape is arrived at.

4. At this stage it is a good idea to draw a blacked-in character and reduce it to type-size for checking.

5. Continue to complete the blacked-in rough drawings of the character set.

6. FINISHED DRAWINGS

It is impossible to produce finished drawings without spacing the character first.

7. SPACING PROCEDURE

N.B. Spacing is a lengthy procedure, but it is crucial to the final appearance of the type and must not be hurried unnecessarily.

8. POSITIONING OF ACCENT

It is strongly recommended to draw accents positioned in relation to one character, e.g. \bar{n} . Begin with the subscripts, ensuring that the stroke width is visually equivalent to the stroke it joins so that no "bumps" are caused. (See note vii of Replies)

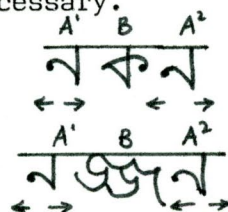
Once the position is fixed, draw a line on the nearest unit value to the left edge of the vowel sign. (The right side bearing is determined by the zero-point which in this face falls on 9 units. The left side bearing is crucial and will affect the spacing of all the other characters.

The reph should be positioned separately in the same manner; candrabindu is centred by the program. *

9. SPACING OF CHARACTERS

Determine the first two characters' ideal side bearings as follows:

- a) Place a copy of the character to be spaced between the two standard characters, e.g. \bar{n}
- b) Increase or reduce the space between the characters until they appear to be balanced/evenly spaced. Adjusting the headline, remembering to allow for 3mm minimum overlap where necessary.



Move A^1 and A^2 until B looks evenly spaced between them.

- c) Now fit these first rough side bearings to the unit system. Remember, the overall width of a character must be an exact number of units.
- d) Position the above and below accents with character 'B' ensuring both a proper fit and that the left side bearing falls on a unit value. If the initial rough side bearings no longer fall on a unit value, redefine them making any adjustments to the headline that may be required.

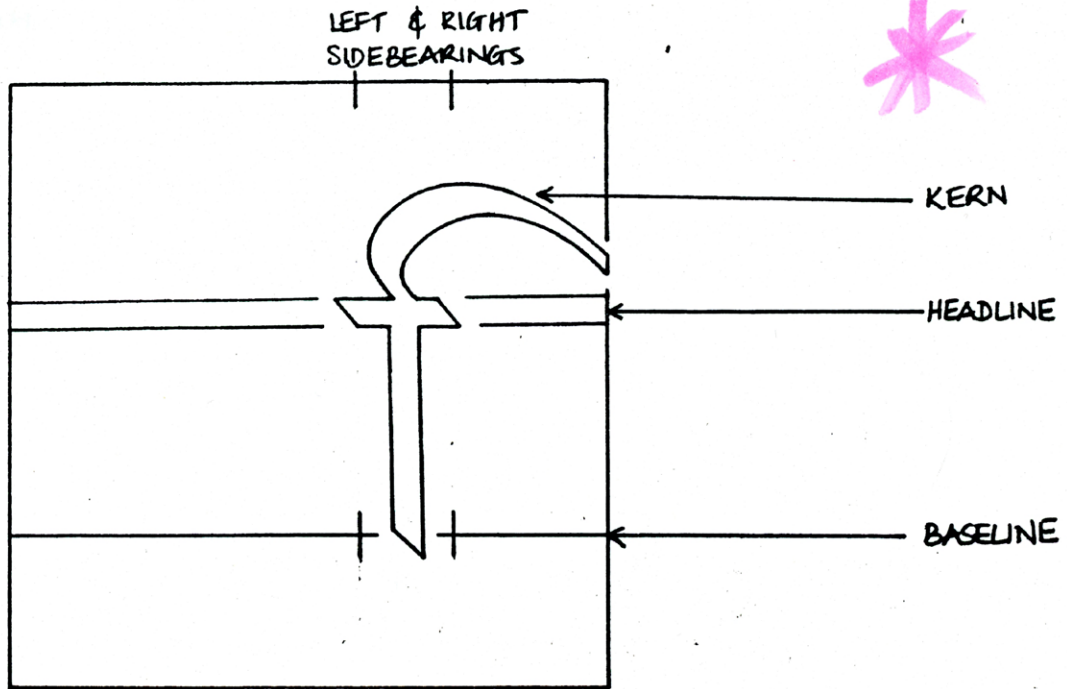
10. Continue the spacing procedure outlined in 9. a - d for all other characters in the set.
11. Once the side bearings have been established proceed with the finished drawings.
12. Finished drawings should be correctly labelled with a drawing number and preferably the same character number which was used for the original fonts (see font listing).
Accent placement marks should be drawn in also.
13. Completed artwork and queries should be sent to Fiona Ross, Head of Language Research and Development, Typographic Services, Linotype-Paul, Chelham House, for checking.
Revisions may be needed at this stage.

REPLIES TO QUERIES IN CORRESPONDENCE

- i) The paper which you use is of adequate quality, and the drawings which you have sent up show the fineness and smoothness of line which is required in the typedrawing procedure. However, if you find it any easier, firm dark pencil outlines may be used instead of ink outlines.
All drawings should be punched to ensure exact and constant positioning within the mask.
- ii) Please use the mask which Fiona Ross supplied to Mr. A. Sarkar, instead of the one which you designed.
We shall forward you a squared grid mask with both horizontal and vertical unit values as soon as possible.
- iii) Since all of the characters in the Bengali script require an offset of 9 units, the \emptyset point will, in effect, fall on the unit value of 9.
Owing to this offset the width of all characters should not exceed 54 units. However, we have found a means of digitizing characters e.g. ঔ up to 3 units in width. (Please do not exceed this).
- iv) The overall character width must not be confused with the stroke width of a character:- a characters' stroke width need not fall on a whole number of units, since it is entirely governed by the required appearance of an individual type design.
- v) For the sake of consistency in design the vertical stroke of characters such as ন and য, where the stroke falls on the right, always occupies the same position on the mask. However, this rule does not apply to characters with a central verti-bar. a left hand verti-bar or to characters without a verti-bar.
- vi) There appears to have been some confusion in your drawings between the positioning of a characters' side bearings and the accent placement marks. In order to clarify this misunderstanding the accompanying drawing samples have been labelled as follows:
- baseline — + = left and right side bearings
 | = below accent placement marks
 | = above accent placement marks
- vii) In your drawings the width of the joining stroke of the accent is too narrow to ensure a perfect join with the characters.
(See enclosed drawing no 3)

DETAILS TO CLARIFY TERMINOLOGY

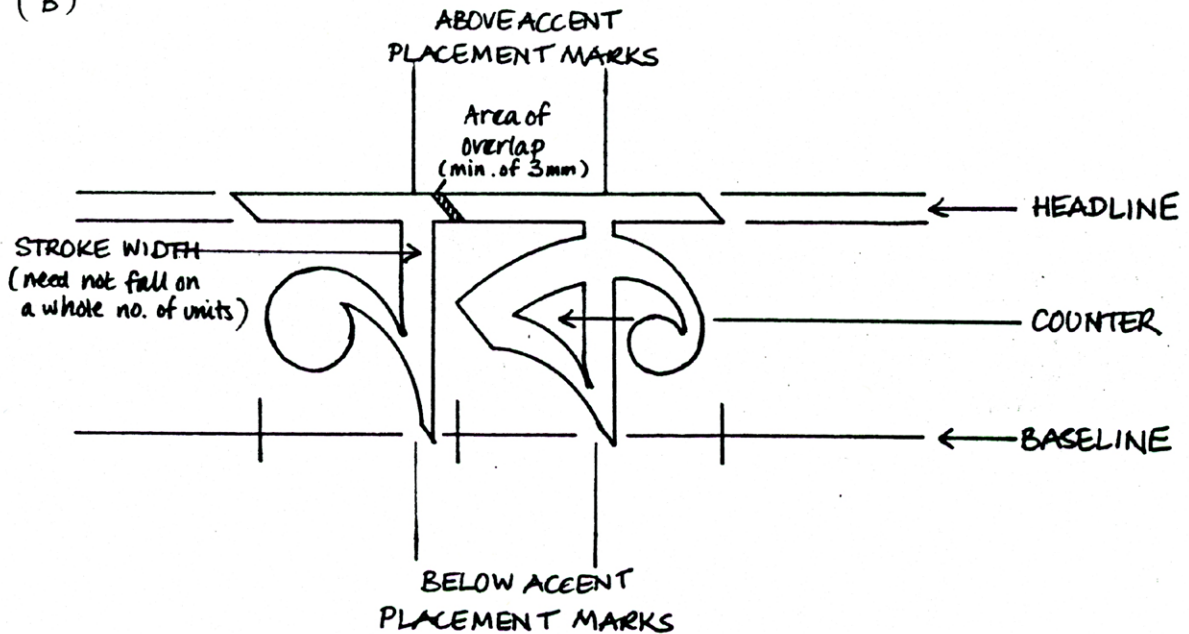
(A)



63 20 9 0 -9

CHARACTER WITH A WIDTH OF 11 UNITS

(B)



* Page 4 re. accent placement

The positioning of subscripts below characters which occupy the full depth of the EM square can be handled by the software.

The drawings should, however, be marked for the horizontal accent placement as usual and the vertical offset (i.e. the amount the vowel sign has to drop) should be given in whole numbers of units. (See drawing example no 1)

Appendix B

Guidelines for the Sarkar *stylistic set* that John Hudson sent to ABP in September 2012. After producing the Sarkar typeface, Hudson realized that some OpenType features were not working on InDesign because the Adobe shaping engine processes all Indic script features at the cluster level (see § 2.1 and § 4.6). Hudson wrote: ‘This is when we determined the problem with cross-cluster features, and had to replace the contextual lookups with the stylistic set workaround’¹. To render the final forms of the typeface ‘they have to be applied selectively, using Stylistic Set 4. The last cluster of the word needs to be selected, and <ss04> applied only to that selection. This can be done manually, or it could be something scripted (non capisco questo: something scripted non significa nulla) in InDesign’².

Hudson discussed possible solutions to this problem in a pdf published on Tiro Typeworks website³.

1. John Hudson. Email to the author, 30 August 2014.
2. Ibid.
3. www.tiro.com/John/Fixing_Indic2_OTL.pdf

Sarkar stylistic set behaviour

This document shows select outcomes of applying different OpenType ‘Stylistic Set’ features to text set in the Sarkar fonts. These features are not mutually exclusive: more than one feature can be applied to the same piece of text. They are available in both the Regular and Bold fonts. Note that Stylistic Set 3 is intended to be used selectively, in particular contexts, and Stylistic Set 4 *must* only be applied to the final cluster in a word. The stylistic set features can be applied in InDesign CS6, from the OpenType menu; the features are also accessible in Word 2010 for Windows, but this has not been tested yet with the Sarkar fonts and it is possible that Word’s implementation is limited to European scripts.

Stylistic Set 1 : variant –*Ra* conjunct forms

This feature affects only two glyphs in the fonts, activating variant forms of the *Kra* and *Tra* conjunct ligatures.

Default shaping

କ



SS01 form

କ

ତ



ତ

Stylistic Set 2 : variant *candrabin*du positioning

This feature can be used to change positioning of the *candrabin*du mark relative to the long *iikar* sign. Note that this feature increased the overall height of text, and hence must only be used where linespacing or whitespace permits. The illustration below shows the behaviour applied to the default *iikar* and *iikar+repha* forms; it also works for all contextual variant forms of these.

Default shaping

କିଂ



SS02 form

କିଂ

କିଂ



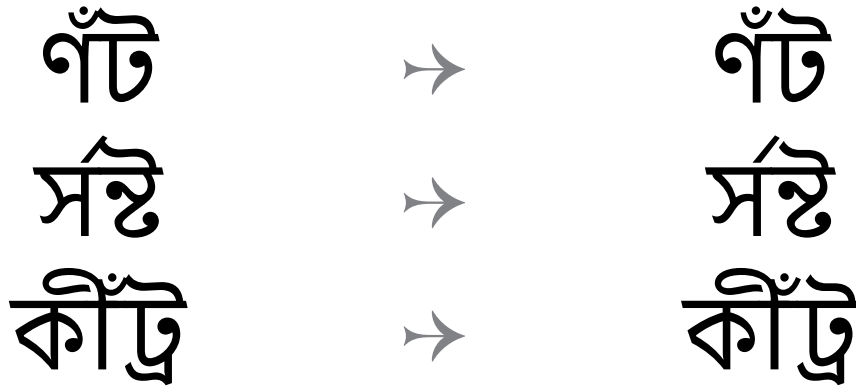
କିଂ

Stylistic Set 3 : shortened horizontal flourish forms

This feature should only be applied selectively, to particular glyphs or clusters. In many cases, these short form variants will be applied automatically, on a contextual basis, but because existing Indic shaping engines fail to apply lookups across syllable boundaries the automatic substitutions fail when the context is an *repha* or *candrabindu* sign on a preceding syllable. In these instances, the short flourish form can be applied directly by the typesetter using this stylistic set feature. The illustration below shows only a representative selection of the glyphs to which this feature may be applied.

Default shaping

ss03 form



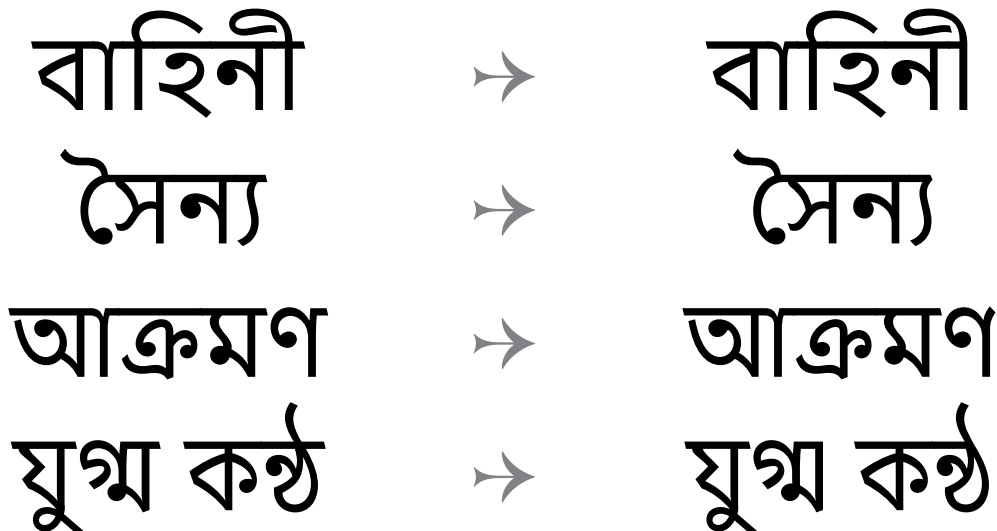
Stylistic Set 4 : word-final form

IMPORTANT This feature must only be applied selectively to the final cluster in a word; if the feature is applied anywhere else it will result in incorrect display.

This feature replaces letters, conjuncts and some vowel signs at the end of words with special forms in which the head-line extension is trimmed or reshaped to give a cleaner overall shape to the word. This was intended to happen automatically, on a contextual basis, but the failure of Indic shaping engines to apply context lookups across syllable boundaries means that this automatic behaviour had to be disabled to prevent the substitution occurring in mid-word. This feature should be used with care, and never applied to a full block of text, only selectively at the end of individual words. The illustration below shows only a representative selection of the glyphs to which this feature may be applied.

Default shaping

ss04 form



Notes

This essay is typeset in *Zenon* and *Zenon Bengali*, designed by the author during the MATD program and still in progress. Captions in *MT Grotisque*.

All the illustrations are at their actual size unless otherwise stated, their provenance is provided in the accompanying caption.

All photographs were taken by the author unless otherwise stated.

There is only one abbreviation employed in the essay,

Non–Latin TC, DTGC: Non–Latin Typedesign Collection, Department of Typography & Graphic Communication, University of Reading

The Bengali typefaces displayed were kindly provided by the following people:

Basit Ali (Microsoft) for *Vrinda*, ttf files, 23 July 2014.

Yashpal Bindra (Summit) for *Geetanjali*, ttf file, 13 August 2014.

Amélie Bonet (Dalton Maag) for *Nokia Pure Bengali*, pdf file, 15 July 2014.

M.N. Cooper (Modular InfoTech) for *Shree Lipi 550*, otf file, 18 August 2014.

Surit Doss (ABP) for *ABP font* and *Sarkar*, pdf files, 8 September 2014.

John Hudson for *Nirmala UI*, pdf file, 28 August 2014.

Satya Rajpurohit (ITF) for *Tulika* and *Tatsam*, otf files, 11 May 2014.

Miguel Sousa (Adobe) for *Adobe Bengali*, pdf file, 14 July 2014.

Raghu Bengali, otf file, was downloaded from:

http://www.cdacmumbai.in/projects/indix/n_download.shtml

(last consulted 15 August 2014 – the page is no longer accessible).

Bangla MN comes from the Apple operative system, Os X 10.9.2.

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