L2/07-139

Proposal to Encode North Indian Accounting Signs in Plane 1 of ISO/IEC 10646

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ISO/IEC JTC 1/SC 2/WG 2
PROPOSAL SUMMARY FORM TO ACCOMPANY SUBMISSIONS
FOR ADDITIONS TO THE REPERTOIRE OF ISO/IEC 10646[1]

Please fill all the sections A, B and C below. Please read Principles and Procedures Document (P & P) from http://www.dkuug.dk/JTC1/SC2/WG2/docs/principles.html for guidelines and details before filling this form.
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A. Administrative

1. Title: **Proposal to Encode North Indian Accounting Signs in Plane 1 of ISO/IEC 10646**
2. Requester's name: **University of California, Berkeley Script Encoding Initiative (Universal Scripts Project); author: Anshuman Pandey (apandey@u.washington.edu)**
3. Requester type (Member Body/Liaison/Individual contribution): **Liaison contribution**
4. Submission date: **May 4, 2007**
5. Requester's reference (if applicable): **N/A**
6. Choose one of the following:
   (a) This is a complete proposal: **Yes**
   (b) or, More information will be provided later: **No**

B. Technical - General

1. Choose one of the following:
   (a) This proposal is for a new script (set of characters): **Yes**
      i. Proposed name of script: **North Indian Accounting Signs**
   (b) The proposal is for addition of character(s) to an existing block: **No**
      i. Name of the existing block: **N/A**
2. Number of characters in proposal: **13**
3. Proposed category: **A - Contemporary**
4. Is a repertoire including character names provided?: **Yes**
   (a) If Yes, are the names in accordance with the "character naming guidelines" in Annex L of P&P document?: **Yes**
   (b) Are the character shapes attached in a legible form suitable for review?: **Yes**
5. Who will provide the appropriate computerized font (ordered preference: True Type, or PostScript format) for publishing the standard?: **Anshuman Pandey**; **True Type**
   (a) If available now, identify source(s) for the font and indicate the tools used: **The font contains normalized forms of signs found in hand-written and printed documents. See proposal for additional details.**
6. References:
   (a) Are references (to other character sets, dictionaries, descriptive texts etc.) provided?: **Yes**
   (b) Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached?: **Yes**
7. Special encoding issues:
   (a) Does the proposal address other aspects of character data processing (if applicable) such as input, presentation, sorting, searching, indexing, transliteration etc. (if yes please enclose information)? **Yes; see text of the proposal**.
8. Additional Information: Submitters are invited to provide any additional information about Properties of the proposed Character(s) or Script that will assist in correct understanding of and correct linguistic processing of the proposed character(s) or script. Examples of such properties are: Casing information, Numeric information, Currency information, Display behaviour information such as line breaks, widths etc., Combining behaviour, Spacing behaviour, Directional behaviour, Default Collation behaviour, relevance in Mark Up contexts, Compatibility equivalence and other Unicode normalization related information. See the Unicode standard at http://www.unicode.org for such information on other scripts. Also see http://www.unicode.org/Public/UNIDATA/UCD.html and associated Unicode Technical Reports for information needed for consideration by the Unicode Technical Committee for inclusion in the Unicode Standard. **Character properties, numeric information, and currency information are included.**

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[1]Form number: N3102-F (Original 1994-10-14; Revised 1995-01, 1995-04, 1996-04, 1996-08, 1999-03, 2001-05, 2001-09, 2003-11, 2005-01, 2005-09, 2005-10, 2007-03)

C. Technical - Justification

1. Has this proposal for addition of character(s) been submitted before?: **No**
2. Has contact been made to members of the user community (for example: National Body, user groups of the script or characters, other experts, etc.)? **Yes**
   (a) If Yes, with whom?: **Madhav Deshpande (Professor, University of Michigan, mmdesh@umich.edu)**
      i. If Yes, available relevant documents: **N/A**
3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included? **Yes**
   (a) Reference: **The signs in this proposal were used by the general populace of north India.**
4. The context of use for the proposed characters (type of use; common or rare): **Common**
   (a) Reference: **These signs are used to write currency, weight, measurement, and time notations in several contemporary and historical scripts of north India.**
5. Are the proposed characters in current use by the user community?: **Yes**
   (a) If Yes, where? Reference: **It is difficult to ascertain the extent to which the signs here are used. They are attested in written and printed materials through at least 1970.**
6. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP?: **No**
   (a) If Yes, is a rationale provided?: **N/A**
      i. If Yes, reference: **N/A**
7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)? **Yes**
8. Can any of the proposed characters be considered a presentation form of an existing character or character sequence? **No**
   (a) If Yes, is a rationale for its inclusion provided?: **N/A**
      i. If Yes, reference: **N/A**
9. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters? **No**
   (a) If Yes, is a rationale provided?: **N/A**
      i. If Yes, reference: **N/A**
10. Can any of the proposed character(s) be considered to be similar (in appearance or function) to an existing character? **Yes**
    (a) If Yes, is a rationale for its inclusion provided? **Yes**
       i. If Yes, reference: **See text of proposal**
11. Does the proposal include use of combining characters and/or use of composite sequences (see clauses 4.12 and 4.14 in ISO/IEC 10646-1: 2000)? **No**
    (a) If Yes, is a rationale for such use provided? **N/A**
       i. If Yes, reference: **N/A**
    (b) Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided? **No**
       i. If Yes, reference: **N/A**
12. Does the proposal contain characters with any special properties such as control function or similar semantics? **No**
    (a) If Yes, describe in detail (include attachment if necessary): **N/A**
13. Does the proposal contain any Ideographic compatibility character(s)? **No**
    (a) If Yes, is the equivalent corresponding unified ideographic character(s) identified? **N/A**
       i. If Yes, reference: **N/A**

1 Introduction

This is a proposal to encode North Indian accounting signs in the Supplementary Multilingual Plane (SMP) of the Universal Character Set (UCS) (ISO/IEC 10646). The intention is to provide a set of common signs used to write fractions, currency, weight, measurement, and time notations in several major contemporary and historical scripts of north India. Many of these signs were initially proposed for inclusion in the SMP as part of the Kaithi script block in L2/05-343 (Pandey, 2005). However additional research indicated that these signs were also used with regularity in the Devanagari, Gujarati, Gurmukhi, Mahajani, Maithili, and Modi scripts.

The proposed accounting and numerical notation signs were used throughout the region encompassing the modern Indian states of Bihar, Gujarat, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, and Uttar Pradesh. The signs were incorporated as a supplement to a wide range of scripts, but their the typology and semantics remained consistent. The prevalence of these signs is evidenced from their presence in documents ranging from newspaper media to accounting ledgers. Moreover, the signs were described in grammar texts through the 1970s, which suggests that knowledge of these signs was considered a rudimentary part of the numerical systems of Hindi, Gujarati, and other languages.

Due to the common typology and semantics of these signs, they are proposed for inclusion in the UCS as a single block to be named "North Indian Accounting Signs." The signs may be categorized constituting a "Category A" (contemporary) or a "Category B.1" (specialized) script, as per the criteria specified in ISO/IEC JTC 1/SC 2/WG 2 N3002.[2] The term "North Indian" is a geographical descriptor that refers to the distribution and use of these signs within the modern Indian states mentioned above. The signs may be considered as belonging to a north Indian accounting and numerical notation system that is uniquely distinguished from other such systems used in other regions of South Asia, for example, in eastern and southern India, and even within north India (see section 6). The unified encoding of these signs within a generic block, instead of within the repertoire of individual scripts, will faciliate their use across writing systems in a manner which reflects historical and contemporary practices.

The use of the accounting signs and its associated numerical notation diminished in the latter half of the 20th century when India changed its currency and system of measurement. On April 1, 1957, India introduced a new coinage system called "Naya Rupee," which was based on the decimal system.[3] On October 1, 1958, the metric system of weights and measures was introduced in India.[4] The change of the currency base from hexadecimal to decimal and the adoption of the metric system rendered the older accounting signs obsolete. The fractions and currency marks continued to be used in writing and in print through the 1970s, but are rarely attested in the present.

An encoding for north Indian accounting signs in the UCS is necessary for the complete encoding of writing and printed materials in north Indian scripts. As these signs appear in a variety of historical and contemporary scripts, it is necessary to identify these signs uniquely so that they accompany the text of such scripts in plain-text. Such an encoding is important to specialists who require the ability to accurately represent numerical notation and accounting signs in order to preserve source materials and in order to reproduce and represent such materials in digital media.

[2] International Organization for Standardization, 2005: 4.
[3] Pořízka, 1972: 513.
[4] Pořízka, 1972: 304.

2 Acknowledgments

This proposal was made possible in part by a grant from the United States Endowment for the Humanities (NEH) for the Universal Scripts Project (part of the Script Encoding Initiative at the University of California, Berkeley).

3 Characters Proposed

There are thirteen code-points proposed for the North Indian Accounting Signs block. Included in this set are: six fraction signs, three independent fraction signs, one quarter mark, one placeholder mark, one currency mark, and one weight mark:

- NORTH INDIAN FRACTION ONE SIXTEENTH
- NORTH INDIAN FRACTION ONE EIGHTH
- NORTH INDIAN FRACTION THREE SIXTEENTHS
- NORTH INDIAN FRACTION ONE QUARTER
- NORTH INDIAN FRACTION ONE HALF
- NORTH INDIAN FRACTION THREE QUARTERS
- NORTH INDIAN INDEPENDENT FRACTION ONE QUARTER
- NORTH INDIAN INDEPENDENT FRACTION ONE HALF
- NORTH INDIAN INDEPENDENT FRACTION THREE QUARTERS
- NORTH INDIAN QUARTER MARK
- NORTH INDIAN PLACEHOLDER MARK
- NORTH INDIAN RUPEE MARK
- NORTH INDIAN WEIGHT MARK

The signs and their properties are discussed throughout the proposal and given in the Unicode Character Database format in Table 1. Although the signs proposed here require only a single row in the SMP, it is requested that the North Indian Accounting Signs block be allocated two rows (16 code-points) to accommodate the additional of signs in the future.

Other signs for denoting weights and measures have been identified and are discussed in section 5. There is insufficient information regarding the use of these signs. Therefore, they are not proposed for encoding within the present block. If and when information about these signs becomes available and if additional signs are later identified, they will be submitted for formal review for inclusion in the set. The proposed signs are sufficient for the encoding and processing of accounting notation in Indian language documents.

3.1 Basis for Character Shapes

All of the characters proposed here are found in both written and printed materials. The shapes of the proposed characters are based primarily on characters found in print.

4 Overview of the Accounting Signs

4.1 Fraction Signs

Description The fraction signs proposed here were widely used throughout north India to indicate currency, weights, measures, time, and other units. The signs represent fraction values of a base-16 (hexadecimal) notation system. The fraction signs appear in both written and printed materials in several north Indian scripts. Their use in written documents is attested to at least the 16th century CE and in texts printed as late as 1970. They were part of the character repertoire of Devanagari metal fonts such as Nirnaya-Sagar Pica No. 1 (see Figure 27) and Monotype Devanagari (see Figure 28). The use of fraction signs diminished after 1957, when India adopted the metric system and changed its currency to decimal notation.

The fractions are written as follows:

‾	1/16	।‾	5/16 [= 1/4 + 1/16]	॥‾	9/16 [= 1/2 + 1/16]	॥।‾	13/16 [= 3/4 + 1/16]
≂	1/8 (2/16)	।≂	6/16 [= 1/4 + 1/8]	॥≂	5/8 (10/16) [= 1/2 + 1/8]	॥।≂	7/8 (14/16) [= 3/4 + 1/8]
≣	3/16	।≣	7/16 [= 1/4 + 3/16]	॥≣	11/16 [= 1/2 + 3/16]	॥।≣	15/16 [= 3/4 + 3/16]
।	1/4 (4/16)	॥	1/2 (8/16)	॥।	3/4 (12/16)	؞	1

Typology The 15 fractions can be decomposed into six elemental forms from which all fractions can be created through an additive process. Only these six elemental forms are proposed for encoding in the UCS:

‾ NORTH INDIAN FRACTION ONE SIXTEENTH
≂ NORTH INDIAN FRACTION ONE EIGHTH
≣ NORTH INDIAN FRACTION THREE SIXTEENTHS
। NORTH INDIAN FRACTION ONE QUARTER
॥ NORTH INDIAN FRACTION ONE HALF
॥। NORTH INDIAN FRACTION THREE QUARTERS

Theoretically, even these six forms can be reduced to the two primitives ‾ NORTH INDIAN FRACTION ONE SIXTEENTH and । NORTH INDIAN FRACTION ONE QUARTER. The four other elemental forms may be considered as composite characters created from sequences of these primitives. For example, ॥ NORTH INDIAN FRACTION ONE HALF may be composed by writing NORTH INDIAN FRACTION ONE QUARTER twice as । + । = ॥. Similarily, ≣ NORTH INDIAN FRACTION THREE SIXTEENTHS may be composed by writing NORTH INDIAN FRACTION ONE SIXTEENTH three times as ‾ + ‾ + ‾ = ≣. The traditional practice, however, is to consider these six elemental fraction signs as precomposed signs, and they appear as such in Devanagari metal fonts.

Names The fractions one-quarter (।), one-half (॥), and three-quarters (॥।) have unique names in north Indian languages. In Hindi, the names are *pāo* (पाओ) or *pāv* (पाव), *ādhā* (आधा), and *paune* (पौने), respectively. In Gujarati, the names are *pā* (પા) or *pāo* (પાઓ), *ādho* (આધો) or *ardho* (અર્ધો), and *poṇo* (પોણો) (see section 6.1 for further details). While the names of these fractions differ by language and region, the forms of the fractions are identical across scripts.

Properties The fractions belong to the Unicode general category "Number, Other" (No) and are non-combining characters. The appropriate numeric value should assigned to each fraction: "1/16" for NORTH INDIAN FRACTION ONE SIXTEENTH, "1/2" for NORTH INDIAN FRACTION ONE HALF, etc. The fractions are always written left to right and should be assigned bidirectional values of "Left-to-Right" (L).

Orthography The vertical shaped fractions are always written before the angled fractions; for example, the fraction ⅝ is correctly written as ꠱꠴, not as ꠴꠱. The vertical positioning of the angled fractions may vary in written and printed texts. In some texts they are vertically centered, but the general practice is to align them at the top.

Variants Variant forms exist for NORTH INDIAN FRACTION ONE SIXTEENTH, NORTH INDIAN FRACTION ONE EIGHTH, and NORTH INDIAN FRACTION THREE SIXTEENTHS. These fractions are also written horizontally instead of at an angle: ꠳ may be written as ‾; ꠴ as =; and ꠵ as ≡ (see Figure 13).

Homoglyphs The form of ꠰ NORTH INDIAN FRACTION ONE QUARTER and ꠱ NORTH INDIAN FRACTION ONE HALF resemble *daṇḍā* and double *daṇḍā* of various Indic scripts. Sequences consisting of a digit followed by a *daṇḍā* are used in enumerated lists in Devanagari similar to the practice in Latin of writing digit + period; for example ‘२।’ (U+0968 DEVANAGARI DIGIT TWO + U+0964 DEVANAGARI DANDA) is the enumeration label that represents ‘2.’ In isolation, such a sequence might also represent ‘२꠰’ (U+0968 DEVANAGARI DIGIT TWO + NORTH INDIAN FRACTION ONE QUARTER), or the fraction ‘2¼’. The proper meaning of such sequences, however, is apparent from context. Among signs used in other Indian systems of accounting notation, the fraction ꠰ NORTH INDIAN FRACTION ONE QUARTER resembles ৷ U+09F7 BENGALI CURRENCY NUMERATOR FOUR.

4.2 Independent Fraction Signs

- ·꠰· NORTH INDIAN INDEPENDENT FRACTION ONE QUARTER
- ·꠱· NORTH INDIAN INDEPENDENT FRACTION ONE HALF
- ·꠲· NORTH INDIAN INDEPENDENT FRACTION THREE QUARTERS

Description The fractions one-quarter, one-half, and three-quarters have different forms when they are written independently. These independent forms are used more generally in Maharashtra and Gujarat, and they appear in materials written and printed in the Devanagari (Figure 16) and Gujarati (Figure 3) scripts.

Typology The independent fractions are created by writing dots to the left and right of the regular fractions. One-quarter is represented as ·꠰·; one-half is represented as ·꠱·; and three-quarters is represented as ·꠲·.

Properties The independent fractions belong to the Unicode general category "Number, Other" (No) and are non-combining letters. They have the bidirectional value of "Left-to-Right" (L). The appropriate numeric value should assigned to each independent fraction: "¼" for NORTH INDIAN INDEPENDENT FRACTION ONE QUARTER, etc.

Orthography The independent fractions are never used for writing mixed fractions or when accompanied by currency or weight signs; for example, "4 *ānās*" is always written ꠰꠶, never as ·꠰·꠶.

Variants There are two variant methods of writing independent fractions. One is by writing the regular fractions after the digit zero with no dots, as ०꠰, ०꠱, and ०꠲ (see Figure 4). The other is to write the dots at the baseline instead of at the middle of the glyph, as .꠰., .꠱., and .꠲. (see Figure 17). The latter method appears to be a substitute for the lack of glyphs for independent fractions in a font.

4.3 Quarter Mark

◦ NORTH INDIAN QUARTER MARK

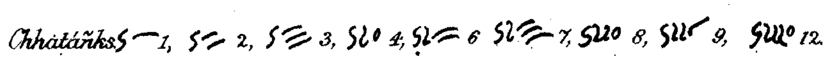
Description The quarter mark is used to explicitly mark the quarter fractions in cases where ambiguity might arise. For instance, the weight value ʃ|||≡ would typically denote "15 *chaṭāṃk*." However, when *ser* and *chaṭāṃk* are written together without the weight sign, the form ʃ|||≡ might represent three different values: | + ||≡ ("ten *ser* and eleven *chaṭāṃk*"); || + |≡ ("twenty *ser* and seven *chaṭāṃk*"); and ||| + ≡ ("thirty *ser* and three *chaṭāṃk*"). In such cases the quarter mark would be written after the *ser* unit to specify the explicit value of the fraction. Thus, ʃ|◦||≡, ʃ||◦|≡, and ʃ|||◦≡ for the above forms, respectively.

Also, there are two different ways of writing *ser* values, which is discussed in detail in section 4.6. When the tens unit of the *ser* value is written to the right of the weight sign as ʃ| ("10 *ser*"), it is identical to ʃ| ("4 *chaṭāṃk*"). Here the quarter mark is used to identify ʃ|◦ explicitly as a *chaṭāṃk* value.

Properties The NORTH INDIAN QUARTER MARK belongs to the Unicode general category "Symbol, Other" (No). It is a non-combining and precomposed letter. It has a bidirectional value of "Left-to-Right" (L).

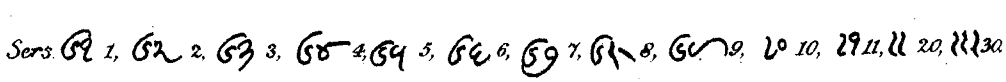
Orthography This sign is never written independently. When written, it must be written after the appropriate quarter fraction: NORTH INDIAN FRACTION ONE QUARTER, NORTH INDIAN FRACTION ONE HALF, or NORTH INDIAN FRACTION THREE QUARTERS.

In illustrating the system for writing *chaṭāṃk* weight values, Grierson shows the use of the quarter mark to denote quarter units:[5]



The same practice is used for writing *kaṭṭhā* measurement values:[6]

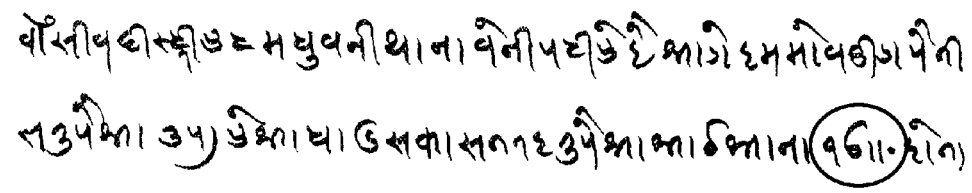
However, the use of the quarter mark is not mandatory. In illustrating the writing of *ser* values, Grierson writes the value value '10 *ser*' with the quarter mark, but does not do so for the values '20 *ser*' and '30 *ser*':[7]



Homoglyphs The quarter mark resembles the digit zero as found in Indic scripts and ॰ U+0970 DEVANAGARI ABBREVIATION SIGN. Among other signs used in different Indian accounting notation systems, it resembles ◦ U+09F9 BENGALI CURRENCY DENOMINATOR SIXTEEN. The rules for the use of NORTH INDIAN QUARTER MARK are different from that of U+09F9 BENGALI CURRENCY DENOMINATOR SIXTEEN. Figures 32 and 33 show the use of U+09F9 BENGALI CURRENCY DENOMINATOR SIXTEEN in writing all currency values. The NORTH INDIAN QUARTER MARK is reserved specifically for writing quarter values.

[5] Grierson, 1899: Plate IV.
[6] Grierson, 1899: Plate IV.
[7] Grierson, 1899: Plate IV.

Variants The quarter mark may also be written as a closed dot. The following example shows the use of fractions to write *rupayā* and *ānā* values:[8]



4.4 Placeholder Mark

૯ NORTH INDIAN PLACEHOLDER MARK

Description The placeholder mark is used to mark the absence of a unit when writing currencies. It appears in written and printed texts, primarily in Maharashtra, where it is known as *āḷī* (आळी). It is commonly used in the Modi script and appears in Peshwa records of the Maratha dynasty from at least the 16th century CE (see Figure 26). The placeholder mark appears in Devanagari metal fonts such as Nirnaya-Sagar Pica No. 1 (Figure 27), Monotype Devanagari (Figure 28), and Vijapure Devanagari.[9]

Properties The placeholder mark belongs to the Unicode general category "Symbol, Other" (So). It is a non-combining and precomposed letter. It has a bidirectional value of "Left-to-Right" (L).

Orthography The placeholder mark is reserved for marking the absence of intermediate units, such as the *pavalī* (*paisā*) unit. For example, the notation २૯= represents the value "2 *rupayā*, 2 *ānā*," where the placeholder mark indicates "0 *pavalī*" (see Figure 18). The mark would not be used to denote the absence of larger units when the currency value consists only of a smaller unit, eg. "1 *pavalī*" would not be written as ૯।, where the placeholder mark indicates "0 *rupayā*."

Variants The placeholder mark has historical variants in Maharashtra and Gujarat, which may reflect forms used in Modi (see Figure 19). The form that appears in Devanagari metal fonts is proposed here as the modern standard form.

4.5 Currency Sign

૱ NORTH INDIAN RUPEE MARK

Description The NORTH INDIAN RUPEE MARK was a standard and common sign for writing currency notations. The sign appears in both written and printed materials. The rupee mark is not mandatory in the writing of currencies, but it is generally used. When not used, the different currency units are distinguishable through the method of writing the units. The semantics of the north Indian rupee mark are similar to the Bengali rupee mark, which is encoded in the Bengali block as ৳ U+09F2 BENGALI RUPEE MARK. The Bengali rupee mark belongs to a system of notation used in eastern India and is not used in north India (see section 6.2 for further details).

[8] Grierson, 1899: Plate ??????????

[9] Naik, 1971: 330.

Properties The currency sign belongs to the Unicode general category "Symbol, Currency" (Sc) and is a non-combining sign. Like all other currency signs encoded in the standard, the NORTH INDIAN RUPEE MARK has a bidirectional value of "European Number Terminator" (ET).

It is not a subtending character; its left-ward downstroke does not extend to the width of the entire numeric sequence that is it written after. It typically extends beneath the digit it is immediately written after: ४३६৲ not ४३६ ৲. In written materials, the length of the left-ward stroke may extend to the right margin of the numeric sequence to which the sign is applied, but this is a swash attribute. The mark is given a fixed-length here for purposes of standardizing the sign.

Currency Notation The north Indian currency system is traditionally based on the unit of the *rupayā* (रुपया), normally Anglicized as "rupee." The *rupayā* is comprised of smaller units called the *ānā* (आना); there are 16 *ānā* in 1 *rupayā*. The *ānā* consists of smaller units called the *pāī* (पाई); there are 12 *pāī* in 1 *ānā*. The manner of writing these values is as follows:

- The *rupayā* is indicated with digits and is always written before the rupee mark: ३৲ = 3 *rupayā*.
- The *ānā* is written using fractions and is always written before the rupee mark (see Figure 2):

1 *ānā*	৴	5 *ānā*	।৴	9 *ānā*	।।৴	13 *ānā*	।।।৴
2 *ānā*	৵	6 *ānā*	।৵	10 *ānā*	।।৵	14 *ānā*	।।।৵
3 *ānā*	৷	7 *ānā*	।৷	11 *ānā*	।।৷	15 *ānā*	।।।৷
4 *ānā*	।৲	8 *ānā*	।।৲	12 *ānā*	।।।৲	1 *rupayā*	১৲

1 *ānā*	৴	5 *ānā*	।৴	9 *ānā*	।।৴	13 *ānā*	।।।৴
2 *ānā*	৵	6 *ānā*	।৵	10 *ānā*	।।৵	14 *ānā*	।।।৵
3 *ānā*	৷	7 *ānā*	।৷	11 *ānā*	।।৷	15 *ānā*	।।।৷
4 *ānā*	।৲	8 *ānā*	।।৲	12 *ānā*	।।।৲	1 *rupayā*	১৲

- The methods of writing *pāī* differ by region. It is, however, always written after the rupee mark. In one method, the *pāī* is written using a combination of digits and fractions, in another, the *pāī* is written using only fractions. Each quarter *pāī* is marked with a quarter fraction.

  The first method, where mixed values are obtained by writing either the digit one or the digit two after the appropriate quarter fraction:

1 *pāī*	৲১	4 *pāī*	।৲১	7 *pāī*	।।৲১	10 *pāī*	।।।৲১
2 *pāī*	৲২	5 *pāī*	।৲২	8 *pāī*	।।৲২	11 *pāī*	।।।৲২
3 *pāī*	৲।	6 *pāī*	৲।।	9 *pāī*	৲।।।	1 *ānā*	৴

1 *pāī*	৲১	4 *pāī*	।৲১	7 *pāī*	।।৲১	10 *pāī*	।।।৲১
2 *pāī*	৲২	5 *pāī*	।৲২	8 *pāī*	।।৲২	11 *pāī*	।।।৲২
3 *pāī*	৲।	6 *pāī*	৲।।	9 *pāī*	৲।।।	1 *ānā*	৴

  The second method, where fractions are used for all values (see Figure 24):

1 *pāī*	৲৴	4 *pāī*	।৲৴	7 *pāī*	।।৲৴	10 *pāī*	।।।৲৴
2 *pāī*	৲৵	5 *pāī*	।৲৵	8 *pāī*	।।৲৵	11 *pāī*	।।।৲৵
3 *pāī*	৲।	6 *pāī*	৲।।	9 *pāī*	৲।।।	1 *ānā*	৴

- There are regional methods of grouping *ānā* and *pāī* into intermediate units. Throughout north India,

there is a unit called the *paisā* (पैसा), which comprises each quarter *pāī*.[10] Thus, ৶ = 1 *paisā* (or, 3 *pāī*); ৶৷ = 2 *paisā* (or, 6 *pāī*); ৶৷৷ = 3 *paisā* (or, 9 *pāī*); 4 *paisā* = 1 *ānā*.

In Maharashtra, there is an intermediate unit called the *pavalī* (पवली), which comprises 4 *ānā*. There are 4 *pavalī* in 1 *rupayā*.[11]

Thus, the notation ৭৷৺৷২ represents "7 *rupayā*, 5 *ānā*, and 5 *pāī*" or "7 *rupayā*, 5 *ānā*, and 1 *paisā*, and 2 *pāī*."

Variants In many printed texts, the Latin) U+0029 RIGHT PARENTHESIS is used as a substitute for the rupee mark, often because the correct glyph is absent from the font. It is a variant form of the rupee mark, not an independent or script-specific mark. The practice of using the right-parenthesis is evidenced in texts printed in Devanagari (Figure 6) and Gurmukhi (Figure 7). The figures show parentheses used in the appropriate manner as well as the use of the right-parenthesis to denote the rupee mark. A comparison of the right-parenthesis with the rupee mark in the given excerpts indicates that the parenthesis used in the same character. Figure 25 shows printed text with the rupee mark as it should appear and as it is proposed here.

Modern Notation India abandoned the currency system based on the *ānā* in favor of a decimal system in 1957. Since then, the use of the NORTH INDIAN RUPEE MARK and fractions has diminished. Nowadays, currency is written using digits. The rupee mark has been replaced with the abbreviation 'Rs.' U+20A8 RUPEE SIGN ('Re.' is used for a single rupee) is the common sign of writing currency. It appears in Indic scripts as the syllable *ru*, which is an abbreviation of *rupayā*; for example Devanagari रु॰. Rupee signs for Bengali, Gujarati, and Tamil are already encoded in the Universal Character Set: ৳ U+09F3 BENGALI RUPEE SIGN, ૱ U+0AF1 GUJARATI RUPEE SIGN, and ₹ U+0BF9 TAMIL RUPEE SIGN. Another method is to write *rupayā* and *paisā* using a slash '/' to separate the units; for example "13 *rupayā* and 67 *paisā*" is written "१३/६७." Whole rupee units are marked using '/-', such as १००/- for one-hundred rupees.

4.6 Weight Mark

৻ NORTH INDIAN WEIGHT MARK

Description The NORTH INDIAN WEIGHT SIGN was used for writing weight notations. This sign appears in both written and printed materials. The weight sign is not mandatory. Weight values are written without the mark and different units are identifiable by the method of writing them. The weight sign has been included in sets of Devanagari metal type, such as Nirnaya-Sagar Pica No. 1 (see figure 27) and Monotype Devanagari (see figure 28). An example of the sign in a document typeset in Devanagari is given in Figure 25.

Properties The weight sign belongs to the Unicode general category "Symbol, Other" (So). It is a non-combining and precomposed sign. Although used for writing weight values, it functions like currency marks. It may be given the bidirectional value of "European Number Terminator" (ET) or "Other Neutrals" (ON).

The weight sign is not a subtending character, that is, it does not extend left-ward to the width of the numeric sequence that is it written after. It typically extends beneath the digit it is immediately written after: ४३६৻ not ४३६ ৻. In written materials, the length of the left-ward stroke may extend to the left margin of the numeric sequence to which the sign is applied, but this is a swash attribute. The mark is given a fixed-length here for purposes of standardizing the sign.

[10] In British grammars, *pāī* is called 'pie' (and its plural 'pies') and *paisā* is referred to as 'pice.'

[11] Darby, 1915: 105.

Weight Notation The writing of weights follows a principle similar to that of writing currency, with a mixture of digits and fractions to indicate different units.

The traditional north Indian system of weight is based on the *man* (मन), which is equal to roughly 40 kilograms. One *man* is equal to 40 *ser* (सेर), and one *ser* is equal to 16 *chaṭāṃk* (छटांक). The manner of writing these values is as follows:

- The *man* is always indicated using digits and is written to the left of the NORTH INDIAN WEIGHT SIGN: ५𑅵 = 5 *man*.
- The *ser* is written with a combination of digits and fractions. Quarter fractions are used to mark the tens unit and are written to the left of the weight sign (see Figure 25):

1 *ser*	𑅵१	11 *ser*	𑅵१	21 *ser*	𑅵𑅵१	31 *ser*	𑅵𑅵𑅵१
2 *ser*	𑅵२	12 *ser*	𑅵२	22 *ser*	𑅵𑅵२	32 *ser*	𑅵𑅵𑅵२
3 *ser*	𑅵३	13 *ser*	𑅵३	23 *ser*	𑅵𑅵३	32 *ser*	𑅵𑅵𑅵३
4 *ser*	𑅵४	14 *ser*	𑅵४	24 *ser*	𑅵𑅵४	32 *ser*	𑅵𑅵𑅵४
5 *ser*	𑅵५	15 *ser*	𑅵५	25 *ser*	𑅵𑅵५	32 *ser*	𑅵𑅵𑅵५
6 *ser*	𑅵६	16 *ser*	𑅵६	26 *ser*	𑅵𑅵६	32 *ser*	𑅵𑅵𑅵६
7 *ser*	𑅵७	17 *ser*	𑅵७	27 *ser*	𑅵𑅵७	32 *ser*	𑅵𑅵𑅵७
8 *ser*	𑅵८	18 *ser*	𑅵८	28 *ser*	𑅵𑅵८	32 *ser*	𑅵𑅵𑅵८
9 *ser*	𑅵९	19 *ser*	𑅵९	29 *ser*	𑅵𑅵९	39 *ser*	𑅵𑅵𑅵९
10 *ser*	𑅵	20 *ser*	𑅵𑅵	30 *ser*	𑅵𑅵𑅵	1 *man*	१𑅵

  There is regional variation in the position of the NORTH INDIAN WEIGHT SIGN in the writing of *ser*. In addition to the method shown above, another method is to write the entire *ser* value to right of the weight sign:

1 *ser*	१𑅵	11 *ser*	१𑅵	21 *ser*	१𑅵𑅵	31 *ser*	१𑅵𑅵𑅵
2 *ser*	२𑅵	12 *ser*	२𑅵	22 *ser*	२𑅵𑅵	32 *ser*	२𑅵𑅵𑅵
3 *ser*	३𑅵	13 *ser*	३𑅵	23 *ser*	३𑅵𑅵	32 *ser*	३𑅵𑅵𑅵
4 *ser*	४𑅵	14 *ser*	४𑅵	24 *ser*	४𑅵𑅵	32 *ser*	४𑅵𑅵𑅵
5 *ser*	५𑅵	15 *ser*	५𑅵	25 *ser*	५𑅵𑅵	32 *ser*	५𑅵𑅵𑅵
6 *ser*	६𑅵	16 *ser*	६𑅵	26 *ser*	६𑅵𑅵	32 *ser*	६𑅵𑅵𑅵
7 *ser*	७𑅵	17 *ser*	७𑅵	27 *ser*	७𑅵𑅵	32 *ser*	७𑅵𑅵𑅵
8 *ser*	८𑅵	18 *ser*	८𑅵	28 *ser*	८𑅵𑅵	32 *ser*	८𑅵𑅵𑅵
9 *ser*	९𑅵	19 *ser*	९𑅵	29 *ser*	९𑅵𑅵	39 *ser*	९𑅵𑅵𑅵
10 *ser*	१𑅵	20 *ser*	२𑅵	30 *ser*	३𑅵𑅵	1 *man*	१𑅵

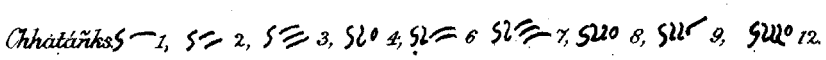
- The *chaṭāṃk* unit is written only with fractions and is written to the right of the weight mark:

1 *chaṭāṃk*	𑅵𑅴	5 *chaṭāṃk*	१𑅵𑅴	9 *chaṭāṃk*	२𑅵𑅵𑅴	13 *chaṭāṃk*	३𑅵𑅵𑅵𑅴
2 *chaṭāṃk*	𑅵𑅵	6 *chaṭāṃk*	१𑅵𑅵	10 *chaṭāṃk*	२𑅵𑅵𑅵	14 *chaṭāṃk*	३𑅵𑅵𑅵𑅵
3 *chaṭāṃk*	𑅵𑅶	7 *chaṭāṃk*	१𑅵𑅶	11 *chaṭāṃk*	२𑅵𑅵𑅶	15 *chaṭāṃk*	३𑅵𑅵𑅵𑅶
4 *chaṭāṃk*	१𑅵	8 *chaṭāṃk*	२𑅵	12 *chaṭāṃk*	३𑅵𑅵	1 *ser*	१𑅵

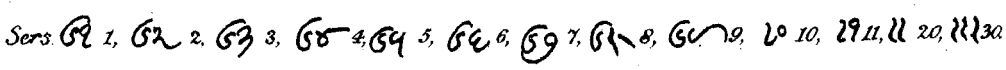
  In some cases, quarter units are marked with the NORTH INDIAN QUARTER MARK, as shown in Figure 1. Figure 25, on the other hand, illustrates the writing of *chaṭāṃk* units without the quarter mark.

Variants The proposed shape of 𑅵 is based on the metal type shown in Figure 28 and the example of the sign shown in Figure 25. Other texts show stylistic variation in the shape of the weight sign. In the specimen

below, Grierson illustrates the writing of *chaṭāṃk* values using the sign ꠸, which is semantically identical to the proposed ꠷:[12]



Grierson's example of *ser* notation uses the sign ꠹:[13]



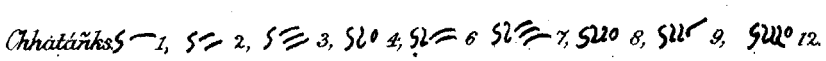
This sign appears visually distinct from ꠷, but semantically identical to the proposed sign, as illustrated in Figure 25. For this reason, ꠹ is considered here as a variant of ꠷ (see 5 for further discussion).

Homoglyphs The weight sign slightly resembles ऽ U+093D DEVANAGARI SIGN AVAGRAHA and it is sometimes indicated by the *avagraha* in printed texts when the correct glyph is absent from the given font (see Figure 21).

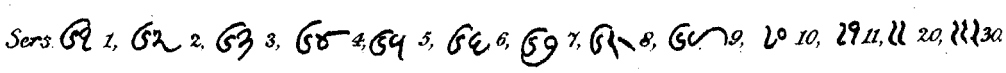
5 Signs Not Proposed

5.1 Weight Marks

Grierson shows the use of two signs for writing weight values. These are the signs ꠸ and ꠹ (see Figure 1 and below). The *chaṭāṃk* values are written with ꠸, which is a variant of the proposed weight mark ꠷:[14]



In examples of *ser* values, Grierson shows the sign ꠹:[15]



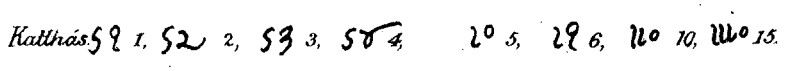
The sign ꠹ is visually distinct from ꠷, but the specimens indicate that they are semantically identical. It may be considered a cursive or swash variant of ꠷, where the left-bound stroke of ꠹ curves upwards and over the body of the sign. Grierson's ꠹ is problematic because it is used only for writing ꠹ values, while ꠸ is used for writing *chaṭāṃk* values. Moreover, the shape of ꠹ in Grierson is uniform and distinct from ꠸. It is, therefore, possible that ꠹ is a unique sign for writing *ser* notation. Scholberg, however, uses the single sign ꠷ for both *ser* and *chaṭāṃk* (see Figure 25). Moreover, while the method of writing weights differ in Grierson and Scholberg, the meaning of the signs and the representative notations are clear. Nevertheless, not enough is known at this time to determine whether ꠹ is a stylistic variation of ꠷ or an independent sign. It is, therefore, not proposed for encoding and assumed to be semantically identical to the proposed weight mark.

[12] Grierson, 1899: Plate IV.
[13] Grierson, 1899: Plate IV.
[14] Grierson, 1899: Plate IV.
[15] Grierson, 1899: Plate IV.

5.2 Measures Marks

Grierson shows two signs used for writing the measurement values *kaṭṭhā* (कट्ठा) and *dhūr* (धूर). These are ꠸ and ꠹, respectively:

Forms of *kaṭṭhā* in Grierson:[16]



Forms of *dhūr* in Grierson:[17]

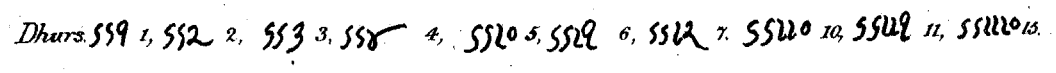


Figure 21 shows the use of *avagraha* to write measures.

There is insufficient information to determine whether ꠸ is an independent sign for the *kaṭṭhā* unit, or if it is a graphical variant of the *chaṭāṃk* sign ꠸ shown in Grierson. If the latter case, then it should be unified with the proposed ꠰.

The sign for the *dhūr* unit, ꠹, appears graphically distinct from ꠰. However, it is unclear whether the sign is an independent sign or a composite character created by writing the *kaṭṭhā* sign ꠸ twice. It is, therefore, not being proposed for encoding at this time.

Measures Notation The system of measure is based on the *bīghā* (बीघा). One *bīghā* is equal to 20 *kaṭṭhā* (कट्ठा), and one *kaṭṭhā* is equal to 20 *dhūr* (धूर).

- The *bīghā* is always indicated using digits. There is no unit sign for the *bīghā*.
- The *kaṭṭhā* is written with a combination of digits and fractions. It is noted with the sign ꠸. Fractions are used to mark every quarter unit and are further indicated by the NORTH INDIAN QUARTER MARK: ꠸꠰ = five *kaṭṭhā*. Other values are indicated with digits: ꠸꠴ = four *kaṭṭhā*; ꠸꠱ = eleven *kaṭṭhā*.

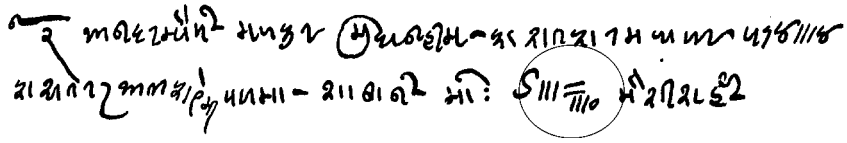
1 *kaṭṭhā*	꠸꠱	6 *kaṭṭhā*	꠸꠰꠱	11 *kaṭṭhā*	꠸꠰꠰꠱	16 *kaṭṭhā*	꠸꠰꠰꠰꠱
2 *kaṭṭhā*	꠸꠲	7 *kaṭṭhā*	꠸꠰꠲	12 *kaṭṭhā*	꠸꠰꠰꠲	17 *kaṭṭhā*	꠸꠰꠰꠰꠲
3 *kaṭṭhā*	꠸꠳	8 *kaṭṭhā*	꠸꠰꠳	13 *kaṭṭhā*	꠸꠰꠰꠳	18 *kaṭṭhā*	꠸꠰꠰꠰꠳
4 *kaṭṭhā*	꠸꠴	9 *kaṭṭhā*	꠸꠰꠴	14 *kaṭṭhā*	꠸꠰꠰꠴	19 *kaṭṭhā*	꠸꠰꠰꠰꠴
5 *kaṭṭhā*	꠸꠰	10 *kaṭṭhā*	꠸꠰꠰	15 *kaṭṭhā*	꠸꠰꠰꠰	1 *bīghā*	꠱

- The *dhūr* is also written with a combination of digits and fractions, identical to the form for the *kaṭṭhā*. It is noted with the sign ꠹.

1 *dhūr*	꠹꠱	6 *dhūr*	꠹꠰꠱	11 *dhūr*	꠹꠰꠰꠱	16 *dhūr*	꠹꠰꠰꠰꠱
2 *dhūr*	꠹꠲	7 *dhūr*	꠹꠰꠲	12 *dhūr*	꠹꠰꠰꠲	17 *dhūr*	꠹꠰꠰꠰꠲
3 *dhūr*	꠹꠳	8 *dhūr*	꠹꠰꠳	13 *dhūr*	꠹꠰꠰꠳	18 *dhūr*	꠹꠰꠰꠰꠳
4 *dhūr*	꠹꠴	9 *dhūr*	꠹꠰꠴	14 *dhūr*	꠹꠰꠰꠴	19 *dhūr*	꠹꠰꠰꠰꠴
5 *dhūr*	꠹꠰	10 *dhūr*	꠹꠰꠰	15 *dhūr*	꠹꠰꠰꠰	1 *kaṭṭhā*	꠸꠱

- Thus, an amount consisting of 13 *bīghā*, 17 kaṭṭhā, and 5 *dhūr* is written ꠱꠳꠸꠰꠰꠱꠹꠰꠰.

[16] Grierson, 1899: Plate IV.
[17] Grierson, 1899: Plate IV.



6 Relationship to Other Indian Notation Systems

6.1 Gujarati Fractions

In 2004, the Government of India presented a proposal (L2/04-358) seeking to encode the fractions one-quarter (૧), one-half (૨), and three-quarters (૩) as part of the Gujarati block under the names GUJARATI SIGN PAO, GUJARATI SIGN AADHO, and GUJARATI SIGN PONO, respectively. The proposal provided an excerpt from a Gujarati newspaper that illustrated the use of fractions in modern Gujarati orthography to denote time (see Figure 29). In his response to the proposal, Eric Muller wrote that the fractions are also used to write quantities than other time.[18] Indeed, as is shown in the present proposal, the fractions are used to write currency, weight, measure, and time values. The use of fractions to denote time is not a practice unique to Gujarati; fractions are also used to denote time in Hindi written in the Devanagari script (see Figure 22 and Figure 23).

The signs proposed by the Government of India — GUJARATI SIGN PAO, GUJARATI SIGN ADDHO, and GUJARATI SIGN PONO — are identical to those proposed here — NORTH INDIAN FRACTION ONE QUARTER, NORTH INDIAN FRACTION ONE QUARTER, and NORTH INDIAN FRACTION THREE QUARTERS — respectively. Therefore, the three Gujarati fractions should not be encoded separately in the Gujarati block, but should be unified with the signs proposed here and the code charts commented to reference the regional equivalences. Moreover, the uniform structure and semantics of fractions in Devanagari and Gujarati scripts further support the recommendation that such accounting signs be encoded in a script-independent block suitable for use in all Indic scripts as necessary.

6.2 Bengali Currency Signs

Besides the north Indian accounting system, there exists an equally complete system in Bengal as well.[19] Bengali has several script-specific signs for currency notation, which are already encoded in the UCS:

- ৲ U+09F2 BENGALI RUPEE MARK
- ৳ U+09F3 BENGALI RUPEE SIGN
- ৴ U+09F4 BENGALI CURRENCY NUMERATOR ONE
- ৵ U+09F5 BENGALI CURRENCY NUMERATOR TWO
- ৶ U+09F6 BENGALI CURRENCY NUMERATOR THREE
- ৷ U+09F7 BENGALI CURRENCY NUMERATOR FOUR
- ৸ U+09F8 BENGALI CURRENCY NUMERATOR ONE LESS THAN THE DENOMINATOR
- ৹ U+09F9 BENGALI CURRENCY DENOMINATOR SIXTEEN

A brief discussion of Bengali currency notation is made here for purposes of illustrating the differences between it and the north Indian system.

[18] Muller, 2004.

[19] A comprehensive description of the Bengali accounting system and its accompanying notation is given by Nathaniel Brassey Halhed in his *A Grammar of the Bengal Language* (Hoogly, Bengal, 1778: 166–177).

- Similar to the north Indian system, the Bengali system has the units *rupayā* (রুপয) [or *ṭākā* (টাকা)], *ānā* (আনা), and *pāī* (পাঈ).

- The *rupayā* unit is marked with ৲ U+09F2 BENGALI RUPEE MARK. It is written after the *rupayā* value: ৭৲ = "7 *rupayā*."

- The *ānā* unit is marked with ◦ U+09F9 BENGALI CURRENCY DENOMINATOR SIXTEEN. It is written after the *ānā* value. Currency enumerators, not fractions, are used to denote quarter and mixed values:

1 *ānā*	৴◦	5 *ānā*	।৴◦	9 *ānā*	।।৴◦	13 *ānā*	৸৴◦
2 *ānā*	৵◦	6 *ānā*	।৵◦	10 *ānā*	।।৵◦	14 *ānā*	৸৵◦
3 *ānā*	৶◦	7 *ānā*	।৶◦	11 *ānā*	।।৶◦	15 *ānā*	৸৶◦
4 *ānā*	।◦	8 *ānā*	।।◦	12 *ānā*	৸◦	1 *rupayā*	১৲

  This system differs from north Indian notation, in which the *ānā* is always written using fractions:

1 *ānā*	৷	5 *ānā*	।৷	9 *ānā*	।।৷	13 *ānā*	।।।৷
2 *ānā*	৸	6 *ānā*	।৸	10 *ānā*	।।৸	14 *ānā*	।।।৸
3 *ānā*	৹	7 *ānā*	।৹	11 *ānā*	।।৹	15 *ānā*	।।।৹
4 *ānā*	৺	8 *ānā*	।।	12 *ānā*	।।।	1 *rupayā*	৻

- There is a unit sign for *pāī* (৻), which is not encoded in the UCS. It is no longer used and appears to be rare; the present author has seen the Bengali *pāī* mark in only one printed specimen, which is shown in Figure 31. In the specimen, the Bengali *pāī* unit is based on 20 *pāī* in 1 *ānā*. The *pāī* value is written using digits and is always written after the *pāī* mark:

1 *pāī*	১	6 *pāī*	৬	11 *pāī*	১১	16 *pāī*	১৬
2 *pāī*	২	7 *pāī*	৭	12 *pāī*	১২	17 *pāī*	১৭
3 *pāī*	৩	8 *pāī*	৮	13 *pāī*	১৩	18 *pāī*	১৮
4 *pāī*	৪	9 *pāī*	৯	14 *pāī*	১৪	19 *pāī*	১৯
5 *pāī*	৫	10 *pāī*	১০	15 *pāī*	১৫	1 *ānā*	◦

  In the north Indian system, there are 12 *pāī* (पाई) in 1 *ānā*. The *pāī* is written using a combination of digits and fractions and is also always written after the *ānā* mark. Each quarter *pāī* is marked with a quarter fraction. Mixed values are obtained by writing either the digit one or the digit two after the appropriate quarter fraction:

1 *pāī*	⁻	4 *pāī*	।⁻	7 *pāī*	।।⁻	10 *pāī*	।।।⁻
2 *pāī*	⁼	5 *pāī*	।⁼	8 *pāī*	।।⁼	11 *pāī*	।।।⁼
3 *pāī*	।	6 *pāī*	।।	9 *pāī*	।।।	1 *ānā*	৷

- Only one currency sign is used when multiple units are written. This sign is typically the sign for the smallest unit. When *rupayā* and *ānā* values are written together, the Bengali rupee mark is dropped and only the *ānā* mark is used: "15 *rupayā* and 3 *ānā*" is written as ১৫৹◦, not as ১৫৲৹◦ or ১৫৲৹. When *rupayā*, *ānā*, and *pāī* are written together, only the *pāī* mark is used: "27 *rupayā*, 6 *ānā*, and 5 *pāī*" is correctly written as ২৭।৵৫.

While the accounting notation system of Bengali is different from the north Indian system, the fractions one-quarter (।), one-half (।।), and three-quarters (।।।) are used in the Bengali script when writing conversions of the Bengali currency system to the north Indian (see Figure 31). The equivalences between the north Indian and Bengali methods of indicating fractions are:

- ⁻ NORTH INDIAN FRACTION ONE SIXTEENTH = ৴ U+09F4 BENGALI CURRENCY NUMERATOR ONE

- = NORTH INDIAN FRACTION ONE EIGHTH = ৵ U+09F5 BENGALI CURRENCY NUMERATOR TWO
- ≡ NORTH INDIAN FRACTION THREE SIXTEENTHS = ৶ U+09F6 BENGALI CURRENCY NUMERATOR THREE
- । NORTH INDIAN FRACTION ONE QUARTER = ৷ U+09F7 BENGALI CURRENCY NUMERATOR FOUR
- ॥ NORTH INDIAN FRACTION ONE HALF is produced by writing ৷ U+09F7 BENGALI CURRENCY NUMERATOR FOUR twice
- ||| NORTH INDIAN FRACTION THREE QUARTERS = ৸ U+09F8 BENGALI CURRENCY NUMERATOR ONE LESS THAN THE DENOMINATOR

6.3 Malayalam Fractions and Letter-Numerals

Numerical notation in South Indian scripts is represented through the the decimal system (*aṅgapalli*) and an alphabetic system (*akṣarapalli*). The decimal system corresponds to the Arabic digits, while the alphabetic system uses the letters of a script to represent numbers. N. Ganesan submitted a proposal (L2/06-260) to encode Malayalam fractions and letter-numerals in the UCS within a block named "South Indian Supplement." The manner of representing numerical notation in Malayalam differs significantly from the North Indian scripts. For example, ന U+0D28 MALAYALAM LETTER NA represents '1'. Malayalam fractions are also written in a fashion entirely distinct from the north Indian method. See Figure 34 and Figure 35.

6.4 Raqm Digits

The name <raqm> *raqm* is an Arabic word meaning to write. It is used in Urdu for the keeping of accounts. In Raqm, there are distinct signs for the digits 1–9, 10–90, 100–900, 1,000–9,000, and 10,000—90,000. The digit 1 is written عمم , 2 is عصا , 3 is ـب , etc.; 10 is عـه , 20 is عـه ; 30 is بـه , etc.; 100 is ما , 200 is مالا , 300 is عما , etc.; 1,000 is الـ , 2,000 is عـ , 3,000 is مـ ; 10,000 is عـ , 20,000 is عـ , 30,000 is بـ . A table of the Raqm digits is shown in Figure 36.

The Raqm digits one through nine are based, for the most part, on the initial letters of the Arabic names for the numbers. The initial letters are identifiable in the Raqm digits one through nine, but the remainder of the form is a stylized abbreviation. The primary unit digits have alternate shapes when they are used for writing mixed units.

Raqm also has four signs for writing fractions and a rupee mark. The fraction ¼ is indicated by the sign ‾; the fraction ½ by the sign ˙; the fraction ¾ by the sign ∸; and a whole by the sign ˈ. The rupee mark is ∕.

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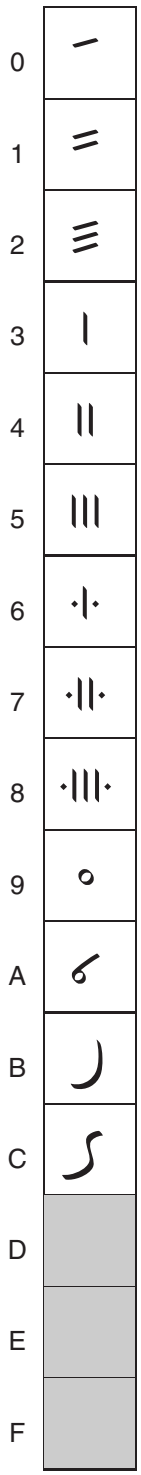



```
xx00;NORTH INDIAN FRACTION ONE SIXTEENTH;No;0;L;;;;1/16;N;;;;;
xx01;NORTH INDIAN FRACTION ONE EIGHTH;No;0;L;;;;1/8;N;;;;;
xx02;NORTH INDIAN FRACTION THREE SIXTEENTHS;No;0;L;;;;3/16;N;;;;;
xx03;NORTH INDIAN FRACTION ONE QUARTER;No;0;L;;;;1/4;N;;;;;
xx04;NORTH INDIAN FRACTION ONE HALF;No;0;L;;;;1/2;N;;;;;
xx05;NORTH INDIAN FRACTION THREE QUARTERS;No;0;L;;;;3/4;N;;;;;
xx06;NORTH INDIAN INDEPENDENT FRACTION ONE QUARTER;No;0;L;;;;1/4;N;;;;;
xx07;NORTH INDIAN INDEPENDENT FRACTION ONE HALF;No;0;L;;;;1/2;N;;;;;
xx08;NORTH INDIAN INDEPENDENT FRACTION THREE QUARTERS;No;0;L;;;;3/4;N;;;;;
xx09;NORTH INDIAN QUARTER MARK;So;0;L;;;;;N;;;;;
xx0A;NORTH INDIAN PLACEHOLDER MARK;So;0;L;;;;;N;;;;;
xx0B;NORTH INDIAN RUPEE MARK;Sc;0;ET;;;;;N;;;;;
xx0C;NORTH INDIAN WEIGHT MARK;So;0;ET;;;;;N;;;;;
```

Table 1: Glyph chart and character names and properties for the North Indian Accounting Signs.

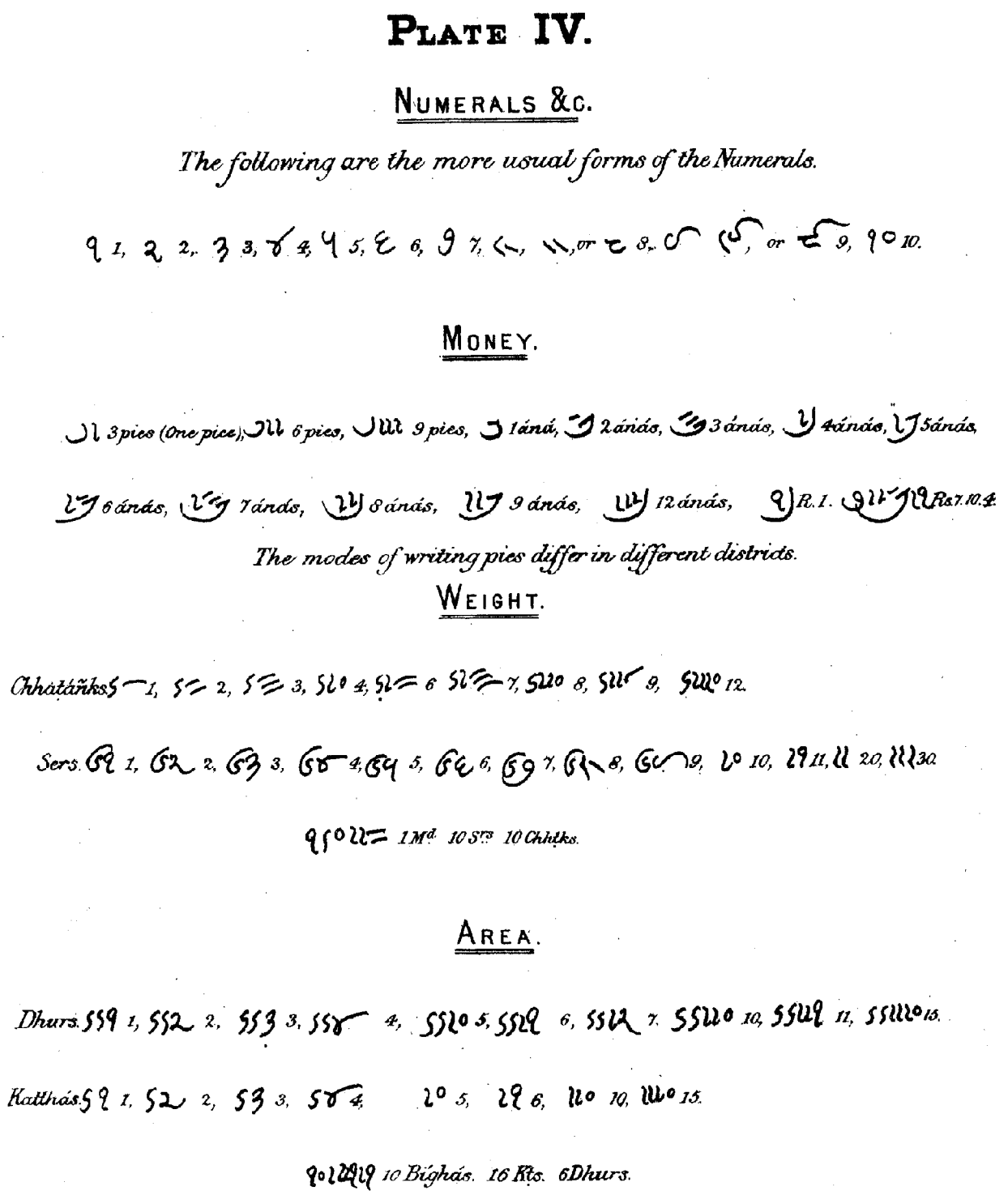


Figure 1: Currency, weights, and measures signs that appear in Kaithi documents (from Grierson, 1899: Plate IV).

The leading feature in Indian arithmetic being the division by four, the signs for fractions are adapted thereto. The rupee is divided into 4 × 4 = 16, parts called *ānā*, which are thus designated (units of all kinds are also thus divided) —

1 *ānā* or $\frac{1}{16}$	⁄)	9 *ānās*	||⁄)
2 *ānās*	⁄)	10 *ānās*	||⁄)
3 *ānās*	⁄)	11 *ānās*	||⁄)
4 *ānās*	)	12 *ānās*	||)
5 *ānās*	⁄)	13 *ānās*	|||⁄)
6 *ānās*	⁄)	14 *ānās*	|||⁄)
7 *ānās*	⁄)	15 *ānās*	|||⁄)
8 *ānās*	|)	One rupee	૧) .

Figure 2: System of notating currency in Kaithi using fractions and the currency symbol (from Grierson, 1903b: 9). Compare to fractional forms given in figure 1.

४. पाढे इ.

पाढे म्हणण्याची रीत

२ × १ = २	अे एेका अे	बे एके बे
२ × २ = ४	अे दुु चार	बे दुणे चार
२ × ३ = ६	अे तरी छ	बे त्रीक सहा
२ × ४ = ८	अे चोक आठ	बे चोक आठ
२ × ५ = १०	अे पंचा दस	बे पंचे दहा
२ × ६ = १२	अे छक बार	बे सक बारा
२ × ७ = १४	अे साता चौद	बे साते चौदा
२ × ८ = १६	अे अठा सोळ	बे आठे सोळा
२ × ९ = १९	अे नवा अढार	बे नवे अठरा
२ × १० = २०	अे दान वीस	बे दाहे वीस

निमकी (अर्धाना आंक)

१ × ·||· = ·||·	अेक अर्धे अर्धो	एक निम्मे निम्मे
२ × ·||· = १	अे अर्धे अेक	बे निम्मे एक
३ × ·||· = १||	तीन अर्धे दीढ	तीन निम्मे दीड
४ × ·||· = २	चार अर्धे अे	चार निम्मे दोन
५ × ·||· = २||	पांच अर्धे अढी	पांच निम्मे अडीच
६ × ·||· = ३	छ अर्धे त्रण	सहा निम्मे तीन
७ × ·||· = ३||	सात अर्धे साडात्रण	सात निम्मे साडेतीन
८ × ·||· = ४	आठ अर्धे चार	आठ निम्मे चार
९ × ·||· = ४||	नव अर्धे साडाचार	नऊ निम्मे साडेचार
१० × ·||· = ५	दसे अर्धे पांच	दहा निम्मे पांच

व्यवहारांतील पूर्णांक-अपूर्णांक

·|·	पा	पाव	१|	सवा	सव्वा	२|	सवाअे	सव्वादोन
·||·	अर्धो	अर्धा, निम्मा	१||	दोढ	दीड	२||	अढी	अडीच
·|||·	पोणो	पाऊण	१|||	पोणाअे	पावणेदोन	२|||	पोणात्रण	पावणेतीन

Figure 3: Excerpt from a Gujarati-Marathi dictionary showing the forms of regular and independent fractions in Gujarati and Devanagari (from Dharmadhikari, 1967: 436.

The numerical signs in Gujarātī are: ૧, ૨, ૩, ૪, ૫, ૬, ૭, ૮, ૯, ૧૦, = 1, 2, 3, &c. Fractions are written thus:—$\frac{1}{4}$ = ol; $\frac{1}{2}$ = oll; $\frac{3}{4}$ = olll; as $1\frac{1}{2}$ = ૧ll; $3\frac{3}{4}$ = ૩lll.

Figure 4: An excerpt from a Gujarati grammar showing the writing of fractions after a zero (from Tisdall, 1961: 86).

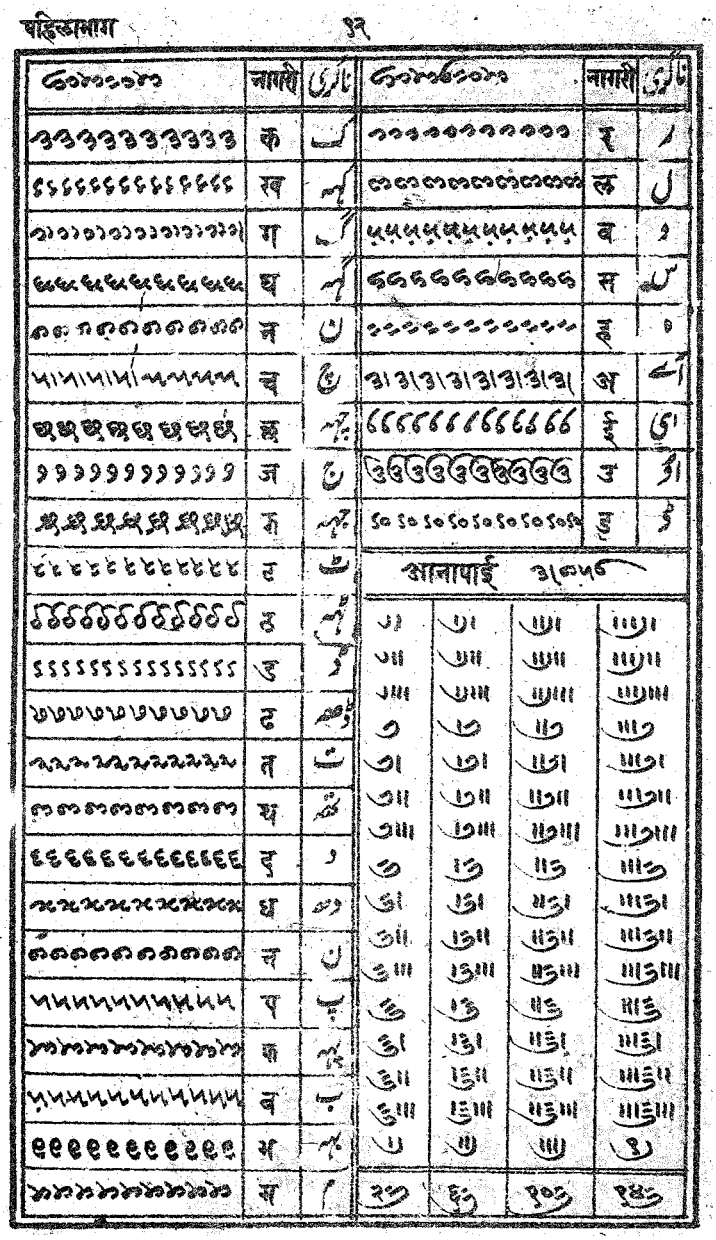


Figure 5: A specimen showing the use of fractions and the currency symbol to write *ānā* and *pāī* in the Mahajani script (from *Mahājanīsārahissāavvalavadoyama*: 12).

स्वाध्याय के लिए चुनी हुई पुस्तकें

वैदिक साहित्य

वैदिक विनय १,२,३ भाग	श्री अभय	१॥),२॥),२॥)
वैदिक ब्रह्मचर्य-गीत	श्री अभय	२)
ब्राह्मण की गौ	श्री अभय	।॥)
वैदिक अध्यात्म विद्या	श्री भगवद्दत्त	१।)
वैदिक स्वप्न-विज्ञान	श्री भगवद्दत्त	२)
वेद गीताञ्जली [वैदिक गीतीयां]	श्री वेदव्रत	२)
वैदिक सूक्तियां	श्री रामनाथ	१॥।)
वरुण की नौका [दो भाग]	श्री प्रियव्रत	६)
सोम-सरोवर, सजिल्द, अजिल्द	श्री चमूपति	२), १॥)
अथर्ववेदीय मन्त्र-विद्या	श्री प्रियरत्न	१॥)

धार्मिक साहित्य

सन्ध्या रहस्य	श्री विश्वनाथ	२)
धर्मोपदेश १,२,३ भाग	श्री स्वामी श्रद्धानन्द	१।),१),१॥)
आत्ममीमांसा	श्री नन्दलाल	२)
प्रार्थनावली [प्रेरणा देने वाली प्रार्थनाएं व गीतीयां]		।)
आर्यसमाज और विचार-संसार	श्री चमूपति	।)
कविता मंजरी		।-)
कविता कुसुमाञ्जली		।)

प्रकाशन, मन्दिर, गुरुकुल कांगड़ी विश्वविद्यालय, हरिद्वार।

Figure 6: Pricelist for books showing the use of the rupee mark. Digits and fractions are used to denote rupee and *ānā* values.

'पण्डित-पुस्तकालय काशी' के शुद्ध सुन्दर और सस्ते

संस्कृत महाग्रन्थ—

श्रीमद्भागवत भा० टी० (पत्राकार)	२४)	मनुस्मृति भा० टी०	३)
श्रीमद्भागवत भा० टी० (सजिल्द)	१५)	रुद्री	।=)
श्रीमद्भागवत 'श्रीधरी' संस्कृत टीका	२४)	उपनयनपद्धति भा० टी० (बड़ी)	।॥)
श्रीमद्भागवत 'चूर्णिका' संस्कृत टीका	२४)	अमरकोष संक्षिप्त भा० टी०	१)
भागवत दशमस्कन्ध भा०टी०	८)	(बाणभट्टकृत) कादम्बरी भा० टी० (सम्पूर्ण)	७)
श्रीमद्देवीभागवत भा०टी० पत्राकार	३२)	दुर्गासप्तशती भा० टी०	१)
योगवासिष्ठ भा० टी० सम्पूर्ण	३६)	गरुड़पुराण मूल (सम्पूर्ण)	४)
श्रीमद्वाल्मीकीय रामायण भा० टी०	२४)	गरुड़पुराण 'प्रेतकल्प' भा० टी०	१॥)
वाल्मीकीय सुन्दरकाण्ड भा० टी०	३)	पञ्चतन्त्र भा० टी०	४)
श्रीमद्वाल्मीकीय रामायण मूल	८)	हितोपदेश भा० टी०	१॥)
श्रीमद्देवीभागवत मूल	८)	कालिदासग्रन्थावली भा० टी०	८)
शिवपुराण मूल	१०)	अभिज्ञानशाकुन्तल भा० टी०	२)
आनन्दरामायण भा० टी०	१६)	रघुवंश (मल्लिनाथी टीका) सम्पूर्ण	३)
महाकवि कल्हणकृत राजतरङ्गिणी भाषा टीका	२०)	रघुवंश भा० टी० सम्पूर्ण	३)
कौटिलीय अर्थशास्त्र भा० टी०	८)	मेघदूत मल्लिनाथी तथा भा० टी० सम्पूर्ण	।॥)
बृहत्स्तोत्ररत्नाकर (स्तोत्र-संख्या ४००)	३)	कुमारसम्भव भा० टी० सम्पूर्ण	२)
भैषज्यरत्नावली मूल	४)	रामचरितमानस	३)
शार्ङ्गधरसंहिता भा० टी०	४)	दृष्टान्तदीपक	२)
रसेन्द्रसारसंग्रह भा० टी०	३)	गाँवकी कहानियाँ (लेखक-राहगीर)	१)
माधवनिदान भा० टी०	२॥)	जन्मपत्रफार्म रङ्गीन	५)
भावप्रकाशनिघण्टु सटिप्पण	१॥)	लग्नपत्रिका (बड़ी)	१०) सै०।
नाड़ीज्ञानदर्पण भा० टी०	॥)		

(सर्वत्र मिलते हैं)

Figure 7: Pricelist for books showing the use of the rupee mark. Digits and fractions are used to denote rupee and *ānā* values.

भट्टोजी दीक्षितकृत

प्रौढ मनोरमा

व

त्या ग्रंथावरील शब्दरत्ननामक टीका

यांचें स्त्रीप्रत्ययान्त

मराठींत विस्तृत विवरणासह व प्रक्रियेसह

सुबोध भाषांतर

★

विवरणकर्ता

कै० रावबहादुर ना. दा. वाडेगांवकर, एम्. ए.
सेवानिवृत्त डिस्ट्रिक्ट व सेशन्स जज्ज, नागपूर.

★

किंमत ७॥ रु.

Figure 8: Title page showing the use of fractions to denote price. The abbreviation for the word *rupayā* in Devanagari is used in place of the rupee mark.

श्रीपण्डित-प्रवर-वरदराज-प्रणीता

मध्यसिद्धान्तकौमुदी

प्रभाकरी-विवृति-सहिता परमोपयोगि-परिशिष्ट-विशिष्टा च
हिन्दीभावानुवाद-संवलिता अन्ते प्रश्नोत्तरावलि-सहिता च

सम्पादको विवृतिकारश्च—
पण्डित-श्रीरामनारायणशर्म-तनूजन्मा
श्रीविश्वनाथशास्त्री 'प्रभाकरः'
(प्रिंसिपल, श्रीसरस्वती-संस्कृत-कालेज खन्ना पञ्जाब)
उपसम्पादकः परिशिष्टकारश्च—
कविकान्तः श्रीनिगमानन्दशास्त्री हिन्दीप्रभाकरो विद्यालङ्कारः

प्रकाशकः
मोतीलाल बनारसीदास
पो० ब० ७५ वाराणसी
(बनारस)

द्वितीयं संस्करणम् २०००

सन् १९५६ ई०

मूल्यम् ५॥)

Figure 9: Title page showing the use of the rupee mark and fractions to denote price.

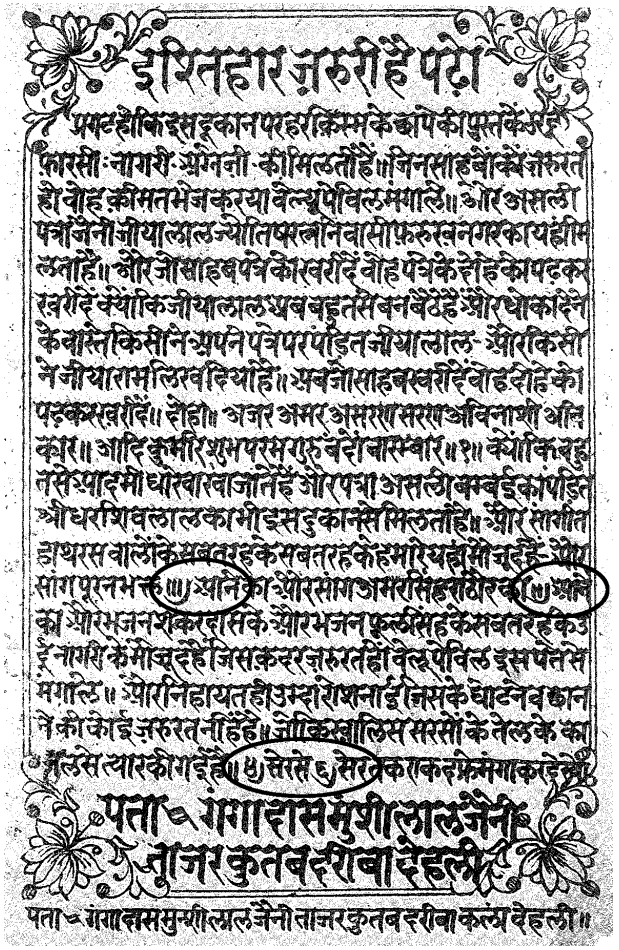
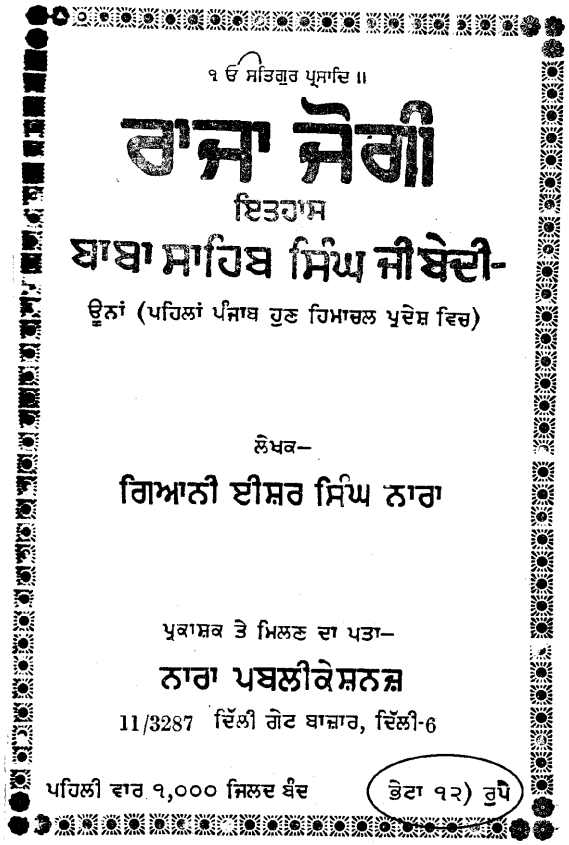


Figure 10: The use of the rupee mark in Devanagari text (*Mahājanīsārahissāavvalavadoyama*: 49).



ੴ ਸਤਿਗੁਰ ਪ੍ਰਸਾਦਿ ॥

ਰਾਜਾ ਜੋਗੀ

ਇਤਹਾਸ

ਬਾਬਾ ਸਾਹਿਬ ਸਿੰਘ ਜੀ ਬੇਦੀ-

ਊਨਾਂ (ਪਹਿਲਾਂ ਪੰਜਾਬ ਹੁਣ ਹਿਮਾਚਲ ਪ੍ਰਦੇਸ਼ ਵਿਚ)

ਲੇਖਕ–

ਗਿਆਨੀ ਈਸ਼ਰ ਸਿੰਘ ਨਾਰਾ

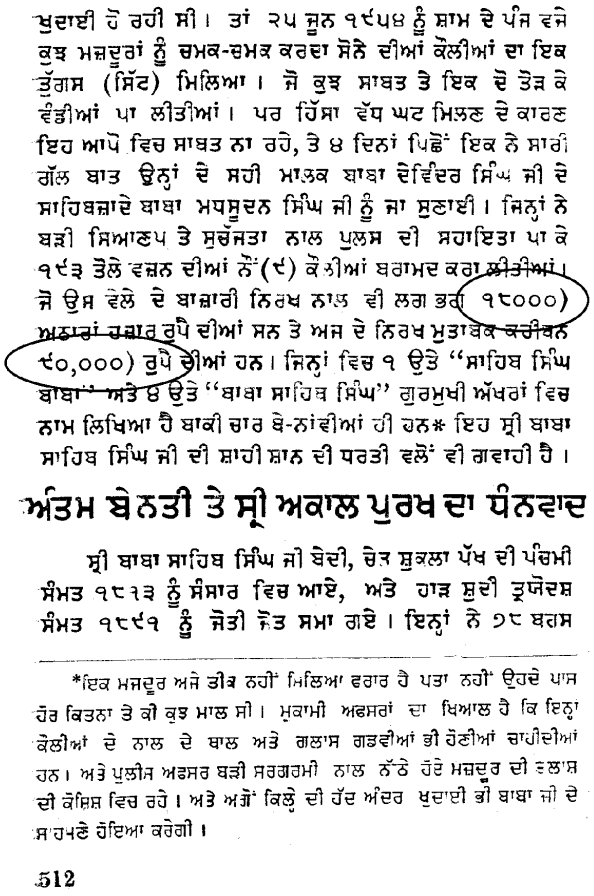
ਪ੍ਰਕਾਸ਼ਕ ਤੇ ਮਿਲਣ ਦਾ ਪਤਾ–

ਨਾਰਾ ਪਬਲੀਕੇਸ਼ਨਜ਼

11/3287 ਦਿੱਲੀ ਗੇਟ ਬਾਜ਼ਾਰ, ਦਿੱਲੀ-6

ਪਹਿਲੀ ਵਾਰ ੧,੦੦੦ ਜਿਲਦ ਬੰਦ ਭੇਟਾ ੧੨) ਰੁਪੈ

Figure 11: Title page showing the use of the rupee mark and fractions to denote price in the Gurmukhi script. Here both the rupee mark and the abbreviation for rupee are printed.



ਖੁਦਾਈ ਹੋ ਰਹੀ ਸੀ। ਤਾਂ ੨੫ ਜੂਨ ੧੯੫੪ ਨੂੰ ਸ਼ਾਮ ਦੇ ਪੰਜ ਵਜੇ ਕੁਝ ਮਜ਼ਦੂਰਾਂ ਨੂੰ ਚਮਕ-ਚਮਕ ਕਰਦਾ ਸੋਨੇ ਦੀਆਂ ਕੋਲੀਆਂ ਦਾ ਇਕ ਤੁੰਗਸ (ਸਿੱਟ) ਮਿਲਿਆ। ਜੋ ਕੁਝ ਸਾਬਤ ਤੇ ਇਕ ਦੋ ਤੋੜ ਕੇ ਵੰਡੀਆਂ ਪਾ ਲੀਤੀਆਂ। ਪਰ ਹਿੱਸਾ ਵੱਧ ਘਟ ਮਿਲਣ ਦੇ ਕਾਰਣ ਇਹ ਆਪੋ ਵਿਚ ਸਾਬਤ ਨਾ ਰਹੇ, ਤੇ ੪ ਦਿਨਾਂ ਪਿਛੋਂ ਇਕ ਨੇ ਸਾਰੀ ਗੱਲ ਬਾਤ ਉਨ੍ਹਾਂ ਦੇ ਸਹੀ ਮਾਲਕ ਬਾਬਾ ਦੇਵਿੰਦਰ ਸਿੰਘ ਜੀ ਦੇ ਸਾਹਿਬਜ਼ਾਦੇ ਬਾਬਾ ਮਧਸੂਦਨ ਸਿੰਘ ਜੀ ਨੂੰ ਜਾ ਸੁਣਾਈ। ਜਿਨ੍ਹਾਂ ਨੇ ਬੜੀ ਸਿਆਣਪ ਤੇ ਸੁਚੱਜਤਾ ਨਾਲ ਪੁਲਸ ਦੀ ਸਹਾਇਤਾ ਪਾ ਕੇ ੧੯੩ ਤੋਲੇ ਵਜ਼ਨ ਦੀਆਂ ਨੌਂ(੯) ਕੋਲੀਆਂ ਬਰਾਮਦ ਕਰਾ ਲੀਤੀਆਂ। ਜੋ ਉਸ ਵੇਲੇ ਦੇ ਬਾਜ਼ਾਰੀ ਨਿਰਖ ਨਾਲ ਵੀ ਲਗ ਭਗ ੧੮੦੦੦) ~~ਅਠਾਰਾਂ ਹਜ਼ਾਰ~~ ਰੁਪੈ ਦੀਆਂ ਸਨ ਤੇ ਅਜ ਦੇ ਨਿਰਖ ਮੁਤਾਬਕ ~~ਕਰੀਬਨ~~ ੯੦,੦੦੦) ਰੁਪੈ ਦੀਆਂ ਹਨ। ਜਿਨ੍ਹਾਂ ਵਿਚ ੧ ਉਤੇ "ਸਾਹਿਬ ਸਿੰਘ ~~ਬਾਬਾ~~" ~~ਅਤੇ ੪~~ ਉਤੇ "ਬਾਬਾ ਸਾਹਿਬ ਸਿੰਘ" ਗੁਰਮੁਖੀ ਅੱਖਰਾਂ ਵਿਚ ਨਾਮ ਲਿਖਿਆ ਹੈ ਬਾਕੀ ਚਾਰ ਬੇ-ਨਾਂਵੀਆਂ ਹੀ ਹਨ* ਇਹ ਸ੍ਰੀ ਬਾਬਾ ਸਾਹਿਬ ਸਿੰਘ ਜੀ ਦੀ ਸ਼ਾਹੀ ਸ਼ਾਨ ਦੀ ਧਰਤੀ ਵਲੋਂ ਵੀ ਗਵਾਹੀ ਹੈ।

ਅੰਤਮ ਬੇਨਤੀ ਤੇ ਸ੍ਰੀ ਅਕਾਲ ਪੁਰਖ ਦਾ ਧੰਨਵਾਦ

ਸ੍ਰੀ ਬਾਬਾ ਸਾਹਿਬ ਸਿੰਘ ਜੀ ਬੇਦੀ, ਚੇਤ ਸ਼ੁਕਲਾ ਪੱਖ ਦੀ ਪੰਚਮੀ ਸੰਮਤ ੧੮੧੩ ਨੂੰ ਸੰਸਾਰ ਵਿਚ ਆਏ, ਅਤੇ ਹਾੜ ਸੁਦੀ ਤ੍ਰਯੋਦਸ਼ ਸੰਮਤ ੧੯੮੧ ਨੂੰ ਜੋਤੀ ਜੋਤ ਸਮਾ ਗਏ। ਇਨ੍ਹਾਂ ਨੇ ੭੮ ਬਰਸ

*ਇਕ ਮਜਦੂਰ ਅਜੇ ਤੀਕ ਨਹੀਂ ਮਿਲਿਆ ਫਰਾਰ ਹੈ ਪਤਾ ਨਹੀਂ ਉਹਦੇ ਪਾਸ ਹੋਰ ਕਿਤਨਾ ਤੇ ਕੀ ਕੁਝ ਮਾਲ ਸੀ। ਮੁਕਾਮੀ ਅਫਸਰਾਂ ਦਾ ਖਿਆਲ ਹੈ ਕਿ ਇਨ੍ਹਾ ਕੋਲੀਆਂ ਦੇ ਨਾਲ ਦੇ ਥਾਲ ਅਤੇ ਗਲਾਸ ਗਡਵੀਆਂ ਭੀ ਹੋਣੀਆਂ ਚਾਹੀਦੀਆਂ ਹਨ। ਅਤੇ ਪੁਲੀਸ ਅਫਸਰ ਬੜੀ ਸਰਗਰਮੀ ਨਾਲ ਨੱਠੇ ਹੋਏ ਮਜ਼ਦੂਰ ਦੀ ਤਲਾਸ਼ ਦੀ ਕੋਸ਼ਿਸ਼ ਵਿਚ ਰਹੇ। ਅਤੇ ਅਜੋਂ ਕਿਲ੍ਹੇ ਦੀ ਹੱਦ ਅੰਦਰ ਖੁਦਾਈ ਭੀ ਬਾਬਾ ਜੀ ਦੇ ਸਾਹਮਣੇ ਹੋਇਆ ਕਰੇਗੀ।

512

Figure 12: The use of the rupee mark in Gurmukhi text (from Nārā, 1973: 512).

170. In bookkeeping the following symbols are made use of by the Bunneahs to represent pice, annas, and rupees (3 pies=1 pice, 4 pice=1 anna, 16 annas=1 rupee).

one pice, two pice, three pice; one anna, two annas, three annas, four annas, eight annas, twelve annas, five annas and one pice, six annas and two pice, fifteen annas and three pice; one rupee, fifty rupees and eight annas; six hundred and thirty-four rupees ten annas and nine pies.

Figure 13: from Green, 1895: 153

रुपया rupee; आना anna; पैसा pice (- 3 pies). १)=Re. 1; ।)= 4 annas; -) = 1 anna,)। = 1 pice.

४।≡)॥ = Rs. 4-7.6; १२॥-)॥। = Rs. 12-9-9 ॥।=)। = Re. 0-14-3.

I tola (तोला) = 1 rupee weight; 5 tolas = chhatak (छटाँक); 16 chhataks = 1 seer (सेर); 40 seers = 1 maund (मन)।

Figure 14: from Vajpeyee, 1946: 24.

The following illustrate the method of writing down rupees, annas, and pice:—

For rupees, the number is written with this mark after it. =5 Rs. =2 Rs.

For annas, a small horizontal or oblique stroke signifies 1 anna, a perpendicular stroke 4 annas, written in the same way before the mark .

Thus or is 1 anna, or is 3 annas, is 4 annas, is 6 annas, is 15 annas, etc.

Pice are indicated by similar horizontal strokes written to the right hand of this . Thus is 2 pice. is 1 pice. is Rs. 2-8-0. is Rs. 4-10-9.

It should be noticed that, in expressing Indian money in English, the number of *pice* is never written, but the number of *pie*. Rs. 5-4-3 means 5 rupees, four annas, 3 pies (*i.e.*, 1 pice), *not* 3 pice.

Figure 15: Excerpt from a Hindi grammar showing the variant forms of writing fractions (from Greaves, 1921: 423–424).

(80)

55	५५ पंचावन्न.	72	७२ बाहत्तर.	89	८९ एकुणनव्वद.
56	५६ छपन्न.	73	७३ त्र्याहत्तर.	90	९० नव्वद.
57	५७ सत्तावन्न.	74	७४ चौऱ्याहत्तर.	91	९१ एक्याण्णव.
58	५८ अठ्ठावन्न	75	७५ पंचाहत्तर.	92	९२ ब्याण्णव.
59	५९ एकुणसाठ.	76	७६ शाहत्तर.	93	९३ त्र्याण्णव.
60	६० साठ.	77	७७ सत्याहत्तर.	94	९४ चौऱ्याण्णव.
61	६१ एकसष्ट.	78	७८ अठ्याहत्तर.	95	९५ पंचाण्णव.
62	६२ बासष्ट.	79	७९ एकुणऐंशी.	96	९६ शाण्णव.
63	६३ त्रेसष्ट.	80	८० ऐंशी.	97	९७ सत्याण्णव.
64	६४ चौसष्ट.	81	८१ एक्यायशी.	98	९८ अठ्याण्णव.
65	६५ पांसष्ट.	82	८२ ब्यायशी.	99	९९ नव्याण्णव.
66	६६ सासष्ट.	83	८३ त्र्यायशी.	100	१०० शंभर.
67	६७ सदसष्ट.	84	८४ चौऱ्यायशी.	101	१०१ एकशें एक.
68	६८ अडसष्ट.	85	८५ पंचायशी.	102	१०२ एकशें दोन.
69	६९ एकुणहत्तर.	86	८६ शायशी.	200	२०० दोनशें.
70	७० सत्तर.	87	८७ सत्यायशी.	300	३०० तीनशें.
71	७१ एकाहत्तर.	88	८८ अठ्यायशी.	1,000	१,००० हजार.

10,000 १०,००० दहा हजार. 10,00,000 १०,००,००० दहा लाख.
1,00,000 १,००,००० लाख. 1,00,00,000 १,००,००,००० कोटी.

Fractions.

$\frac{1}{4}$	।· पाव.	$2\frac{3}{4}$	२॥। पावणेतीन.	$\frac{1}{2}$	$\frac{1}{2}$ एकद्वितीयांश.
$\frac{1}{2}$	।।· अर्धा.	$3\frac{1}{4}$	३। सवातीन.	$\frac{1}{3}$	$\frac{1}{3}$ एकतृतीयांश.
$\frac{3}{4}$	।।।· पाऊण.	$3\frac{1}{2}$	३।। साडेतीन.	$\frac{1}{4}$	$\frac{1}{4}$ एकचतुर्थांश.
$1\frac{1}{4}$	१। सव्वा.	$3\frac{3}{4}$	३॥। पावणेचार.	$\frac{1}{5}$	$\frac{1}{5}$ एकपंचमांश.
$1\frac{1}{2}$	१।। दीड.	$4\frac{1}{4}$	४। सवाचार.	$\frac{1}{6}$	$\frac{1}{6}$ एकशष्ठांश.
$1\frac{3}{4}$	१॥। पावणेदोन.	$4\frac{1}{2}$	४।। साडेचार.	$\frac{1}{7}$	$\frac{1}{7}$ एकसप्तमांश.
$2\frac{1}{4}$	२। सवादोन.	$4\frac{3}{4}$	४॥। पावणेपांच.	$\frac{1}{8}$	$\frac{1}{8}$ एकअष्टमांश.
$2\frac{1}{2}$	२।। अडीच.			$\frac{1}{10}$	$\frac{1}{10}$ एकदशांश.

These numerals generally take आ in the crude form, but दोन, तीन and चार are changed to दोहों, तिहीं, and चोहों, and when they refer to persons they assume दोघे, तिघे, चौघे for masculine, -घी for feminine, -घें for neuter.

Figure 16: An excerpt from a Marathi grammar showing the writing of fractions (from Bhide, 1889: 80).

80 THE ADJECTIVE. [§ 143—

Fractional Numbers.

$\frac{1}{4}$	.I. पाव.
$\frac{1}{2}$	.II. अर्धा-धीं-धें, &c.
$\frac{3}{4}$	.III. पाऊण
$1\frac{1}{4}$	१। सव्वा.
$1\frac{1}{2}$	१॥. दीड.
$1\frac{3}{4}$	१।।। पावणेदोन, पाउणेदोन.
$2\frac{1}{4}$	२। सव्वादोन.
$2\frac{1}{2}$	२॥. अडीच.
$2\frac{3}{4}$	२।।। पावणेतीन, पाउणेतीन.
$3\frac{1}{4}$	३। सव्वातीन.
$3\frac{1}{2}$	३॥. साडेतीन.
$3\frac{3}{4}$	३।।। पावणेचार, पाउणेचार.

§ 143. The numbers from three and onwards are regularly denominated. Like **सव्वातीन** ($3\frac{1}{4}$) we have **सवाचार** ($4\frac{1}{4}$), **सवापांच** ($5\frac{1}{4}$), and so on. The words **सव्वा** and **दीड** prefixed to the cardinal signify $\frac{1}{4}$ and $\frac{1}{2}$ plus, while **पाउणे** prefixed to the cardinal, signifies $\frac{1}{4}$ minus. Thus **पावणेदोन** means $2-\frac{1}{4}$ $(-1\frac{3}{4})$; but **सव्वादोन** means $2+\frac{1}{4}$ $(=2\frac{1}{4})$; **साडेतीन** $3+\frac{1}{2}$ $(=3\frac{1}{2})$.

§ 144. The fractionals may be reduced still lower in Maráthì :—

$\frac{1}{4}$ **पाव** a fourth, a quarter.
$\frac{1}{8}$ **अधपाव.**
$1\frac{1}{2}$ of $\frac{1}{4}$ = $\frac{1}{8}$ **दीडपाव.**
$2\frac{1}{2}$ of $\frac{1}{2}$ = $\frac{5}{8}$ **अडीचपाव.**

Note.—One-eight ($\frac{1}{8}$) of a measure is called **नवटांक** or **छटांक.**

§ 145. The fractionals are thus employed with the aggregate numbers:—

पाउणशें (100—$\frac{1}{4}$ of 100) 75.
सव्वाशें (100+$\frac{1}{4}$ of 100) 125.
दीडशें ($1\frac{1}{2}$ of 100) 150.
पाउणेदोनशें (200 —$\frac{1}{4}$ of 100) 175.
सव्वादोनशें (200+ $\frac{1}{4}$ of 100) 225.
अडीचशें. ($2\frac{1}{2}$ of 100) 250.

Figure 17: An excerpt from a Marathi grammar showing variant forms of the independent fractions (from Navalkar, 1925: 80).

Then rupees are written full, pavalis with vertical strokes. annas with horizontal strokes, pice with vertical, and any remaining pies are written fully; *e.g.* 3 Rupees 10 annas 11 pies is equal to 3 Rupees 2 pavalis, 2 annas, 3 pice and 2 pies and is written ३॥=॥॥२. If any item is omitted, the sign ८ (आळी) is inserted, as २ Rupees २ annas is २८= and the sign ८ means 'no pavalis;' But when no rupees are to be written, a zero is put before the pavali stroke.

In reading these figures only rupees, annas, and pies are enunciated, the pavalis being counted in the annas and the pice in the pies, thus ३॥=॥॥२ is read तीन रुपये पावणे अकरा आणे दोन पै.

Figure 18: An excerpt from a Marathi grammar showing the writing of the placeholder mark (from Darby, 1915: 106).

अळो *f* (**अलि** S) A maggot which infests grain and fruit: also a little caterpillar-like creature found upon leaves. 2 A lane, an alley, a row. 3 The mark ◌ (or, among the Gujaráthís, ૦) placed in papers of accounts before any fractional item (of money, measures &c.) indicating the absence of the integral sum or quantity: corresponding, therefore, with our (॥). 4 A cavity

Figure 19: An excerpt from a Marathi dictionary showing the historical variants of the placeholder mark (from Molesworth, 1857).

213. A special notation is employed to denote the subdivisions of the rupee. It is to be observed that the rupee is subdivided into sixteen *áne*, and each *áná* again into four *paise*. These are denoted as follows:—One *paisá*, ⟌।; two *paise*, ⟌॥; three *paise*, ⟌।।।; one *áná*, ⟌; two *áne*, ⟌); three *áne*, ⟌)); four *áne*, ⟌)।; eight *áne*, ⟌)॥; twelve *áne*, ⟌)।।।. These, again, are combined, after the following manner:—Five *áne* and one *paisá*, ⟌)।।; six *áne* and two *paise*, ⟌))॥; eleven *áne* and three *paise*, ⟌))।।।; fourteen *áne* and one *paisá*, ⟌))।; one rupee, ९); thirty rupees and four *áne*, ३०⟌)।; two hundred and thirty-five rupees, seven *áne* and two *paise*, २३५⟌))॥.

Figure 20: from Kellogg, 1893: 147.

सारणी VII : TABLE VII

वर्ग-मान : Measures

स्थानीय : Local		दाशमिक : Metric		ब्रिटिश : British	
एकक	**वर्ग गज**	**वर्ग मीटर**	**हेक्टर**	**वर्ग फुट**	**एकड़**
बिगहा/कुरबा = 20 कट्ठा	3600	3010.058	.301	32400	.7438
कट्ठा = 20 धूर	180	150.494	.01505	1619.9	.03719
धूर = 16 कनमा	9	7.525	.0008	81	.0019
कनमा	0.5625	.4703	.00005	5.0625	.00012
हेक्टर	11960	10000	—	10769	2.471
एकड़	4840	4047	.4046	43559.93	—

A *लेखन*—१।ऽ।।३ = एक बिगहा पाँच कट्ठा तेरह धूर। २।।२ऽ।२ = दू बिगहा बारह कट्ठा सात धूर।

सारणी VIII : TABLE VIII

मुद्रा : Money

नवीन मुद्रा (Current coin)— टाका/रुपैआ = 100 पाइ/पैसा।

प्राचीन मुद्रा (Obsolate coins)— टाका = 16 आना आना = 4 पाइ। दाम = 20 कौड़ी।
सुक्का = 4 आना। पाइ = 5 दाम। कौड़ी = 16 दन्ति।

B *लेखन*—१।।)२।। = एक टाका दस आना दू पाइ। १।)३।।। = एक टाका सात आना तीन पाइ।

Figure 21: A table showing the system of measurement and currency used in north Bihar. The example (A) for writing measurement uses the Devanagari *avagraha* to represent the NORTH INDIAN WEIGHT MARK, while the example (B) for writing currency uses the Latin right-parenthesis to represent the NORTH INDIAN RUPEE MARK (from Jhā, 1999: 691).

2. Číslice **2. Numerical Figures**

० १ (१) २ ३ ४ ५ ६ ७ ८ (८) ९ (९) १० ११ ... १९६३

0 1 1 2 3 4 5 6 7 8 8 9 9 10 11 ... 1963

Pro čtvrthodiny, čtvrtrupie apod. užívá se znaménka ।(srov. § 61,11; § 157,2):

For a quarter of an hour or of a rupee, etc., the sign ।is used (cf. § 61,11; § 157,2):

। = ¼; ।। = ½; ।।। = ¾; १। = 1¼; १।। = 1½; १।।। = 1¾; etc.

***Pozn.* Některé číslice se píší dvojím způsobem. Podoba, která je uvedena v závorkách, byla zavržena konferencí pro reformu devanágarského písma v Lakhnaú 1953.**

***Note.* Some figures have alternative forms. The forms given above in brackets were rejected by the Devanāgarī Script Reform Conference in Lakhnaū, 1953.**

Figure 22: Excerpt from a Hindi grammar indicating that fractions are used for time notation (from Pořízka, 1972: 37).

11. V devanágarském písmě píše se čtvrt značkou ৷ (pro čtvrthodiny, čtvrtrupie ap., srov. § 157,2), půl ॥, tři čtvrti ॥৷. Např.: ৭৷ ‚$1\frac{1}{4}$', ৭॥ ‚$1\frac{1}{2}$', ৭॥৷ ‚$1\frac{3}{4}$' atd.

11. In the Devanāgarī script, a quarter is denoted by the sign ৷ (for a quarter of an hour or of a rupee, etc., cf. § 157,2), half by ॥, three quarters by ॥৷. E. g.: ৭৷ '$1\frac{1}{4}$', ৭॥ '$1\frac{1}{2}$', ৭॥৷ '$1\frac{3}{4}$', etc.

Figure 23: (Pořízka, 1972: 162).

V údajích ceny se píše např.:

Price is written, e.g.:

रु. ५,०० (रु० ५-००) / ५ रु. ‚pět rupií' — 'five rupees'

रु. ५,३० ‚pět rupií 30 nových paisů' — 'five rupees 30 naye paise'.

2. Stará měnová soustava:

1 rupie (रुपया **rup(a)yā** *m.*) = 16 ánů
1 án (आना **ānā** *m.*) = 4 paisy
1 pais (पैसा **paisā** *m.*) = 3 pái
पाई **pāī** *f.* ‚pái'

2. The old coinage system:

1 rupee (रुपया **rup(a)yā** *m.*) = 16 annas
1 anna (आना **ānā** *m.*) = 4 pice
1 pice (पैसा **paisā** *m.*) = 3 pies
पाई **pāī** f. 'pie'.

Značky, kterých se užívá v devanágarském písmě:

৭ ‚jedna rupie' — 'one rupee'
৷ ‚čtvrt rupie' (srov. § 61, 11) — 'a quarter of a rupee' (cf. § 61, 11)
– ‚jeden án' — 'one anna'
৷ ‚čtvrt ánu' (tj. jeden pais) — 'a quarter of an anna' (i.e., one pice)
– ‚jedna pái' — 'one pie'.

Signs used in the Devanāgarī Script:

V anglických textech píší se číslicemi jen rupie, ány a pái:

४ ৷৷ / Rs 4—8—0 (= Rs 4/8/0) ‚4 rupie 8 ánů' — '4 rupees 8 annas'

५ ॥৷– ৷৷– / Rs 5—14—8 (= Rs 5/14/8) ‚5 rupií 14 ánů 8 pái' — '5 rupees 14 annas 8 pies'.

In English texts, figures are only used to denote rupees, annas and pies:

Figure 24: (from Pořízka, 1972: 514).

आदमी मेले में शामिल हुए, 'Nearly a hundred thousand people were at the fair'.

§65. एक is sometimes used where the English would use the indefinite article 'a', but more often it is used when the definite idea of 'one' is desired, as in एक चम्मच लाओ, 'Bring one spoon'; चम्मच लाओ, 'Bring a spoon'.

§66. The idea of 'one or two' is expressed by दो एक; 'two or three' by दो तीन; 'fifteen or twenty' by पन्द्रह बीस; 'four or five' by पाँच चार or by चार पांच; 'five or ten minutes' by एक दस पांच मिनट, etc. These expressions are as irregular as they are indefinite.

§67. The special notation for keeping accounts is of interest to all who go shopping, or who wish to keep accounts. Note that the rupee is divided into four 'four-anna bits' (चौ आने), and a चौ आना into four 'annas', and the anna into four 'pice'. These are then written as follows:—One pice J| ; two pice J|| ; three pice J||| ; one anna -J ; two annas =J ; three annas ≡J ; four annas |J ; five annas |-J ; six annas |=J ; seven annas |≡J ; eight annas ||J ; twelve annas |||J ; fifteen annas |||≡J ; one rupee १J. Combinations are made in this way:—five annas and one pice |-J| ; six annas and two pice |=J|| ; seven annas and three pice |≡J||| ; eleven

annas and three pice ||≡J||| ; two rupees, fourteen annas and one pice २|||=J| ; seventy-five rupees, ten annas and three pice ७५||=J|||. Care must be taken when writing these out in the English notations: here the full number of annas is written out, and instead of pice we take account of pies. The pice must be multiplied by three to get the right number of pies.

§68. Weights have a similar notation beginning with one chhatank (छटाँक). The table of weights followed in a large part of India is as follows:—

5 tolas (तोले) equals one chhatank.
4 chhatanks equals one pao (पाव).
16 chhatanks equals one seer (सेर).
40 seers equals one maund (मन).

(*a*) The following illustrates the system of weight notation:—

one chhatank,	एक छटांक	ʃ-
2 chhatank,	दो छटांक	ʃ=
3 chhatank,	तीन छटांक	ʃ≡
one pao,	एक पाव	ʃ|
1¼ pao,	सवा पाव	ʃ|-
1½ pao,	डेढ़पाव	ʃ|=
1¾ pao,	पौने दो पाव	ʃ|≡
2 pao,	दो पाव	ʃ||

2¼ pao,	सवा दो पाव	ʃ||-
2½ pao,	ढाई पाव	ʃ||=
2¾ pao,	पौने तीन पाव	ʃ||≡
3 pao,	तीन पाव	ʃ|||
3¼ pao,	सवा तीन पाव	ʃ|||-
3½ pao,	साढ़े तीन पाव	ʃ|||=
3¾ pao,	पौने चार पाव	ʃ|||≡
one seer,	एक सेर	ʃ१
9 seer,	नौ सेर	ʃ९
10 seer,	दस सेर	|ʃ
11 seer,	ग्यारह सेर	|ʃ१
19 seer,	उन्नीस सेर	|ʃ९
20 seer,	बीस सेर	||ʃ
21 seer,	इक्कीस सेर	||ʃ१
29 seer,	उन्तीस सेर	||ʃ९
30 seer,	तीस सेर	|||ʃ
31 seer,	इकतीस सेर	|||ʃ१
39 seer,	उनतालीस सेर	|||ʃ९
one maund,	एक मन	१ʃ

(*b*) Combinations may be made as follows:—
18 seer, 2 pao and 3 chhatank is |ʃ८||≡
2 maund, 25 seer, 3 pao, 1 chhatank is २||ʃ५|||-.

§69. The ordinals (क्रमबोधक) up to 'sixth' are irregular, as follows:—पहला or पहिला 'first'; दूसरा 'second'; तीसरा 'third'; चौथा 'fourth'; पाँचवाँ 'fifth';

Figure 25: Excerpts from a Hindi grammar illustrating the writing of currency and weight notation in Devanagari using the currency and weight signs (from Scholberg, 1940: 89–91).

१४२

प्रांती सरकार कामास होते त्यांनी राहाहून घेतले. पुढे मदगिरी नजीक टिपूचा छापा पडला. लोक जखमी झाले. घोडी पाडाव गेली. जखमी वगैरे लोक लष्करांत आले त्यांची गणती वगैरे घेऊन रोजमुरे दिले.

बळवंतराव बापूजी यास जखमा भारी याजकरिता निरोप घेऊन घरीं गेले बद्दल २०० रु.

No. 252] *[23-5-1796*

छ १५ जिलकाद

१७४०॥= श्रीमंत माहाराज राजश्री छत्रपति स्वामी यांजकडे सातारियास राजश्री चिमणाजी माधवराव यास पेशवाईचे पदाची वस्त्रे आणावयास त्रिंबकराव अमृतेश्वर पेठ्ये पाठविले होते त्यास तेथे खर्च जाहाला तो गुा सिदोजी कांड्या खिजमतगार.

५४०॥= नजर करावयास

१०८८=	माहाराज यांस
१०८८=	मातोश्री आईसो यांस
१०८८=	राजश्री प्रतापराव पुत्र यांस
१०८८=	वाडा पहिला
१०८८=	वाडा दुसरा

१२०० इनाम माहाराज यांजकडील शागर्दिपेशा वगैरे यांस नख्त.

No. 253] *[23-5-1796*

छ १५ जिल्काद

राजश्री चिमणाजी माधवराव यांस पेशवाईची वस्त्रे सातारियाहून आणली; सबब दिा हुजारत सनग येकून आंख.

श्रीमंत माहाराज राजश्री छत्रपती यांजकडील मंडळी.

३३४ निळकंठ बाबूराव मजमदार यांस सनगे

2549

Figure 26: An excerpt from Peshwa records in Devanagari transliteration from Modi script showing the use of the placeholder mark. The currency notation १०८८= indicates "108 *rupayā*, 0 *pavalī*, and 2 *ānā*" (from Sardesai, 1932: 143).

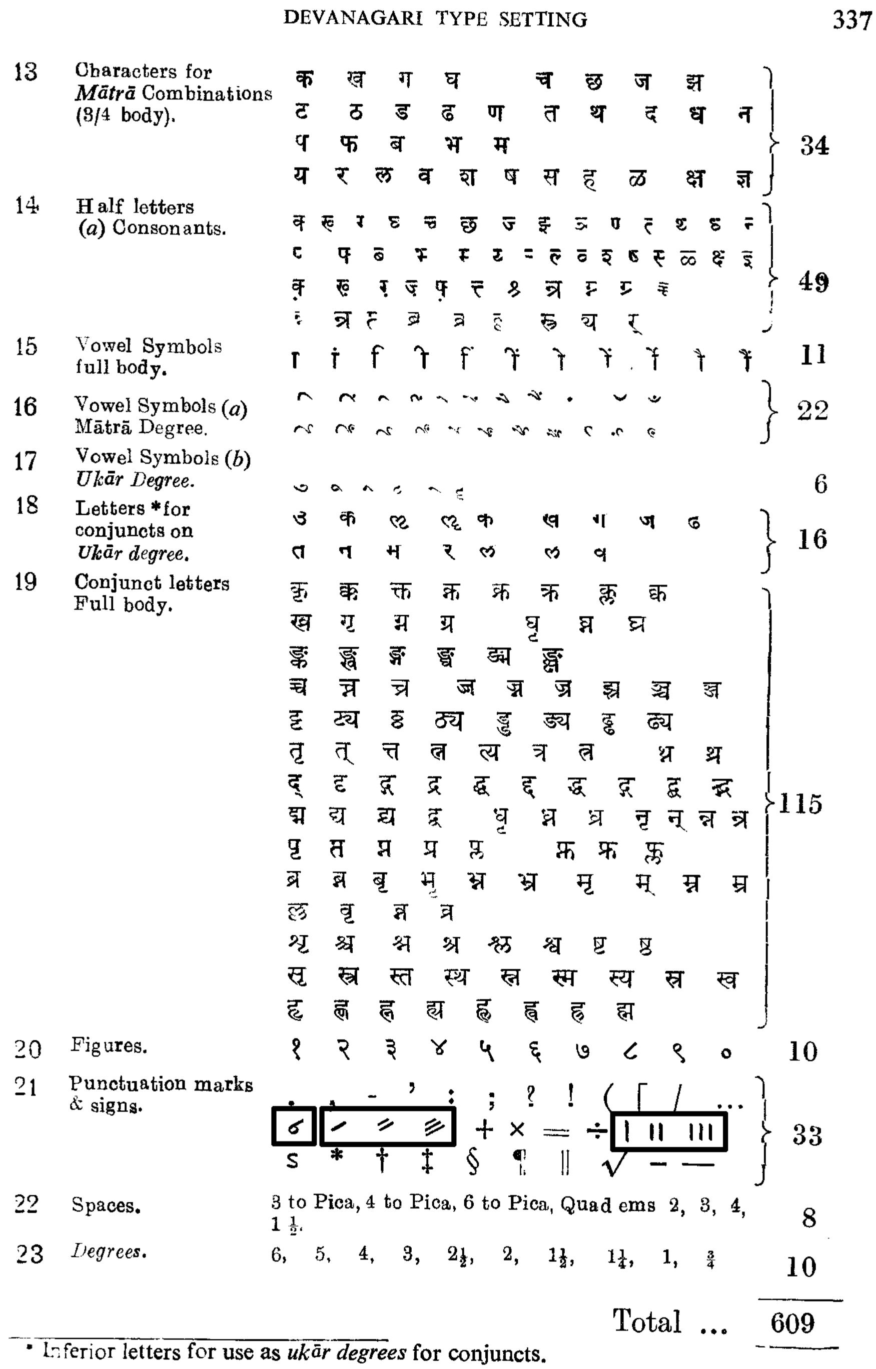
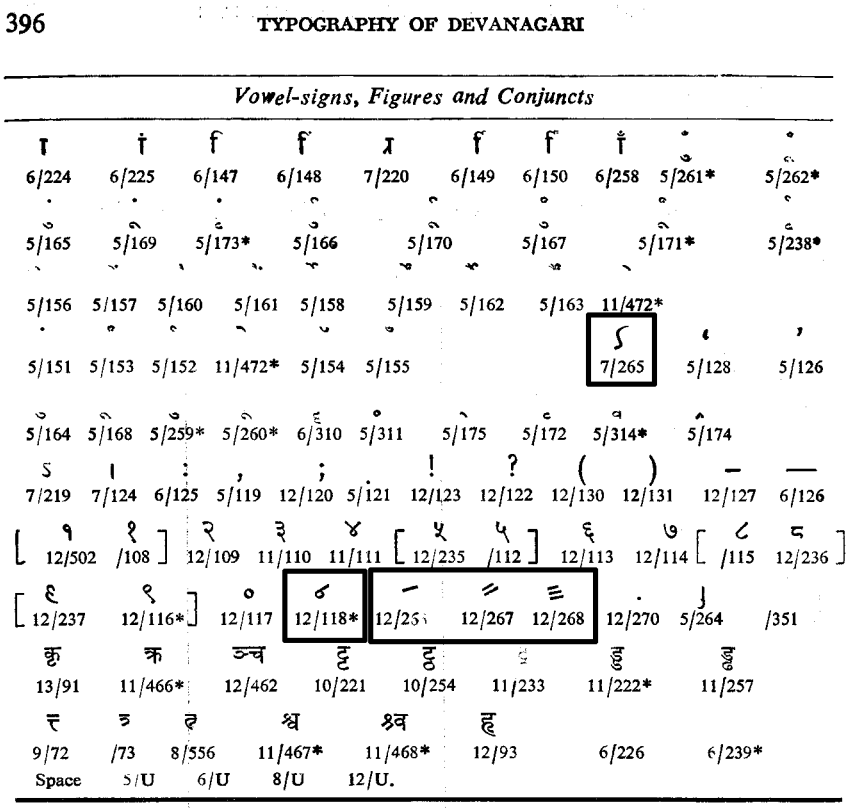

DEVANAGARI TYPE SETTING
337
13 Characters for Mātrā Combinations (3/4 body). 34
14 Half letters (a) Consonants. 49
15 Vowel Symbols full body. 11
16 Vowel Symbols (a) Mātrā Degree. 22
17 Vowel Symbols (b) Ukār Degree. 6
18 Letters *for conjuncts on Ukār degree. 16
19 Conjunct letters Full body. 115
20 Figures. १ २ ३ ४ ५ ६ ७ ८ ९ ० 10
21 Punctuation marks & signs. 33
22 Spaces. 3 to Pica, 4 to Pica, 6 to Pica, Quad ems 2, 3, 4, 1 ½. 8
23 Degrees. 6, 5, 4, 3, 2½, 2, 1½, 1¼, 1, ¾ 10
Total ... 609
* Inferior letters for use as ukār degrees for conjuncts.

Figure 27: A specimen of a Nirnaya-Sagar Devanagari type shows the placeholder mark and the six fractions. It is likely that the signs for the fractions one quarter and one half serve to indicate *daṇḍā* and double *daṇḍā* (from Naik, 1971: Table 57, after p.337).



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Vowel-signs, Figures and Conjuncts

6/224 6/225 6/147 6/148 7/220 6/149 6/150 6/258 5/261* 5/262*

5/165 5/169 5/173* 5/166 5/170 5/167 5/171* 5/238*

5/156 5/157 5/160 5/161 5/158 5/159 5/162 5/163 11/472*

5/151 5/153 5/152 11/472* 5/154 5/155 7/265 5/128 5/126

5/164 5/168 5/259* 5/260* 6/310 5/311 5/175 5/172 5/314* 5/174

7/219 7/124 6/125 5/119 12/120 5/121 12/123 12/122 12/130 12/131 12/127 6/126

12/502 /108 12/109 11/110 11/111 12/235 /112 12/113 12/114 /115 12/236

12/237 12/116* 12/117 12/118* 12/25 12/267 12/268 12/270 5/264 /351

13/91 11/466* 12/462 10/221 10/254 11/233 11/222* 11/257

9/72 /73 8/556 11/467* 11/468* 12/93 6/226 6/239*

Space 5/U 6/U 8/U 12/U.

351. Monotype Devnagari design in 12 pt. (9 set) is based on Nirnaya-sagar Pica No. 1 and is not much distinguishable to a common reader. The larger versions 14 pt. and 16pt. are the enlargements of 12 pt. design and have no relation to the original Nirnayasagar design of 14 pt. Great face. In all the three cases the Monotype face is wider as compared to the height of the letters. Following deficiencies are inherent in the Monotype Devanagari currently in use :

(1) The *Velānti* ि ी and *Velānti-rāfār* ि ि overhang. They do not meet the vertibar of the letter i.c. (मार्मिक).

(2) The *Ukārs* cast on high-speces do not fit properly, distorting the look of the letter (कुणबी).

(3) The *Mātrās* and *Ukārs* do not touch the headline and the Vertibar (मेंबर, नूतन).

(4) The double *mātrās* are too small (मैंने).

(5) Letter ह्‌ is disproportionate in height.

(6) Letter ऋ, and conjuncts of ह्‌, ङ, द are disproportionate. घ्र, भ्र, म्र are wide in set. Letters like ख्र are not available.

Figure 28: Table 61 shows the list of characters available on the Monotype machine for the Monotype Devanagari font. The star after the matrix number indicates outside-characters. The Monotype Devanagari design is based on Nirnaya-Sagar Pica No. 1. The glyph labeled "7/265" is the NORTH INDIAN WEIGHT SIGN; "12/118" is the NORTH INDIAN PLACEHOLDER MARK; and "12/266," "12/267," and "12/268" are NORTH INDIAN FRACTION ONE SIXTEENTH, NORTH INDIAN FRACTION ONE EIGHTH, and NORTH INDIAN FRACTION THREE SIXTEENTHS, respectively. Glyphs for the fractions one quarter, one half, and three quarters are absent, but presumably, might be created through additive application of the *daṇḍā* (from Naik, 1971: Table 61, after p.396).

Figure 29: Annexure II from the proposal submitted by the Government of India to encode Gujarati fractions. The illustration of these characters is an advertizement for movie theaters, and the fraction characters are used to represent 15 (।), 30 (॥), or 45 (॥।) minutes after the hour. The times shown for the PAO examples are 12:15, 3:15, 7:15, and 9:15. The times shown for the ADDHO examples are 3:30, 7:30, and 9:30. The times shown for the PONO example are 12:45, 3:45, 7:45, and 9:45 (from Government of India, 2004).

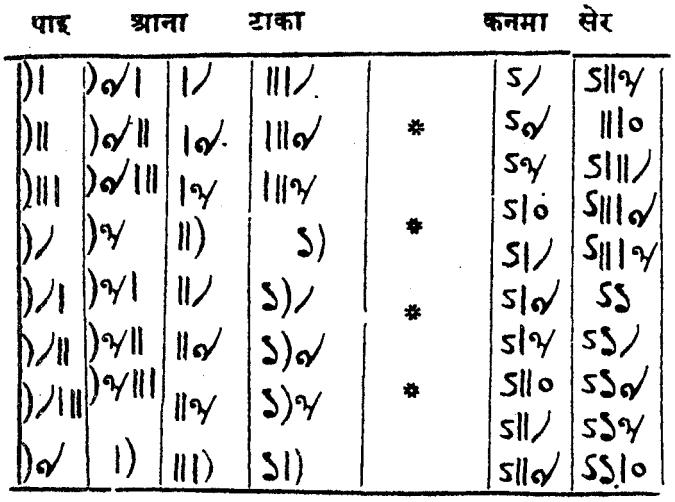

Figure 30: An example illustrating the writing of currency — *pāī* (पाई), *ānā* (आना), and *ṭākā* (टाका) — and weight — *kanamā* (कनमा) and *ser* (सेर) — in the Maithili script. The rupee mark used here resembles the right-parenthesis. The U+09F4 BENGALI CURRENCY NUMERATOR ONE, U+09F5 BENGALI CURRENCY NUMERATOR TWO, and U+09F6 BENGALI CURRENCY NUMERATOR THREE are used here to write quarter fraction forms of currency. The Maithili form �previously is used for the ৶ U+09F6 BENGALI CURRENCY NUMERATOR THREE (from Raya, 1970?: 39).

Figure 31: An illustration comparing the methods of writing currency in the accounting systems of north India and Bengal (from Beri, 19–?: 21). (A) The chart has two typographical errors: First, Bengali ৵৫ is incorrectly transliterated as ৲৷; the correct form is ৲৷, as in the transliteration of ৵১০ and ৵১৫. Second, Bengali ১৲৷৷ is incorrectly transliterated as ৷৷৲; the correct form is ৷৷=, without the second NORTH INDIAN RUPEE MARK, as in the transliteration of ১৲৫, ১৲১০, etc. (B) This chart illustrates the use of the mark ৲ to write *pāī* values in Bengali.

MONEY

Officially India has gone back to the metric system of money and weights, and there is no difficulty about these, since the way of saying them is straightforward. The changeover, however, has not been completely assimilated by those who were brought up in the old ways, and it is necessary to know the tables as follows:—

তিন পাই—three pies = এক পয়সা—one pice

চার পয়সা—four pice = এক আনা—one anna

ষোল আনা—16 annas = এক টাকা—one rupee

Note also the word সিকি which means "a four-anna (25 P.) piece".

For writing money the ordinary numerals are used with hasanta for full rupees and smaller amounts are expressed by the following symbols:—

/০—1 anna ।/০—5 annas ।।/০—9 annas ৸/০—13 annas

৵০—2 annas ।৵০—6 annas ।।৵০—10 annas ৸৵০—14 annas

৶০—3 annas ।৶০—7 annas ।।৶০—11 annas ৸৶০—15 annas

।০—4 annas ।।০—8 annas ৸০—12 annas ১৲—1 rupee

These are also used sometimes to express fractions, e.g. $6\frac{1}{4}\%$ is এক আনা, etc.

Figure 32: An illustration of the method of writing *ānā* and *rupayā/ṭākā* in the Bengali script (from Hudson, 1965: 85).

'The leading feature in Indian arithmetic being the division by four, the signs for fractions are adapted thereto. The rupee is divided into 4 × 4 = 16 parts, called *ānā* which are thus designated (units of all kinds are also thus divided):—

1 ānā or $\frac{1}{16}$	/০	5 ānās	।/০	9 ānās	।।/০	13 ānās	৸/০
2 ānās	৵০	6 ānās	।৵০	10 ānās	।।৵০	14 ānās	৸৵০
3 ānās	৶০	7 ānās	।৶০	11 ānās	।।৶০	15 ānās	৸৶০
4 ānās or $\frac{1}{4}$	।০	8 ānās or $\frac{1}{2}$	।।০	12 ānās or $\frac{3}{4}$	৸০'		

Figure 33: The method of writing fractions and currency in the Bengali script (from Grierson, 1903a: 29)

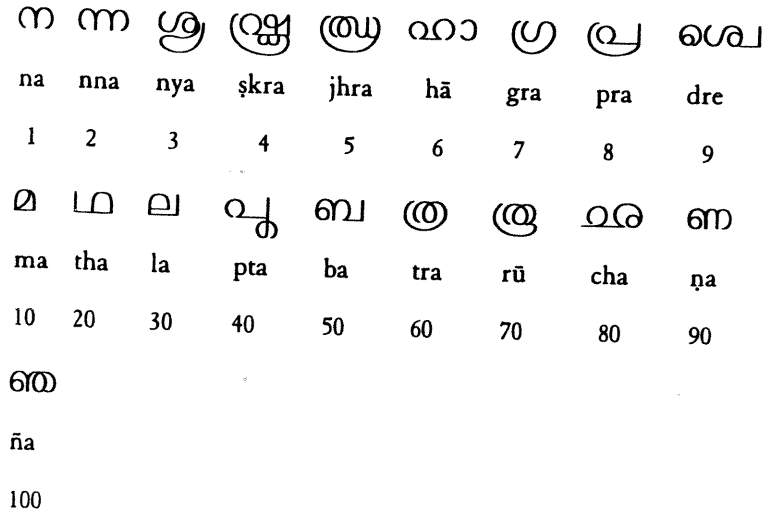

Figure 34: The method of writing numerals in Malayalam (from Ganesan, 2006).

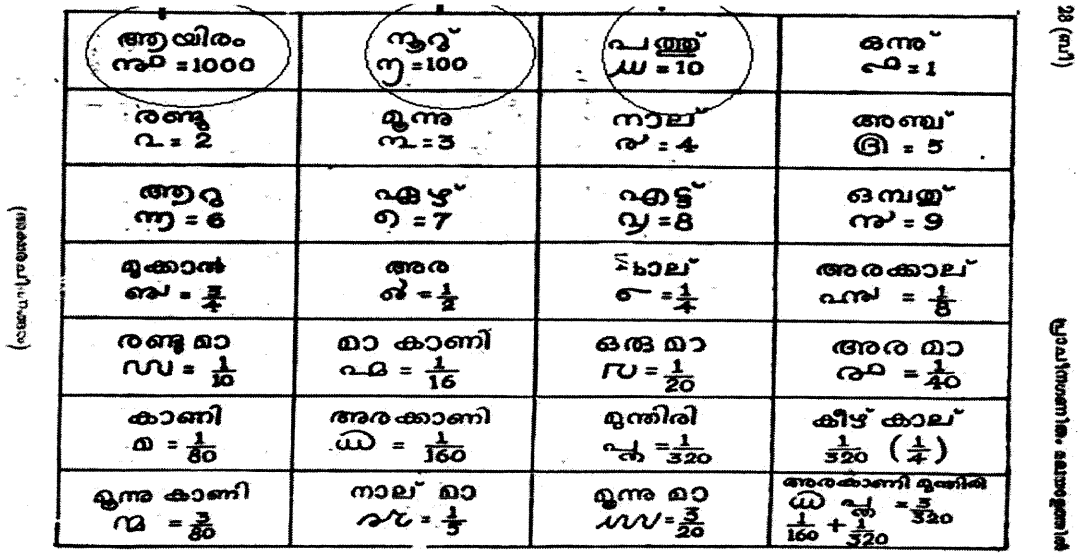

Figure 35: The method of writing fractions in Malayalam (from Ganesan, 2006).

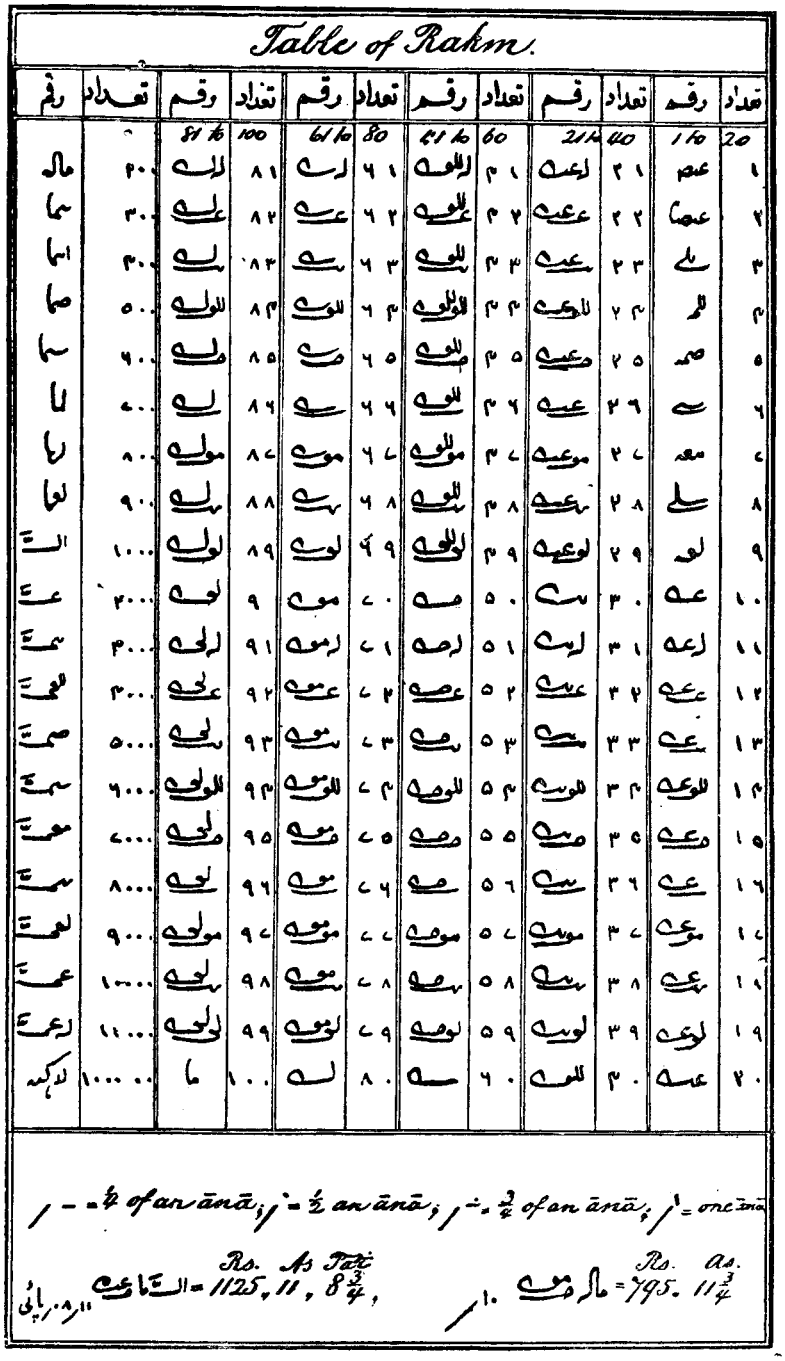

Figure 36: The Raqm system of numeral notation (from Platts, 1909: 60).