Transformation of Tamil letterforms from Palm leaf manuscripts to early Letterpress printing

Submitted in partial fulfillment of the requirements for the Degree of

Doctor of Philosophy

by

D. Udaya Kumar

Roll No: 05413001

Supervisor: **Prof. G. V. Sreekumar**

Co–Supervisor: **Prof. U. A. Athavankar**

Industrial Design Centre

Indian Institute of Technology Bombay

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Dedicated to **my parents** and **children**

Approval Sheet

Thesis entitled **'Transformation of Tamil letterforms from Palm leaf manuscripts to early Letterpress printing'** is approved for the Degree of Doctor of Philosophy.

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Abstract

Keywords: Letterforms, Letterpress, Manuscripts, Palm leaf, Printing, Script, Tamil, Transformation and Typography

Tamil language belongs to the Dravidian languages of Southern India. It is one among the classical languages of the world with a literary history of more than two millenniums. The earliest Tamil literature dates to the Caṅkam period (300 BC – 200 AD). Traditionally, Tamil was written on palm leaves – one of the oldest medium of writing in ancient India. The precise origin and history of palm leaves writing are unknown but the practice is believed to have existed since the Caṅkam period. The use of palm leaf medium continued for several centuries until late twentieth century. A medium with such historicity has a negligible literature on its writing system and its influence on script evolution. The existing literature on evolution of script only focuses on stone and metal inscriptions. Other traditional mediums such as palm leaf manuscripts have not been explored and researched.

In the late sixteenth century the traditional palm leaf manuscript writing gradually got displaced by the introduction of print medium. In 1556, a printing press sent to Abyssinia for missionary works landed in India by an accident. Soon the Christian evangelists adapted the printing press for the conversion of natives. Initiatives of the missionaries led to the spread and establishment of printing. Progressively, the press became one of the major medium of communication and began to dominate the hand written manuscripts in the later centuries. The script on the other transformed itself with respect to the medium. The shift from handwritten palm leaves to printing led to the transformation of letterforms. And also there has been an influence of the letterpress medium and western typography on the native script which needs to be researched. This early transformation is critical for typographers and type designers to understand the script and its evolution from handwritten forms to standardized letters seen today. The understanding will also bridge the knowledge gap between the evolutional findings of archeologist, epigraphists and historians.

Aim of the research was to determine the influence of palm leaf medium and its writing system on evolution of script. Concurrently, it aims to understand the transformation of Tamil letterforms from handwritten palm leaf manuscript to early letterpress typefaces. The

research also seeks to determine the impact of letterpress medium and western typography on Tamil script. At present, there were very few literature and research material available on typography and type design in vernacular languages especially in Tamil. Therefore, the body of research would aim at creating a primary resource and knowledge base for the history of Tamil type design.

Organization of chapters

The thesis is organized into eight chapters including the introduction and conclusion. The introductory chapter outlines the dominance of oral tradition over the written communication, Brāhmī script the mother of all Indian scripts, research problem and methodology adapted. It was observed that the existing studies on script evolution largely rely on stone and metal inscriptions and neglects the other traditional mediums. Therefore, a literature study consisting of various mediums used for writing in ancient India were examined. The study concludes by identifying the gap in knowledge and proposes the aims and objectives of the research. Chapters two, three and four consists of extensive literature survey.

Chapter two concisely describes the history of Tamil language and its script. It explores the existing literature on evolution of Tamil script, with key phases discussed in length. It cites the uniqueness of Tamil script as compared to other Indian languages. The evolution of Roman script was taken as a case study to compare and understand the letter transformation. Through the study, it was understood that the tradition of manuscripts writing (*minuscules*) had transformed the Roman capitals to lowercase letterforms. And the same miniscule was reflected in the typeface designs during movable type printing. Studies of writing tradition and influence of tools on letterforms were well established in Roman script. Tamil script lacked such studies on writing tradition which needs to be addressed to understand its influence on letterforms.

Chapter three gives an overview of palm leaf manuscripts such as types of palm leaves used for writing, preparation and preservation techniques, writing system, reading and characteristics of manuscript letterforms. The characteristics were based on the general study and visual observance of several manuscript images. A more detailed study with a methodology was followed in the later part of the thesis. Chapter four examines the history of Tamil letterpress printing, based on the literature survey and scholarly overview three printing

phases were synthesized. The proposed phases intend for a better understanding of the history of Tamil printing. Some of the key script reformations in Tamil were also highlighted. Finally, the above chapters emphasize the need for research on palm leaf manuscripts, letterpress medium and early typefaces.

In chapter five, two methodologies followed in the field of epigraphy and western typography was analyzed. Appropriate elements from both the methodologies were taken and adapted for the current research. One such element was the visual documentation used as a means of research method. The chapter explains the various data collection process involved in preparation of visual documentation and understanding the mediums. It includes conversation with experts, firsthand experience with palm leaf manuscripts, video documentation and photo documentation of palm leaf manuscripts and old printed books during the field visits to Tamil Nadu, data logging and preparation of visual chart. Along with the chart a visual vocabulary comprising of typographic terminologies, joineries, construction and visual grouping was created to facilitate data analysis.

Chapter six constitutes major part of the research where the visually documented data was analyzed and interpreted. The chapter was divided into two parts – Part I: A critical analysis of palm leaf manuscript letterforms and Part II: Study of transformation and mechanization of handwritten letterforms. In part I, palm leaf manuscripts letterforms were studied based on the visual documentation (visual chart) and evolutional chart prepared by the Department of Archeology, Tamil Nadu. Individual letterforms across manuscripts and evolutional chart were visually compared and analyzed. Similarly in part II, the characteristics of individual letters from manuscripts and early typefaces were visually compared to study their transformation.

Chapter seven discourses the history of early letterpress typefaces through the visual documentation of early printed books and scholars view points. It also determines the impact of letterpress medium and western typography from the analysis of visual chart and documentation. Chapter eight presents an overview of the study and summarizes the conclusion from analysis. It also outlines the contribution of the present research and scope for further research.

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Chapter 1

Introduction

Ancient India was a land of oral tradition based on the *guru-sishya* relationship. The knowledge was orally transmitted from a guru to his/her disciple (*sishya*) likewise to the future generations. *Vedas*, the oldest sacred text of Hinduism complied in Sanskrit was believed to be passed on orally from generation to generation. Naik states, to preserve the Vedas, Hindus laid stress on learning them by heart, imparting them from teacher to pupil and deprecated all tendencies to rely on writing (Naik 1971:6). The early orientalists considered writing of Vedas as a sin and whoever dared shall reach the path of hell. They believed writing can never convey all the meaning of a spoken word. Indian cultural tradition believed in the superiority of the spoken to the written word (Kesavan 1992:4). Richard Salomon adds,

> Discussion of the origin and history of writing, its varieties, styles and methods, and practical instruction therein are surprisingly rare in Indic texts, though we do find a few more or less incidental references in some relatively late texts to the invention of writing by the creator God Brahmā. This tradition is also reflected iconographically, Brahmā and also his wife (or daughter) Sarasvatī, the Goddess of learning, being regularly depicted in sculpture with a book in hand. But beyond legendary accounts such as these, the literature of the Brahmānical-Hindu tradition has, on the whole, little to say about writing as such; this, in striking contrast with its profound fascination with (spoken) language and grammar (Salomon 1988:8).

In traditional India, written word was considered as a reflection rather than a true manifestation of language which may have led to the lack of attention on the aesthetic aspects of writing. The emphasis of spoken language led to the negligence of writing tradition and its study. The concept of writing system in India started much later than its language. The first reference to writing in India was found in a Pāli Buddhists canon of the 5th century BC (Kesavan 1992:9). The heterodox traditions of Buddhism and Jainism had a high esteem for written word. To them, writing was considered as a means of transmitting and documenting knowledge that would otherwise be lost forever. It was only in the texts of these traditions, a list of Indic scripts was found. *Lalitavistara*, the above mentioned Buddhists canonical work lists sixty four script (*lipi*) in its tenth chapter (*Lipiśālāsamdarśanaparivarta*), beginning with Brāhmī and Kharosti. Richard Salomon says, "The historical value of the lists is limited as its dates and names of the most scripts are uncertain and difficult to evaluate. Only the first two, Brāhmī and Kharosti are positively identified whereas others refer to geographical terms and description of graphic or calligraphic characteristics (Salomon 1998:9)."

1.1 Brāhmī Script

The ancient script, Brāhmī is the root of all Indian scripts (Fig. 1.1). The script is also the parent to several other major script families of Central and Southeast Asia (Ibid 7). Brāhmī was used to write *Prakrit language* which prevailed during the ancient India (Visalakshy 2003:39). During the same period there existed another ancient script called *Kharosti* but unlike Brāhmī script it became extinct without any descendants (Naik 1971:5). The origin of Brāhmī script has been an intense debate among scholars. There are several theories proposed by various scholars on the subject. The available archeological evidence dates its presence to fifth century BC (Visalakshy 2003:36).

The development of Brāhmī script can be broadly classified into two major groups, the Northern Brāhmī and Southern Brāhmī (Ibid 41). These major groups developed into further subgroups based on the regional variations. According to Mahadevan, there existed another ancient script called Tamil Brāhmī which has evolved independent of Northern and Southern Brāhmī. Tamil Brāhmī was an adaptation of Brāhmī script used for writing ancient Tamil (Mahadevan 2003:173, 178) (See Chapter 2). There was also a unique variant of Brāhmī script called the Bhaṭṭiprōḷu which was found on the relic caskets in Andhra Pradesh (Salomon 1998:34).

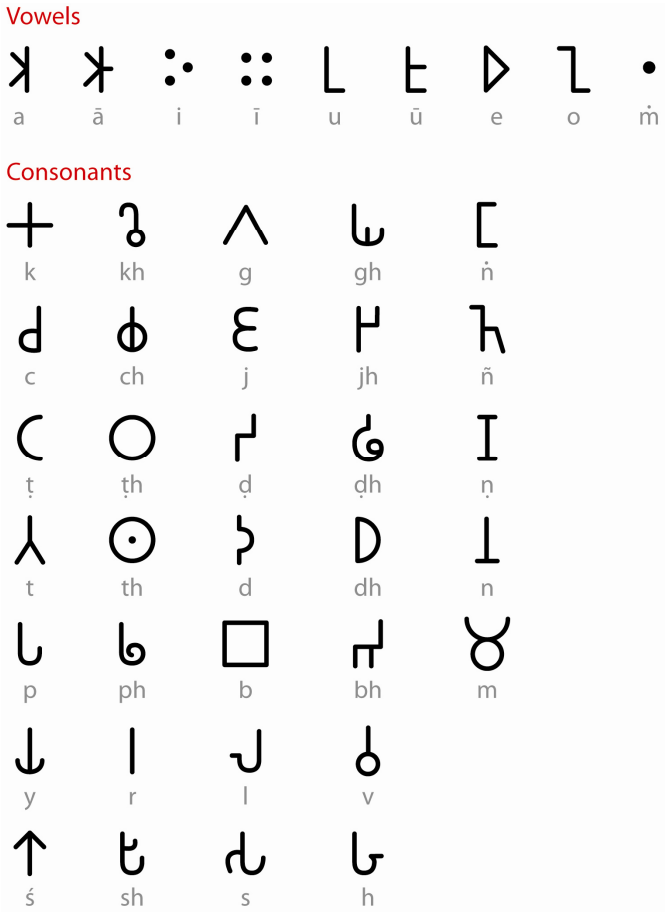


Fig. 1.1: Vowels and consonants of Brāhmī script.

The regional variations further evolved into several modern Indian scripts; from Northern Brāhmī developed Devanagari, Punjabi, Gujarati, Bengali, and Oriya, from Southern Brāhmī, Telugu and Kannada emerged (Fig. 1.2). The modern Tamil script gradually evolved from the Tamil Brāhmī script (Encyclopedia of Tamil literature 1990:105). The offshoots of the ancient Tamil script found in the old inscriptions of Tamil Nadu were of three types namely Vaṭṭeḻuttu, Tamil and Grantha. The Vaṭṭeḻuttu and Tamil scripts were used to write Tamil language and Grantha to write Sanskrit (Govindaraj 1994:13) (See Chapter 2).

1.2 Research Problem

Over centuries, the rudimentary forms of Tamil Brāhmī had transformed to a more complex form – present script. To understand this phenomenon, archeologists and epigraphists have prepared an evolutional chart of Tamil letterforms based on the stone and metal inscriptions (Fig. 1.3 a, b). At present, the evolutional chart is the only source depicting the transformation

of Tamil letterforms from ancient to present. However, the chart does not do justice to the way present letterforms have evolved because of its limitations. Limitations of the chart were:

1. The remarkable work only revolves around the available physical evidences of stone and metal inscriptions. The permanent nature of these mediums had preserved the letterforms for centuries which makes it appropriate for studying the script evolution (Subbarayalu 2001:62). But the chart neglects other traditional medium as a source and also its influences.
2. The chart only serves as a visual documentation but doesn't explain *why* and *how* the transformations have occurred.

Fig. 1.2: Image shows the development of letter 'ṇ' from early Brāhmī to various Indian scripts. *(Reproduced from the source: Indian Epigraphy)*

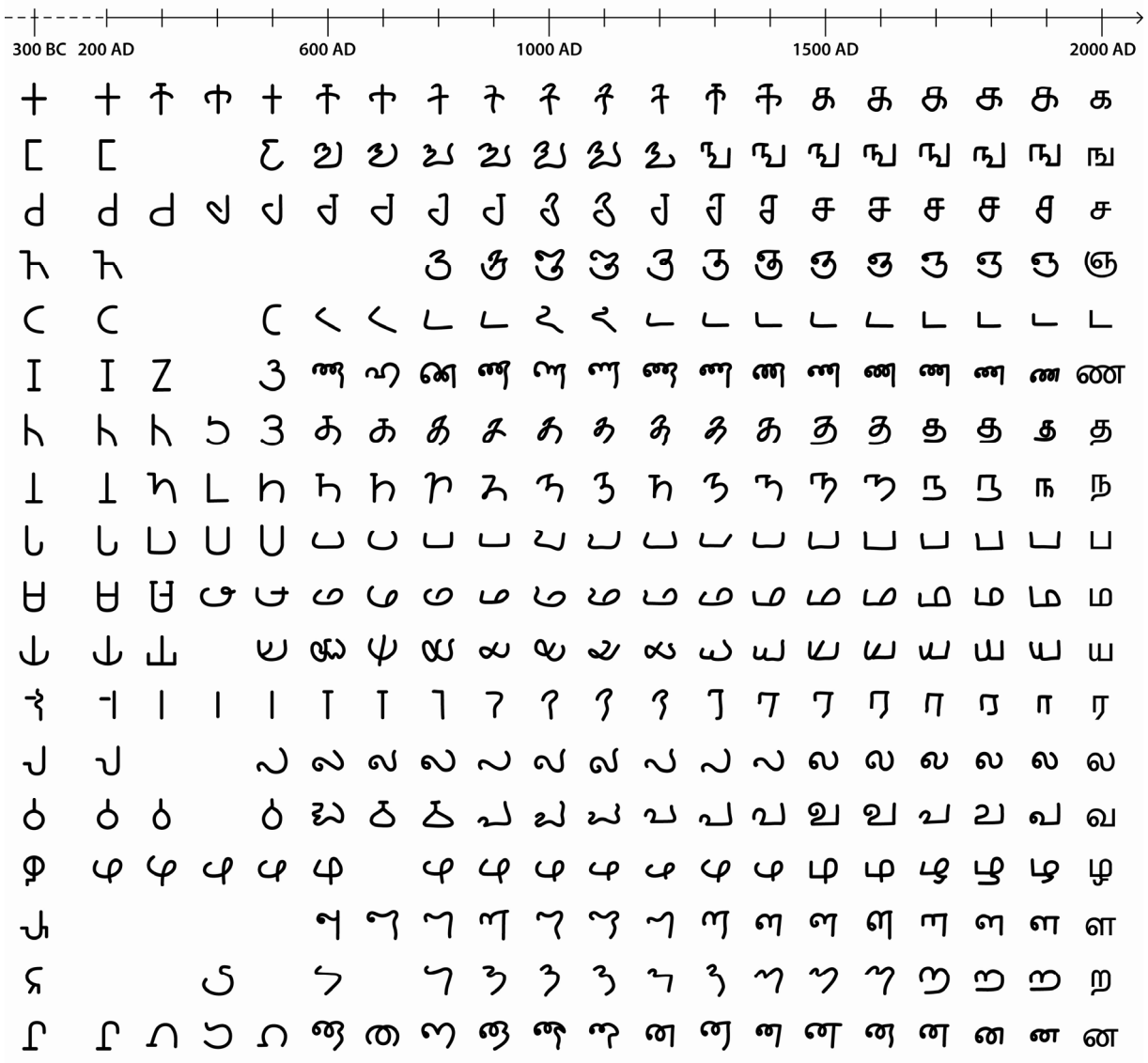


Fig. 1.3 a: Evolution chart of consonants in Tamil. *(Reproduced from the sources of Department of Archeology, Government of Tamil Nadu)*

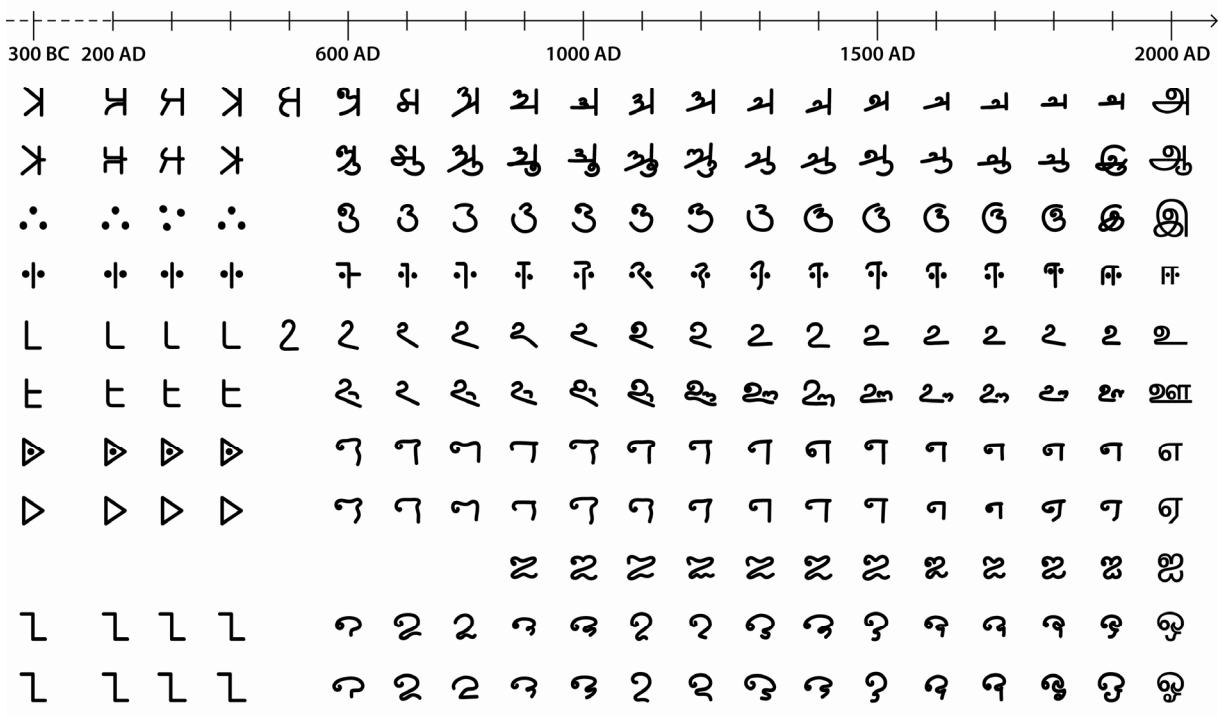


Fig. 1.3 b: Evolution chart of vowels in Tamil. *(Reproduced from the sources of Department of Archeology, Government of Tamil Nadu)*

The reasons behind the changes are important to study and understand, without such understanding the evolution of letterforms will always remain incomplete. T. N. Subramanian states that there were three main reasons behind the transformation of letterforms. They were medium used for writing, writing system and design sensitivity (Subramanian 2004:5). Similarly, Sambandan asserts transformations of letters are attributed to the medium, writing system and tools as they are the foundation of any letterform (Sambandan 1998:129). Since, writing tools and mediums have a direct impact on letterforms their study forms a primary source for understanding the transformation.

One of the classic examples of influence by medium and tool is the omission of puḷḷi[1] (dot) above the pure consonants in Tamil palm leaf manuscripts (See Chapter 2). The use of puḷḷi (dot) was generally avoided in manuscript writing because it damages the leaf and also creates impressions on the other side of the leaf (Ilankumaran 2001:71) (Encyclopedia of Tamil literature 1990:127) (Rajan 2006:220) (Govindaraj 2001:32). Another example is the

[1] The use of puḷḷi (dot above the consonants) is unique to Tamil script and it denotes the absence of inherent vowel sound ‘a’.

Vaṭṭeluttu script from which the modern Malayalam script evolved. Vaṭṭeluttu derives its name from the circular form of its letters (Subramanian 2004:5) (See Chapter 2). One of the reasons for the roundedness is attributed to the medium (palm leaves) used for writing during olden days. Scribers adapted circular forms in order to prevent the leaves from damage (Sambandan 1998:130) (Frutiger 1980:96). Similar examples can also be found in other Indian scripts where the medium has played a vital role in shaping the letterforms. Oriya[2] was traditionally written on palm leaf manuscripts. It was due to the influence of palm leaf medium, Oriya script attained circular forms (Fig. 1.4). The script developed a curved form because the horizontal lines when incised with a metal stylus tore the palm leaves (Bhanumurti 1983). In order to prevent the damage of the leaf, curvilinear forms were adapted which later became characteristics of the script. In addition, Patnaik states,

> The Oriya script was bound to change in the palm leaf medium taking cursive shape. Prior to that cursive script were vogue in Tamil and Telugu. They used to write on palm leaves and they adjusted the scripts to the nature of the palm leaf and the stylus with which the etching was done. As Orissa has constantly come in contact with the South politically, socially and culturally since 1st century AD, it was quite natural that the shape of the Oriya script was influenced by the cursive South Indian scripts (Patnaik 1989:10).

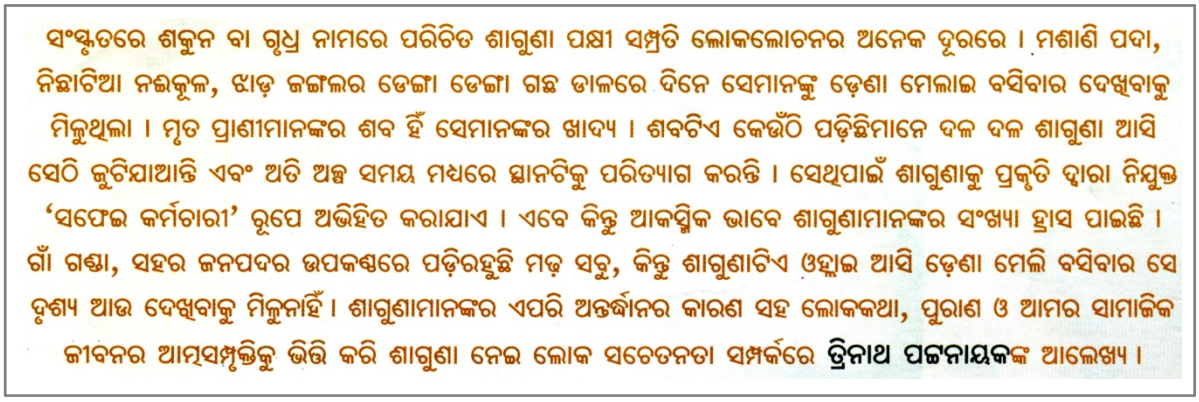


Fig. 1.4: Oriya script attained circular form because of the palm leaf manuscript writing.

The above illustrations denote that there are mediums other than stone and metal inscriptions which have influenced letterforms. To understand the evolution of letterforms, mediums beyond stone and metal have to be studied. Such study can bridge the gap of the evolution chart prepared by Archeological department. Frutiger states, it is the use of wide

[2] Oriya is a script used to write Oriya language which is the predominant language of Orissa (an Indian state)

variety of materials and writing techniques that has given new appearance and style to letterforms over different periods (Frutiger, 1989:159). Therefore, the study looks at other traditional mediums which could have possibly influenced the transformation of letterforms.

1.3 Mediums of graphic representation in ancient India

There were various mediums used for writing purpose during the ancient times (Fig. 1.5). The Buddhists canonical work '*Lalitavistara*' speaks of various types of material used for writing, such as leaves (*panna*), wood (*phalaka* or board, and *salaka* or bamboo chips) and metals (Kesavan 1992:9). In general, written documentation were found on stone, metal, paper, cloth, wood, bamboo, brich bark and palm leaves. Overtime the use of various mediums have influenced and transformed the Indian scripts (Naik 1971:13).

	Medium	Surfaces	Tools	Ink
Hand written	Stone	Granite / Sandstone	Chisel	
	Leaf	Palm leaf	Iron stylus	Charcoal + Leaf extracts
	Metal	Gold / Silver / Copper	Iron stylus	
	Cloth	Silk / Cotton	Brush	Ink (Leaf extracts)
	Paper	Paper	Pen / Brush	Ink
	Wood	Bhurj bark	Reed	Ink (Leaf extracts)
Others	Clay	Earthenware	Sharp tool	
	Bone	Bone	Sharp tool	

Fig. 1.5: Above table shows the various medium and tools used for written communication from ancient India to sixteenth century.

1.3.1 Stone inscriptions

Stone was one of the principal writing materials used during ancient India. Their physical characteristic makes it suitable for recording information permanently. They withstood the passage of time and had preserved the ancient letterforms making it suitable for epigraphic studies (Subbarayalu 2001:62). Tamil stone inscriptions are generally found on the temple walls (Fig 1.6). They are mostly royal charters and contain information about the donations made by various kings. Stone inscriptions involve three stages and three different people to execute them namely *composer* (text provider), *scribe* (one who writes on the stone) and *the engraver* (one who scribes on the stone) (Rajan 2004:35). Before inscribing, the stone is first

dressed (made into a flat surface) by chiseling and polished by rubbing. The content is then written with ink or painted with brush. Once the text is written, a scriber engraves the drawn text with a pointed chisel (Sircar 1996:70). The person who wrote on stone was called *Lipikar, Lekha, Karana, Karanika* or *Kayastha*. And person who inscribes or chisels the script on stone was called *Sūtradhara*, *Silakuta* or *Rupkara*. In South India especially Tamil Nadu, before inscribing on stone, the text is first written on palm leaves and then copied on to stone. S. Rajagopalan states[3] that the content to be inscribed on stone was first written on palm leaf manuscript and then chiseled on stone. K. Rajan ascertains,

> "Before inscribing on a stone or metal, the content was first written on palm leaf manuscripts and then copied on stone. Therefore, the script remains the same in palm leaf, stone and metal in that period. Differences in the scripts come only in different periods and different regions (Rajan 2006:37)."

The emulation only signifies the reflection of manuscript letterforms on to the stone inscriptions. However Subramanian cites, in palm leaves writing a vertical stroke was difficult therefore the strokes were slightly curved. On the other hand circular forms were difficult to inscribe on stone. Therefore it was natural for the straight lines to become curves and circular forms into rectangular forms. For example, letter 'ta'(𑀢) in Brāhmī script was written in a curvilinear form like the Roman capital letter 'C'. Later it got transformed into two strokes like the Roman capital 'L' (Fig 1.7). This proposes that palm leaf manuscripts require a separate study to determine its own influences.

Stone inscriptions had been a vital resource for archeologist and epigraphists to study the early scripts and determine its evolution. Other medium of written communication has not been accounted in the process of script evolution. From experts and literary sources it is evident that palm leaf manuscripts have been the original source for stone inscriptions. Since the writing style varied in handwritten manuscripts, similar variations got imitated on stone and metal inscriptions. Referencing from the varying manuscript writing could have transformed the script periodically over centuries. As a result stone and metal inscriptions (reflecting the manuscript writing) led to the evolution of Tamil script. Therefore it is important to study the manuscript medium and its letterforms. Examination of the original source may provide answers to the transformation of script.

[3] Personal conversation with the Mr. S. Rajagopalan, Senior Epigraphist, Department of Archeology, Chennai

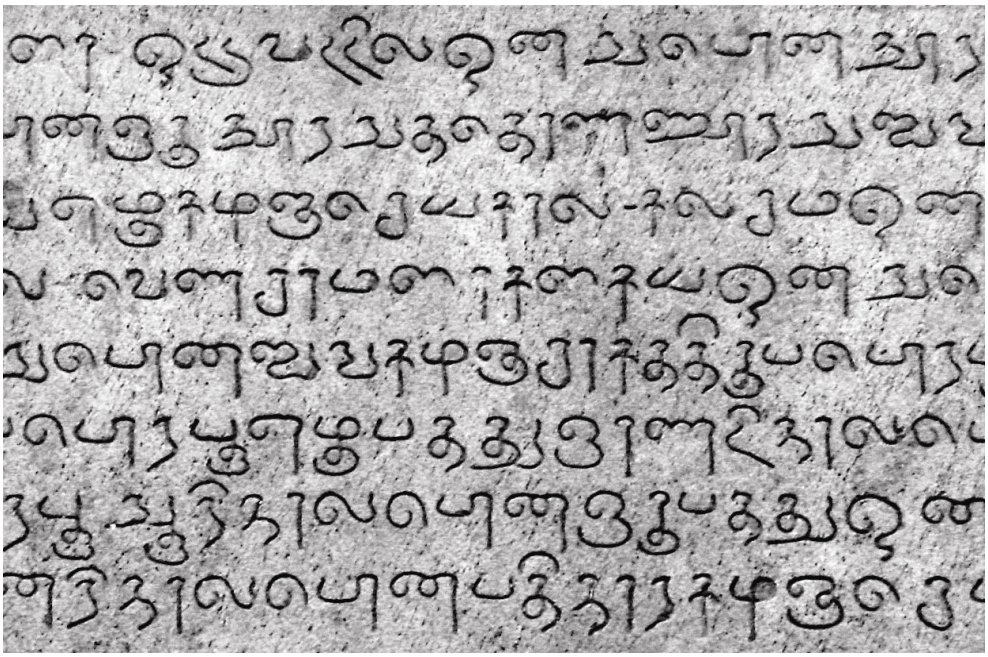


Fig. 1.6: Tamil stone inscriptions on the walls of Brihadeswara temple, Tanjore.

Fig. 1.7: Transformation of Brāhmī script letter 'ta'(𑀢) from one medium to another.
(Reproduced from the book Paṇṭait Tamil Eḻuttukkaḷ)

1.3.2 Metal inscriptions

Metal plates were employed for writing as a source of permanent documentation (Fig. 1.8). Metals like copper, brass and bronze were commonly used. Precious metals like gold and silver were also used for inscriptions but were mostly used for grant deeds and royal charters (Naik 1971:13). To inscribe on metal, first the metal is prepared as a plate by making it flat in desired shape. Then thin parallel lines (like ruled book) are drawn over which text is carefully written with a visible material. Later, the written text is etched using a pointed metal stylus. In case of mistakes that particular portion is melted, flattened and corrected with right text (Rasu 2001:68). Similar to stone inscriptions content to be inscribed on metal are first written on palm leaves and then copied on the metal surface. Even in this case, the original source and primary medium of writing has been the palm leaf manuscripts.

Fig. 1.8: Copper plate inscriptions of the Vakataka King Pravarsena II, fifth century AD. *(Image source: Typography of Devanagari)*

1.3.3 Paper, cloth, wood and bamboo

Paper, cloth, wood and bamboo were also used for writing. In India, paper was found during the eleventh century with the earliest reference to king Bhoja of Dhara in Central India (Naik 1971:17). Paper manuscripts did not gain importance as palm leaves or birch bark manuscripts. In fact, manuscript books on paper were based on the traditional medium. The sheets were cut and sized according to palm leaves or birch bark, holes were then made to bind them through a thread like in palm leaf and bark manuscripts (Sircar 1996:68). It was only after introduction of printing the use of paper gained momentum. It is important to note that paper manuscripts were prevalent in North India. In Tamil, such imitated paper manuscripts written with pen and ink were rarely found, palm leaves were still the popular medium.

On cloth, the surface was first prepared by sizing with wheat or rice pulp and then dried. After drying, they were polished with conch-shell for writing. Black ink was used for writing and sometimes dyes and cereal paste were also used. On wood and bamboo, the characters were either inscribed or written with ink (Kesavan 1992:9). Apart from these materials, there were other indigenous mediums used for writing purpose. For instance, in the Northeastern region of India, the inner bark of Aloe tree was the most popular material used for writing manuscripts (Sircar 1996:65).

1.3.4 Bhūrja-patra

In olden days, two kinds of materials were used for writing documents or literary compositions. First one was the palm leaf manuscripts (tadapatra) which was more common in South India. And second one was the Bhūrja patra which was more common in the north especially in Kashmir where the material was easily available. Bhūrja patra was obtained from the inner bark of Himalayan birch tree (*Baetula bhojpattr*), referred to as Bhūrja in *Amarakosa*. Before writing, the barks were first processed, smoothened and several layers were gummed together to form a leaf. Reed pen and specially prepared ink was used to write upon it (Naik 1971:15). There is hardly any reference to Bhūrja patra in Tamil.

1.3.5 Palm leaf manuscripts

Palm leaf manuscripts were one of the most commonly used medium of communication during the ancient times. Though inscribing on stone, metal and earthen vessels did exist concurrently, the popular medium of writing remained the palm leaf manuscripts. Buddhist tradition states that the canon written immediately after the Buddha's death was on palmyra leaves (Sircar 1996:62). The practice of writing on palm leaves was found throughout India but it was more prevalent in Southern India and Southeast Asian countries. It is believed that the tradition of writing on palm leaf in Tamil existed since the Caṅkam age[4] and continued till the late twentieth century (Encyclopedia of Tamil literature 1990:123). The widespread use of the material in South was due to the abundant growth and availability of palm trees in the coastal area. The palm leaf manuscripts in North and South India are of two types and adapt a different style of writing (see chapter 3). The general practice in North was to write with pen and ink on the leaves, while in the South, letters were incised with a pointed metal stylus and were made visible by besmearing ink on the writing (Sircar 1996:61) (Frutiger 1980:96). Frutiger opines that it is because of this reasons the South Indian scripts are much rounder and more connected than those of the North.

According to Tamil literature there were three modes of graphic communication in ancient Tamil Nadu (Encyclopedia of Tamil literature 1990:123-124). One of them was palm leaves which were used for writing literary works.

[4] Scholars opine that such possibility can only be assumed because a full civilization of such kind could not have otherwise existed.

1. Inscriptions on stones such as *naṭukal* (memorial tablet set up over the grave of deceased warrior, inscribed with his figure and achievement) which is being referred to in Tolkāppiyam (*Porulatikāram 60*) the earliest extant treatise on grammar.
2. Paintings and drawings of subtle workmanship on curtains and other such things, using brushes with the juice of gossypium religiosum (*cemparutti*) serving as the ink, mentioned in the Caṅkam classics such as *Neṭunalvāṭai*.
3. The third kind was writing on palm leaves and similar material using an iron stylus for the pen (Fig. 1.9).

Fig. 1.9: Tamil palm leaf manuscripts written using pointed iron stylus. *(Image source: French Institute Library, Pondicherry)*

Sadly, a traditional practice with such an enormous span has not been studied as a medium and in terms of its writing system. Unlike Stone and metal, the study of manuscript medium has been negligible and so were their influences on letterforms. Very few scholars have ventured into this field and contributed to the subject. Here are some of the known scholarly studies on palm leaf manuscripts with letterforms as focus.

- One of the earliest studies on manuscripts was done by Dr. A. F. R. Hoernle who had examined 134 palm leaf manuscripts dated between sixth and early nineteenth century. His analyses include identification of various types of leaves used, preparation of leaves for writing purpose, determination of various manuscripts dimensions and decipherment of its content (Diringer 1982: 360).
- In 1967, National Institute of Design, Ahmedabad commissioned Adrian Frutiger to design a typeface in Tamil and Devanagari script that could adapt to modern typesetting and printing techniques (Frutiger 1980: 90). Frutiger in collaboration with

Mahendra Patel studied palm leaf manuscripts to design typefaces for the respective scripts. The typeface designed was inspired from the manuscript letterforms and its writing style.

- During the same period, Professor R. K. Joshi a renowned Calligrapher and Type designer has done an extensive study on manuscripts. He has meticulously analyzed the calligraphy of 500 Devanagari manuscripts from Asiatic Society of Bombay (See Chapter 5). His research and insights reflected on his teachings and has enriched several young generations (Joshi 1983).
- Another scholar who has done an extensive study on illuminated manuscripts is Durga Prasad Patnaik. His book on 'Palm leaf etchings of Orissa' gives a detailed description of illustrations etched on palm leaf manuscripts. Unlike the Oriya manuscripts, illustrations were hard to find in South Indian manuscripts. Even if they existed it was mostly seen on the covers of the manuscripts (Patnaik 1989:126).

Apart from the above research works there are some general observations and studies by various other scholars that discourses the influence of manuscript writing on letterforms. These insights provide clue for a further investigation and affirms the possibility of influence of medium and its writing system on letterforms. Further in depth and systematic study could reveal more information on the evolution of letterforms. The subsequent examples demonstrate the influence of manuscript writing system on letterforms. The following passage from the book '*Indian Epigraphy*' by Richard Salomon describes the evolution of certain characters in modern scripts.

> The head marks which begin to appear in certain inscriptions of the Sunga period (2^{nd} – 1^{st} BC) in the form of a small triangle at the top of the vertical stroke are no doubt due to the influence of pen and ink writing, in which such a mark naturally tends to appear at the point where the scribe begins the letter. This accidental formation eventually came to be perceived as a part of the letterform itself, so that it began to appear in epigraphic writing by way of imitation of pen and ink script. This head mark was to develop in the succeeding centuries into different shapes in different regions, eventually resulting in the formation of such characteristic features of medieval and modern Indian scripts as the square of the "box headed" script, the continuous top line of Devanagiri, the curved "umbrella" of Oriya, or the "check mark" of Telugu (Salomon 1998:33-34).

The above discourse clearly states the influence of pen writing on scripts. Modi script[5] is a fine example of an Indian script that has evolved due to the writing system (Fig. 1.10). The script got discontinued due to the difficulty in adapting to the letterpress medium. Presently, Devanagari script has been adapted to write and print Marathi. Sunita Deshpande in Encyclopedic dictionary of Marathi literature writes,

> Modi was developed as a faster way of writing Marathi as compared to the more complicated Devanagari script. This was done by "breaking" some of the characters of the alphabet (to make them simpler) and also by making them more "circular" in shape, which aided in moving from one character to the next without lifting the pen from the paper. Thus, Modi was a sort of "cursive" (not "shorthand") style of writing Marathi, although reading it may not have been as easy (Despande 2007:423).

1.3.6 Letterpress medium

The invention of movable type printing revolutionized the written communication during the fifteenth century. Soon it replaced the handwritten manuscripts around the world, Tamil was no exception. The establishment of letterpress printing in India slowly displaced the handwritten palm leaf manuscripts. As printing progressed, Tamil script was gradually transformed and refined into standard forms pertinent to mass printing. The punch cutting and type casting subtly transformed the shapes of the letters. The modern Tamil script owes its present form and standardization to letterpress printing. Subramanian remarks, “Apart for medium another reason for script evolution was a result of European relationship. Europeans introduced the printing press to our country and printed books using typefaces. Thereafter the medium transformed and standardized our scripts (Subramanian 2004:7).”

And also printing technology having its roots in the west began to cultivate characteristics of western typography on Indian scripts. This can be understood from the introduction of word space, punctuation marks, heading, paragraph, etc which were absent in the handwritten manuscripts. Layout of books diverged from palm leaf manuscripts and followed the stream of western typography. Letterpress printing is another major medium which is not attributed in the transformation of Tamil letterforms.

[5] Modi is a script used to write Marathi language spoken in the Maharashtra state of India.

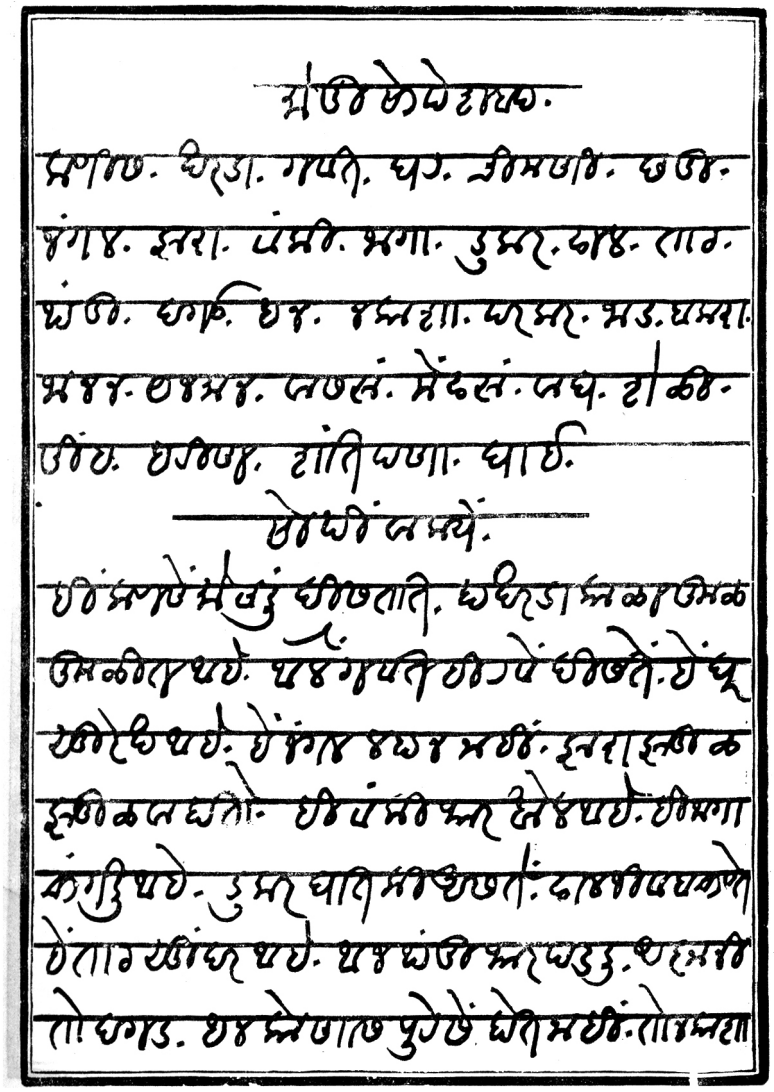


Fig. 1.10: Modi script. *(Image source: Typography of Devanagari)*

Similar to palm leaf manuscripts, Typographic studies in Indian scripts are minimal. The three volumes of 'Typography of Devanagari' by Bapurao S. Naik is one of the resources which broadly discourses on Indian scripts and typography (only in the first volume). As the title suggests the second and third volume are more focused on Devanagari script than other regional scripts. Another scholar who has painstakingly documented and studied the early printing in India was Anant Kakba Priolkar. His seminal work, 'The printing press in India: its beginnings and early development' has been a primary source for many of the scholars who study history of Indian printing. In Tamil, very few scholars like Sambandan, Tamilnadan and Kesavan had researched on the letterpress printing and typefaces. But their studies were based on general observations and were limited to the earliest typefaces. History of Tamil type

design is yet to be expansively studied. Typefaces being the core of typography it is essential to know its evolution and development. Especially it is important for a type designer to understand the evolution of letterforms in order to utilize its potentiality with maximum efficiency. Alexander Nesbitt opines the need of such historical study of letterforms in his book *'The History and Technique of Lettering',*

> History of the design of letters is most important to the student or craftsman, for, once he understands the traditions of his craft – what others have created and contributed before him – there is a chance that he may become a properly discriminating worker (Nesbitt 1957: ix).

1.4 Gap in the knowledge

Stone and metal inscription has been the primary means for determining the evolution of a script. Their permanent nature and abundant availability has helped to decipher ancient scripts. Unfortunately, the other modes of representation which prevailed during the same period could not be foreseen in the process of script evolution. The reasons for such lacuna could be the following,

1. The use of perishable material for writing that left no trace of its availability.
2. Absence of research and proper documentation on early manuscripts letterforms.
3. Belief in oral tradition than written communication in Indian culture.

The perishable nature of the medium might have made it impossible to study its early influences. However, from the above study we can infer that palm leaf manuscripts have a vital role to play on the transformation of letterforms. Primarily because,

- The tradition of writing on palm leaf manuscript is believed to have existed from the Caṅkam age (300BC) (Fig 1.11). A medium with such historical span is most likely to affect the nature of letterforms.
- Palm leaf manuscripts not just existed during the ancient times but were the most commonly used medium for writing. Moreover, stone and metal inscriptions were copies of palm leaf manuscript which makes the medium a master source.

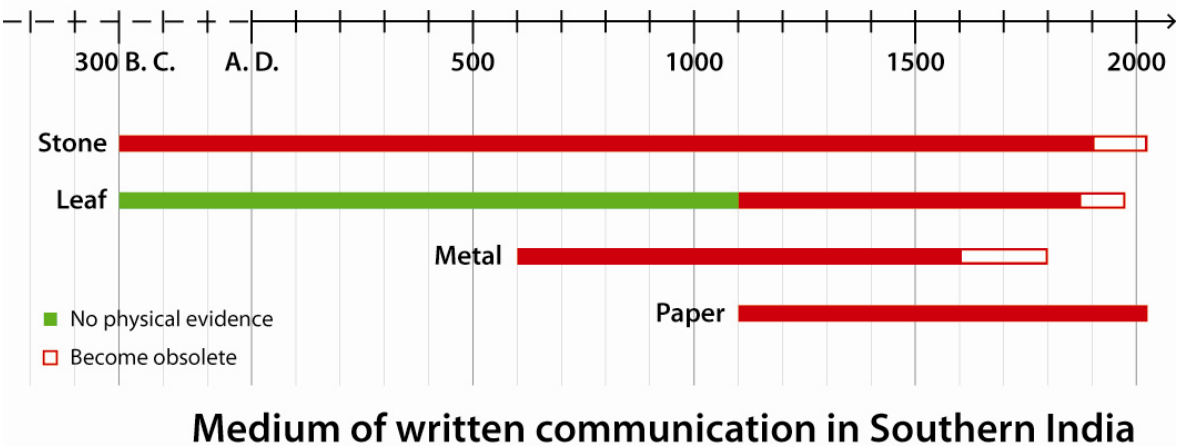


Fig. 1.11: Major mediums and their relative time span used for written communication in ancient Southern India.

- Over the years, studies on manuscripts in archives, libraries and museums are mostly restricted to decipherment of its content. There is hardly any examination on its letterforms and calligraphic nature. In the words of R. K. Joshi, "What is written on manuscripts is well researched and how it is written is yet another area, ever awaiting exploration (Joshi 1983)." And also in recent times, manuscript researches are focused on preservation technique and digitization of the existing manuscripts. There is a lack of research on the palm leaf medium and its influence on letterforms.
- In Tamil, palm leaf manuscript study with letterforms as its focus is nearly absent. The existing literatures are only based on general observations and not a comprehensive study. Therefore, a detailed investigation on Tamil palm leaf manuscripts is required.
- It is evident from the observations and insights by the scholars that palm leaves as a medium has an impact on the evolution of letterforms. And also its writing system has induced certain character in the letters which over the years have become part of the letterforms itself.

From the above discourse we can infer that the study of palm leaf manuscripts may hold key to the understanding of letter transformation. This study would facilitate and supplement the efforts made by the Epigraphers and Paleographers in developing an evolution chart. Professor R. K. Joshi was of strong opinion that such projects needs to be taken in various libraries and museums in India and abroad to clearly understand the historical trends

in Devanagari calligraphy. And also to acquire a sound knowledge of various writing styles in an organized manner and printed communications in Devanagari (Joshi 1983). Such studies are not only required in Devanagari script but also in all other Indian scripts. Therefore, there is certainly a need to study palm leaf manuscripts which could throw light on the transformation of letterforms.

In addition to palm leaf manuscript, the other major medium, the letterpress printing doesn't find its place in script transformation. Printing press was another medium which has transformed and standardized the Tamil script. In a span of hundred years after Guttenberg's invention, printing came to India by an accident. Tamil is the foremost Indian language to be printed in India and it also the earliest Non-European language in print (Blackburn 2005:31) (Fig. 1.12). The advent of printing saw the decline of palm leaf manuscripts. Shift from palm leaves to printing brought changes to the script, the letterpress medium transformed the shapes and finer details of the letterforms. And also the characteristics of western typography brought another influence on Indian scripts. Tamil was one of the earliest Indian scripts to get accustomed to such changes. A script with such incredible print historicity has very little literature on type history and typography.

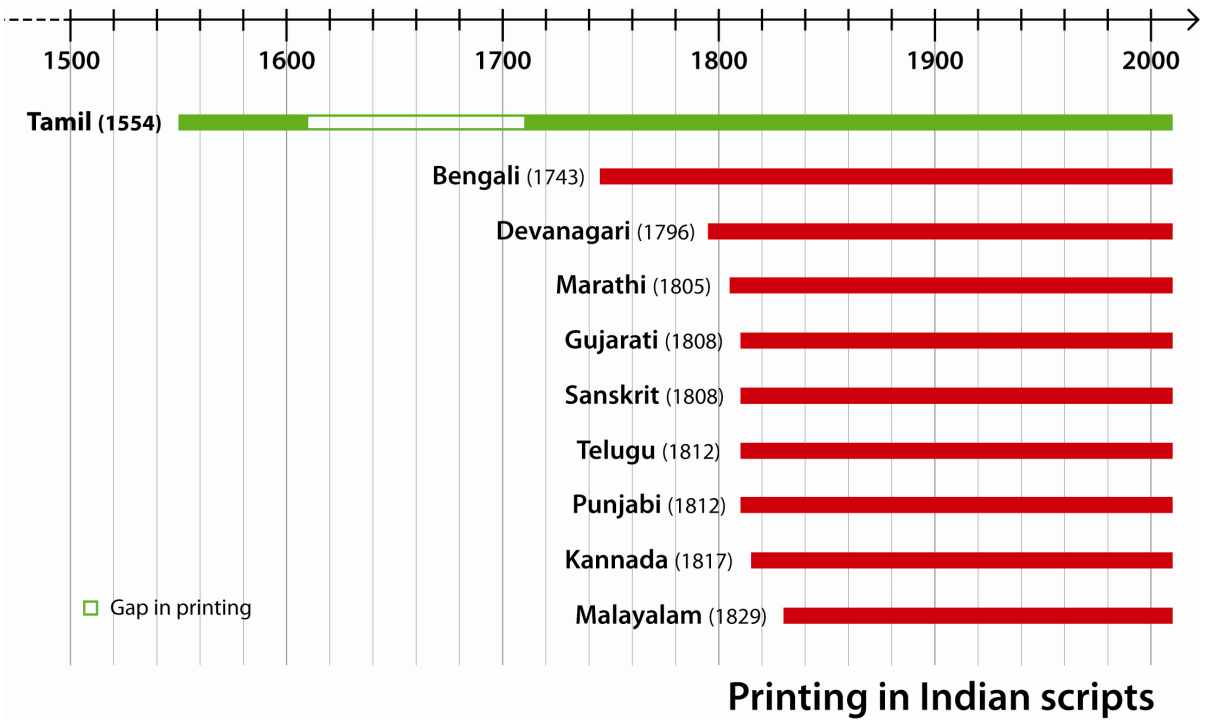


Fig. 1.12: Tamil is the foremost Indian and Asian script to be printed in India and abroad.

1.5 Research Objectives

In Tamil, stone and metal inscriptions have been extensively studied by the Archeologists to understand the evolution of letterforms. Palm leaf manuscripts and letterpress printing are yet to be researched comprehensively. Therefore, to fully understand the transformation of Tamil letterforms, the present research proposes to investigate the following:

1. Determine how the writing process on palm leaves influenced Tamil letterforms.
2. To understand the influence of palm leaf as a medium on Tamil letters.
3. Determine the transformations of handwritten palm leaf manuscript letterforms to early letterpress typefaces.
4. To research and develop resource on history of Tamil typefaces.

1.6 Research method

The existing research methods in the field of Epigraphy and western typography were studied. Epigraphic methods involved the reproduction of original inscriptions. The reproduced images are then traced, studied and published as a research material (Mahadevan 2003:82). Individual letters from the traced image are then chronologically plotted on to a visual chart to study the script's evolution. In west, early hand written manuscripts and printed works were well preserved and documented. This facilitated type historians to visually study the originals or facsimiles and record their observations. The research of various experts on the subject constituted the history of Roman script. After studying the above research methodologies, a combined research method was developed which included preparation of a visual chart and visual documentation of palm leaf manuscripts and early printed works.

1.6.1 Data collection and analysis

An extensive field visits were made to Tamil Nadu to visually document palm leaf manuscripts and old printed books. Photographs of manuscripts and photocopies of early printed books were obtained from various libraries. From the visual documentation, two visual charts comprising of manuscript letterforms and early typefaces were prepared. The visual chart consisted of basic vowels, consonants, ligatures and few vowel-consonants. The selection of letters was completely random and covered as many variations as possible. The process involved identification of variations of an individual letterform (a vowel or a consonant) across images of a particular palm leaf manuscript. From these variations the most

commonly used letterform was chosen and mapped on the chart. The same process was followed to plot the visual chart of early letterpress typefaces.

One drawback of the chart was that the manuscript letterforms were not chronological based. Only the letterpress typefaces were plotted sequentially in time. Therefore, sequential transition from palm leaf to letterpress printing was difficult to establish. Each visual chart was studied separately and then compared to understand the imitations and differences between both mediums. Before analysis, a visual vocabulary comprising of typographic terminologies, joineries, construction and visual grouping was developed. Creation of anatomical terms and visual grouping facilitated the visual analysis.

1.6.2 Usage of terms

There are several terms in the thesis which appears to have similar meanings. Some of these terms are scripts, letters, letterforms, type and typefaces. According to the dictionary meaning, *script* is described as something written; handwriting; characters used in a handwriting; mode of writing. And *letter* mean, a symbol or character used to represent a sound; a character standing for a vowel or consonant; a written or a printed message in print. *Type* is given as a rectangle/rectangular piece or block, usually of metal, having on it upper surface a letter or character in relief for use in printing. *Typeface* is a set of printing types in one design; face. *Transformation* is described as, the act of transforming or the state of being transformed. Wherein transform means – to change in form or appearance; metamorphose; to change; to change in condition, nature or character; convert; to change into another substance; transmute; to change completely or strikingly in appearance or nature. *Evolution* is defined as, the process of developing into a different form; origination of living things by such development.

In the thesis usage of terms are restricted to the following meanings. Scripts are generally referred to ancient writings, stone and metal inscriptions and also to holistically represent written communication of the language. Letter and letterform are used synonymously and they mean a symbol or character used to represent a vowel or consonant sound. Type and typeface signify characters used for printing. The last two terms (type and typeface) are mostly used in the thesis after the introduction of printing. Transformation in this research means, change in appearance/shape of the letters from one form to another. And evolution is meant by process of gradual development or growth.

1.7 Summary

- Brāhmī script is considered to be the mother of all modern Indian scripts. It is also the primal source of other major script families of Central and Southeast Asia.
- Epigraphic evidences indicate Tamil Brāhmī script, a derivative of Brāhmī script as the earliest known Tamil script.
- At present, the Government Archeological department's evolutional chart of Tamil script is the only source that depicts the transformation of letterforms. The limitation of the chart is that it only serves as a visual documentation but doesn't explain *why* and *how* the transformations have occurred. And also it does not seems to include the influence of other traditional mediums.
- In Tamil, stone and metal inscriptions have been expansively studied by archeologists and epigraphist. Palm leaf manuscripts and letterpress printing have not yet been researched comprehensively.
- The study of palm leaf manuscript, a traditional writing medium, may provide clues and bridge the understanding of how the changes in letterform occurred over centuries. The study would contribute to the efforts made by archeologists and epigraphist in understanding the script.
- Another medium which was absent in the process of script evolution was letterpress printing – a medium which changed the world. The modern Tamil script owes its standardization to the letterpress printing. The advent of printing also saw the decline of handwritten palm leaf manuscripts.

Chapter 2

Evolution of Letterforms

Tamil language is one of the oldest languages in the world and is the official language of Tamil Nadu a southern state in India. It is also recognized as an official language in Singapore and Sri Lanka. There are significant minorities of Tamil speaking communities in other countries like Canada, Mauritius, Malaysia, Burma, South Africa, Vietnam and other South Asian countries.[1] Tamil has one of the oldest literatures in the world spanning from the Caṅkam literature. It was the foremost Indian language to be declared as a classical language by the government of India in 2004.[2]

2.1 Tamil Caṅkam

The earliest known source of Tamil literature dates back to 500BC to 300AD known as *Caṅkam literature* (Varadarajan 2001:18).[3] Tamil Caṅkam was a congregation or assembly of Tamil scholar's and poet's who displayed and shared their knowledge during the ancient times. It was like a huge Tamil conference or convention in modern terms. The Tamil society

[1] http://en.wikipedia.org/wiki/Tamil_language (visited on 25.11.09)
[2] The Hindu, National newspaper, September 18, 2004
[3] The exact period of the Caṅkam literatures are unknown but scholars generally opine that Tamil Caṅkams existed roughly between 300BC to 300AD

during the Caṅkam age was an advanced and civilized society, which had reached great heights in commercial prosperity and in the field of fine arts (Subramanian 1980:337). Scholars believe that there were three Caṅkam's or literary academies held at three different venues. This is proposed in the literary work, *Iṟaiyaṉār akapporuḷ urai* of eight century AD (Encyclopedia of Tamil literature 1990:73). The three Caṅkam's were held at following places (Swaminathaiyer 2000:6):

1. Mudhal Caṅkam – *Kumari kandam*
2. Idai Caṅkam – *Kabaadapuram* and
3. Kadai Caṅkam – *Madurai*

The Pāṇṭiya dynasty believed to have founded and patronized these academies. The Caṅkam literature comprised of 2381 poems which contained more than 50,000 lines was composed by 473 poets including many women poets (Varadarajan 2001:40). Tolkāppiyam, the earliest extant literature in Tamil is said to have belonged to the second academy.

2.2 Tolkāppiyam

Tolkāppiyam is a work on poetics and grammar which describes the language of the classical period. Tolkāppiyar, author of the epic work gives a detail description of Tamil letterforms existed during his time. His descriptions of letterforms only indicate that Tamil had attained its script form even before the Caṅkam age (Ibid 6). At present, his description is the earliest available literary evidence of Tamil script. Tolkāppiyam consists of three books called *atikārams*, they are, *Eḻuttu atikāram* (Letters), *Sol atikāram* (Words) and *Porul atikāram* (Meaning). Each of these atikārams are further divided into nine chapters where eḻuttu atikāram contains the following sections - *Nool Marabu, Mozhi Marabu, Pirappiyal, Punariyal, Thokai Marabu, Urubiyal, Uyir Mayangial, Puḷḷi Mayangial and Kutriyalukarap-punariyal.* The first section of the book - *Nool Marabu*, describes the total number of characters and categorizes them into vowels, consonants and diacritic symbols. Each of these groups is further classified into to subgroups based on their phonetics like short sound (*Kuril*) and long sound (*Nedil*).

The chapter gives a visual description of certain letterforms. Following are extracts from the section which details the orthography of Tamil letterforms (Singaravelan 1988:3-10):

1. Tamil alphabet consists of 33 letters they are 12 vowels, 18 consonants and three dependent sounds – *Carpeḻuttu.* (Tol:1)
2. When letter 'pa'(ப) has a dot within itself it becomes letter 'ma'(ம). (Tol:14)
3. All consonants have dot (puḷḷi) above them. (Tol:15)
   The use of puḷḷi is unique to Tamil script and it is from Tolkāppiyam's description its usage remains as a testimony to the world.
4. Vowel signs 'e'(ெ) and 'o'(ொ) will have dot above them. (Tol:16)
5. Vowel consonants will have the same visual form as their respective consonants with addition of horn/hook above and below them – compound signs (*matras)*. (Tol:17)

According to tradition, Tamil language was received by *Agastya*, greatest Vedic sage among the seven sages – *Saptarishis*, from Lord Siva himself. But the precise origin and history of traditional writing in Tamil is still unknown. Epigraphic attestation of Tamil begins with stone inscriptions from the 3rd century BC, written in Tamil-Brāhmī (Mahadevan 2003:169-173). According to Mahadevan Tolkāppiyam belongs to the Late Tamil Brāhmī period. The modern Tamil still continues to follow the literary history and has its roots in *Tolkāppiyam* (Encyclopedia of Tamil literature 1990:10). The present Tamil script has the same number of vowels and consonants as specified in Tolkāppiyam. It has twelve vowels called *uyir* or *life* and eighteen consonants called *mey* or *body.* The only characters missing in present alphabet were three diacritic symbols mentioned during Tolkāppiyam period. Instead there is one secondary sound called *aytam* which is seldom used in modern Tamil. The vowels and consonants combine to form 216 compound characters called *uyir-mey* or *animated body*, giving a total of 247 characters in Tamil. In addition, six Grantha alphabets got included in the mainstream Tamil to denote words of Sanskrit origin.

2.3 Tamil Brāhmī

According to Department of Archeology, Tamil Nadu, the earliest known Tamil inscription was referred as Tamil Brāhmī, a derivative of Brāhmī script (Fig. 2.1). The available stone inscriptions indicate its presence to 200BC. Unlike all other regional variants of Brāhmī, Tamil Brāhmī was uniquely adapted to Dravidian language (Mahadevan 2003:173). The presence of this ancient script has been referred by the names *damili* or *dravidi* in the Jaina canonical texts, *Pannavana sutta* and *Samavayanga sutta*. This was further attested by the name *dravida-lipi* in the later Buddhist work *Lalitavistara* (Ibid 167, 168). Tamil Brāhmī

closely resembled the Brāhmī script of Emperor Asoka in Northern India but however the script was different from Asokan Brāhmī for the following reasons (Encyclopedia of Tamil literature 1990:106) (Govindaraj 1994:16) (Rajan 2006:203).

1. Firstly, very few consonants exist in Tamil Brāhmī as compared to Asokan Brāhmī system. Each of the consonants represents more than one sound depending upon the context in which it was used.
2. It has signs representing the consonants ழ(l̲), ள(l̤), ற(r̲) and ன(n̲) which are not represented in the Asokan Brāhmī.
3. Absence of letters for sounds not present in Tamil namely *voiced consonants*, *aspirates*, *sibilants*, *anusvara* and *visarga* (Mahadevan 2003:167, 173).
4. The use of *puḷḷi* is unique to Tamil Brāhmī system and it has eliminated the conjunct consonant system of writing followed in all other Indian scripts that have evolved from Asokan Brāhmī.

Fig. 2.1: Vowels and consonants of Tamil Brāhmī script.

Consonants with puḷḷi above them are called *pure consonants* and has a half sound. Puḷḷi denotes the absence of an inherent 'அ' vowel (a – vowel) in consonants for example: க (k) becomes க் (half sound of 'k' without a – vowel). In contrast to other Indian scripts, this sign denotes the absence of final vowel sound (Nakanishi 1989:58). According to Govindaraj, pure consonants with puḷḷi were found on the early stone inscriptions it was due to palm leaf manuscripts the use of puḷḷi disappeared on the stone inscriptions. He states,

> The dots (puḷḷi) are found for the pure consonants in the early inscriptions. But this has not been strictly followed because some of them are found without dots, though they were royal charters. Also in later inscriptions the dots are completely ignored. In the beginning, the charters were written on the palm leaf and after that for preservation these were copied on non-perishable materials like copper plates and stone. It seems on the palm leaves the dots were

> purposely omitted because they caused damage to the leaves. It may be inferred that when the charters of the palm leaves were recopied on to non-perishable materials they followed the originals accurately (Govindaraj 1994:21).

The absence of pulli in stone inscriptions is due to the tradition of palm leaf manuscript writing. Omission of puḷḷi on palm leaf manuscripts and stone inscriptions was one of the first known instances of influence from one medium to another medium.

Tamil Brāhmī letterforms were simple in graphic representation with minimal strokes and construction. But during the 7th century AD, a drastic transformation in the letterform was observed. The linear and horizontal strokes developed into curvilinear forms. Y. Subbarayalu, an Epigraphist, comments that, "The Tamil Brāhmī script (earliest script) was simple, clean and neat. It was linear and rectangular which could be easily read and written. Later, the script evolved into a circular form called as Vaṭṭeḻuttu."According to Iravatham Mahadevan, the evolution of Tamil Brāhmī script was divided into two broad periods namely Early Tamil Brāhmī (200 BC – 100 AD) and Late Tamil Brāhmī (200 AD – 400 AD). And Late Tamil Brāhmī script evolved into Early Vaṭṭeḻuttu during 5th – 6th century (Mahadevan 2003:168).

2.4 Vaṭṭeḻuttu

Around 2nd – 3rd centuries AD Tamil Brāhmī script began to undergo a change and attained round forms namely Vaṭṭeḻuttu during 5th century AD (Rajan, 2006:206). But precise transition of the script from Tamil Brāhmī to Vaṭṭeḻuttu is still unknown. The script derives its name from its visual form (Subramanian 2004:74). Vaṭṭeḻuttu was the main script used for writing Tamil in the Pāṇṭiya and Cēra countries till the end of tenth century AD (Visalakshy 2003:59). There were three phases of evolution of Vaṭṭeḻuttu script (Rajan 2008:208):

1. First phase (2nd – 4th century AD)
2. Second phase (4th – 8th century AD) and
3. Third phase (8th – 13th century AD)

First stage marked the transformation from Late Tamil Brāhmī script to early Vaṭṭeḻuttu script. In the second stage Vaṭṭeḻuttu attained its basic form and in third stage they become distinct and independent script (Ibid 210). Similar phases and evolution of Vaṭṭeḻuttu has been identified by Iravatham Mahadevan but his dates vary. According to him, the early phase dates between 5th – 6th centuries AD, middle phase (7th – 10th centuries AD) and the late

phase from 11th – 19th centuries AD (Mahadevan 2003:211, 212). During the last phase of Vaṭṭeluttu there existed another script called Kōleluttu which was a variant of Vaṭṭeluttu. The script was more prevalent in North Kerala and was popular among the Māppiḷas (Malabar Muslims) (Visalakshy 2003:62).

Vaṭṭeluttu is a very good example of how medium and writing system has influenced letterforms. R. Govindaraj accounts, "The mode of writing Vaṭṭeluttu seems to be anti-clock wise, so the cursive and slanting forms developed in the evolution. Angular shapes transformed into cursive forms. Unlike Tamil script symbols for the vocalic consonants are written with a single stroke attached to the letters (Govindaraj 1994:20)." The writing style gave emphasis to curves and arcs. The simple lines and angularities of Tamil Brāhmī script got smoothed and rounded, leading to its name Vaṭṭeluttu or round letters (Encyclopedia of Tamil literature 1990:107). The modern Malayalam script of Kerala gradually evolved from Vaṭṭeluttu and Grantha script (Mahadevan 2003:212) (Salomon 2004:41).

2.5 Grantha script

Grantha script belongs to the writing system of southern India (Fig. 2.2). The script evolved during 6th century AD and was mainly used to write Sanskrit in Tamil Nadu (Encyclopedia of Tamil literature 1990:105). The term '*Grantha*' was of Sanskrit origin meaning a book or bundle of palm leaves. Therefore, the script used for writing books was called Grantha script (Rajan 2006:212) (Visalakshy 2003:66). Similar to Brāhmī and Tamil Brāhmī script there are different hypothesis on the evolution of Grantha script. According to P. Visalakshy,

> There are several theories on the origin of Grantha script proposed by various scholars like Mangalam, A. H. Dani, Burnell, Sriman Narayana Murthy and Sivarama Murthy. One such view gives the credit to the Pallavas, originally an Andhra power, for the introduction of Grantha script when they became one of the major ruling powers of Tamil state. According to Sriman Narayana Murthy, it was during the reign of Pallava ruler Mahendravarman (600 – 630 AD) the kannada – Telugu script began to take the shape of Grantha script. According to Burnell, Grantha script was originated from Cēra character, which according to him was a variety of the cave character, used in the Cēra kingdom during the early centuries of Christian era (Visalakshy 2003:65).

According to R. Govindaraj, "The Grantha inscriptions in Tamil Nadu are seen from the beginning of the 7th century AD and they have to be attributed to the advent of the Pallavas in northern Tamil Nadu (Govindaraj 1994:17)." Pallavas introduced Grantha script in

Tamil Nadu says Rajan (Rajan 2006:212). In general, Pallava kings are credited for the development of Grantha script; the available stone inscriptions also indicate the same. Based on the period of development, Grantha script can be classified into four varieties, they are (Visalakshy 2003:67):

1. Archaic variety (Before 7th century)
2. Middle variety (8th-10th century)
3. Transitional variety (10th-13th century) and
4. Modern variety (from 14th century onwards)

The Grantha script found in palm leaf manuscripts were of Transitional variety and Modern variety was used for printing. The script is almost extinct today except for its use by few Brahmins in Tamil Nadu. The variety of Grantha script suitable enough to represent both Tamil and Sanskrit is known as '*Tamil Grantha*' or '*Grantha Tamil*' (Ibid 2003:66). The Grantha influence over the native archaic Vaṭṭeluttu script caused the origin of Tamil script in the beginning of 7th century (Govindaraj 1994:18).

Fig. 2.2: Basic vowels and consonants of Grantha script. The script was used for writing Sanskrit in Southern India.

2.6 Tamil script

Tamil script evolved from Vaṭṭeluttu and Grantha script of South India. Until 7th century AD, Grantha script was employed to write Tamil when a distinctive script evolved exclusively for Tamil. Archaeological evidence dates the origin of Tamil script to the beginning of 7th century AD (Govindaraj 1990:17). Though Tamil got introduced during the 7th century it wasn't prevalent across Tamil region (Rajan 2006:209). Table 2.1[4] is a compilation by R. Govindaraj which shows the chronological distribution of the stone inscriptions in three scripts up to 10th century AD. The steep increase in number of stone inscriptions indicates the growth and establishment of Tamil script. The rise of Cōḻa Empire had led to the widespread of Tamil script, the language flourished under their rule (Fig 2.3). Mahadevan notes,

> The classical age of Tamil script commences with the ascendancy of the Cōḻa's from the middle of the 9th century AD. The Cōḻa's, who were earlier the feudatories of the Pallavas, inherited the Tamil script from them and spread its use in all the conquered territories (except the Cēra country) making the Tamil script the exclusive script of the language in Tamil Nadu from about the beginning of the 11th century AD (Mahadevan 2003:213-214).

The practice of bilingual copper plate inscriptions in Tamil and Sanskrit during the Pallavas reign developed into a full-fledged Tamil inscription by succeeding dynasties of Cōḻas and Pāṇṭiyas (Salomon 1998:105). Stone and metal inscriptions have been the primary resources for determining the evolution of Tamil script. On the other hand, the evolution of Roman script has been established through the study of various mediums, writing tools and writing system.

Period AD	Vaṭṭeluttu	Tamil	Grantha
500-600	25	-	2
601-700	54	8	40
701-800	49	41	30
801-985	236	1762	52

Table 2.1: Table shows the distribution of stone inscriptions from 6th – 10th century.

[4] Reproduced from the statistics provided in the book by Govindaraj R., *Evolution of script in Tamil Nadu AD 500-985*, Tanjore: Tamil Nadu Archeological Society, Special issue No. 1, 1994, p. 14

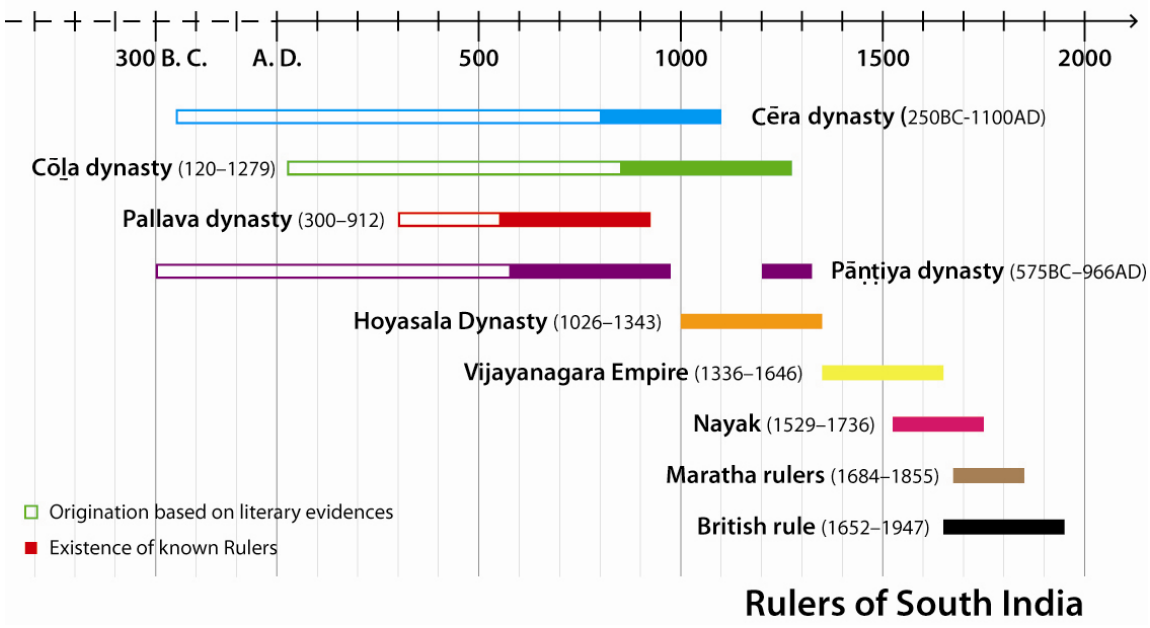


Fig. 2.3: The rise of Cōḻa Empire during 10th century led to the establishment of Tamil script.

2.7 Roman script

The present Roman script also known as Latin script has evolved from the Greek script. The earliest surviving European letterforms are Greek capitals inscribed on stone. According to Robert Bringhurst, "These early Greek letters were drawn freehand, not constructed with compasses and rule, and they have no serifs – neither the informal entry and exit strokes left by a relaxed and fluent writer, nor the symmetrical finishing strokes typically added to letters by a formal scribe (Bringhurst 2002:119)." During the later periods the strokes of these informal Greek letters became thicker, the aperture lessened and serifs appeared (Fig. 2.4). These newly developed letterforms later became the model for formal lettering in Roman Empire (Ibid 120).

Roman capital letters first attained its form during the first century AD (Sutton and Bartram 188:6). The letterforms were formal, simple and geometrical in shapes. Fine examples of the Roman capitals are the inscriptions on Pantheon and Trajan's Column, monuments in Rome (Fig. 2.5). Scholars opine that the Trajan capitals were first painted on the stone with a square cut brush and then incised by a stone cutter. Robert Bringhurst remarks, "The Roman inscriptional letters were written with a flat brush, held at an angle like a broad nib pen, then carved into the stone with mallet and chisel (Bringhurst 2002:120)."

Unlike Tamil stone inscriptions, they are not a copied from handwritten manuscripts. Further James Sutton and Alan Bartram ascertains,

> Roman capitals are freely drawn lines which do not correspond to the arc of a circle or a perfect straight edge, yet are highly controlled; give the alphabet its particular quality of strength and poise. Their shapes were formed by the way they were drawn on the stone. They were first marked out with a broad reed pen or sign-writer brush cut square at the tip and thus acquired their thick and thin strokes. Then they were cut into the stone with a sharp chisel. This gave those disciplined curves and angles and determined the form of their stroked endings (Sutton & Bartram 1988:6).

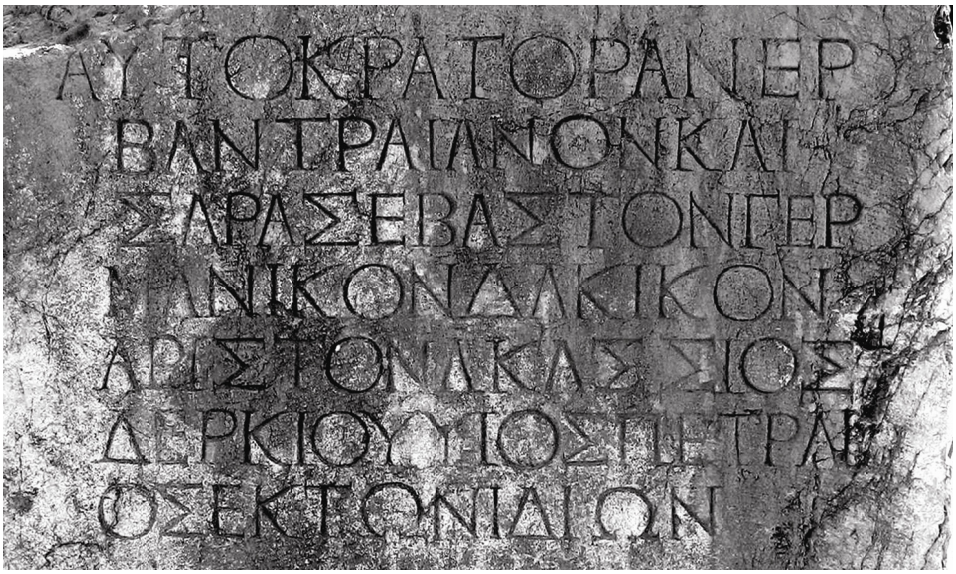


Fig. 2.4: Greek stone inscriptions from ruins of ancient Delphi.

Fig. 2.5: Roman capitals on Trajan's column, 113 AD. *(Image source: An Atlas of Typeforms)*

2.7.1 Handwritten manuscripts

Before movable type printing was invented, original manuscripts were copied manually by hand. Later books were printed on paper using wood blocks. This tradition continued until the appearance of movable type in fifteenth century. Chappell remarks, the history of letterforms from Roman inscriptions to Gutenberg's time was the history of calligraphy which saw the emergence of various European letterforms (Chappell & Bringhurst 1999:27). The handwritten form or the pen variety of Roman capitals was called *Quadrata*, which was made with square cut reed or quill. Since this writing style was a slow process, it gave way to an easy to write script called *Rustica*. The Rustica in turn was displaced as a manuscript letter by the *Uncial* (Nesbitt 1957:14). Gradually over centuries *Semi Uncials*, *Carolingian* minuscule and many other letterforms began to evolve (Fig. 2.6). The modern lowercase alphabet evolved from the Carolingian minuscule. The cause for such transformation was the spread of writing to different regions, use of various materials and need for faster writing. The spread of writing established many regional scripts across Europe (Bringhurst 2002:120). The use of variety of writing instruments in association with different materials has determined the aesthetic standards of script (Frutiger 1989:159).

2.7.2 Medium and tools used for writing

Two basic forms of script representation were followed around the world. One was the monumental letterforms which were seen in architectural monuments, rocks, etc and other was the handwritten letterforms practiced in manuscripts (Ibid 153). In west, there existed majuscules (large formal letters) and minuscules (smaller casual letters) which are commonly known as *uppercase* and *lowercase* (Bringhurst 2002:120). Tamil did not have such distinguishes as majuscule and miniscule but two modes of written communications existed – stone inscriptions and manuscripts.

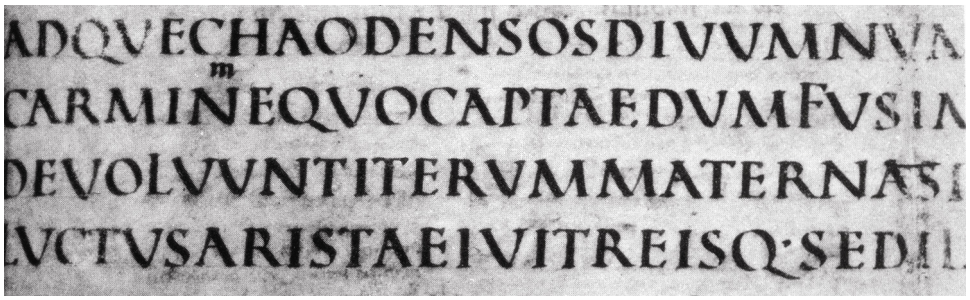
a. Monumental letterforms – stone inscriptions

Stone has been one of the primary medium of graphic representation in India and in West. Stone inscriptions in Tamil were unlike the monumental letterforms of Roman alphabet.

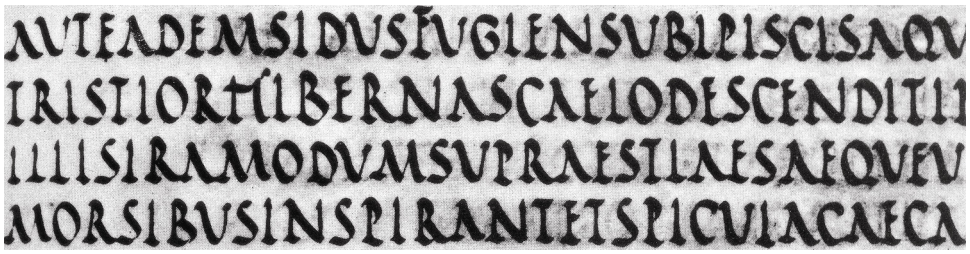
1. **Tools and materials:** The tools used for inscribing on stone were different in both the scripts. In west, flat edged chisel was used for carving letters which produced contrasting thick and thin strokes. Whereas in Southern India, pointed chisel was used to inscribe Tamil letters which produced uniform thickness strokes (Fig. 2.7).

2. **Characteristics of letterforms:** The Roman inscriptions were formal, proportional, geometrical and also optically corrected. Romans perfected the art of monumental letterforms. On contrary, Tamil inscriptions reflected handwritten letterforms of palm leaf manuscript which were informal. In Tamil, stone inscriptions were not given importance as an art form. There were very few exceptions like the Grantha stone inscriptions of Pallavas which were decorated and beautifully carved.

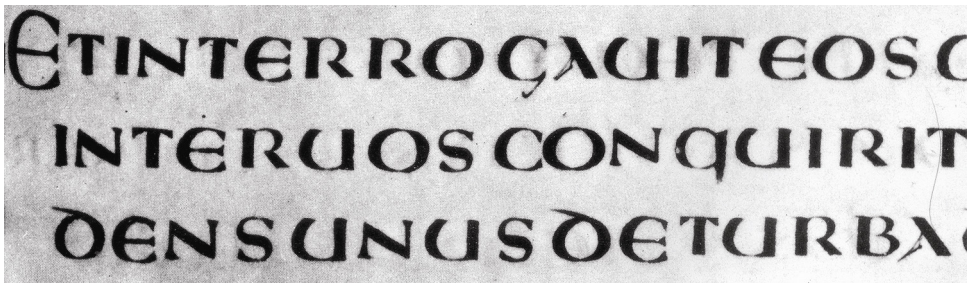
a.



b.



c.



d.

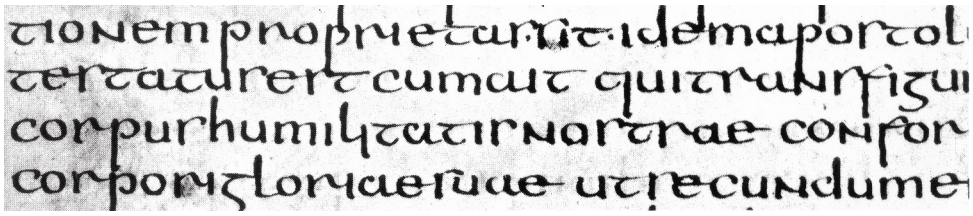


Fig. 2.6: a. Square capitals/Quadrata capitals, Virgil, 300–400 AD

b. Rustics, Virgil, 300 AD–400 AD

c. Uncials, Gospel of St Matthew, 700 AD

d. Semi uncials, St Hilarius: de Trinitate, 500 AD

(Images source: An Atlas of Typeforms)

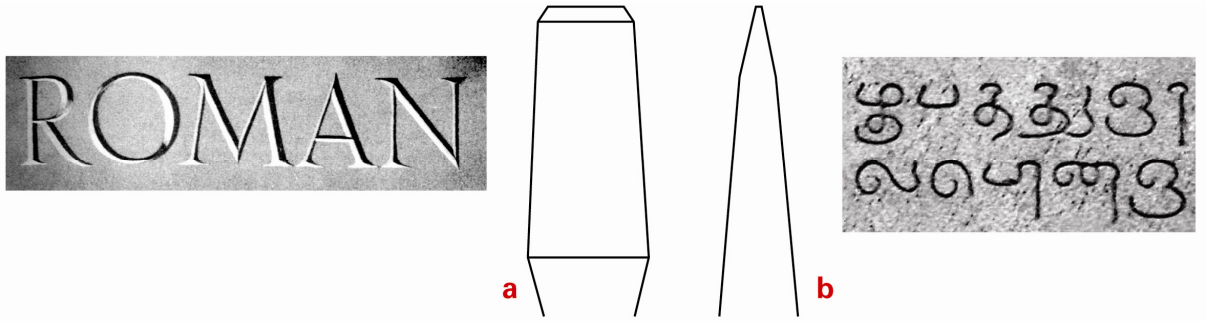


Fig. 2.7: Tools used for inscribing letters on stone.

a. Flat edged chisel was used to inscribe Roman capitals which led to formation of thick and thin strokes in the script.

b. Pointed metal chisel was used to engrave Tamil script which produced uniform stroke thickness.

b. Manuscript letterforms

The concept of manuscripts existed both in India and West but their format and writing system was different. In both regions, there was a need for rapid writing which transformed the letterforms.

1. **Tools and materials:** In West, books were hand written on parchment[5] or vellum[6] until the availability of paper during the late thirteenth century (Chappell & Bringhurst 1999:5). Quill and calligraphic pens were used to write on books. In Southern India, palm leaves were used for writing texts with a pointed metal stylus.

2. **Characteristics of letterforms:** The spread of learning in Europe increased the necessity for more books. The scribes who made these books were often hard pressed for time. The need for speed copying transformed letters into rounded forms and some even lost a stroke or two in the process (Wotzkow 1952:129, 133). Thus, Roman capitals slowly began to transform into to rounded forms in the process of cursive writing. Furthermore Chappell remarks, "The rounded forms were used chiefly to increase speed, since the curves reduced the number of strokes required to shape the letters. These forms flow directly and easily from a quill or reed and therefore have a natural authority (Chappell & Bringhurst 1999:30, 31)." The style of writing and faster

[5] Parchment is an animal skin, chiefly sheep or goat, which has been scraped, dressed and prepared as a basis for writing.
[6] Vellum is parchment made from the skin of a new born calf or lamb.

writing led to the transformation of Roman capitals to lowercase letterforms. In Tamil script, such transformation is observed since the ancient Tamil Brāhmī script. But there are very few literatures available on the study of letter transformation.

2.7.3 Revivalism of Stone and manuscript letterforms

Apart from the use of different tools what needs to be inferred from the evolution of both scripts is the fact that Roman capitals remained the same after two millenniums. And its hand written manuscript letterforms – miniscule, served as an inspiration for the movable type printing. In west, type designers, typographers and punch cutters were keener on reviving the stone and manuscript letterforms. They brought back most of those letterforms to life during printing and in digital medium. On the contrary, Tamil letterforms found on stones have transformed drastically over centuries making it difficult to revive.

Stone inscription – Roman capitals

The Roman inscriptions have retained its form for years maybe because of its constructive nature, geometric form and structured proportion which was reproducible. And also stone inscriptions were never referenced from another medium. An excellent revival of stone inscription is the Trajan, a typeface designed by Carol Twombly in 1988. Trajan font was based on the inscription on Trajan's column carved during 113 AD in Rome (Fig. 2.8). In case of Tamil inscriptions, there is no set proportion or method of constructing the letterforms which made it difficult to reproduce. The inscriptions were defined by the proficiency of the scriber which might had individual style. Moreover, the imitation of palm leaf manuscripts varied the stone inscriptions in different places and time. Thus, the stone inscription became unsuitable for revival. There could also be other reasons such as absence of paleographic study during the early printing era. And also the early type designers may not have thought stone inscriptions to be their inspiration conceivably for the rationale of portability. In general, stone inscriptions never turned out to become typefaces, even today.

Manuscript letterforms

The early typographers were fascinated by the calligraphy of manuscripts. They began to take inspirations and introduce them in print. Today, many of the old scribal conventions survive in typesetting (Bringhurst 2002:120). Wotzkow states, "During early letterpress printing, the most popular local book hands were used as a basis for type designs and the types cut by

several of the new printing establishments were really nothing but carefully carved copies of contemporary manuscript letters (Wotzkow 1952:134).” A fine example of revivalism is design of Italics by Aldus Manutius during 1500 AD (Fig. 2.9). Aldus designed his type face following some of the most beautiful cursive hands of the day (Ibid 134). Similar to western typography, the early Tamil printing imitated the handwritten manuscript letterforms (Sambandan 1997:314). These were general observations which required further investigation. During the early printing, manuscript letterforms were transformed into typefaces but how long the influence continued is unknown. And also what elements got imitated needs to be identified and studied comprehensively.

Fig. 2.8: Trajan font, designed by Carol Twombly was based on the first century Roman capitals on Trajan’s column at Rome.

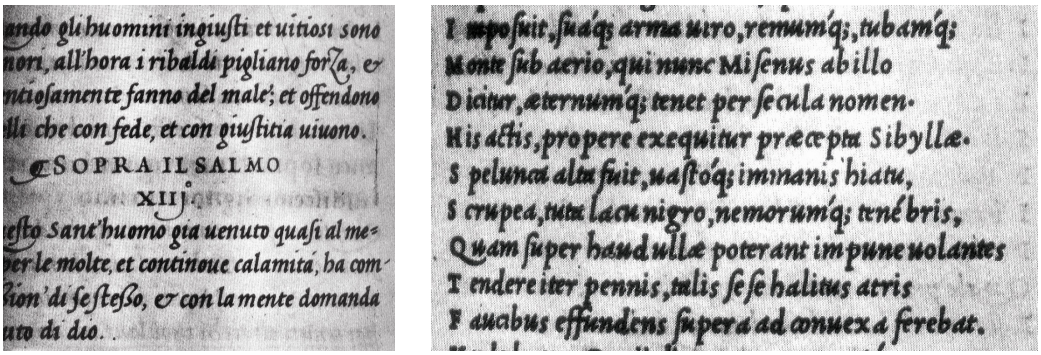


Fig. 2.9: On left is a handwritten manuscript of sixteenth century (Marcantonio Flaminio, La Paraphrasi) and on right is the first *italics* designed by Aldus Manutius in 1501 (a page from Virgil’s Opera). *(Image source: An Atlas of Typeforms)*

2.8 Summary and Conclusion

- Tamil Brāhmī was used to write ancient Tamil in Southern India and unlike other sibilants of Brāhmī, it was unique in nature. From Tamil Brāhmī emerged other South Indian scripts namely Vaṭṭeluttu, Grantha, Tamil and Malayalam (Fig. 2.10).
- The influence of Grantha script over the archaic Vaṭṭeluttu script during the 7th century AD led to the origin of Tamil script.
- Roman alphabet existed in two forms, Majuscule and Miniscule. Majuscules are large formal capital letters found in architectural monuments basically carved on stone. Miniscule are manuscript letterforms which evolved from Roman capitals. The evolution of lower case is attributed to rapid writing and the tools employed.
- In west, early handwritten manuscripts were well preserved and documented. And the influence of tools, medium and writing tradition on the script were abundantly researched and established (Fig. 2.11). In contrast to Roman script, Tamil script lacked study of handwritten manuscripts and writing tradition. And palm leaf manuscripts are the only traditional source which is likely to have influenced the script. Therefore, palm leaf medium and its writing system needs to be explored and researched.
- In west, stone inscriptions and handwritten manuscripts have been inspirations for the print medium. Similarly, in Tamil the early typefaces has been quoted as an imitation of palm leaf manuscripts which requires a systematic investigation. And also the extent of palm leaves influence during the early typefaces needs to be studied.

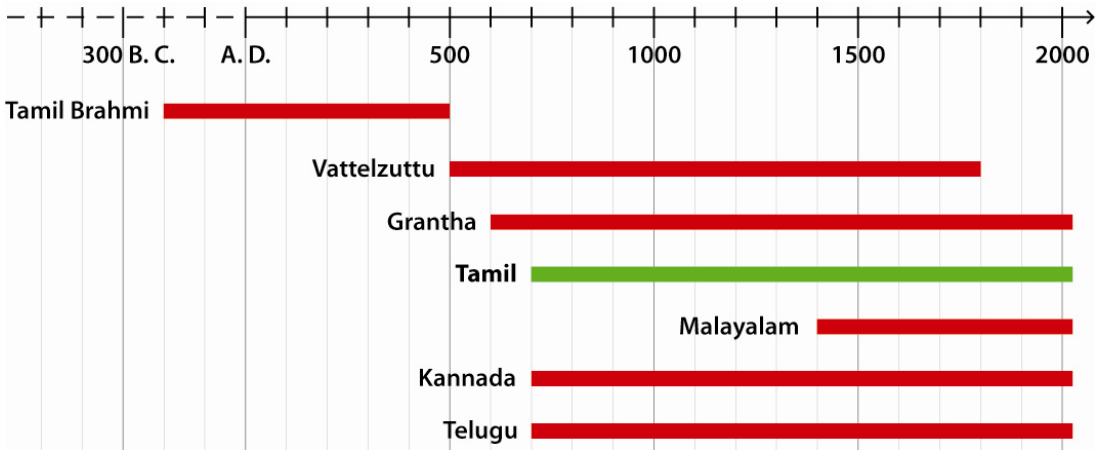


Fig. 2.10: Scripts of southern India, except for Kannada and Telugu all the other scripts evolved from the Tamil Brāhmī script. *(Reproduced from the book 'Early Tamil Epigraphy – From the Earliest Times to the Sixth century AD')*

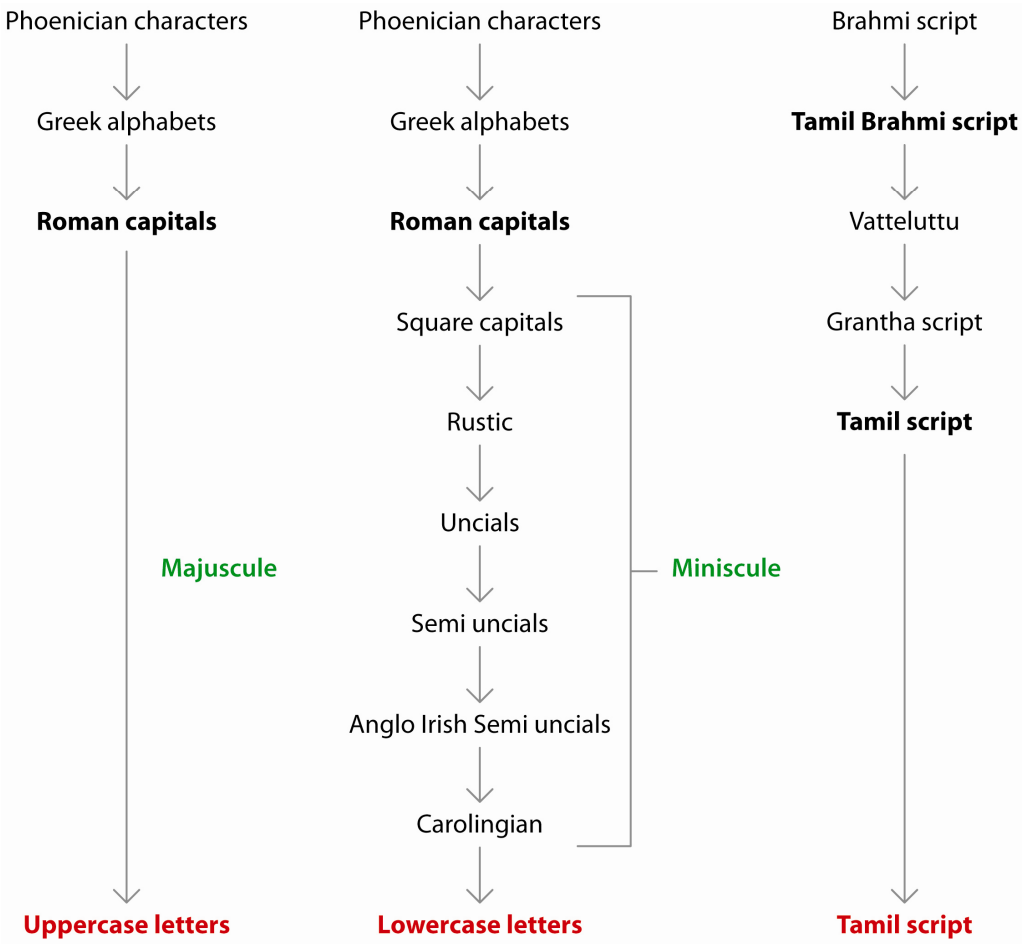


Fig. 2.11: Flow chart showing the overview of evolution of Roman and Tamil script. Tamil script lacked the study of manuscripts writing tradition.

Chapter 3

Characteristics of Palm leaf manuscripts

The comparative study of the evolution of Roman and Tamil script only strengthens the need for manuscript study. In Tamil, palm leaves have been a chief traditional medium used for writing. Therefore, it is important to research the handwritten manuscript medium to understand its influence on Tamil letterforms.

3.1 Palm leaf medium

Palm leaf manuscript is one of the oldest medium of writing in India especially in Southern India. It is also the major source for writing and painting in South and Southeast Asian countries including Nepal, Sri Lanka, Burma, Thailand, Indonesia and Cambodia (Agrawal 1984:24). In Tamil, writing on palm leaf manuscripts was practiced since the Caṅkam age and continued till the late twentieth century. Similarly, the use of palm leaves existed in other parts of the country. The oldest available palm leaf manuscript in India belongs to 10th century AD. According to Agrawal, the earlier works got completely destroyed due to the extreme climatic conditions of India (Agrawal 1984:1). Further Richard Salomon states,

> Before Asoka, writing was probably used principally, if not exclusively, for economic and administrative, as opposed to literary and monumental, purposes; perishable materials such as palm leaves, tree bark and (according to Nearchos)

> cloth, which have little chance of surviving the rigors of the Indian climate, were used. Thus, according to this view, we need not be surprised that no early specimens of Indian writing have survived and their absence does not prove that they never existed (Salomon 1998:14-15).

Though palm leaf writing was practiced since the ancient times its precise origin is still unclear. The magnitude of the medium is such that its composition and method of writing has remained unchanged right from its known existence. People still prepare and use palm leaf manuscripts the way our ancestors used centuries ago. The continuation of the traditional practice may provide evidences on the medium's influence on the script.

3.2 Types of palm leaves

There are many varieties of palm-trees. However, the leaves of only a few have been used for writing. The most widely used are (Agrawal 1984:25-27):

1. *Borassus flabellifer Linn* (the palmyra palm)

   These palm trees grow in a dry climate. The leaves of the palmyra palm are thick, fibrous, initially strong and flexible, over time its flexibility decreases. They are also prone to insect attacks.

2. *Corypha umbraculifera Linn* (talipot, fan palm)

   The talipot palm needs wet climate and abundantly grows in moist coastal areas. The leaves are soft, light colored when dry and remain flexible for a long period. The earliest manuscripts are on this type of leaves. The leaves are also used for making fans, mats, umbrellas, baskets, thatching, roofing and so on.

3. *Corypha taliera Roxb.*

   The Corypha taliera are strong palm trees. Its leaves are slightly brown in color with black spines. They are thick, non flexible and prone to insect attack.

Of the three varieties of palm leaves, talipots have the most smooth, delicate and supple leaves. Its fibers do not damage easily and are more resistant to decay. In India, all the varieties are used for writing. Palm leaf manuscripts are found in linear horizontal format this is basically due to the natural size of the leaves. Normally, length of the leaves vary from 15cm-60cm and width between 3cm–12cm. The manuscripts dimension depends on the available size of leaves. Before writing, palm leaves have to be processed and prepared to make it suitable for scribing.

3.3 Preparation of palm leaves for writing

There are several ways of processing palm leaves, these methods differ from region to region. In South India, different method is adopted whereas in Orissa and other Southeast Asian countries different technique is adopted (see appendix). The basic method of palm leaf preparation for writing is as follows[1] (Patnaik 1989:16-17).

Palm leaves are first cut from the trees before they could dry up and become brittle. Only a half opened young shoot of palm leaves are suitable for making manuscripts. These are cut into required sizes and then boiled in water to the required temperature in order to render them soft. The softened leaves are then dried in the shade or mild sunshine. The unwanted middle ridge is removed from the main leaf. The desired portion is pressed, polished and trimmed to size. Then holes are made on either side of the leaves with a red hot wire. A cord is passed through the holes to hold the leaves together. Two wooden planks of leaf dimension are then placed above and below the manuscript as covers to protect the leaves and stored in dry place (Fig. 3.1). After sometime the leaves are taken out which by now would have become flat and smooth for writing. The total number of leaves in a manuscript depends on its content. To the above descriptions Agrawal further adds on its binding system,

> Palm leaves could not be bound like a book. Therefore, they were stored between two wooden panels that were slightly larger in size than the leaves. These wooden boards were sometimes painted or decorated with ivory and mother of pearl inlay work. To keep the leaves together, holes were punched in the leaves: in the centre, if the leaf was small; otherwise at either end of it. A cord was passed through the holes and bound around the manuscripts to keep the leaves in position. The wooden holders were polished with insecticide oils prepared from lacquer and minerals. Illustrations are also seen on the cover boards, the drawings were based on the contents of the book. Finally, the bundle is wrapped in cloth to keep it free from dust (Agrawal 1984:34).

In addition to the string/thread thin metal or wood rods called *āṇi* are used for binding purpose (Fig. 3.2). If the manuscripts are larger and lengthier, thin metal rods are inserted on the second hole to hold the leaves together and add strength to the manuscript bundle. These rods ensure the leaves are intact and easy to handle.

[1] http://www.kamat.com/database/books/kareducation/palmleaf_texts.htm (last visited on 20.06.09)

Fig. 3.1: Wooden planks slightly bigger than the leaves size are placed above and below the manuscripts as a protective cover. A cord is passed through the hole to bind the leaves. *(Image source: Government Oriental Manuscript Library, Madras University, Chennai)*

Fig. 3.2: When manuscripts are larger and lengthier thin metal rods called *āṇi* are used for binding. *(Image source: Pulavar Chockalingam)*

3.4 Convention of palm leaf manuscripts writing

Traditionally, palm leaf writing has been passed on from generations to generations through scholars and scribers. It was a customary practice that whenever a palm leaf decays, its contents were transferred on to fresh new leaves. And that was how our written ancient literature was passed on to the newer society. John Samuel says,

> Lifespan of a palm leaf manuscript is about 300-350 years. The present manuscripts are mere copies of the earlier manuscripts which are also replications. Manuscripts have been copied from generations to generations by

> a set of people. Each time a manuscript gets old or decays it is transferred on to a new leaves, these new ones are then preserved. The old manuscript is either burnt in ghee or thrown into the river.

Writing on palm leaf is a skilled activity which requires patience, practice and training. A common man cannot easily take to writing on palm leaves. In olden days, writing on palm leaves was practiced as a profession by some, they were called as *Lipikaras* – copyist.[2] There are also references of families who belong to the generation of palm leaf manuscript writing.[3] T. Ganesan refers,

> In olden days only a section of people specialized in writing on palm leaves. Knowledge in written form was passed on by copying the text from old manuscripts to new manuscripts. At present, very few people know the technique of writing on palm leaves; the tradition has come to an end. The practice doesn't exist as people no more understand what's written on the palm leaves. Some even throw the manuscripts in the river without making a copy of it. Thus some of the most valuable resources and knowledge are lost forever.[4]

3.4.1 Writing system

In general, there are two main techniques of writing on palm leaf manuscripts (Agrawal 1984:31). They are:

1. **Writing with ink:** In this method, a brush or a reed pen dipped in pot of ink was used to write on palm leaf manuscripts (Fig. 3.3). The writing was done in the usual manner as with pen on paper. Since palm leaf is less absorbent than paper, the ink remains on the surface. This method was mostly prevalent in North India.
2. **Writing by incision with a pointed metal stylus:** This method is predominant in Southern India. Tamil palm leaf manuscripts are normally written using this method (Fig. 3.4). The current research is based on this type of Tamil manuscripts.

In south India, incision with stylus is the most common method of writing. Even within the incision method there are two ways of scribing.

a. In one method, the stylus is held in the right hand, at a fixed place on the leaf. The leaf is held in the left hand and is moved backward and forward to make the incision (Fig. 3.5). In this method, both hands are actively involved in the writing process and their coordination is important to scribe letters. In right hand, the stylus is held upright

[2] http://www.kamat.com/database/books/kareducation/palmleaf_texts.htm (last visited on 20.06.09)
[3] Personal conversation with Prof. Kovai Mani, Palm leaf manuscripts Department, Tamil University, Tanjore
[4] Personal conversation with Dr. T. Ganesan, Senior Researcher, French Institute, Pondicherry

between the ring finger and last finger. The left hand, apart from holding the leaves, also controls and directs the stylus using the thumb nail. Scribers who write on palm leaf usually grow their left thumb nail through which a hole is bored to hold the stylus. Alternately, some people make a groove in the nail to hold the stylus. To write, the stylus is placed over the grove of left thumb nail and incisions are made letter by letter. As the writing progresses the leaf is moved leftwards using the left hand. At times, the holes made on either side to bind the leaves get bigger with frequent use. Therefore, a sufficiently large margin is provided around the holes (Fig. 3.6).[5]

In the process of writing, the left thumb plays a crucial role in supporting and directing the stylus. It controls the stylus to properly align and position the start of next letter. Perhaps, this determines the letter spacing and some cases even line spacing. The extent at which the left thumb nail moves is one of the factors which determine the size of letters. To draw an analogy, its movement could be compared with the type caster of Monotype type machine where the matrix moves in x, y direction to cast individual letters.

Fig. 3.3: Illuminated palm leaf manuscript, *'Astasahasrika Prajnaparamita'* of 11th century from Nalanda monastery, Eastern India. *(Image Source: Buddhism, Art and faith)*

[5] http://www.kamat.com/database/books/kareducation/palmleaf_texts.htm (last visited on 20.06.09)

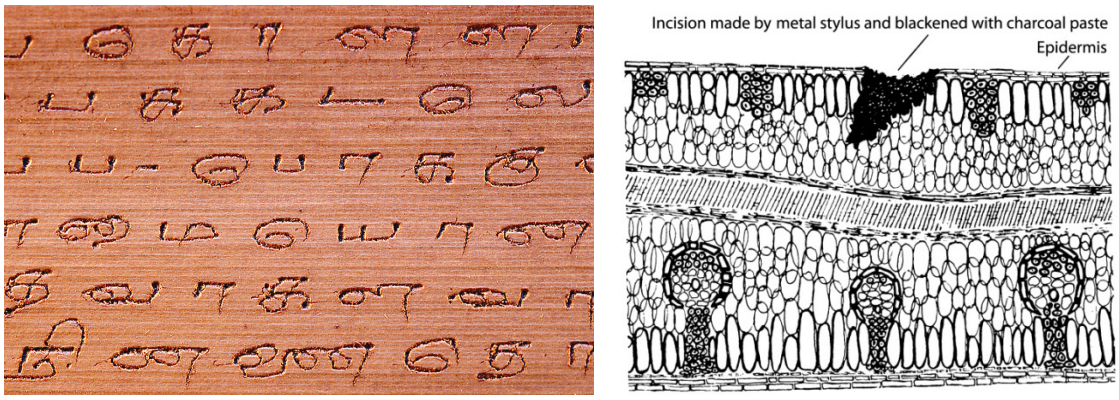


Fig. 3.4: Tamil palm leaf manuscript and its cross section showing the incision and deposition of black powder. *(Image source: Government Oriental Manuscript Library, Chennai)*

Fig. 3.5: Method of writing on a palm leaf manuscript. Right side image shows the groove made in the left thumb nail to control the stylus while writing.

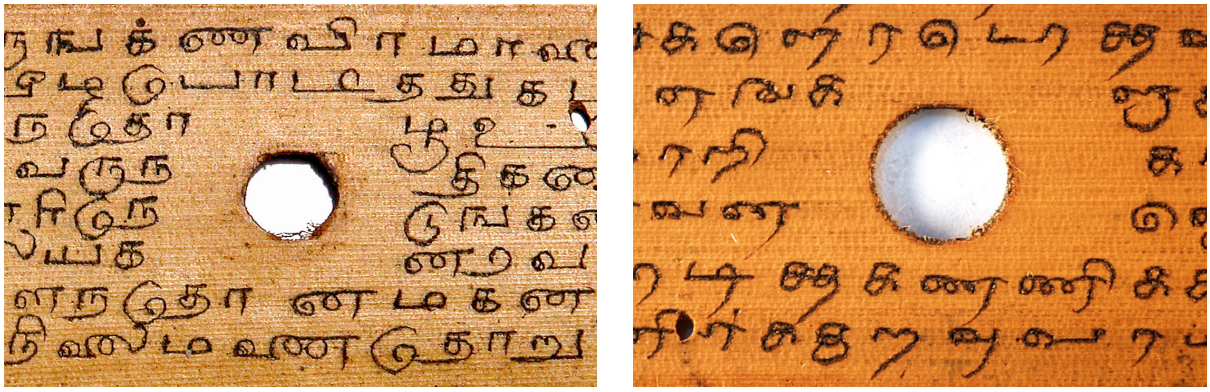


Fig. 3.6: Sufficient margin is given around the hole as they expand due to frequent use. *(Image source: Government Oriental Manuscript Library, Chennai)*

b. In the other method, writing is done by moving the stylus. Similar to the previous method, the stylus is held in right hand and the leaf in left hand. In this method, the writer generally sits on the ground and places the leaf on the right knee, using it as desk. He then scribes with the stylus, moving it from left to right (Fig. 3.7). Sometimes, the leaves are placed on the desk and inscribed like writing with pen and ink in normal books.

After incision, the letters may not be visible to read (Fig. 3.8). Therefore, lamp-black or coal powder mixed with oil is applied on the leaves so that the letters become noticeable and read easily. The excess mixture is then wiped off with a cloth. Sometimes, fresh green leaves of a particular tree are rubbed on the palm leaves so that the green juice of leaves gets deposited in the engravings rendering it visible. Since correction or overwriting was difficult, great attention was required to make each leaf error free. The palm leaf manuscripts also had illustrations, either incised or painted with a brush. The illustrations are incised with stylus in the same manner as writing.

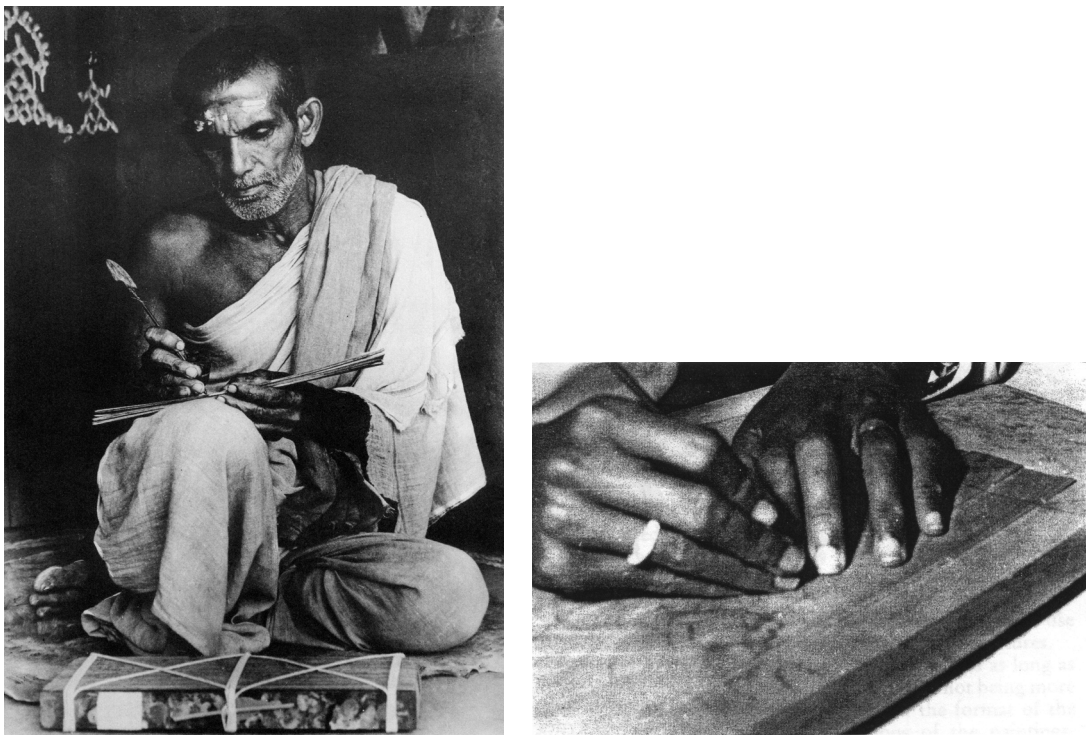


Fig. 3.7: A method of writing on a palm leaves where the stylus is held like a normal pen and the leaves are kept on thighs or table to write. *(Image source: The Book in India and Conservation of Manuscripts and Paintings of South-east Asia)*

Fig. 3.8: Left image shows a manuscript immediately after incision where the letters are hardly visible. Therefore, a paste of charcoal powder mixed oil is smeared on the manuscript to make the letters visible (see image on right). *(Image source: Government Oriental Manuscript Library, Chennai)*

3.4.2 The writing tool - Stylus

The metal stylus or needle used for writing on palm leaves by scratching the surface was called *śalākā* in Sanskrit. And some call the instrument *lekhana, kanta and loha kantaka*. In Tamil, the stylus was called *eḻuttāṇi* or *ūci* (needle). There were different types of stylus and were available in various sizes. They were *maṭakku eḻuttāṇi, kuṇṭeḻuttāṇi, maṭieḻuttāṇi, nelikkāyeḻuttāṇi, tēreḻuttāṇi, vāreḻuttāṇi* and *kuṭaeḻuttāṇi* (Encyclopedia of Tamil Literature 1990: 126). Patnaik gives a description of one such variety,

> The iron pen or needle by which etching is done is called *Lekhana*. It is an iron rod 8 inches long. One of its ends is pointed and other is of the shape of 'half a leaf' the underside of the blade is made straight and the upper side, semi circular. The straight end is sharpened and used to cut the leaf when necessary and the pointed side of the rod is used for writing. The part of the rod where the fingers are set to write on the leaf, is made little thicker to provide a better grip. Palm leaf and stylus has been used for fairly a long period (Patnaik 1989:19).

Like mentioned above, most of the stylus function as dual purpose. One end of the stylus was used to write and the other end for trimming or pruning the leaves (Fig. 3.9). Some styluses were ornamental and also had a decorative cover (Fig. 3.10). There was a variety of stylus called pen knife in which it has a foldable knife and pointed metal rod (Fig. 311). These were more compact and easy to carry styluses.

Fig. 3.9: Iron and brass stylus with one end pointed for writing and other end for timing the leaves. *(Image source: Pulavar Chockalingam)*

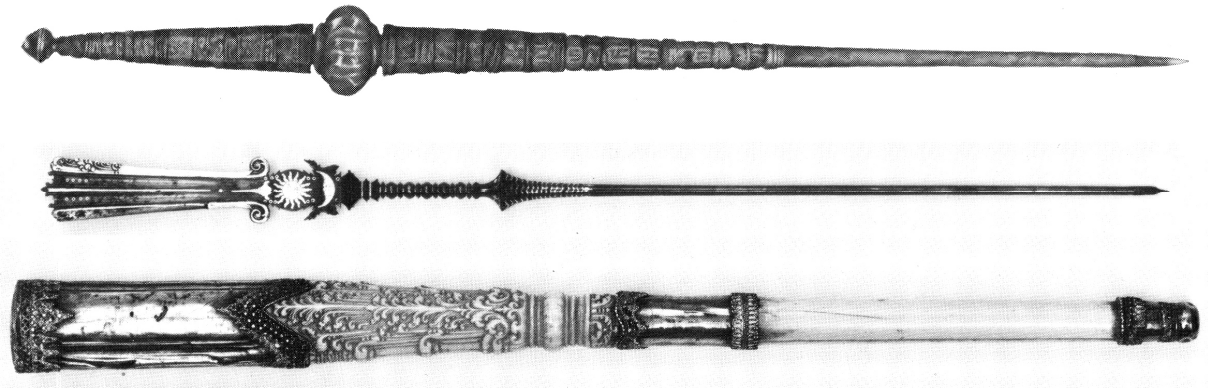


Fig. 3.10: Ornamental stylus with cover. *(Image source: The Book in India)*

Fig. 3.11: A foldable stylus called pen knife. *(Image source: Pulavar Chockalingam)*

3.5 Reading system

Similar to writing, it is not easy for a common man to read palm leaf manuscripts. In spite of knowing the language and script it is difficult to comprehend what is written. Reading palm leaf manuscript is a specialized task, it requires formal education and training. The primary reasons for the difficulty in reading manuscripts are

1. Consonants do not have puḷḷi (dot) above them which makes it very difficult to form right words and understand.
2. Letter 'ர' doesn't exist in palm leaf manuscripts, instead 'ற' is used to denote the letter. Letter 'ர' is only seen in later manuscripts which too is rare.
3. Similarly there is no differentiation between short sound vowel 'எ' and long sound vowel 'ஏ' both are denoted by letter 'எ'.
4. There is no 'ே' symbol in manuscript which denotes long sound 'o' karam. Only 'ெ' symbol is used for both short and long sound 'o' karam. This makes the text even more confusing as to what needs to be substituted to read it correctly.
5. Absence of word spacing and sentence break requires skill to form words and read. All these factors make reading difficult. For example: பொனபினனெ in palm leaf manuscript can mean four different things depending on the context. It could be transcribed in different ways and could mean the following.

   பொனபினனெ – பொன் பின்னே (going after the gold)
   – போன பின்னே (after leaving)
   – பேரன் பின்னே (behind grandson)
   – பெரன்பின்னே (my beloved)

The following passage from the biography of Bartholomeau Ziegenbalg, the author illustrates the hardship of reading and comprehending palm leaf manuscripts by Ziegenbalg.

> All matters were written on palm leaves and dot could not be given at the suitable places since it would tear the palm leaves. The Tamil letter 'ர' did not have descender stroke. The Tamil letters னா, ளை had different form in those days. There was no separate letter for long sound like 'ே' and it had to be substituted only by the short sound letter 'ெ'. Hence the Tamil work 'வரவேணும்' in those days would appear as 'வரவெணும்'. The reader has to guess and read to understand words and Ziegenbalg had undertaken this complicated task and by God's grace he won in this attempt to translating the Bible into Tamil (Singh 2001:19).

3.6 Preservation of palm leaf manuscripts

Palm leaf manuscripts are organic in nature and are susceptible to different types of deterioration. If not preserved properly they are subject to physical damage and decay. Some of the most common deteriorating agents are climatic factors (e.g. variations in relative humidity and temperature), light, insects, constant handling and adverse storage (Ibid 36). To prevent from such defects, palm leaves are treated with special preservatives. T. Ganesan states[6], "At present, to preserve palm leaves lemon grass oil is applied to each leaf, then dried and kept under air condition at low temperature. Each state and region has its own indigenous method of preparing, writing and preserving the palm leaves." Few general methods to conserve manuscripts are (Agrawal 1984: 43-48) (See appendix for more techniques):

1. The use of natural herbs like sweet flag (*ghorabach*) or *margosa* leaves with the manuscripts to keep insects away.
2. Application of citronella oil, camphor oil, or lemon grass oil on the surface of the leaves to keep it flexible. This prevents physical damage due to brittleness.
3. Fumigation with thymol vapors helps to prevent fungus.
4. Fading of ink is restored by applying carbon black mixed with oil to the leaf.

3.7 Characteristics of Tamil palm leaf manuscript

In general, Tamil is written from left to right without any space between the words (word space was introduced after printing). Unlike Roman script, Tamil does not have an uppercase or lowercase and is written in clockwise direction with few exceptions. The characteristics were based on the general study and visual observance of several manuscript images. A more detailed study with a methodology was followed in the later part of the thesis. Some of the general characters observed in Tamil palm leaf manuscripts are:

3.7.1 Writing style

- In palm leaves most of the letterforms are written in one continuous stroke. Continuous writing has led to several interesting forms which are later copied during the early letterpress printing (Fig. 3.12 a). Subramanian ascertains,

> "In palm leaves, once the scriber starts writing from the left he does not lift his stylus until he completes the lines at the right end. He does not lift the stylus for each and every letter. Over time this continuous

[6] Personal conversation with Dr. T. Ganesan, Senior Researcher, French Institute, Pondicherry

writing action without lifting the stylus from the leaf has led to the addition of so many strokes which later became a part of the letter (Subramanian 2004:7)."

Influence of the palm leaf writing system can be traced to the early stages of Tamil script transformation. Subramanian cites the example of consonant 'ka'(க) and its transformation from Brāhmī script to Tamil script as a result of the palm leaves writing. The consonant letter 'ka'(க) in Brāhmī script was written as a plus sign with two strokes. In manuscript writing the two stroke letter was written in a single stroke. The ends of the strokes got connected thereby creating a new form (Fig 3.12 b). The example justifies the influence of manuscript writing on Tamil script. Therefore, it is important to investigate the palm leaf medium and its writing process.

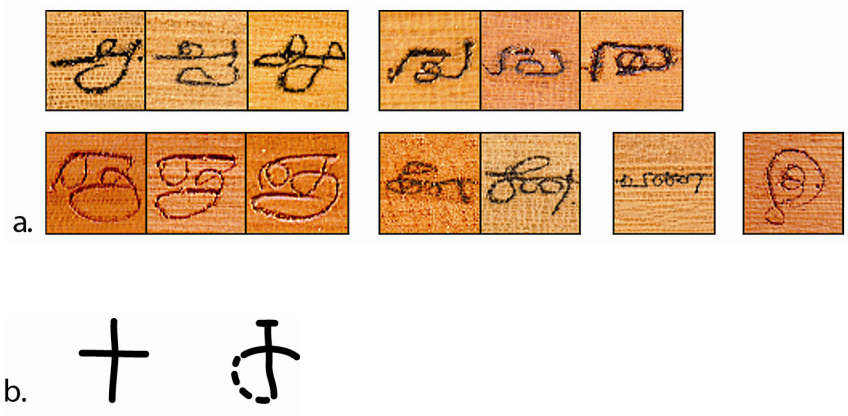


Fig. 3.12: a. In palm leaves most of the letters are written in one continuous stroke.
b. Illustration shows how the two stroke Brāhmī script 'ka'(க) gets connected in palm leaves (on the left).

- Tamil script has unique form compared to the other Dravidian scripts. Unlike Malayalam, Kannada and Telugu which are round forms, Tamil script has a mix of rectangular and circular forms. One theory for such an evolution of visual form is based on the direction of writing. Subramanian explains that there are two ways of writing a letterform, clockwise and anticlockwise direction. Letters written in anticlockwise direction attained circular forms and clockwise in different forms. He further elaborates,

"In anticlockwise direction of writing the vertical strokes and curves tend to become circular because of the circular hand movement in that direction. Perhaps, Vatteluttu, Malayalam, Kannada and Telugu were

written anticlockwise which led to the circular forms. In contrast, Tamil and Grantha would have been written in clockwise direction which resulted in different forms (Subramanian 2004:5-6)."

- The need for faster writing has contributed to the slant of letterforms in manuscript. It is a normal tendency for a person to write faster with inclination than upright letterforms. Most of the manuscripts had inclined letterforms only very few manuscripts were found with upright letters which too lacked consistency (Fig. 3.13). The same inclined characteristics of palm leaf manuscripts letterforms have influenced the printing typefaces. Reference to this can also be found in the text from *Notices sur les Caractères Étrangers*, that says it was after the nineteenth century that a slanted stylized for of the script, closer to the contemporary slanting style and referred as 'modern writing' began to be reproduced from calligraphy to type.[7]

Typefaces with inclined vertical strokes are termed as inclined typefaces in Tamil (Fig. 3.14). In general, they are similar to the terms italics or oblique fonts of Roman script. Italics are disjointed cursive letterforms inspired from calligraphy. And typefaces whose orientation is skewed or slanted are termed oblique. Italics were more close to hand written forms whereas oblique typefaces were distortion of the upright Roman fonts (Fig. 3.15). The concept of Tamil inclined font closely resembles an oblique font than italics.

- In most manuscripts more pressure is applied at start or end of a letterform making a pointed depression (Fig. 3.16).
- In some manuscripts, the scriber had used the stylus to move the leaves leftwards to progress writing. This can be seen from the dots placed after every letter and its elongation towards right (Fig. 3.17).
- Speed writing led to combination of certain letterforms resulting in ligatures.

[7] Cited from the source, Vargas, Fernando de Mello (2007), *Evolution of Tamil typeface, Origins and development,* Reading: University of Reading, Pg 13

Fig. 3.13: Palm leaf manuscript with inclined and upright letterform. *(Image source: Government Oriental Manuscript Library, Chennai)*

Fig. 3.14: Top row shows an inclined typeface where vertical strokes are at an angle to the baseline as compared to the typeface below.

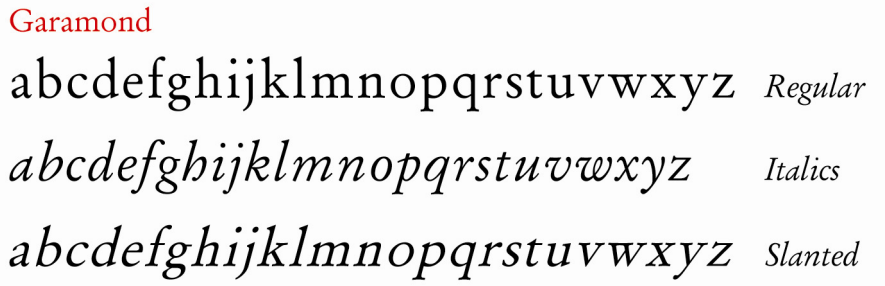


Fig. 3.15: Example from the Garamond font family shows the difference between an italics font and manually distorted oblique font.

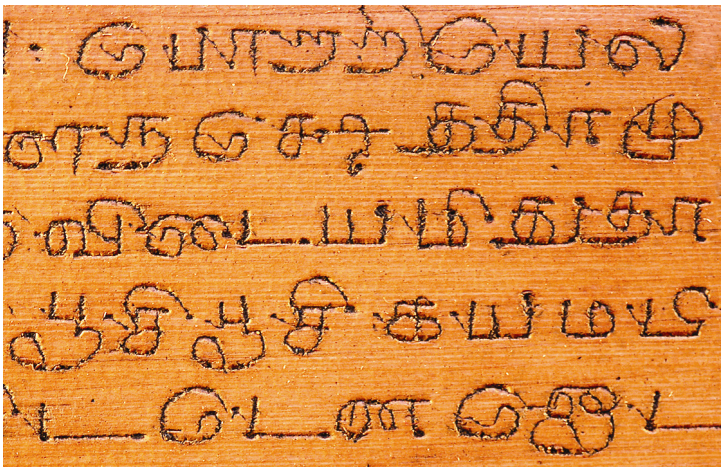


Fig. 3.16: More pressure is applied at the end of a stroke which could be observed from deeper and pointed incision. *(Image source: GOML, Chennai)*

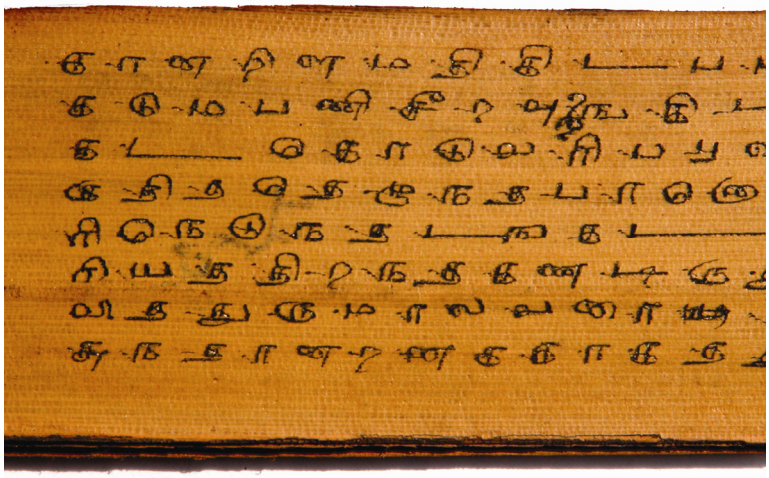


Fig. 3.17: The stylus is sometimes used for moving the leaves towards left to progress writing. This could be observed from the dots placed on left side of every letter.

3.7.2 Medium

- Since letterforms are written with pointed stylus they have uniform line thickness.
- To draw vertical lines the scriber has to apply more pressure as compared to horizontal lines. This is due to the horizontal fibers which run along the length of the leaf. More force is required to cut through the fibers to scribe a vertical stroke. On the other hand the fibers facilitated in drawing a horizontal stroke (Fig. 3.18). Sometimes the leaves may split if more pressure is applied while making horizontal stroke.

- Scholars attribute the rounded forms in South Indian scripts to the physical nature of palm leaves. One such view by Shreenand Bapat states, “Palm leaves do not easily allow incision of horizontal lines. They may get torn along the veins while being incised. Thus, areas using palm leaves for writing, such as Orissa, Karnataka, Andhra Pradesh, Kerala and Tamil Nadu have developed round forms, and avoided horizontal bars in their respective scripts (Bapat 2007, 3).” Though letters developed rounded forms because of palm leaves but it is uncertain that horizontal strokes are completely avoided. Unlike other South Indian scripts, Tamil script has an equal number of horizontal and vertical strokes. There are letterforms where horizontal strokes are frequently seen in Tamil palm leaf manuscripts (Fig. 3.19). For example, letter ‘ட’(ṭa), ‘ு’(u) and ‘ூ’(ū) ends with a horizontal stroke.

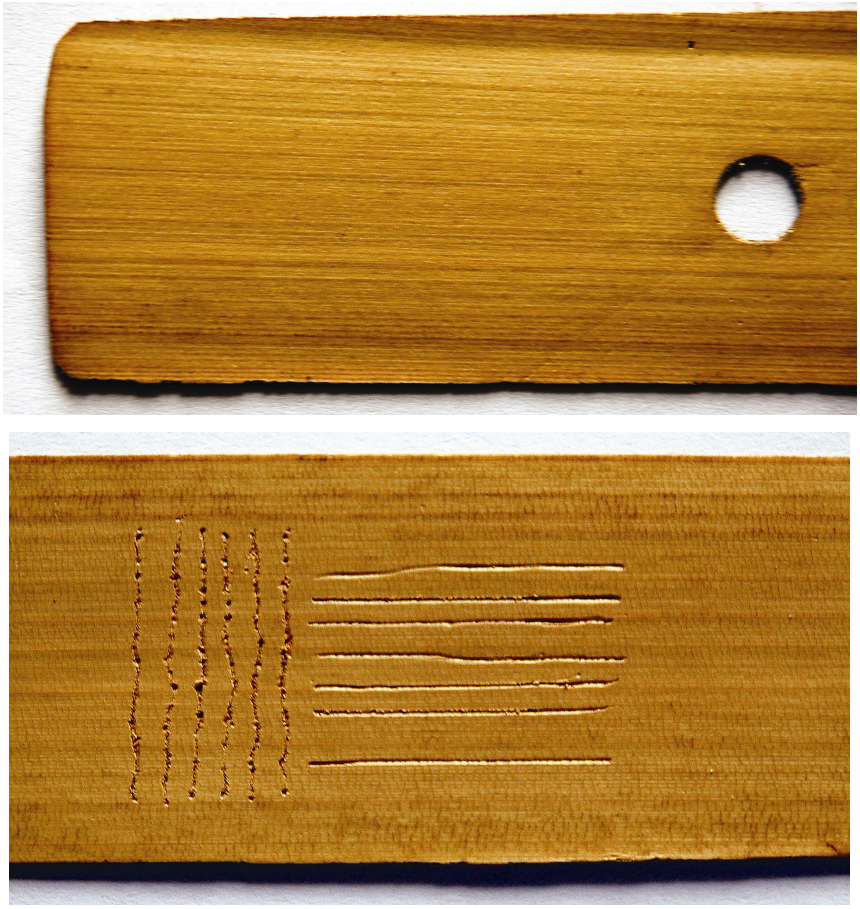


Fig. 3.18: Top image shows the horizontal fibers run along the length of the leaf. Bottom image, illustrates the difficulties in inscribing a vertical and horizontal stroke.

Fig. 3.19: Above Tamil palm leaf manuscript shows letters which have horizontal strokes and its frequency.

3.7.3 Text composition

- Consonants don't have puḷḷi (dots) above them.
- The text doesn't have any word spacing (Fig. 3.20).
- The text doesn't have any punctuations or special characters.
- Only Tamil numerals are seen on manuscripts.
- Unlike Western typography there is no heading, subheading and paragraphs.
- There are no variations in letterform style to differentiate or highlight text.
- Some of the manuscripts display page numbers at either ends of the leaf where there is sufficient margin provided.
- Number of lines varies according to width of the leaf and size of the letterform.
- Line length of text depends on length of the leaf. There is no concept of sentence break in manuscript writing. The text is written in continuous manner, the reader has to pause and comprehend based on the content.
- In most manuscripts, there is hardly any space between the text area and edge (top and bottom) of the leaf (Absence of *margins* – in printing terms).
- In Tamil manuscripts images are rarely seen within the text or part of the text.
- Two holes made for the purpose of binding are the only elements which break the lines of text. A minimum margin of one centimeter is seen around each hole.
- The wooden planks which are placed above and below the leaves for protection of leaf are sometimes decorated with designs, motifs or figures based on the content.

Fig. 3.20: Tamil palm leaf manuscript showing the characteristics of text composition. It does not have word space, special characters and typographic norms like heading, paragraphs etc. *(Image source: French Institute Manuscript Library, Pondicherry)*

3.8 Conclusion

The above characteristics suggest that the medium has certainly influenced Tamil script. The uniqueness and physical nature has given certain characters to the script. To be more specific the unique writing style, pen hold, writing action, direction and sequence of writing have all contributed to the formation of certain characteristics in letters. And also with respect to medium, the horizontal fibers along the length have played an important role in shaping the letterforms. In addition to the above characteristics, a detailed and systematic study has been followed in later chapters to understand its characteristics in depth.

Chapter 4

An historical overview of Tamil printing

Palm leaf manuscripts have been in existence since the ancient India. Its uniqueness and physical nature has given certain characteristics to Tamil script. A traditional medium with such heritage was slowly displaced by the introduction of printing technology. Letterpress printing was another major medium which has significantly influenced Tamil script.

4.1 Movable type printing

Movable type printing was first originated in China. The earliest known printed book, the Diamond Sutra was printed in China during 868 AD (Fig. 4.1). The book was about sixteen foot long and one foot in width. Since, Chinese has enormous number of characters; the language became least suited to the use of movable type. During the fifteenth century, Guttenberg a printer from Mainz printed books using assembled characters. In general, Guttenberg is credited for inventing the movable type in 1455. After his invention, the art of printing spread to other European countries. In 1498, Vasco da Gama's discovery of sea route to India led many Christian missionaries to land in the country. The missionaries soon established centre's along the coastal line and profoundly involved into evangelical activities. First thing they resorted in spreading their faith was to learn and translate their scriptures into

native language. As they found difficulties in native medium of communication – palm leaf writing, letterpress printing was adapted for the purpose. Following passage from the *Encyclopedia of Tamil Literature*, illustrates,

> There is no doubt that the earliest printing in India was done with the intention of spreading the Christian word and making converts. But it was soon realized that spreading the gospel in the local languages would be necessary if greater numbers were to be drawn to the Church. And so it was ordained in 1575 that Christian literature be printed in the vernacular languages. This necessitated not only a study of local literature and grammar but also the cutting and casting of types for the local languages (Encyclopedia of Tamil literature 1990:381).

Fig. 4.1: Diamond Sutra, the earliest known book was printed in China during 868 AD.

4.2 Printing in India

The credit for the origin of printing in India goes to the Christian missionaries especially the Portuguese missionaries and latter Danish missionaries. On 6th September 1557 the first printing press landed in India at Goa by an accident. According to Priolkar, "The press which eventually arrived in Goa was intended to help missionary work in Abyssinia; but circumstances conspired to detain in Goa on its way to that country. The unforeseen death of the priests who brought the printing machine, delayed the printing process to begin in India for a long time (Priolkar 1958:2, 3)." In the beginning the missionaries planned to print

pamphlets, leaflets and small notices to distribute among people, later they brought out small booklets. The first known printed book in Goa was the *'Doctrina Christam'* by St. Xavier in 1557 (Naik 1971:227). This marked the beginning of printing in India and this was soon followed by printing in native script – Tamil.

4.3 Printing in Tamil

After the establishment of printing in Goa, numerous printing activities began and Tamil became the earliest native script to be printed in India. Interestingly, Tamil book was printed even before movable type printing came to India. In 1554, the foremost Tamil book *'Luso Tamil catechism'* was printed in Lisbon, capital of Portugal (Kesavan 1985:16). It was a bilingual book printed in both Portuguese and Tamil language. An interesting feature of the book was that it was printed in two colors, for every Tamil stance in black equivalent Portugal translation was printed in brown color. And also Tamil scripts were bigger in size than the Portuguese (Tamilnadan 1995:81, 83). *Luso Tamil catechism* was the earliest Indian language book to be printed on a foreign soil. It is unclear why Tamil was chosen for printing than other regional languages. The less number of characters in Tamil might have favored the print medium. Or maybe Tamil was the dominant language in the peninsula during that period.

4.4 Printing phases

The initial Tamil book to be printed in India is *'Doctrina Christam'* by Fr. Henrique Henriquez and Fr. Manoel De Sao Pedro at Goa in 1577 (Naik 1971:228) but unfortunately no copy of this book is available. This sowed the seed for Tamil printing in India since then the practice continued spanning more than 430 years. In its long print history, the script has undergone numerous changes in printing, type design and typography. Given such extensive span, Tamil printing can be grouped into major phases. At present, there are several printing phases suggested by different scholars based on their research. The present study intends to propose three new major phases for a better understanding of the history of Tamil printing. The proposed phases were synthesized based on a scholarly overview and several factors like personalities behind the presses, time period, geographical location and literary content. Following were the three proposed phases of Tamil printing:

1. **Early printing (1578-1679)**
2. **Lutheran printing (1713-1800)**
3. **Native printing (1800-1900)**

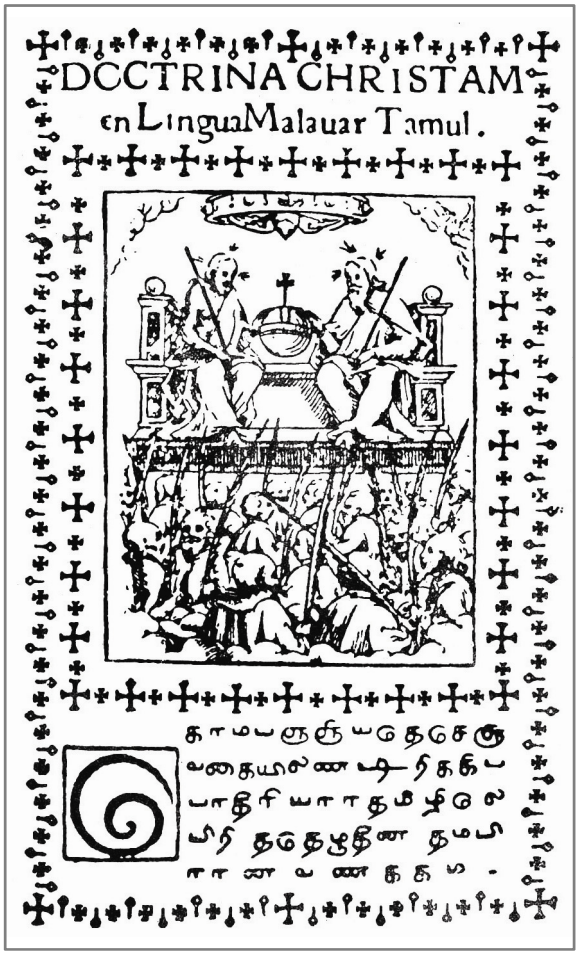
4.4.1 First phase: Early printing (1577-1679)

After Vasco de Gama's sea route to India, the Portuguese expanded themselves by building forts and trading centers along the western coastline. Arrival of Portuguese saw the establishment of first printing press in India by the Jesuit missionaries. During the early phase, there were five known presses located at different places along the coast. First being Goa in 1556, then Quilon (1578), Cochin (1579), Punicle (1586) and the last one at Ambalakad (1675) (Fig. 4.2).

Fig. 4.2: Map showing the establishment of early printing presses in Southern India.

The entire credit for the early phase of Tamil printing goes to Father Henrique Henriques, a Jesuit missionary from Portugal. His pioneering efforts produced five books in Tamil and Portuguese printed at various Jesuit settlements. His first book *'Doctrina Christam'* ('Worship of the Lord') was printed at Goa in 1577 which was a revision of St. Xavier's earlier writing. In the following year another book with similar title was printed by him. The second edition was printed using improved types at Quilon in 1578 (Fig. 4.3). Since the copy of Goa book was unavailable, *Doctrina Christam* printed at Quilon became the first and foremost printed Tamil book in India. The book contained 16 pages and was printed on paper of Chinese origin. The third book was a Tamil translation of a popular Portuguese text

by Marcos Jorge printed at Cochin in 1579. It has a highly decorative drop cap at the beginning of every chapter and contained 122 pages. In the following year (1980), Henriques printed another book titled confessionary (*Confessionairo*) at Cochin of which there is no surviving copy exists (Fig. 4.4). The confessionary comprised of 107 leaves, measuring 9 x 13.5cm, with twenty-two lines of Tamil text per page (Kesavan 1985:152). The consecutive prints at Cochin made its press on par with the press at Goa. This saw Cochin being the hub of Tamil printing during the early phase (Ibid 155).



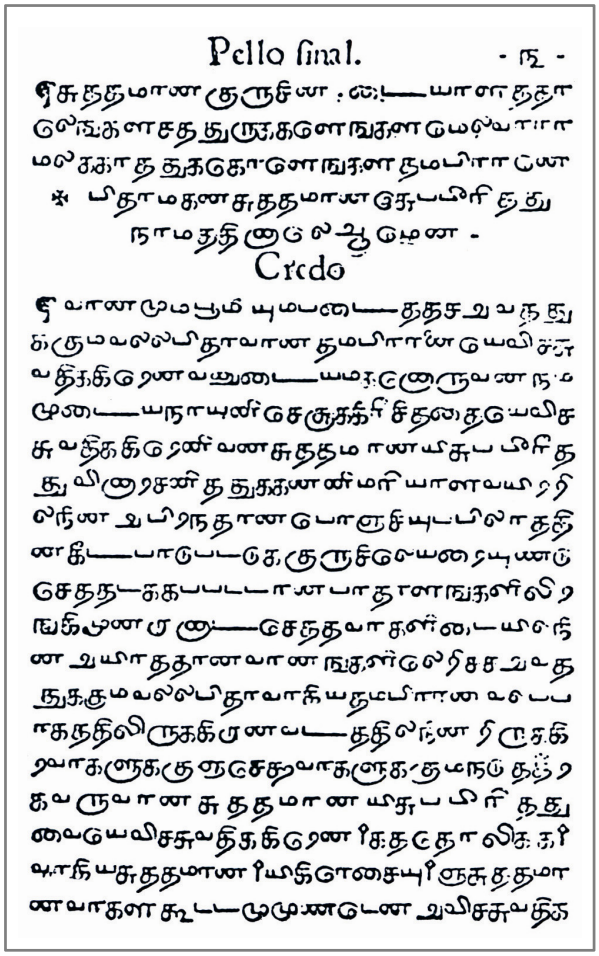


Fig. 4.3: *Doctrina Christam* printed at Quilon in 1578 was considered the first printed Tamil book in India. *(Image source: Accum Patippum)*

In 1586, six years after confessionary, Henriques printed a new book titled *Flos Sanctorum*, which was on the life history of sacred apostles and that of Jesus Christ. *Flos Sanctorum* was considered one of the massive and most famous works printed during the Jesuit printing (Ibid 32). It was printed at Punicle with the same types used for printing the

1579 Doctrina at Quilon. It measures 20.5 x 35cm in dimension and consists of 666 pages. Surprisingly, after this monumental work there weren't any evidence of Tamil printing, it took more than a century (120 years) for the next Tamil book to appear in print. According to Blackburn, Henrique's books published between 1577 and 1586 constitute the first phase of printing in Tamil (Blackburn 2005:39).

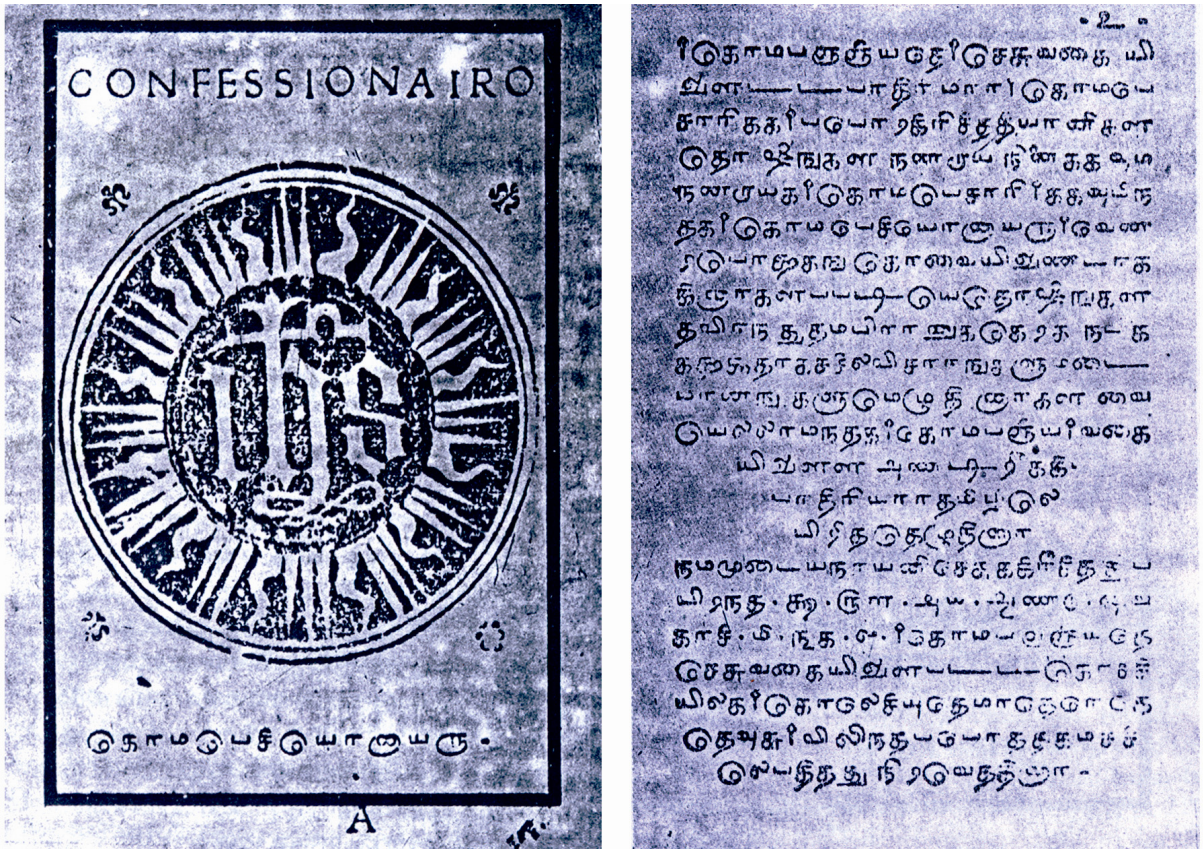


Fig. 4.4: The fourth Tamil book printed in India was *'Confessionairo'* by Henrique Henriques in 1580. Type cut by Father Joao de Faria in Quilon was used to print the book. *(Image source: History of Printing and Publishing in India)*

Lull in printing

As noted by many scholars, there existed a big gap in printing from seventeenth century to early eighteenth century. This setback was not only in Tamil printing but printing in India as a whole. Priolkar states, "Jesuits printing activity came to an abrupt end towards the middle of the seventeenth century before the efforts of these missionaries could find their natural fruition in the spread of the art of printing to all parts of India (Priolkar 1958: xi)." There were several reasons speculated by scholars for the absence of printing. Foremost being the

extensive use of traditional medium – palm leaf manuscripts, lack of Tamil types and unavailability of paper (Kesavan 1985:35). Blackburn further adds to it,

> The century long lull in Tamil printing must therefore be explained by technical problem. First, there was the now persistent lack of good Tamil fonts; those cast in the sixteenth century were presumably either worn out or lost since the Tamil types used in the seventeenth century were cast in Rome and then taken to India. Second, there was a lack of printers with sufficient knowledge of Tamil. Even the few Tamil books that were printed in the 1670s might never have been produced; only a few years later, in 1684 the Portuguese officially withdrew support for Indian languages and ordered that education and missionary work be undertaken only in Portuguese and Latin (Blackburn 2005:40).

Scarcity of printing presses, types and paper remained a problem for continuation of printing. And also the non-involvement of the locals failed to progress Tamil printing. The only reason which could have attracted the native's was the novelty of printing press. The lack of interest coupled with insufficient equipments left a big void in the history of Tamil printing during the early phase.

Ambalakad press

After almost a century long gap Tamil printing resumed at Ambalakad again with the efforts of Jesuit missionaries. Blackburn calls it as the second phase or the revival of Tamil printing. The Ambalakad press may have only lived for about two years as deduced from the works it printed. The notable and major contribution of the press was the *Tamil-Portuguese dictionary* by Antao de Proenca printed in 1679. This was the first dictionary to be printed in Indian Language. This was also the earliest book in India to use alphabetical order which later become the standard. But the quality of print and typeface used was inferior (See Chapter 7).

Apart from the Ambalakad press, there were two instances of Tamil works seen printed abroad. First was a *Tamil Grammar* by John Borstius printed at Rotterdam in 1671 and second was *Hortus Indici Malabarici* printed at Amsterdam in 1679. However, Proenca's dictionary was the last known notable book of the early phase of Tamil printing. After the Ambalakad press, it took almost thirty five years to start print activity in Southern India. The shift of political power from the Portuguese saw a change of printing in Southern Indian. In this regard Blackburn writes,

> None of the early centers for Tamil printing on the west coasts – Goa, Cochin, Quilon, and Ambalakad – produced a single book in any language in the eighteenth century. In part this was due to the shift in official Portuguese policy

> away from Indian languages; but it also follows a more general trend, in which, by the end of the eighteenth century, political and economic power had shifted from Goa and its dependencies to Madras, Colombo, Calcutta and Bombay. This relocation of printing presses in India, mirroring the decline of Portuguese power in the subcontinent and the rise of Dutch and British companies, wrought immediate and long-lasting changes in Tamil printing and literary culture (Blackburn 2005:44).

In similar note Priolkar states, "We have seen how in South India the printing press had been established as early as 1578, but the printing activity came to an end owing to a gradual decline in the religious zeal of successive generations of missionaries (Priolkar 1958:37)." Slide in the Jesuit missionary activities led to the rise of Protestant missionaries along the eastern coast of peninsula. The arrival of Danish missionaries marked the beginning of the second phase of Tamil printing.

4.4.2 Second phase: Lutheran printing (1713-1800)

Establishment of Danish missionary along the east coast manifested the beginning of second phase of Tamil printing. Priolkar enumerates this beginning as the third phase of printing press (Priolkar 1958:36). Blackburn considers this as the second development of Tamil printing while Kesavan observes as the Protestant phase of printing. Kesavan writes, "Portuguese zeal blazed its way through Goa, Quilon and Cochin, creating imperishable landmarks in the first phase of the history of early printing in India. We now come to another beacon which shed its lustrous light, on the Coromandal Coast, no less illustrious in achievement than the Portuguese effort. This could be called the Protestant phase of development (Kesavan 1985:39, 40)." Scholars unanimously agree that the Danish missionary's initiative as a new beginning of another printing phase. Absence of printing after Ambalakad press and institution of different missionary clearly demarcated the beginning of a new printing phase.

The Danish protestant missionary, Bartholomeau Ziegenbalg was the first to setup a printing press at Tranquebar on the east coast of Southern India (Blackburn 2005:50). His contribution was considered one of the biggest achievements in the history of Tamil printing and printing in India. He pioneered the printing scenario during the wake of nineteenth century. The scores of letters written to his parent mission describe the amount of dedication and efforts put forth by him and his missionaries to persuade the natives. One such effort was

the establishment of printing press at Tranquebar. Ziegenbalg realized that for the missionary to succeed it was important to use the language of the people. It had to be used extensively and printing was the only option (Kesavan 1985:43). And also Ziegenbalg's attempt to transcribing books on palm leaves proved to be slow, laborious and expensive process. So, he appealed to his higher authorities requesting for a printing press.

Tranquebar press

As per Ziegenbalg's request, the Society for Promoting Christian Knowledge (SPCK) in Europe sent him a printing machine, English types, 100 reams of paper and 213 copies of Portuguese translation of New Testament besides several other useful works and materials. Thus the first Protestant printing press was established at Tranquebar. The oldest Tamil book printed at the press was a copy of *'The Four Evangelists and Acts of the Apostles'* by Ziegenbalg in 1714 (Encyclopedia of Tamil literature 1990:384). Following the press, first type foundry and paper mill was set up with great efforts at *Porayar* near Tranquebar in 1715.

Type foundry and Paper mill

Ziegenbalg was not satisfied with the Halle typeface which was sent along with the press. As the types were too big it consumed large amount of paper. And paper being expensive at that time it was not affordable to use this type anymore. Therefore, Ziegenbalg decide to cast a smaller type to print the remaining part of *'The New Testament'*. He was also keen on obtaining better typefaces. In a brief note Kesavan accounts, Ziegenbalg put a great effort in evolving Tamil types as he did not like the clumsy Tamil types cast at Amsterdam in 1678. Which he said was hard even for Tamilians to recognize (Kesavan 1985:46). Therefore, Ziegenbalg wrote to his superiors stating the need for new types and paper mill for the missionary activities.

> The scarcity of paper has hindered us from pursuing the impression to the end of the Epistles: for of the seventy five reams of the largest paper you were pleased to send us last year, only six remain; but of the lesser size, which made up your first present of paper, we have thirty reams left in our store. For the setting up a Paper-Manufacture here, though we do not think it altogether impracticable, yet our perpetual want of money has not permitted us hitherto to attempt any such thing. The Malabar types which were sent from Germany proved so very large, that they consumed abundance of paper: To remove this inconveniency, our letter founder has, about two months since, cast another type of a smaller size, wherewith we design to print the remaining part of the New Testament (Priolkar 1958:44).

Ziegenbalg's plea and efforts led to the establishment of first Type foundry and Paper mill in India. Type foundry and Paper mill made Tranquebar printing press a self sufficient unit which became central to the mission (Blackburn 2005:51). The earliest Bible in Tamil by Ziegenbalg was printed using the improved types cast in the type foundry in 1723 (Fig. 4.5). Tranquebar press paved way for the increase in Tamil printing and it lasted for more than a century till 1847. Other than the Tranquebar press, Tamil works were also printed elsewhere. In fact, several copies of Tamil translation of *Confession of Faith* and *Symbolum Apostolicum* and Ziegenbalg's, '*Grammatica Damulica'* (Tamil Grammar) were printed at Halle in 1714 and 1716 respectively. In 1749, a Tamil book titled *'Ngyana Mandri Selva pungavam'* was also printed at Germany.

Fig. 4.5: The earliest Bible printed in 1723 used the types casted in Tranquebar press. *(Image source: Typography of Devanagari)*

Hollander press at Sri Lanka

During the middle of eighteenth century there was a press set up by Hollanders at Colombo. The press was established to serve the needs of Dutch East India Company and their church in Sri Lanka. The press took help of the Protestant missionary at Tranquebar press to cast Tamil types for its printing. This illustrated the dominance and influence of Tranquebar press during that time. Blackburn comments, "The Lutherans soon extended their printing efforts to larger centres of trade and politics, under the British protection. In 1737 they sent a Danish type caster to Colombo, where he prepared new Tamil types and printed in Tamil Lord's prayer in 1739, parts of the Tamil Bible were printed in Colombo in 1741 (Blackburn 2005:58)." In 1741, the first Tamil Biblical translation of the St. Mathew's Gospel was printed at Colombo and the remaining Gospel the next year (Kesavan 1985:59). In a decade, Hollander press had few books printed, of which the known works were of Phillip De Melho. Firstly, he translated *The New Testament* from Greek and printed it in 1749. Following this he wrote a bilingual book, '*Sathiyathin Jebam*' in Tamil and Dutch which was printed in 1753. British conquest of Sri Lanka led to the end of Hollander press in 1775 (Sambandan 1997:61).

After the cessation of Jesuit printing in the late seventeenth century, the missionaries had an opportunity to revive its printing at French occupied Pondicherry. The political intervention delayed the printing and curtailed the efforts at Pondicherry until the 1840s. During the end of eighteenth century, British conquest of south India turned Madras[1] into a centre of patronage and trade. By then, Protestant missionaries had moved to the metropolis, bringing their printing activity with them (Blackburn 2005:57, 74). Expansion of British power saw their southern capital Madras, to become a hub of various activities. This led to the changeover of printing activities to their administrative centre.

Printing press at Madras

British brought the printing press to Madras when they defeated the French in Pondicherry. Following record describes the acquisition of printing press by the British from the French.

> In 1761 Sir Eyre Coote captured Pondicherry from the French and in the Governor's house was found a printing press and some types. These were brought back to Madras as part of the loot, but the Fort St. George Authorities were unable to make use of them as they had no printer. Fabricius, the great Tamil scholar, was then living at Vepery, and the equipment was handed over

[1] Madras is now renamed as Chennai

> to him on condition that if at any future time the Company should require any printing done; he would do it for them… It was at Vepery that Fabricius printed his hymn-book, and also his Tamil-English dictionary (1779). [2]

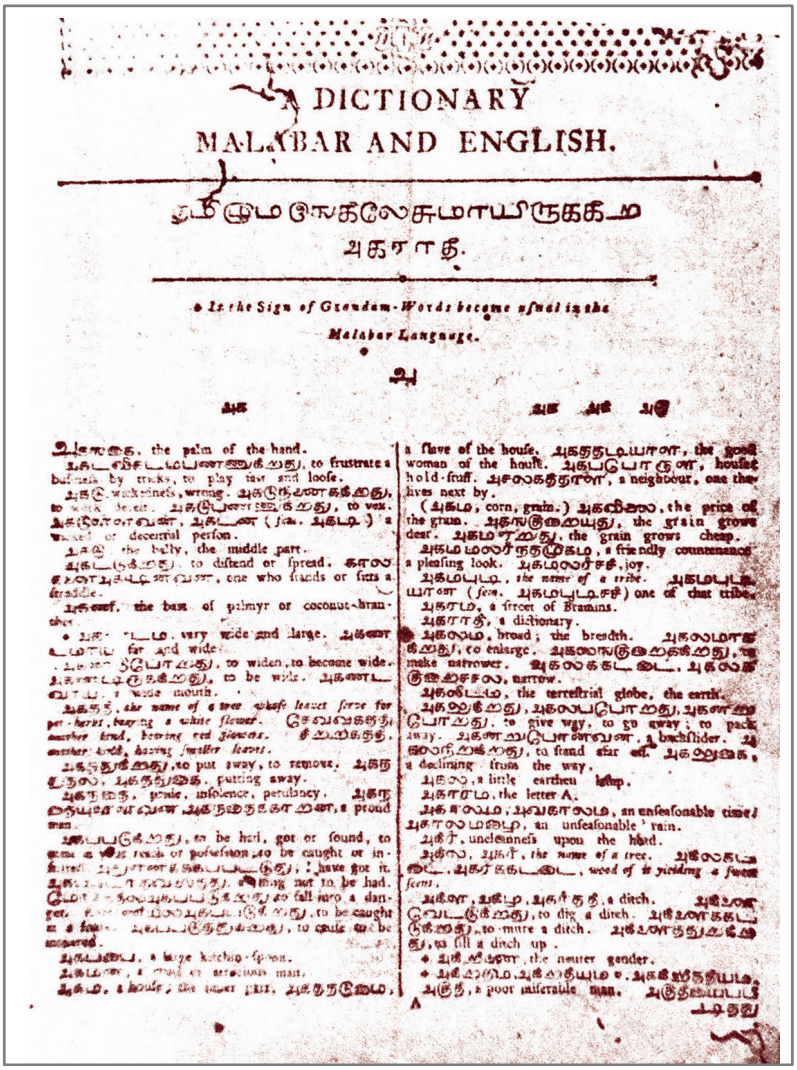
As mentioned above, the press was given to a Danish missionary named Fabricius, European Tamil scholar who knew printing. In Vepery press, Fabricius printed his first major Tamil work, '*Malabar New Testament'* in 1772. Fabricius also brought out his first and well known dictionary, '*Tamil and English dictionary'* in 1779 (Fig. 4.6). Establishment of Vepery press saw the increase in number of Tamil printing; it soon became one of the most renowned presses in India. It had advanced and improved technological equipments which cut and cast its own Tamil types for use. Vepery press also known as SPCK press (Society for Promoting Christian Knowledge) was later changed to the name Diocesan Press. Vepery press is one of the long standing presses in India which still continues to function under the Tamil Nadu state government in the name of *Government Press*.

4.4.3 Third phase: Native printing (1800-1900)

Nineteenth century marked the beginning of Tamil printing's third phase. It was during this period, Tamil literature began to be printed for the first time. As mentioned earlier, early presses were at the hands of missionaries and none were owned by the Indians. And their works only aimed to propagate Christianity or educate the Europeans for local administrative purpose. The absences of Indian initiated presses were due to the lack of infrastructure in terms of machineries and the availability of Tamil types. And also restrictions from the government were a critical problem. All these factors impeded the natives from owning a printing press. The lack of Indian publishers also saw a scarcity of Indian literature in print. Blackburn enumerates,

> While these few presses appeared to meet the needs of the European population and wealthy Indian merchants, a literary culture led by print would not exist until Indians published books in Indian languages for Indian audiences. But that required three separate developments: more printing presses and types; a relaxation of government controls over printing; and lastly, the involvement of traditional pundits in the new method of text production. A limited supply of good types also impeded printing in Tamil and Telugu in Madras in the early years of the nineteenth century. The missionary press at Vepery was well supplied with types from Halle and London, but other had to with those cut in Madras, which were hard to find and often of inferior quality (Ibid 78, 79).

[2] *Memories of the Madras Library Association*, Madras 1941, p. 42.



A DICTIONARY
MALABAR AND ENGLISH.

அகராதி.

* In the Sign of Grandam-Words become useful in the Malabar Language.

Fig. 4.6: The first Tamil and English dictionary printed at Vepery press by Fabricius in 1779. *(Image Source: Accum Patippum)*

Sir Charles Metcalfe act

One of the major hurdles for the Indians to set up a press was from the Government. The British feared that the press would become a tool for the Indians to use it against its own government. They felt that a free press might unite the public minds to revolt against their authority. Therefore, Government laid stringent rules and prohibited Indians from owning a printing press. But soon these restrictions were taken back and allowed the locals to run a press. Kesavan notes, "Till 1835 there were stringent restrictions on the freedom of printing, but they were removed by Sir Charles Metcalfe in 1935. As a consequence, the number of printing presses in Madras gradually increased (Kesavan 1985:50)." Blackburn refutes, the

government did not restrict anyone from owning a press but only enforced them to obtain a license to run it.

> Government controls over printing were another impediment to Indian access to the new technology, but this restriction has often been exaggerated and is widely misunderstood. It is commonly accepted, for instance, that until Metcalfe's minute in 1835 Indian were prohibited by law from owning or operating a printing press; no such law, however, ever existed. Indian access to printing was not prohibited by law, but it was restricted through licensing (Blackburn 2005:79, 80).

Supporting this argument Blackburn states that in Madras, at least seven Indian-owned presses published in Tamil before 1835, the first being '*Attiniyam ant Teli Niyus Piras'* (Athenaeum and Daily News Press), which published a pamphlet in 1809 (Ibid 81). *Tamil Vilakkam*, a Tamil grammar meant for the European scholars, was considered one of the earliest Tamil books to be authored and printed by an Indian was prior to Metcalfe's act. Although scholars have ascertained it as a milestone in the history of Tamil literature, none has actually seen a copy. The unavailability of a copy raised the question of authenticity of its publication. Later it was discovered that '*Karaikkal Ammaiyar Tivya Carittira Kirttanai'* printed in 1809 was the foremost book published by an Indian in Madras, with or without government permission (Ibid 84, 85).

Indian publishers and presses

Thirukkural, published in 1812 was the second book to be published by an Indian author. Gnanapirakacam Pillai who owned the Commercial press was its publisher, the same press published the second edition of '*Tamil Vilakkam*' in 1817. Thirukkural was another milestone in Tamil printing because it was intended for the Tamil community. The establishment of College of Fort St. George (in line with the College of Fort William at Calcutta) in 1812 at Madras led to the start of a new printing press namely the College Press. Like Vepery press, College press became popular in no time. Within decades, College press produced various publications in Tamil and other languages like Telugu, Kannada, Malayalam, Arabic and Persia. Francis Whyte Ellis, president of the College Board was the driving force behind the College press and its success.

College press became the centre of Tamil publishing in Madras with its scholarly authority but some college pundits published with other presses, especially the missionary

press at Vepery (Blackburn 2005:96). After the college press, soon several other presses began to operate in Madras. Native presses began to be established, the first ones being very small and formed by booksellers who printed their own books (Murdoch 1865: ix). One of the first Tamil presses to appear was '*Kalvi Vilakkam'* ('Knowledge Elucidation), which was run by the famous Tamil scholar Thiruttanigai Kandappaiyar later continued by his sons Caravanaperumal and Vicakaperumal (Kesavan 1985:69). By the mid-nineteenth century there were more than ten printing presses owned by Indians in the city of Madras. And it was at this time commercial printing came into existence. The increase in publications by the natives in early nineteenth century resulted in the commencement of commercial publishing in Tamil printing.

4.5 Early letterpress typefaces

Almost every printed script in the world was first inspired by the handwritten letterforms. The early typefaces imitated the manuscript letterforms prevailed during that period. Perhaps, manuscripts were one of the accessible references available for the printers to base their type design. When Gutenberg first invented the movable type printing, he based his type on the writing style that existed in Mainz (now part of Germany). His 42 line Bible contained the black letter which was most commonly used handwritten script in Germany. In order for Gutenberg's invention to be accepted, his type was designed to look like the manuscript hands it replaced (Baines & Haslam 2005:48). Tamil printing was no exception, writes Sambandan in his book *Accum Pattippum*. The Tamil typeface used in the early printed book was an imitation of palm leaf manuscript writing (Sambandan 1997: 310). For the early printers, palm leaf manuscripts were the only portable reference available to cast types for letterpress printing. Fr. Schurhammer, G. M. Cottrell, John Murdoch, Katharine S Diehl, Sambandan and Tamilnadan are few pioneers who had studied the early Tamil typefaces. Apart from their study there isn't any comprehensive history on the early letterpress typefaces. Following were the observations made by Sambandan of the first Tamil typeface (Sambandan 1997: 316):

1. Consonants don't have puḷḷi (dot) above them like in the palm leaf manuscripts.
2. Letterforms ற(ṟa), றா(ṟā) and று(ṟu) do not have the front counter space between the first two vertical strokes.
3. Letters து(tu), ணு(ṇu), னூ(ṉu) and று (ṟu) do not have the lower bowl rather it looked like the letter 'ங'(ṅa) from the bottom end.

4. North Indian letter 'ஷ'(sha) was seen at one place and in other places it's been substituted by a Tamil letter 'ழ'(l̲u).
5. In ancient times, the letter 'அ'(a), was written without the lower bowl; the same letterform was followed in letterpress printing.
6. Letter 'ற'(ru), does not have the sloping line at the end and appears to be 'ռ'.
7. There was no word spacing but full –stop was seen at the end of every sentences.

Similar observations have been inferred by Tamilnadan in his book, *'Tamil Mozhiyin Mudhal Atchu Pathippagam'* (First printed publications in Tamil). Tamilnadan briefly describes the types used in Goa, Quilon, Cochin and Punicle (Ibid 60, 61):

- Tamil types used in Goa and Quilon resemble letterforms in palm leaf manuscripts, inscriptions on stone and metal of that time, they were unlike the present letterforms.
- Consonants did not have dot (puḷḷi) above them.
- There was no clear distinction between short and long sound vowels.
- Long sound vowels were seen as ligatures (Combined letters).
- Letterforms அ(a) and து(tu), does not have lower bowl.
- There was no word space.
- Ligatures are found in many places.
- Letter 'ற' (r̲a) has a single counter space in both Goa and Quilon types.

Sambandan and Tamilnadan, based on their observation concur that early typeface resembled the palm leaf manuscript letterforms. Similarly Kesavan accounts that both Goa and Quilon types resembled the characters found in Tamil inscriptions and manuscripts of roughly the same period, the Goa alphabets were more ornate in style (Kesavan 1985:26). In general, scholars opine that the early typefaces were an imitation of palm leaf manuscripts. In addition to scholar's viewpoints, the present study attempts to determine the influence of palm leaves on letterpress typefaces through a research methodology. It also attempts to examine and understand the extent of palm leaves influences on early typefaces (See Chapter 7).

4.6 Reforms in Tamil

The Christian evangelist, wherever they went, first learned the native language and their customs. They then translated their scriptures to preach in local language and thus introducing

changes in it. In India, Tamil became the foremost language to be reformed by the European scholars. The missionaries found Tamil as a noble language with a noble literature, but were generally neglected by its people because of its literary dialect being almost entirely poetical, and so different from the spoken dialect.[3] Therefore, they began to enrich Tamil language and its long standing ancient literature with their intellectual knowledge and literary practices. S. D. Sargunar writes in his foreword to the book *'Christuvamum Tamilzhum'*,

> "The European Christian missionaries were the first to simplify the Tamil script. They introduced space between the words, simple or compound, of a sentence, for it had been the native custom to write whole sentences as if it were composed of one long word. They were the first to print Tamils tracts, books, and papers. They were the first to introduce the study of Tamil into the civilized countries of the world. They were the first to make Tamil translations from European languages, they were the first to compile Tamil word-books, dictionaries and lexicons, which made obsolete the time-honored custom of memorizing the metrical Tamil vocabularies, before taking up literature."[4]

4.6.1 Addition of letters

European Tamil scholar Fr. Constantine Joseph Beschi popularly known as VeeraMamunivar was the first to bring changes in Tamil Script. In palm manuscripts, short and long sound vowels 'எ' and 'ஒ' had same letterform. Fr. Beschi changed this tradition and introduced a new method to differentiate both the vowels. He introduced a dash above the short vowels and a circle above the long vowels of 'எ' and 'ஒ' (Venkataswamy 2000:64, 65).

Ex: எ̅, ஒ̅ – represented the short sound vowels

ஏ̊, ஓ̊ – represented the long sound vowels

Only few books during the 19th century followed the above reformation but later these were abandoned. The present transformation or the differentiation between those letterforms is still ambiguous as to who brought the changes. Few Tamil scholars opine that Fr. Beschi added the letters 'ஏ' and 'ஓ' (Table 4.1). Beschi is credited for adding a slanted line to the long sound vowel 'ஏ' to differentiate it from the short vowel 'எ'. He also added a small circle at the terminal of vowel 'ஓ' to distinguish it from short sound vowel 'ஒ' (Ibid 66). His, another major contribution was the introduction of symbol 'ே' to denote long sound vowel-consonants of 'e' karam and 'o' karam. In palm leaves, symbol 'ெ' was used for both short

[3] Quoted from the foreword by S. D. Sargunar, in *'Chirstuvamumu Tamilzhum'*, 1936, p. 11
[4] Ibid 14-15

and long vowel-consonants of ‘e’ karam and ‘o’ karam. As this new symbol was easy to recognize and read, it continues to be followed till today. S. Rajagopalan remarks[5],

> Father Beschi was the first person to bring script reformation in Tamil. He introduced the ligature symbol ‘ெ’ to differentiate the short and long sound for the ‘e’ karam and ‘o’ karam. He also introduced a line to differentiate the ‘ன’ karam and letter ‘ற’. The present script is a continuation of his contribution.

	Palm leaf manuscripts		Letterpress printing	
	Short sound	Long sound	Short sound	Long sound (Added letters)
Vowel	எ	எ	எ	ஏ
Vowel	ஒ	ஒ	ஒ	ஓ
‘e’ Karam	கெ	கெ	கெ	கே
‘o’ Karam	கொ	கொ	கொ	கோ

Table 4.1: Above Table shows the addition of new letterforms by European scholar Beschi.

4.6.2 Removal of letters

Apart from the Europeans intervention in Tamil script, there were several attempts by native Tamil scholars on script reformation. A notable script reformation among those proposals was by E. V. Ra Periyar, a social activists and political leader. Periyar realized that there were too many characters in Tamil script. And this created difficulties in adapting to the modern technologies of printing and typewriters. He thought that it was necessary to change certain letters, modify their signs and lessen the number of letters. Therefore, to reduce the number of letters in Tamil script, Periyar proposed certain changes. First, being the removal of two vowels ‘ஐ’ and ‘ஔ’ from the Tamil alphabets (Subbureddiar 2001:153). Basically, these letters were a combination of a vowel and pure consonant. The existing letters are extraneous and only create redundancy.

Periyar suggested that instead of writing separate symbol for denoting the sound, the combination of the letter itself could be written. By doing this, the number vowels could be reduced from 12 to 10. Though this reduction of two letterforms does not look a great matter to a layman, for a hand composer it would lessen a large amount of work. However, his

[5] Personal conversation with S. Rajagopalan, Senior Epigraphist, Department of Archeological, Chennai

proposal to remove vowels was opposed by many scholars therefore it was retained. Following is the script reformation suggested by Periyar.

1. ஐ = அய் (அ + ய்)
2. ஔ = அவ் (அ + வ்)

4.6.3 Reformation of ligatures

In Tamil, for writing 'ai' karam the symbol 'ை' is used before the consonant. But for certain consonants like ண, ல, ள and ன separate symbols are used which added extra types to letterpress printing. Therefore, the Tamil Nadu Government made changes to those letterforms which could be written like other 'ai' karam letters. This reformation was implemented in 1978 (Kandaih 1988:10). Hence, the following thirteen letters was removed from the Tamil script (Fig. 4.7).

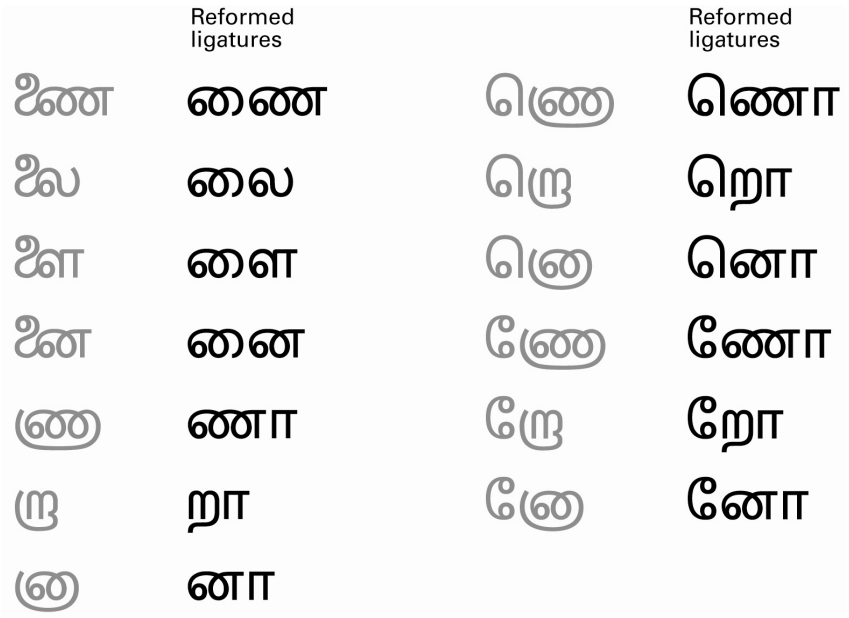


Fig. 4.7: Ligature reformed by the Tamil Nadu government.

4.7 Summary

History of Tamil printing was grouped into three major printing phase based on the existing literature. The proposed phases intend for a better understanding of the history. Following were the characteristics of each phase:

Early printing (1577-1679)

- The first phase of printing was governed by the Portuguese Jesuit missionaries.
- Geographically all these presses were located along the western coast line which share a common province.
- Almost all the early printed Tamil books have been authored by the same Jesuit missionary, Henrique Henriques.
- The content of these books were based on Christian literatures with exception of Proenca's dictionary. The motivation for the early printing was mainly to draw converts towards Christianity and spread the word of their Lord.
- The other intentions were to educate and familiarize the European missionaries of the native language in order to propagate their religious ideologies.
- Decline of the Jesuit missionaries saw the departure of early presses.

Lutheran printing (1713-1800)

- The rise of Protestant missionary led to the decline of Jesuit missionary activities, the missionaries instituted and owned the presses on eastern coast.
- It was during the second phase, the first Type foundries and Paper mill were setup in India. During that period Tamil types were also imported from Europe.
- The second phase saw a tremendous increase in print work.
- The literature produced during later half of the phase, catered to the European audience. The printed contents comprised of Tamil grammars and bilingual dictionaries which mainly addressed the missionaries.
- The emergence of British, established a printing press at Madras. First time, the British involved themselves into print activities for administrative purpose.

Native printing (1800-1900)

- For the first time, Indians owned presses and published books.
- Even though printing in India started in mid sixteenth century, Commercial printing did not develop until the early nineteenth century. Commercial publishing became one of the reasons to instigate Tamil printing into a full-fledged activity in the capital city of Madras.

- Indian literatures came into print and were published for the Indian people. The desire to convert Tamil literatures from palm leaf manuscripts into printing by Tamil pundits and scholars progressed Tamil printing.
- Tamil printing soon began to spread as more number of presses was established and large number books were printed.

Reformation of script – the early missionaries found difficulties in comprehending Tamil language because of its poetical nature and writing system. To overcome the complexity, they brought changes to the script. In 1978, Tamil Nadu government reformed and removed thirteen letters from Tamil script because of redundancy.

4.8 Conclusion

Christian missionaries initially started the press to spread Christianity. Then they utilized it to learn the native script and propagate their activities in regional language. Later, during British rule, the press was majorly used for administrative purpose. Eventually, natives began to own presses and printed books in regional languages. Soon the content shifted from Bible, gospels, dictionaries and grammar to Indian literature.

From the literature survey it was observed that the existing literature mainly focuses on the missionaries and their print activities. There were very few studies on early typefaces and even those expertise were limited and restricted to first two earliest typefaces. In general, the history of Tamil typography and typefaces was primarily absent which needs to be addressed and researched. And also the impact of letterpress medium on Tamil script requires a systematic investigation.

Chapter 5

Methods for studying letterforms

From the previous chapters it was observed that there was a need to study palm leaf manuscripts and letterpress medium. In order to device a method to study the medium and its letterforms existing research methods were examined. The established research methods in the field of epigraphy and western typography were studied. Both these methodologies rely on visual documentation of inscriptions and hand written manuscripts. Images of letterforms were the fundamental source of visual information where the script were observed, illustrated and commented by the researchers. History and evolution of script were built on the knowledge of these scholars' observations. Since, these researches are based on scripts it was found appropriate for the current study. These methods may help to understand the transformation of letterforms with respect to medium and writing system.

5.1 Epigraphic approach

Epigraphy is a study of ancient inscriptions. It is part of archaeology which deals with the inscriptions engraved on stone, metal and other permanent materials like wood, clay, shell, etc. Old writings and inscriptions on coins, medals and seals are also sometimes studied by the epigraphist but they chiefly come under the disciplines called *Numismatics* and

Sigillogprahy.[1] A person who is engaged in the decipherment and interpretation of the epigraphs is called an epigraphist. According to Gai,

> Epigraphy or the study of inscriptions require a two-fold qualification of its votary, viz., ability to decipher the script and secondly the ability to interpret the language and contents of the epigraph. This brings us to the field of paleography and linguistics. In the study of Indian epigraphy, paleography forms an essential and important part and is concerned with the decipherment of the inscriptions without reference to the contents of the records.

Paleography is a study of ancient writing, including determination of date, decipherment, etc. In most cases, the terms Epigraphy and Paleography are used synonymous. According to *The Encyclopedia of Language and Linguistics*, edited by R.E. Asher,

> Paleography is the study of ancient and medieval handwriting. […] Paleography involves the study of writing on papyrus, animal skins, paper, and wax tablets. Inscriptions on other writing materials, including stone, metal, wood, clay, and slate are also of interest, especially for periods where there is no other available evidence. […] Usually, however, inscriptions are considered to be the province of the related discipline of epigraphy. […] The basic task of paleography is to provide the means of dating and localizing manuscripts by establishing patterns in the development of characteristic letterforms and abbreviations (1994:2900).[2]

The above definition brings a slightly different understanding of both the terms. It restricts paleography to manuscripts hand writing and inscriptions to epigraphy. The current research adapts Indian epigraphist's definitions as stated by Gai. Paleography is a part of the epigraphic studies where the focus is decipherment of script and not it's content. To quote Gai again, "But here in India, we consider paleography as an integral and important part of epigraphical studies and it concerns with the decipherment part only without reference to the contents of the epigraph." The present research centers on the script and not the content thereby making it a paleography study. But the methodology followed in epigraphy and paleography was similar.

5.1.1 Methodology

Epigraphists largely rely on stone and metal medium to understand the nature of ancient script. The stone inscriptions are usually found on hero stones, rock caved mountains, stone beds, temple walls, pillars and podiums. Since these inscriptions are scattered on various odd

[1] http://www.ciil-ebooks.net/html/iie/cover.htm (electronic book - Gai, G.S. *Introduction to Indian Epigraphy,* Central Institute of Indian Languages, Mysore).
[2] Quoted from Rilly, Claude (2004b) 'Meroitic Paleography as a Tool for Chronology: Prospects and Limits.' Paper presented at the 10th International Meroitic Conference, September 2004, Paris.

locations, it is not feasible to study them together. Therefore, an epigraphist reproduces the original inscriptions from the site for convenience of study and publication. There are three methods of reproduction adapted by the epigraphists (Salomon 1998:161).

1. Eye copies
2. Mechanical reproduction and
3. Photographed images

Earlier, eye copy method was often used for reproducing inscriptions. Since, they are unreliable it is rarely employed nowadays. Only under unavoidable physical circumstances where the other modes of reproduction are not possible this method is employed. In India, mechanical reproduction is the standard technique adapted by epigraphists. This method involves preparing estampages to trace inscriptions. Estampages are inked impressions, mechanically prepared by affixing wet paper over the inscriptions and squeezing it by applying ink (Fig. 5.1). Iravatham Mahadevan, a well known authoritarian in Tamil epigraphy describes how tracings were made from stone inscriptions.

> The rock surface was first cleaned to remove dirt, moss, etc. The grooves of the inscriptions were marked with chalk for better visibility through the translucent tracing paper which was then affixed to the rock surface with adhesive tape. The paper was then carefully squeezed into the grooves and a pencil was run along the sharp edges of the grooves to delineate the outline of the letters. After some experimentation and practice, reasonably accurate tracings were made. Generally, more than one tracing was taken of each inscription. Finally, fair copies of the tracings were made in Indian ink for publication process (Mahadevan, 2003:82).

Estampages are one of the most reliable methods of reproduction where accuracy is more and distortion is less. Salomon remarks, “The advantage of estampages is that they are objective and, if carefully and skillfully prepared, they are least subject to distortion of all methods of reproduction. Their chief disadvantage is that it requires considerable skill, time and material to prepare a good estampages, especially in case of large inscriptions (Salomon 1998:161).”

In the past decades, photographic reproductions have been most widely used in Indian epigraphic studies. But they are only used as a supplement and not as a substitution for mechanical reproduction. Sometimes, photography becomes difficult or impossible when ideal light conditions, natural or artificial are required. And also producing a high quality

photograph of an inscription requires considerable skill and professional equipment (Ibid 161). At times direct photographs are subject to optical illusions (when it comes to distinguishing cracks and letterforms) therefore, they are seldom satisfactory. According to Salomon, an epigraphist might ideally want all the three methods to be employed to create an authentic reproduction.

Fig. 5.1: Estampage of a Tamil stone inscription of tenth century AD. Estampages are inked impressions mechanically prepared by squeezing a wet paper over the stone inscription and applying ink over it. *(Image source: Early Chola Art)*

5.1.2 Analysis

Once the reproductions are done, individual letters are traced and mapped on to a chart according to different periods (Fig. 5.2). These charts are then studied to identify the changes in letterform across centuries. The peculiarity of the entire process is that the study focuses on individual letters (letter by letter). This brings out a cumulative understanding of the evolution of script. R. Govindaraj writes in his book, *'Evolution of Script in Tamil Nadu A.D. 500-985'* about the study of evolution of script. According to him, "To study the evolution of Vatteluttu and Tamil scripts individual letters of different periods must be compared. Nine inscriptions during the A.D. 500-985 are selected both for Vatteluttu and Tamil script. These are chosen as to represent the features of the evolution with more or less equal time intervals (Govindaraj 1994:19)." A selected number of inscriptions were chosen to determine the evolution of script (Fig. 5.3). These inscriptions included hero stones, rock inscriptions and copper plate inscriptions found at different places and centuries. Individual letters were mapped on a chart and compared. Typically, comparisons involve a visual description of letters with prominent characters – through observations. Following are some of the examples describing the salient characters to show the evolution of Tamil script (Ibid 21, 22) (Rajan 2004:221).

1. The symbol for vocalic consonant 'i'(இ) was written in anti-clockwise direction with reference to the basic characters, as seen from Vallam and Thirukkalkkunram inscriptions. But for the other vocalic consonants it was marked separately on the top of the character, looking like a cap. Finally, it was written in clockwise direction on the left side of the character.
2. At the top of vertical lines of the consonants 'ka'(க), 'ca'(ச), 'ta'(த), 'na'(ந) and 'ra'(ர) a small horizontal stroke is seen. This later developed looking downwards on the left side. The horizontal stroke in the middle bent downwards on both sides. The bottom of the vertical stroke made a slight curve towards left.
3. The downward strokes of 'ta'(த), 'na'(ந), 'l̲a'(ழ) and 'r̲a'(ற) look shorter up to the period of the Kuram plates. After that this is further elongated.
4. The letters 'ṇa'(ண), 'la'(ல), 'ḷa'(ள) and 'n̲a'(ன) developed loops in later inscriptions, perhaps because Tamil letters were written in the clockwise direction.
5. The closed upper portion of 'va'(வ) in Vallam inscriptions is opened in later Tamil inscriptions with a curve in the left upper portion.

These observations formed the evolution of Tamil script. Apart from script evolution, the content of these reproductions are also used as a major sources for reconstructing history and culture of the ancient civilization. In Claude Rilly words, "Paleography can provide valuable information on some cultural, economic, ideological aspects of a civilization, particularly in medieval times when a considerable mass of written documents was produced (Rilly 2004)." The visual documentation as a means for research was adapted from the epigraphist methodology. As mentioned earlier, eye copies were unreliable and estampages were impossible as the palm leaves were too fragile and small. Therefore, the current research adapts the photography to visually document manuscripts. Photo documentation has been a recent practice in Indian libraries and institutions to digitally preserve palm leaf manuscripts.

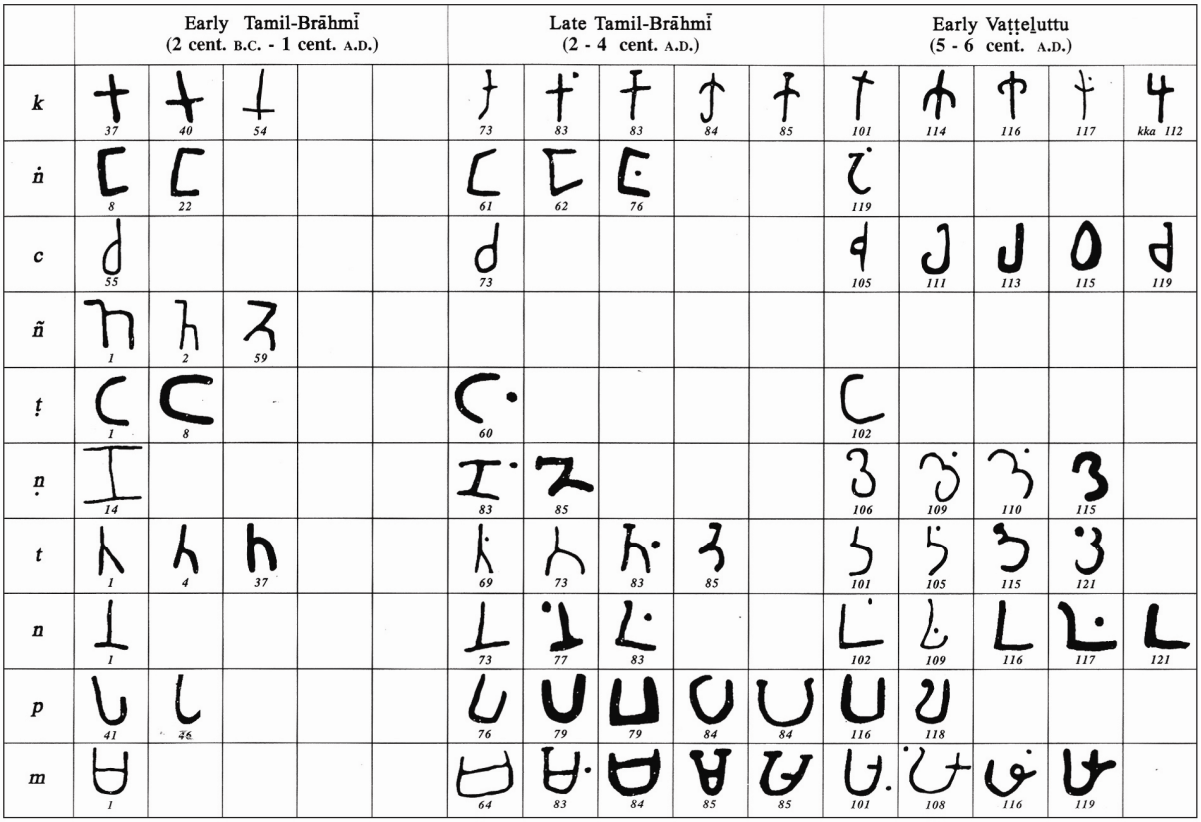


Fig. 5.2: A paleographic chart showing the evolution of consonants in Tamil Brahmi script. Top row indicates different scripts and their chronological time span. Left column shows the phonetic notation of Tamil letters in Roman alphabet. Numbers below inscriptions denote the serial number of the inscriptions found in various places. *(Image Source: Early Tamil Epigraphy, from the earliest times to the sixth century AD)*

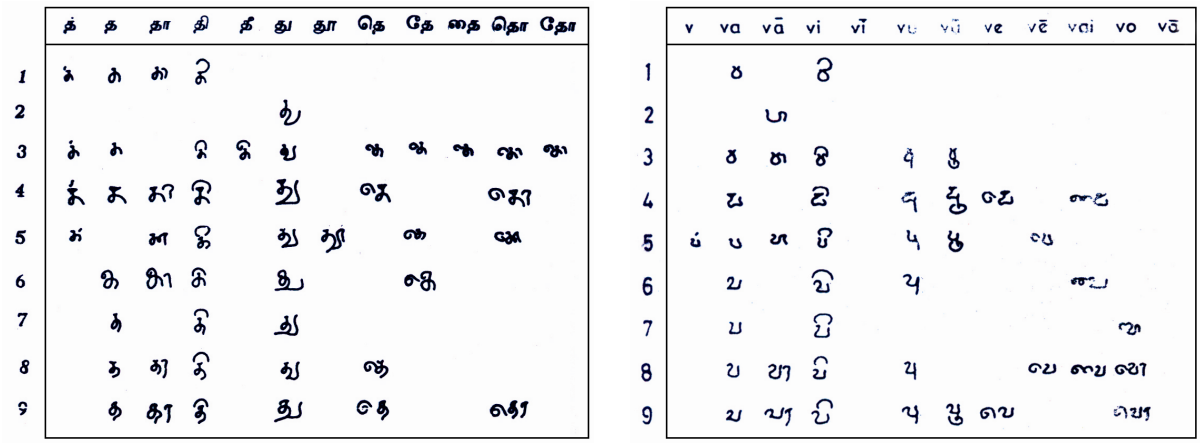


Fig. 5.3: A paleographic chart showing the vowel-consonants of letter 'ta'(த) and 'va'(வ). The numbers on the left column indicate the total number of inscriptions used, details of which are described separately. Top row represents the current script. *(Image Source: Evolution of script in Tamil Nadu AD 500-98).*

5.2 Type historic approach

In west, the hand written manuscripts are visually studied from the original source or from facsimiles. Normally, these manuscripts are well preserved and chronologically documented based on its origin, period, region and writing style. This visual documentation of manuscripts became an important resource for the researchers. Through a detailed visual study of these manuscripts and literary research various characteristics of the scripts are identified. The originals are also reproduced or copied in exact manner to understand its underlying character (Fig. 5.4). Alexander Nesbitt, author of *'History of lettering and technique'* describes,

> Most of the examples of writing and lettering were written or drawn to suit the purposes of this book. They were copied from originals or facsimiles – some quiet freely, others exactly. All specimens were enlarged and carefully re-touched, to give the reader the benefit of clean designs. Of course, line reproductions of type do not give the effect of the original impression; but all that matters in this case is the understanding of developments, design, and style. The students or craftsman may approach original pages or specimens with some degree of understanding and confidence once he understands this history (Nesbitt 1957: x).

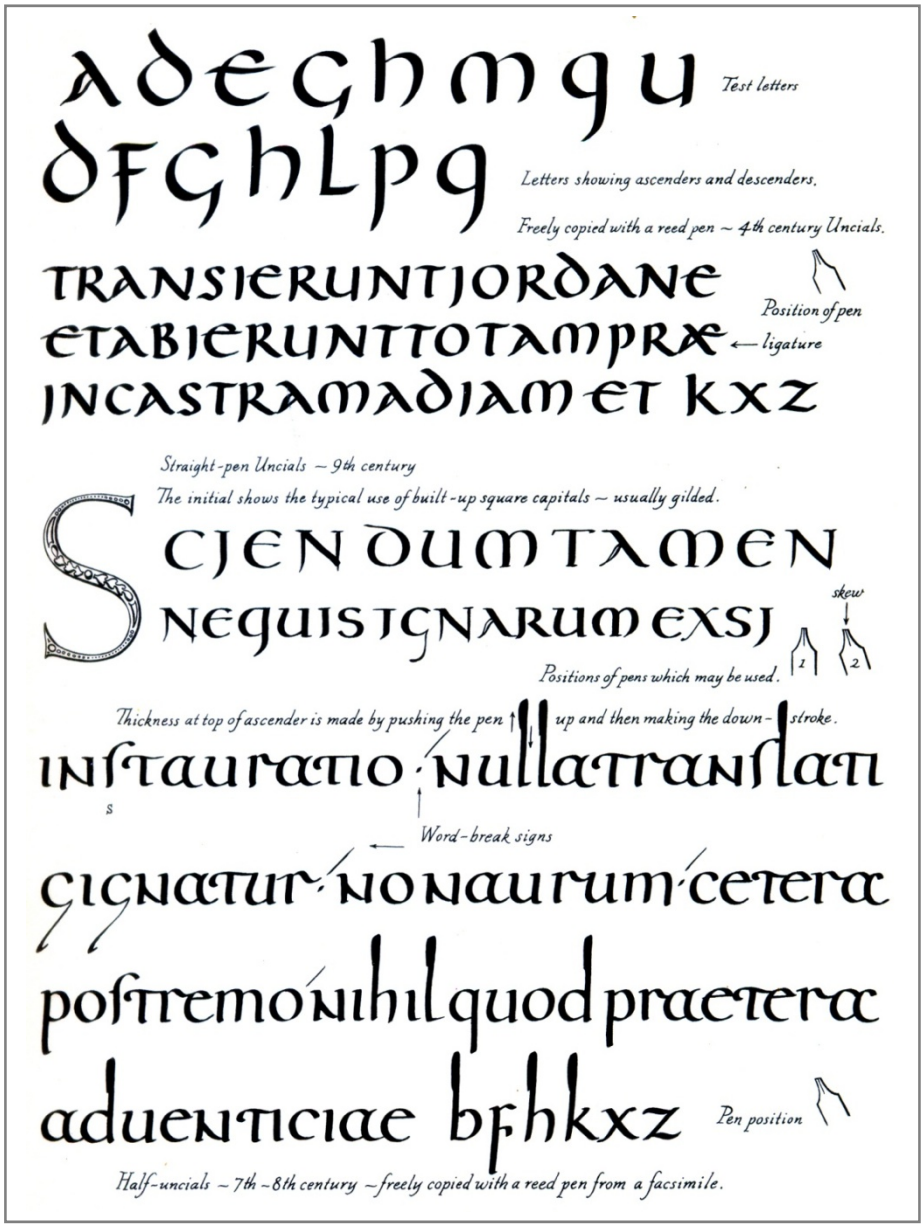


Fig. 5.4: An illustration from the book *'History of lettering and technique'* visually describes the method of study.

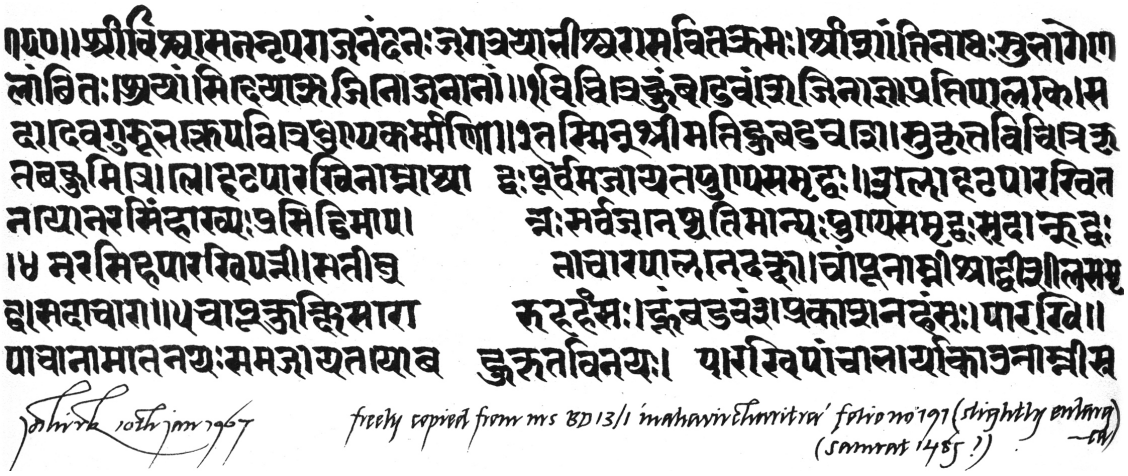
Following is an example which describes some interpretations of the above image.

> New designs appear among the half uncials: the loop of the 'a' is brought up to the top of the back stroke; 'r' is a partly finished majuscule design, with the top loop swung to the right in a broad sweep; 's' has been flattened and made an ascending letter – this is the long 's' of early English books and of the German text; most of the other letters show their derivation from uncials, except that ascenders and descenders are now definitely a part of the design. The upper loop of the 'B' has been omitted; 'd' has acquired a perpendicular stem; the top of the 'e' has now been closed; 'l' is now simply an ascending stem; 'F' has not as yet found its place' and 'T' has still to develop its cross (Ibid 16-17).

A similar approach of studying manuscript was followed by Professor R. K. Joshi, a scholar on Devanagari calligraphy. He has meticulously studied hundreds of Devanagari manuscripts to understand its calligraphic nature. His method of study includes observation and imitation of the original (Fig 5.5 a, b). Such technique has enabled him to understand and appreciate the intrinsic characteristics of the manuscript letterforms. Following is his description about his method of studying manuscripts,

> After noting down date, period, basic size and margins, I used to observe for quite some time, many individual letters, through a magnifying glass, for stroke structures and proportions. After the first excitement of revelation was over, I used to select a pen of the appropriate thickness, with a self cut nib. With that pen I used to copy freely the letters of particular calligraphic interest. This was accompanied by my commentary notes regarding structural peculiarities, proportions, etc. After copying decorative and/or binding devices of interest, I used to copy a page or a portion from the manuscript, by just looking at it and redrawing the same in the exact style and size in my own hand, with the help of a self cut pen (Joshi 1983).

a.



b.

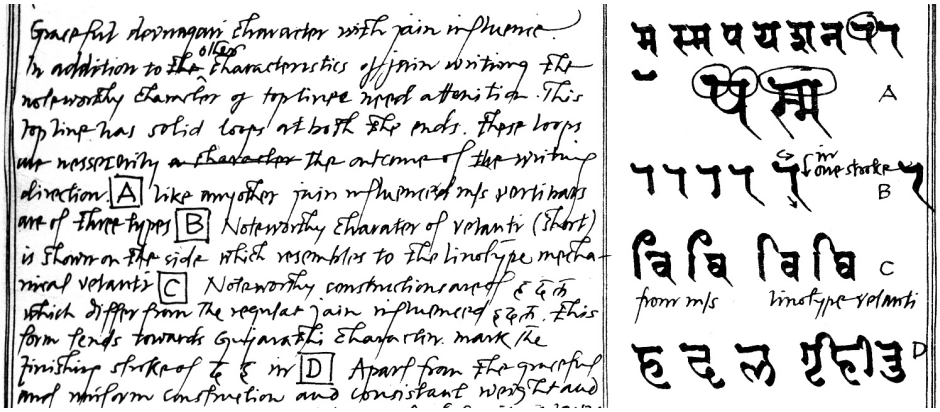


Fig. 5.5: a. Devanagari manuscripts being exactly replicated. *(Image Source: Caltis 83)*

b. Detailed notes from the observation of manuscript letterforms.

Scholars and type historians across the globe appear to have a similar approach to studying old manuscripts. They observe and copy the originals as they are to understand the essential characteristics of the letterforms. Imitation of the originals by scholars themselves brings out insight which otherwise was hard to discover. The above observations are made by studying the entire manuscript. Sometimes the sample size of the study is limited to two or three examples in order to avoid digression. Nesbitt remarks, "The discussion and illustration of these developments (evolution of scripts) is again limited to two or three examples, at the most, of the letter or type in question. Thus it has been possible to present a genuinely comprehensive history of letters without becoming complex or straying into byways or blind alleys (Ibid x)."

Similar to hand lettering and calligraphy, the early typefaces were studied in detail. In west, printing and typography was considered as an art and was given due importance. A conscious effort and care was taken to document the old manuscripts and printed works. Like mentioned before, the well preserved documents and accompanying notes were carefully studied by various scholars. Over centuries, their observations and comments formed a strong literature. And this led to the establishment of western typography and its history. Unlike the type design in west, Tamil typography lacked documentation and scholarly study. This perhaps has left the subject untouched and unknown for centuries. Therefore, as a start, facsimiles of early Tamil printed books were documented for study.

5.3 A combined research approach

After studying both the research methodologies, a new approach was designed for the current research. The new method was an amalgamation of epigraphy and western typography method. Though both these methods depend of visual documentation, their approaches to study scripts were different. Perhaps, the study material (medium) could have played a role in devising the method of study. Following key factors were taken and combined from each of the methods.

Epigraphic approach

- Visual documentation through photographs
- Preparation of a visual chart
- Study of individual letters through comparison

Type historic approach

- Illustrate the manuscript letters to study its underlying characters
- Documentation of early Tamil printed books from facsimiles
- Defining Tamil typographic terminology
- Analysis of letterforms by grouping visual characteristics

As a first step, a visual documentation was created comprising photographs of palm leaf manuscripts, facsimile and photocopies of early printed books. These images became the primary source of visual information for study. After the visual documentation individual letters were selected and complied on a visual chart. Two visual charts were prepared, one from palm leaf manuscripts and other from early printing typefaces. Both these visual charts formed the primary data for the current research. These two charts were then compared and studied to understand the transformation in letterforms between both medium. The data was visually analyzed (with literary references), illustrated wherever necessary and interpreted like in western typography. In the process, Tamil typographic terminologies were also formed to help interpret the transformation. These terminologies defined the parts of letterforms (anatomy), joineries and construction details. Following are the methods adopted for data collection and visual documentation.

5.4 Data collection

Three field visits were carried out in Tamil Nadu for one and half months each. Before going to the field trip, a set of questions was prepared along with a schedule and list people to be visited (See Appendix). The main objectives of the visit were to discuss the research with scholars, collect images of palm leaf manuscripts and early printed books. Outcome of the field works included visual documentation (still images), conversation with experts (notes), video documentation (audio and video) and learning about palm leaf manuscript through a short term course. Other secondary information like literature and publications were also sought after.

5.4.1 Conversation with experts

During the field visit, several experts in the field of Tamil script were interviewed. They include Tamil scholars, research scholars, professors, epigraphists, curators, librarians and publishers. A set of questions was asked to them and their answers, opinions and remarks

were taken on notes. Their response gave lots of common insights into palm leaf manuscripts and stone inscriptions. To give an example, *'Stone inscriptions were an imitation of palm leaf manuscript',* an insight, was common among their replies. Some of the other conclusions which came out from their comments were,

- Tamil palm leaf manuscripts letterforms has not been researched or studied so far.
- For most of them, Typography has been a fresh subject and they had very little knowledge on it.
- They also remarked that Tamil typography is a new field of research and no one had attempted before.
- They opined that there are very few resources available on palm leaf manuscripts and early Tamil printing.

5.4.2 Firsthand experience on palm leaf manuscripts

A two week short course on palm leaf manuscript was attended under the head priest, *Pundit Thiru Chockalingam* of Sri Meenakshi Sundareswarar Madam, Tanjore. At present, he is one of the rare persons who can fluently read and write on palm leaves. During that short duration, various aspects palm leaf manuscripts like preparation, preservation, writing and reading was learned. Writing with iron stylus on palm leaf gave a deeper understanding of the material and writing process. The difficulty to inscribe various types of strokes became evident. The horizontal strokes were easier to inscribe than the vertical strokes. While drawing the vertical strokes, the horizontal fibers along the leaf created a resistance to scratch/cut thereby making it difficult to draw. This was especially true when scribing from down to up. The importance of left thumbnail was also realized in the process of writing (See Chapter 3). The practical experience had helped to understand the medium and relate its influence on letterforms. Similar to writing, even reading was difficult and had to be learned formally (See Chapter 3).

5.4.3 Video documentation – Audio Visual

A small video documentary was made during the palm leaf manuscripts course. The video documents the basics of palm leaf its preparation, preservation, reading and writing process. The purpose of the video was to provide information about palm leaf manuscripts and its writing system. To some extent it could be used as a research material to study the writing process on manuscripts. Incidentally, the document was produced as a record of traditional writing system in South India.

5.4.4 Visual documentation – still images

Photographs and still images were used to document the palm leaf manuscripts and early letterpress typefaces. Images were obtained from various manuscript libraries and old printed books. The images were then used to prepare visual charts.

Palm leaf manuscripts

Photographs found to be the most appropriate data to study the visual characteristics of manuscript letterforms. Unlike stone inscriptions, photographs of palm leaves do not create any optical illusions. Neither there was any difficulty in terms of light conditions or equipments. Moreover, digital photographs were employed by various libraries, government institutes and manuscript missions to create digital transcripts of palm leaf manuscripts. This recent digital documentation was also followed for paper manuscripts and early printed books.

The primary resource for photo documentation was from *Government Oriental Manuscript Library (GOML),* University of Madras, *Kuppuswami Shastri Research Institute*, Chennai and *French Institute*, Pondicherry. GOML had a very diverse collection of manuscripts and was also one of the largest repositories of Tamil manuscripts in the country. It has a total collection of around 71,180 palm leaf manuscripts of which 16,398 were Tamil manuscripts. These manuscripts were collected from various places all over the country. And they varied in subjects such as literature, history, philosophy, astronomy and science from different periods. This collection of various styles and time period became an appropriate resource for the current research. The manuscripts were photographed in a fixed setup with an artificial light (See Appendix). Close up images of the letterforms were shot from individual leaf, with a preset camera setting (Fig. 5.6). A separate log book was kept to record other general information like manuscript dimensions, number of leafs, content and accession number. Around 136 palm leaf manuscripts were photographed. Approximately, 6-10 leaves were shot from each manuscript depending on its size. A total of more than 4500 close up images were digitally captured for the research.

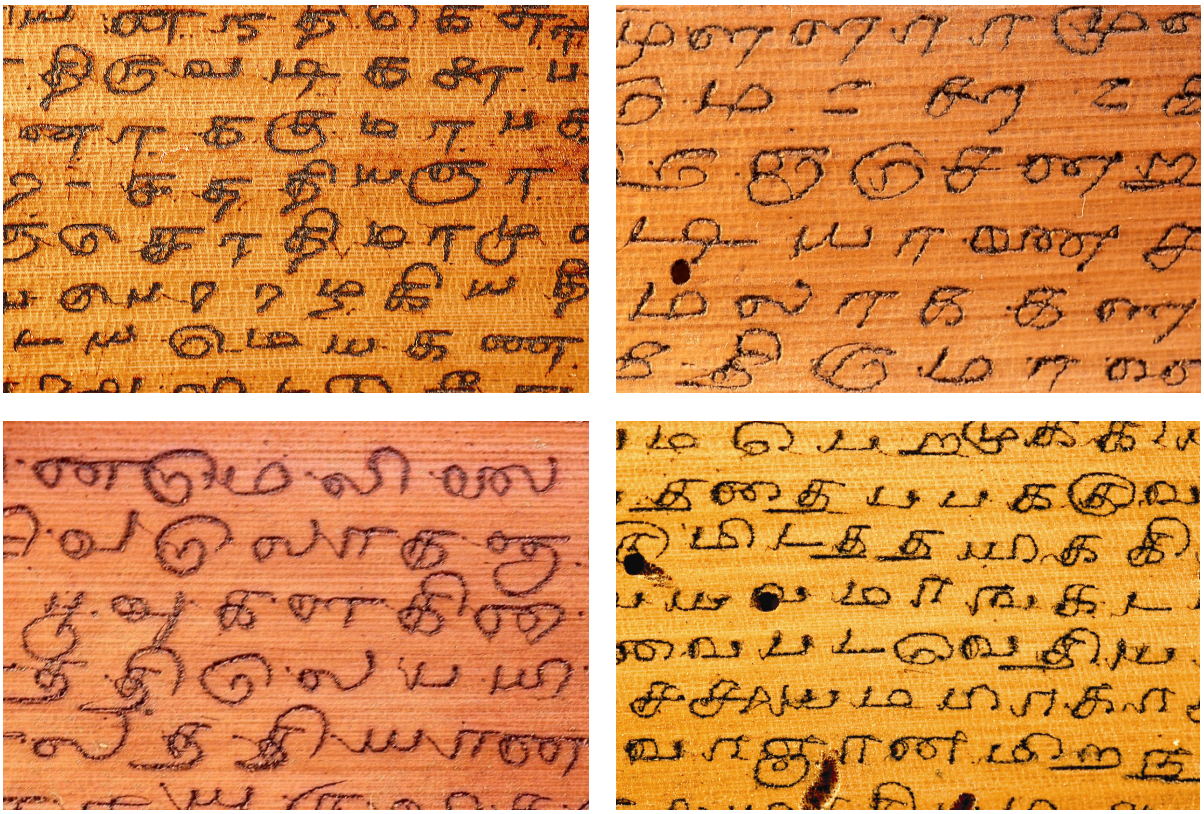


Fig. 5.6: Close up images of a palm leaf manuscript photographed using a professional digital camera with a fixed setup. *(Images source: Government Oriental Manuscript Library, Madras University, Chennai)*

Early letterpress printing typefaces

The early letterpress typefaces were obtained from the facsimiles of old printed pages reproduced in recent books (Fig. 5.7). And some examples were taken from the original print materials from various libraries, especially from *Connemara Central Library*, Chennai. Facsimiles and the pages from original books were photocopied as well as photographed. The photocopied pages were then scanned using flatbed scanner at high resolution of 1200 dpi (dots per inch).

5.5 Data logging

A visual chart of letterforms was prepared from the visual documentation of palm leaf manuscripts and early letterpress typefaces. The documented photographs of palm leaf manuscripts were first cleaned and edited for color & contrast on photo editing software – Photoshop CS. From these images, individual letters were identified and plotted on a visual

chart. The visual chart consisted of basic vowel, consonants, ligatures and few vowel-consonants. One disadvantage of this chart was that the manuscript letters were not placed on a chronological order. Since, most of the manuscripts were undated it was difficult to plot them on a timeline. Therefore, the prepared chart was a collection of manuscripts from different periods and places. It does not show a transition or writing styles over time.

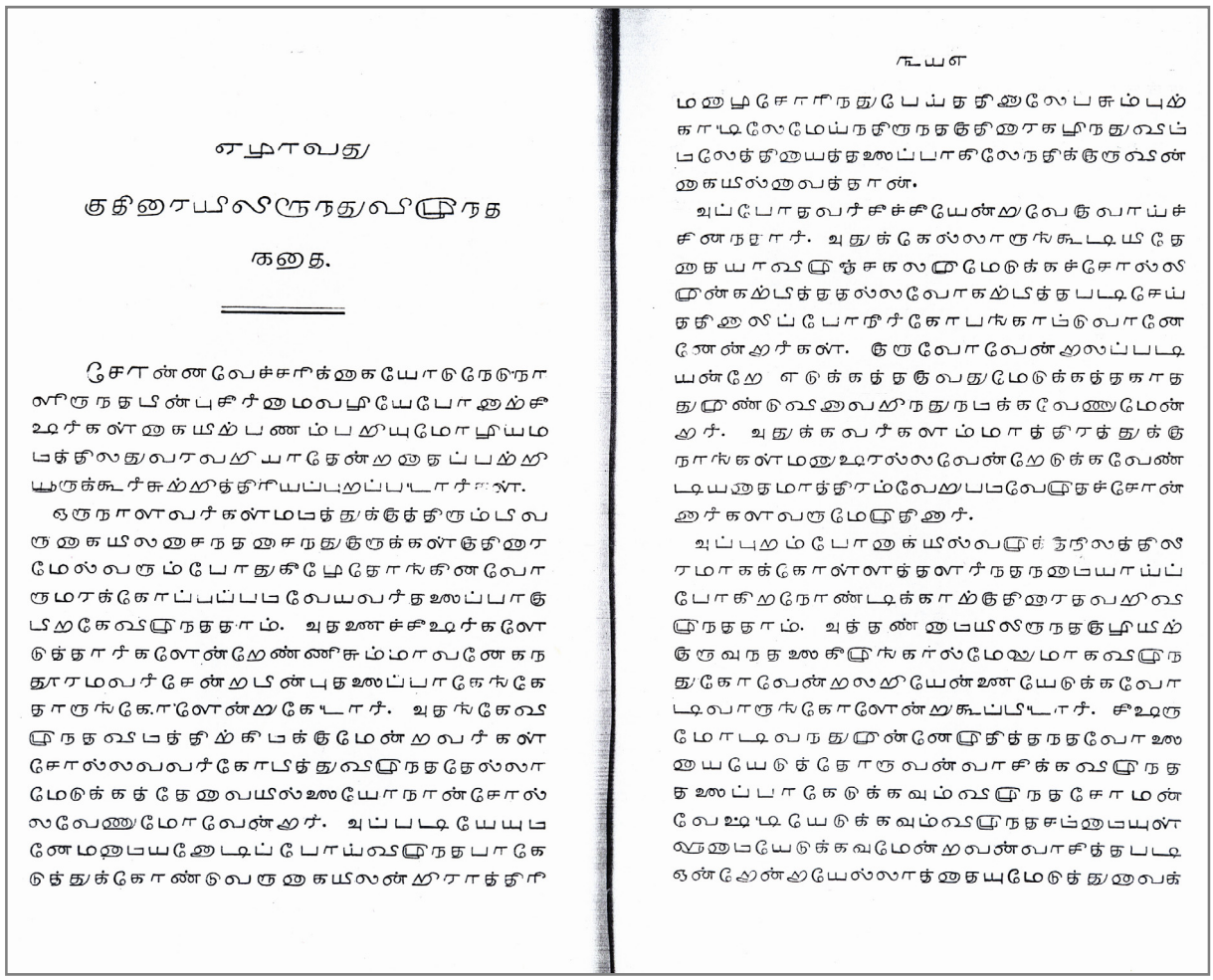


Fig. 5.7: Facsimile of a page from an old book, printed in 1822. The page was photocopied and digitized using scanner. *(Image source: Connermera Library, Chennai)*

5.5.1 Selection of letterforms and typefaces

The selection of letters was completely random and covered as many variations as possible. The process involved identification of variations of an individual letterform (a vowel or a consonant) across images of a particular palm leaf manuscript. From these variations the most commonly used letterform was chosen and mapped on the chart. Likewise, each vowel,

consonant, ligature etc. of a particular manuscript was plotted on the chart (Fig. 5.8). The same process was followed to plot the visual chart of early letterpress typefaces (Fig. 5.9). Both these visual charts was later combined together to give a larger picture of letterforms for comparison. The blank spaces in the charts indicate the absence of letters. This was due to the limited availability of resource for visual documentation. The final chart is enclosed as a separate attachment along with the thesis.

As mentioned earlier, one drawback of the chart was that the manuscript letterforms were not chronological based. Only the letterpress typefaces were plotted sequentially in time. Therefore, an exact transition from palm leaf to letterpress printing was difficult to establish. However, transformation of letterforms from one medium to another medium was studied and analyzed. Each visual chart was studied separately and then compared to understand the imitations and differences between both mediums.

Fig. 5.8: A part of the visual chart prepared from palm leaf manuscript photographs. The image shows the consonant letters from different manuscripts. On the left extreme column are the present letters (for reference) and top row are the accession number of manuscripts.

Fig. 5.9: A part of the visual chart showing the consonants of early letterpress typefaces. On left extreme column are the present letters (for reference) and top row indicates the year of printing. Unlike the manuscript's visual chart, the typefaces are chronologically placed. Blank squares indicate the absence of letter due to limited availability of the print material.

5.6 Tamil typographic terminologies

Before analysis, a visual vocabulary comprising of typographic terminologies, joineries, construction and visual grouping was created (Fig. 5.10) (See end of the chapter). Since, there aren't any well defined typographic terms on Tamil script, new terminologies were created. The new terminologies were based on the present script with Roman script as reference. Most of the terminologies were newly defined with respect to the visual form and some were borrowed from Roman script. The purpose of developing a visual vocabulary was to establish a common understanding of Tamil script.

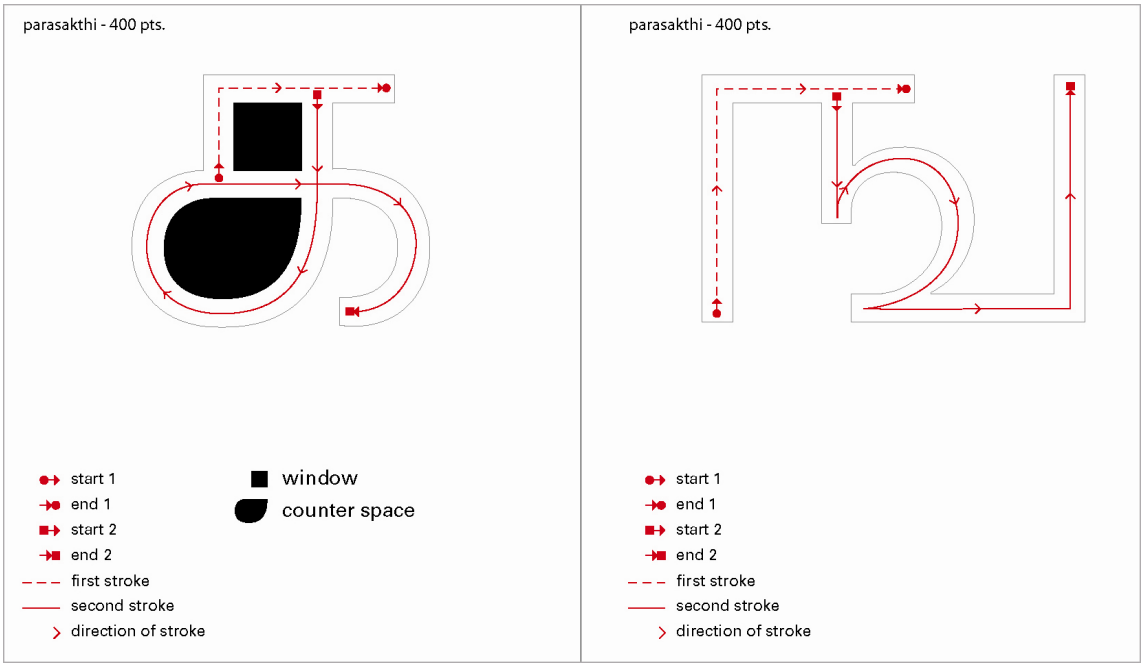


Fig. 5.10: Image shows the method of construction and counter spaces of consonants.

5.6.1 Visual grouping

Letters with similar visual element across the script were grouped together. They were then given terms pertaining to its visual form and function (Fig. 5.10). This formed the anatomy of Tamil script (See appendix). Visual elements, common between the Roman and Tamil script were given the same terms as in the western typography. For example, terms used for measurements such as point size and pica, ascender, descender, baseline and etc were retained in Tamil Typography. Along with the visual grouping, constructions of the letters were illustrated to learn the influence of writing process. According to Baines and Haslam, "Classifying typefaces according to visual similarities produces smaller groupings, which aids

both recognition and selection. As well as forming the organizational basis for a reference work, this visual grouping can help increase awareness of the development of typeface (Baines and Haslam, 2005:50)." Defining the anatomy and visual grouping not only facilitated visual analysis but also helped to identify transformations. Apart from the developed visual groups, existing letter groups such as phoneme grouping, matra grouping were also listed. The present script was used to group similar visual elements. Groupings were done on the basis of (See appendix):

- Primitive structure – rectangular, circular or both
- Composition – vertical, horizontal, inclined or curvilinear stroke
- Joineries / Nodes – terminal, corner, intersection and curvilinear
- Direction of writing – clockwise/anticlockwise
- Letter width – narrow, normal and wide
- Ascenders and Descenders
- Counter spaces

Existing groups of letters

- Basic classification – vowels, consonants, vowel-consonants and ligatures
- Matras – i matra, ī matra, u matra and ū matra
- Phoneme –
    - Short sound (*kuril*) and long sound (*nedil*)
    - Hard consonants
    - Soft consonants
    - Medial consonants

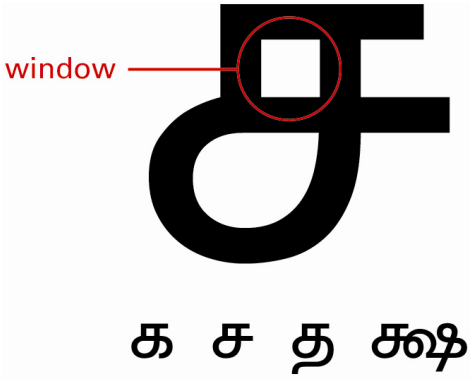


Fig. 5.11: Image shows a rectangular counter space termed jannal (window). Letters with similar counter space are listed below.

5.7 Analysis

The study of palm leaf manuscript letterforms was based on the visual documentation (visual chart) of the manuscript images and evolutional chart prepared by the Department of Archeology, Tamil Nadu. Individual letterforms across manuscripts and evolutional chart were visually compared and analyzed. Letterforms of palm leaves were illustrated and studied to understand the writing process and underlying structure. Through visual comparison of letterforms and analysis of its writing process, the relationship between the letterform (visual structure) and palm leaf writing was identified. And further by building an internal consistency through several examples the influence of manuscript writing was established.

Letterforms in each medium (palm leaf manuscripts and letterpress) was studied separately and then compared with each other to see its imitations and differences. To be specific, characteristics of individual letters from manuscript and typeface were visually compared to study their transformation. These transformations were mostly related to structural changes within a letter and a group of visually similar letters (visual group). Firstly, variations of an individual letter was identified from the visual chart of each medium (manuscript letters separately and letterpress typefaces separately). After that, the most common variation was singled out from each medium. The chosen variant of both the mediums was then visually compared to study the similarities and differences. By this, the transformations (similarities and differences) of the visual element across both the mediums were established. For example in figure 5.12, descender of letter '<u>ḷ</u>'(ழ) is found in several variations in both medium. From the visual comparison of its variations the transformation across medium can be observed.

In case of a visual group, the same process of visual comparison was followed and further repeated with other letters from the same visual group (Fig. 5.13). This was because a change in visual element of a letter in a visual group wais expected to affect other letters in that group. This determined the consistency of visual element across the group. Through visual similarities and differences of variations the transformation was identified. For example, let us consider the phoneme group – 'u' matra (Fig. 5.14). The 'u' matras were divided into three groups based on the visual similarity of the matra (See terminologies). Visual group with the lower bowl was chosen for study. From the group, individual letter was selected (letter 'tu' in this case) and identified in palm leaf manuscript and early letterpress

typefaces. The letter was then compared within each medium (across manuscript and across typefaces) to find variations. In palm leaf, two variation of letter ‘tu’ was found, one with bowl and other without bowl. Once the common variations were found, they were compared across the medium to see any similarities or difference between them. Through this comparison (along with literary references, if any and stone inscriptions) the transformation was established. After that, another letter (letter ‘nu’) from the visual group was chosen and identified in manuscripts and early typefaces. Within each medium, the bowl element of letter ‘nu’ was cross checked with the other letters among the visual group, to see any difference exists. Letter ‘nu’ had two similar variations as observed in letter ‘tu’. These variations were then compared across medium. The same transformation was identified in letter ‘nu’.

The early typefaces were studied with the help of the chronological chart. Along with the visual chart and literature study various characteristics of the typefaces were identified. The characteristics laid foundation for developing the history of Tamil typography. The visual documentation was also used to analyze the influence of western typography on the script.

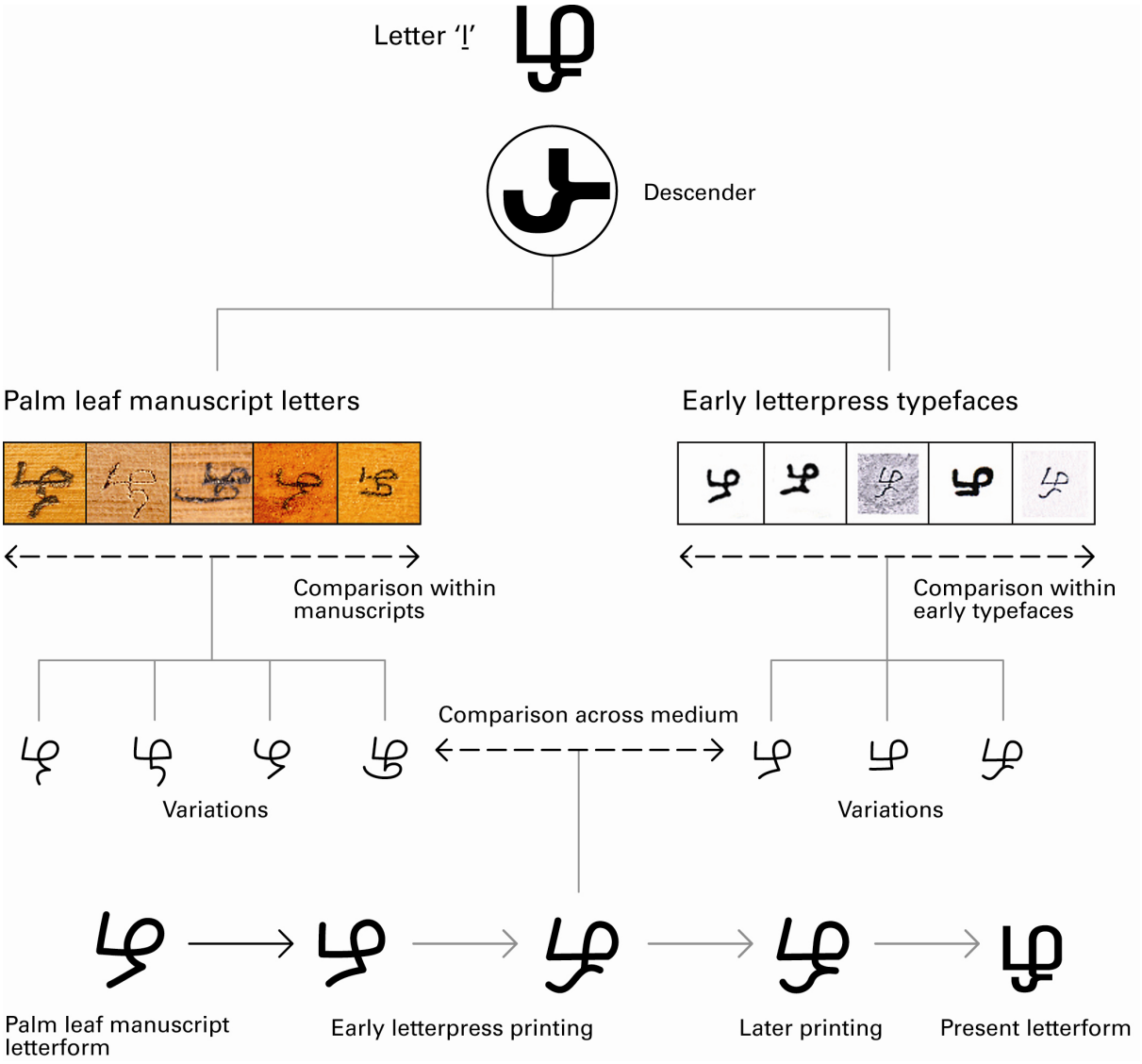


Fig. 5.12: Variations in descender of letter 'l'(ழ) was chosen and identified in palm leaf manuscript and early letterpress typefaces then the detail was compared within each medium separately. The resultant variations were then compared across the medium to observe similarities and differences.

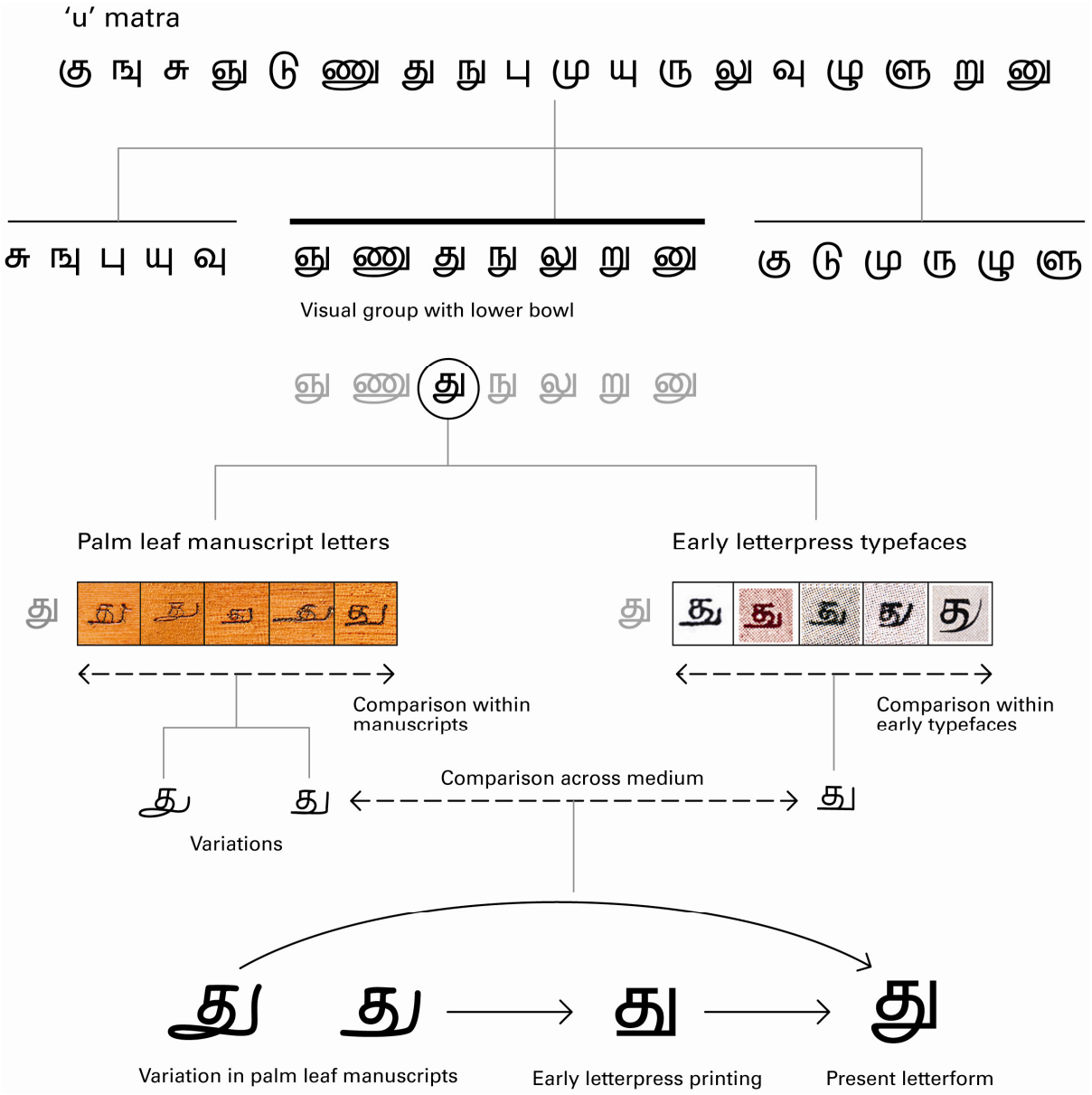


Fig. 5.13: Visual comparison of 'u' matra in palm leaf manuscript and letterpress printing.

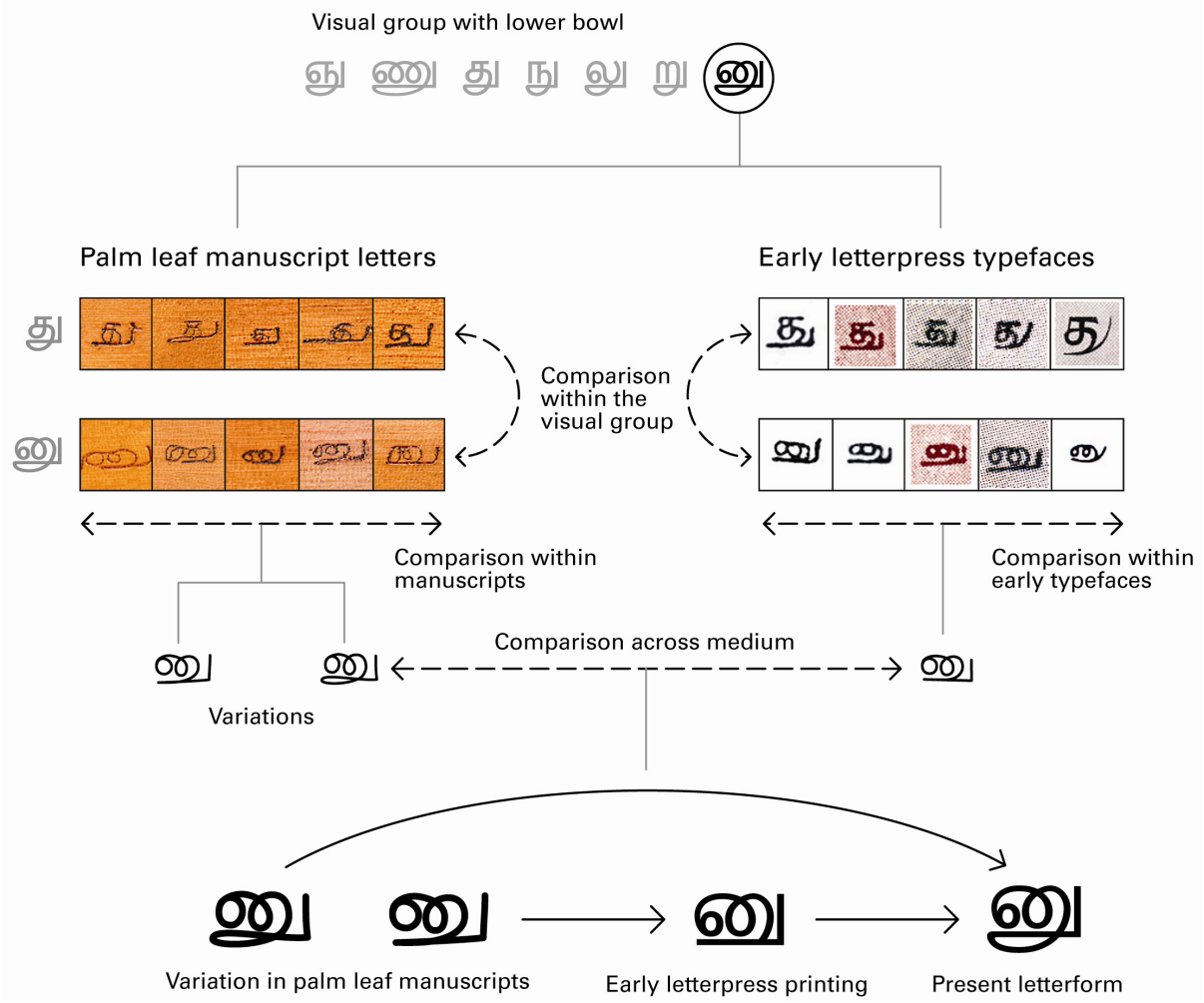


Fig. 5.14: Another letter ‘nu’ from the visual group is chosen and visual compared between manuscript and early typefaces.

5.9 Summary

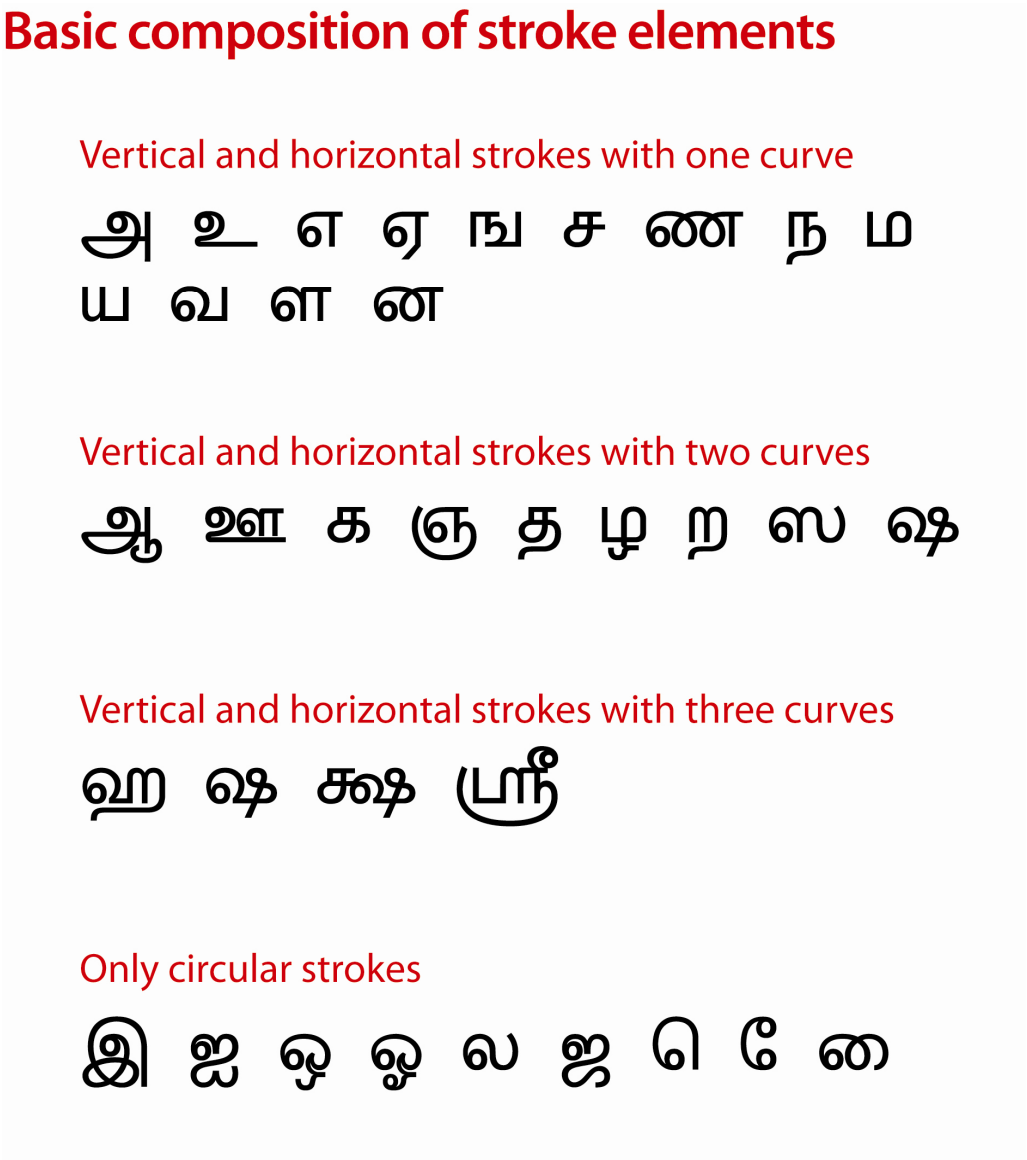
- The present research is based on the combination of existing research methodologies followed in Epigraphy and Western typography.
- The following table gives a concise description of the methods followed in Epigraphy and Western typography.

Epigraphic approach	**Type historic approach**
In most cases, Epigraphists gather new inscriptions from various places and periods. They rely on reproduction of the originals.	Type historians study from the existing documentation either from originals or by reproducing it.
Reproduction of originals 1. Eye copies 2. Mechanical reproduction and 3. Photographed images	Reproduction of originals 1. Illustrations 2. Reprints / Photostats and 3. Photographed images
They study the script evolution, letter by letter through a visual chart.	They study the entire manuscript and comment on individual letters.

- Visual documentation strategies, visual chart preparation, defining terminologies and visual analysis were adapted from the above methods.
- From the visual documentation, two visual charts comprising manuscript letterforms and early typefaces were prepared. The visual chart became the primary data for analysis. Along with the chart, Tamil typographic terminology was developed to support the analysis.
- Analysis was based on the visual comparison of individual letterforms in palm leaf manuscripts and early letterpress typefaces. Through similarities, differences and available literature the transformation between both mediums were established.
- Following factors and visual elements were studied, compared and analyzed
    - Formation of counter spaces
    - Construction of strokes
    - Influence of rapid writing
    - Direction of writing
    - Understanding of joineries, corners, terminals and stroke endings
    - Combination of letterforms
    - Variations of stroke thickness

5.10 Visual Vocabulary

Following is the visual vocabulary developed to facilitate the analysis:



Composition of stroke elements

Circular strokes with one straight line

உ எ ஞ ண ற ன ஸ

Circular strokes with two straight lines

அ ஆ ஏ க த ம வ ஹ ஷ

Circular strokes with three straight lines

ச ந ய ழ ள ஹ

Circular strokes with four straight lines

ஊ

Circular strokes with five straight lines

ங கூ

Circular strokes with six straight lines

ஸ்ரீ

Only straight lines

ஈ ட ப ர ா

Skeletal structure

Straight lines

ஈ ட ப ர ா

Circular strokes

இ ஐ ஒ ஓ ல ஜ ெ ே ை

Vertical and Circular strokes

அ ஆ உ ஊ எ ஏ க ங ச ஞ
ண த ந ம ய வ ழ ள ற ன
ஹ ஸ ஷ க்ஷ ஸ்ரீ

Direction of writing

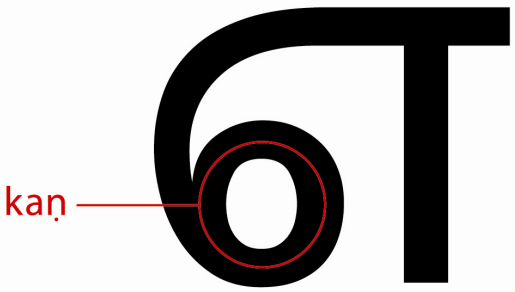
Clockwise direction

அ ஆ இ ஈ உ ஊ எ ஏ
ஐ ஒ ஓ க ங ச ஞ ண
த ந ர ல வ ள ற ன ஜ
ஹ ஸ ஷ க்ஷ ெ ே ை ா

Anti clockwise direction

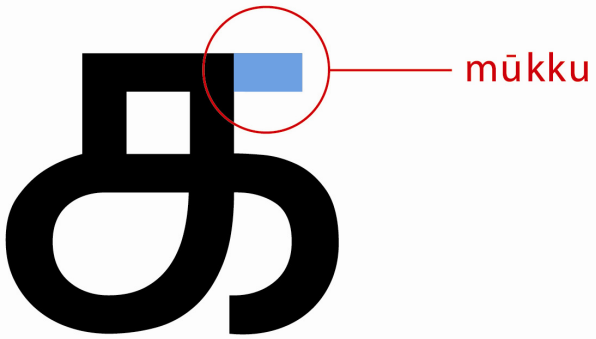
ட ப ம ய ழ ே

Anatomy of letterforms



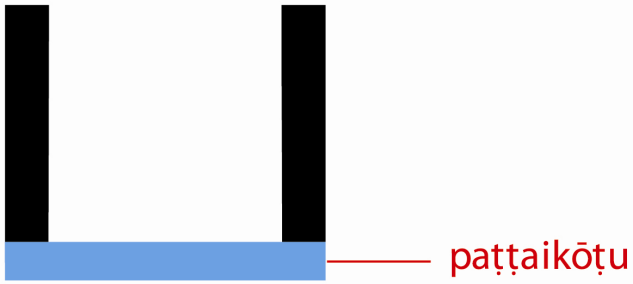
kaṇ (eye)

அ ஆ இ உ ஊ எ ஏ ஐ ஒ ஓ
ஞ ண ல வ ள ன ஜ ஹ ஸ
ஷ ெ ே ை



mūkku (beak)

ஈ ஊ எ ஏ க ங ச ஞ ண த ந ர
ள ன க்ஷ ா

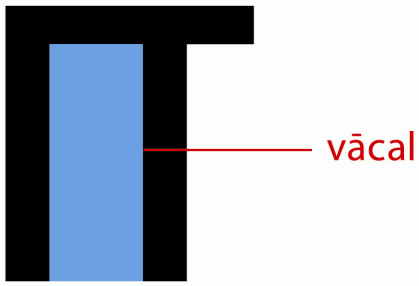


paṭṭaikōṭu (horizontal line)

அ ஆ ஈ உ ஊ எ ஏ க ங ச
ஞ ட த ந ப ம ய ர வ ழ ள
க்ஷ ற

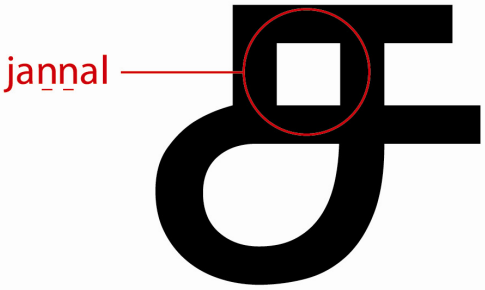
tūṇ (Vertical stroke)

அ ஆ ஈ ஊ எ ஏ ங ஞ ட ண
ந ப ம ய ர வ ழ ள ற ன ஹ
ஸ க்ஷ ற



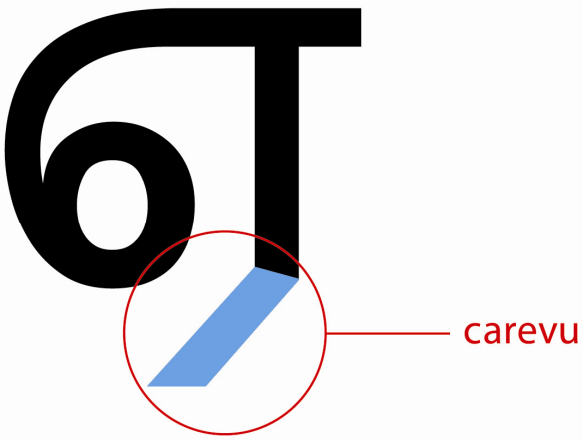
vācal (gateway)

ஈ ஙை நை ரை ளை றை ஹை ா



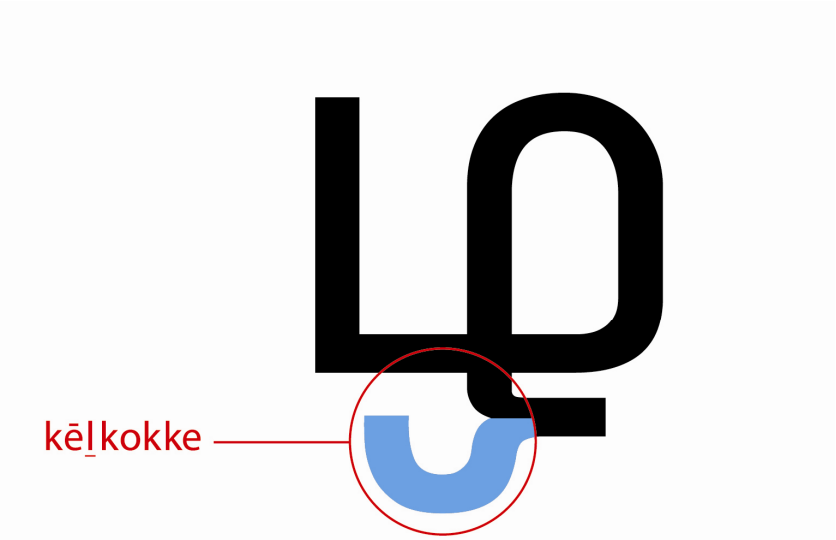
jaṉṉal (window)

க சை தை க்ஷை



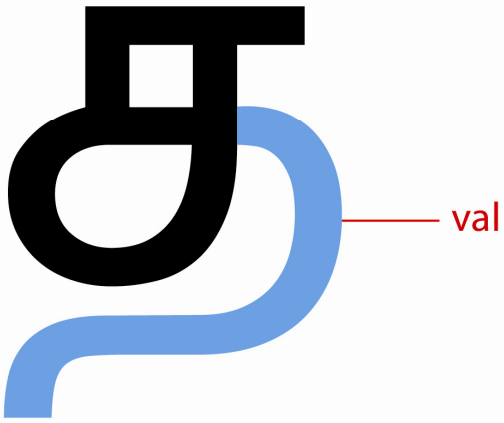
carivu (slope)

ஏ ரே



kiḷkokke (Lower hook)

ழ ழ ழ



val (tail)

த ந ற ஹ

Counter spaces

Without counter space

ஈ ட ப ய ர ற ா ரு

Counter space

அ ஆ இ உ ஊ எ ஏ ஐ ஒ
ஓ க ச ஞ ண த ம ல வ ழ
ள ன ஜ ஹ ஸ ஷ க்ஷ ி ே
ை உண உன உள உல ணு ணூ

Single counter space

உ எ ஏ ஐ ஒ ஞ ம ல வ ழ ள
ஜ ஹ ஸ ி

Two counter space

அ ஊ ஓ க ச த ன
ே ை உள உல ணூ

Three counter space

ஆ ண ஷ
உன ணூ

Four counter space

இ உண

Five counter space

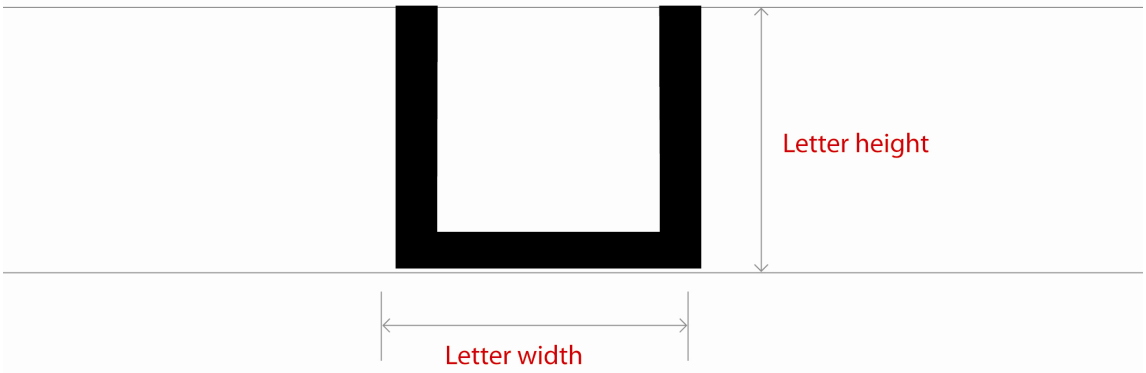
க்ஷ

Letterwidth groups (approximately)

Letter ‘pa’ was considered as reference width

-1	0	1	2	3	4	5	6
ஈ	எ	த	ஐ	ல	அ	ஆ	ண
ர	ஏ	ந	ஒ	வ	இ	ஊ	க்ஷ
ா	க	ற	ஓ	ள	உ	ஹ	
ே	ச	ய	ஜ		ஞ	ஸ	
	ட	ி			ஷ		
	ப				ன		
	ம				ண		
	ழ						

Letter ‘pa’



Joinery details

Terminal joint

ஈ ஊ எ ஏ க ங

ச ஞ ண த ந ர

ள ன க்ஷ ற

க ச த க்ஷ

அ ஆ

ம

Corners

ஈ க ங ச த

ந ர க்ஷ ற

ட ப ம ழ

ங ப ய வ

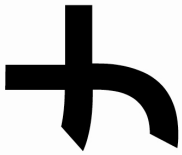
வ

Joinery details

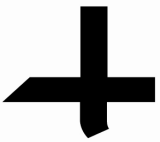
Intersection

ண ன ன ண்ண

அ ஆ



க த



ழ

ஷ க்ஷ

ஷ க்ஷ

Joinery details

Curvilienar Joints (start and terminating points)

எ ஏ ஞ ண ல

வ ள ன ஹ ஸ

ஷ ி ை

உண உன

உள உல

அ ஆ உ ஊ

கஷ

ஐ ஜ

ஆ ஓ

ே

Joinery details

Curvilienar Joints

ஜ ற ஜ ஹ

ஸ ஶ

ஒ ஓ ழ

ஜ

ஶ ஒ ஓ

Vertical and curve

ஊ ள

ஆ

ங ஞ ந

ய ங

Ascenders and Descenders

Pa height

ஈ உ ஊ எ க ங ச ட ண ப

ம ய ல வ ள ன ஸ ன ா

Ascender

இ ெ ே உண உன உள உல

Descender

அ ஆ ஏ ஐ ஒ ஓ ஞ த ந ர

ழ ற ஜ ஹ ஷ க்ஷ ஸ்ரீ ண

ரு ணு

Vowel consonants and their matras

u matra சு ஙு பு யு வு

குடுமுருழுளு

ஞுணுதுநுலுறுனு

ஜுஹுஸுஷுக்ஷு

ū matra கூ

ஙூபூயூவூ

சூடூமூரூழூளூ

ஞூணூதூநூலூறூனூ

ஜூஹூஸூஷூக்ஷூ

i matra கி சி ஞி ணி தி நி ரி ளி னி

மி ழி றி ஜி ஹி ஷி க்ஷி

ஙி பி யி லி வி ஸி

டி

ī matra கீ சீ ஞீ ணீ தீ நீ ரீ ளீ னீ

மீ ழீ றீ ஜீ ஹீ ஷீ க்ஷீ

ஙீ பீ யீ லீ வ ஸீ

டீ

Sound based groups

kuril - short sound

அ இ உ எ ஐ ஒ

neṭil - long sound

ஆ ஈ ஊ ஏ ஓ

valliṉam - hard consonants

க ச ட த ப ற

melliṉam - soft consonants

ங ஞ ண ந ம ன

iṭaiyiṉam - medial consonants

ய ர ல வ ழ ள

Chapter 6

Part I:
A critical analysis of palm leaf manuscript letterforms

In research methods, visual documentation was one of the major sources for studying letterforms. The present study of palm leaf manuscript letterforms was based on the following visual resources.

- Visual documentation (visual chart) of palm leaf manuscripts and
- Evolutional chart prepared by the Department of Archeology, Tamil Nadu.

The manuscript images were analyzed at individual letterforms and also holistically. Construction of letterforms were illustrated and studied wherever required like in western method. The analysis includes the study of enclosed spaces in vowels ‘a’(அ) and ‘ā’(ஆ), letterforms of ‘u’ matra, short sound vowel ‘i’(இ) and small circular space called kaṇ. It also examines the extension of strokes in letter ‘na’(ந), mūkku, formation of kūṭṭeḻuttu and variations in certain letterforms of short sound ‘i’ matra. The above letters were chosen based on the visual dissimilarities between the palm leaf and present letterforms. Unlike other letters, the chosen letters had undergone a substantial transformation in terms of their visual form. Another reason for choosing these letters was that they fall under a group of visually

similar letters (visual groups). They represented a particular visual group with atypical characteristics. Following were the in-depth analysis of palm leaf manuscript letterforms.

6.1.1 Bowl of vowels ‘a’(அ) and ‘ā’(ஆ)

In most of the palm leaf manuscripts, vowels ‘a’(அ) and ‘ā’(ஆ) does not have a bowl (See terminologies) (Fig. 6.1 a). Even in the evolutional chart of Tamil script there was no bowl in the vowels (Fig. 6.1b). Further Sambandan writes, “In olden days letter ‘a’ was written without the bowl and same was followed in the early printing (Sambandan 1980:316).” It was apparent that these two vowels ‘a’(அ) and ‘ā’(ஆ) never had a bowl element.

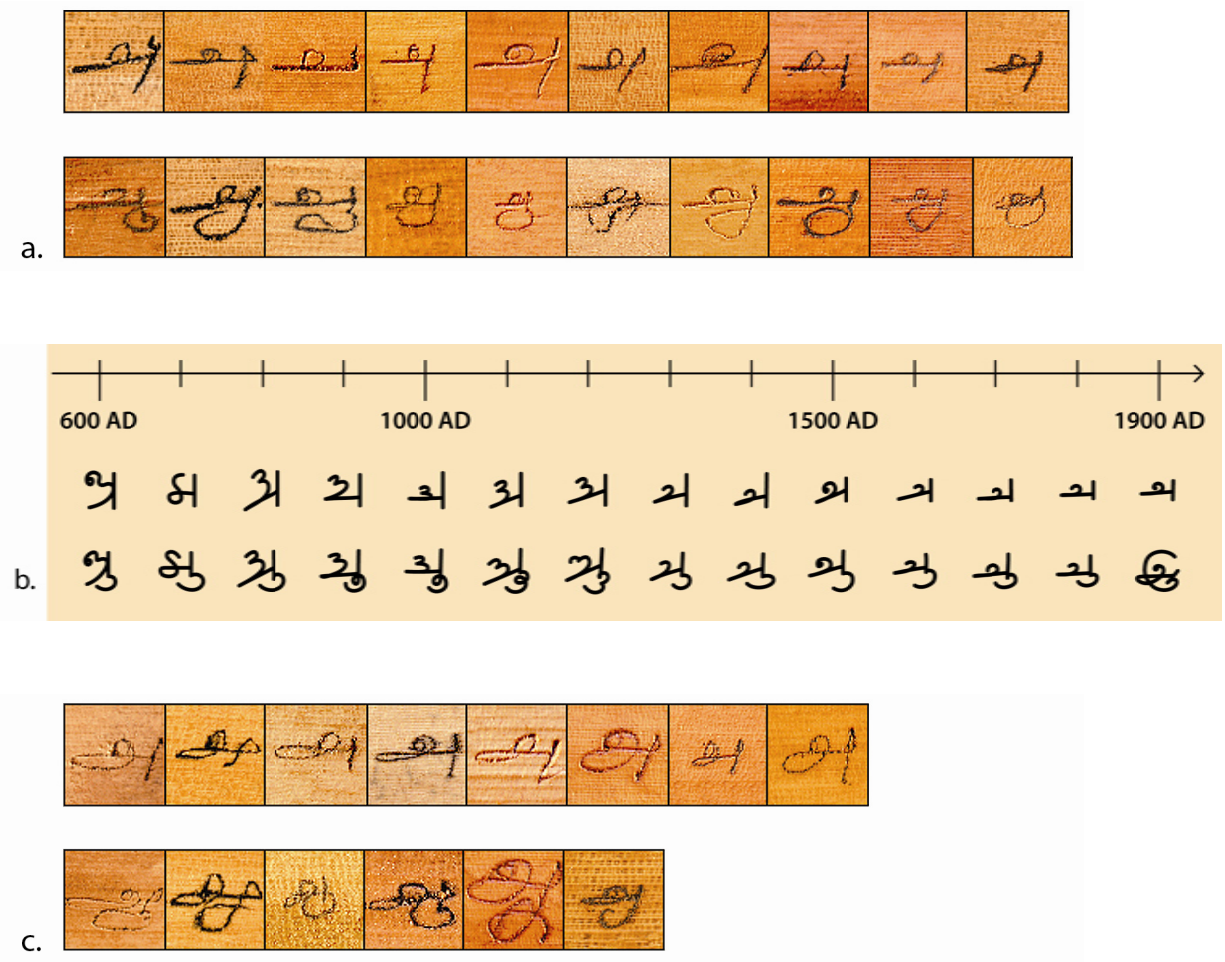


Fig. 6.1: a. In palm leaf manuscripts letter ‘a’(அ) and ‘ā’(ஆ) did not have a lower bowl.

b. In the evolutional chart based on stone and metal inscriptions, vowels ‘a’(அ) and ‘ā’(ஆ) did not have lower bowl.

c. In few manuscripts the vowels were seen with bowl element.

In addition to these letters there were manuscripts seen with bowl (Fig. 6.1 c). Such variations were due to the writing system on palm leaf manuscript. In older letterforms the scriber limited the starting stroke with a short curve and extended it horizontally in a clockwise direction. He then overwrote the horizontal stroke with a back stroke to complete the letterform at right (Fig. 6.2 a). At some point of time the starting curve began to expand due to rapid writing or writing style resulting in an elongated loop. Specifically, the scriber instead of overlapping the horizontal stroke made a continuous curvilinear stroke (Fig. 6.2 b). The expansion of curve and loop formation would have been convenient and quicker for the scriber to write continuously. This variation gradually transformed the conventional letterform and became part of the present script.

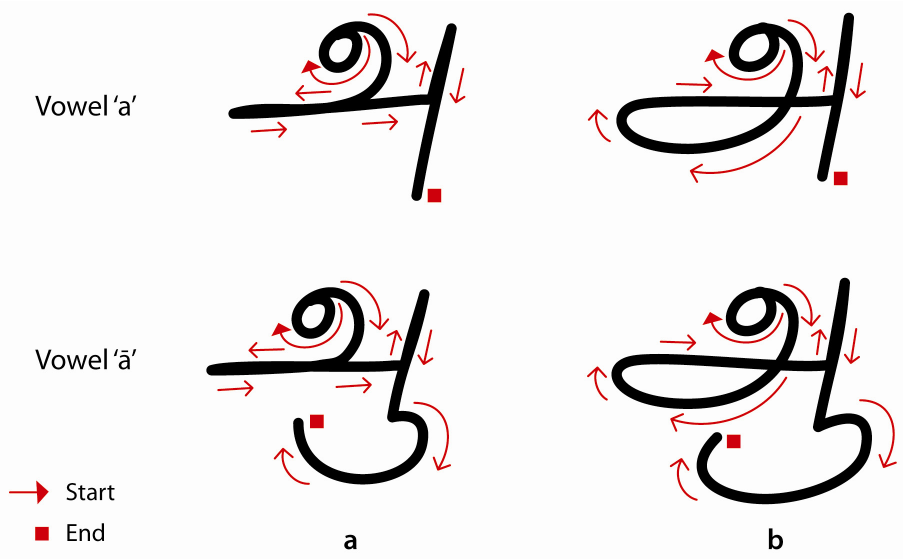
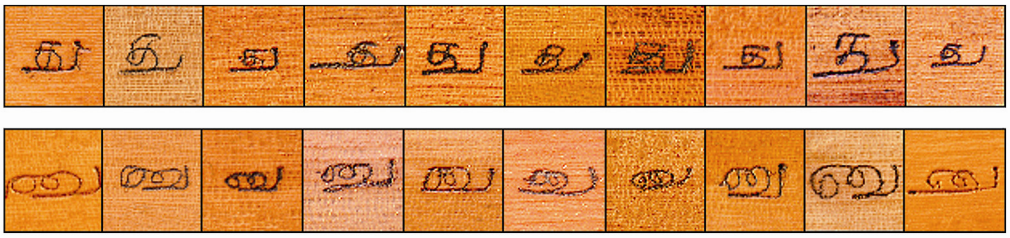


Fig. 6.2: Construction of vowels 'a'(அ) and 'ā'(ஆ) in palm leaf manuscripts.

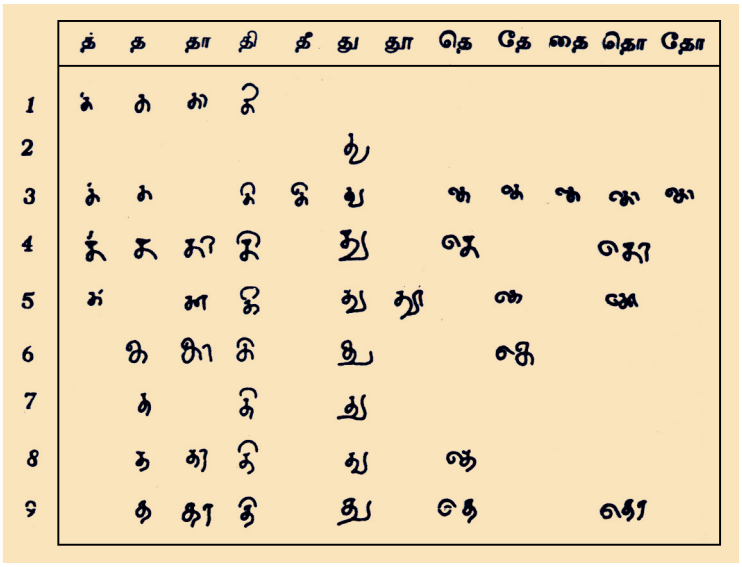
6.1.2 Lower bowl of 'u' matra

In Tamil script, the symbol for 'u' and 'ū' matra varies according to the letterform. In visual grouping, these matras were divided into three visual groups. One such group was the letters with lower bowl (See terminology). In palm leaf manuscripts, some of the letters in the visual group do not have a lower bowl (Fig. 6.5 a). The charts prepared by epigraphist R. Govindaraj to study the evolution of Tamil script shows that the early letterforms did not have a lower bowl (Fig. 6.6). Only a very few manuscripts were seen with the bowl (Fig. 6.5 b). This indicates that the bowl was a later addition similar to the vowels 'a'(அ) and 'ā'(ஆ).

a.



b.



c.

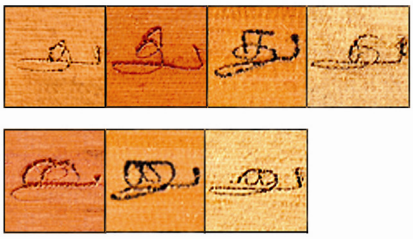


Fig. 6.3: a. In most of the palm leaf manuscripts the lower bowl in letter ‘tu’(து) was absent.

b. From the evolution chart it was evident that the early letterform ‘tu’(து) did not have a lower bowl.

c. Very few palm leaf manuscripts had lower bowl.

From manuscripts writing, it was observed that only after completing the tail, the ‘u’ matra was written. In this, the scriber wrote over the tail without lifting the stylus and then completed the matra with upward vertical stroke. On the other variation, the tail was lowered down which formed an elongated loop to finish with the matra (Fig. 6.4). Only the writing system could have created such enclosed space. This was because the similarity in stroke construction of the letterforms ‘a’(அ), ‘ā’(ஆ). and ‘u’ matra had developed similar bowl

element. Similar writing action seems to have created similar patterns. In other words, the development of bowl in a similar stroke construction emphasizes the influence of writing style on those letterforms.

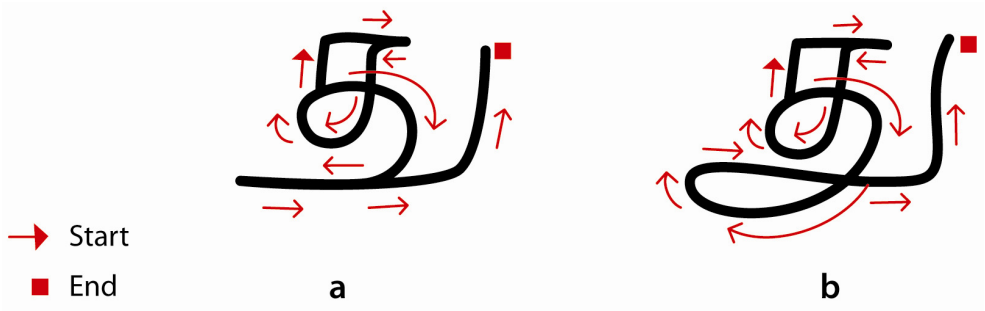
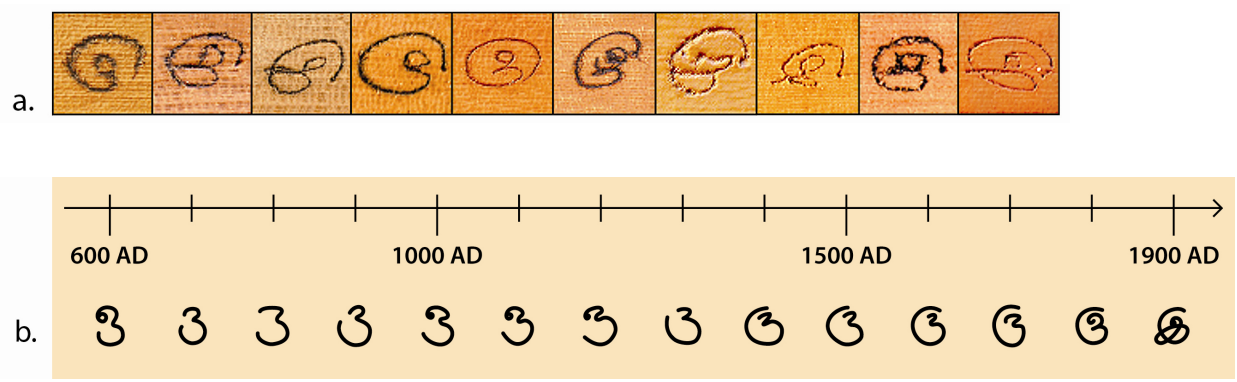


Fig. 6.4: Construction of the letterform ‘tu’(து) in palm leaf manuscripts.

6.1.3 Evolution of letter ‘i’(இ)

The present letter ‘i’(இ) had a completely different visual form in old days. This was evident from evolutional chart and also from the available palm leaf manuscripts (Fig. 6.5 a, b). The reason for such transformation can be understood from the palm leaf manuscripts. The pattern can be observed from variations of the letterform in palm leaves. A metamorphosis from one form to another can be found by organizing (arranging) these variations in certain sequence[1] (Fig. 6.5 c). Through the study of this sequence, the logic of evolution can be perceived. The scribers continuous circular motion of hand to construct the letter slowly expanded the strokes (Fig. 6.6). In the process, strokes began to enlarge, overlap and create new enclosed spaces. The gradual progression of newly developed enclosed spaces gave a new visual form to the letter. The new form retained the counter spaces and its shape during printing and continued till today.



[1] The sequence was developed based on perceived evolution in the absence of dated manuscripts.

Fig. 6.5: a. Letter ‘i’(இ) in palm leaf manuscripts.
b. Evolutional of letter ‘i’(இ).
c. A metamorphosis of the vowel can be observed from the available variations in the palm leaf manuscripts. On extreme right is the present letterform.

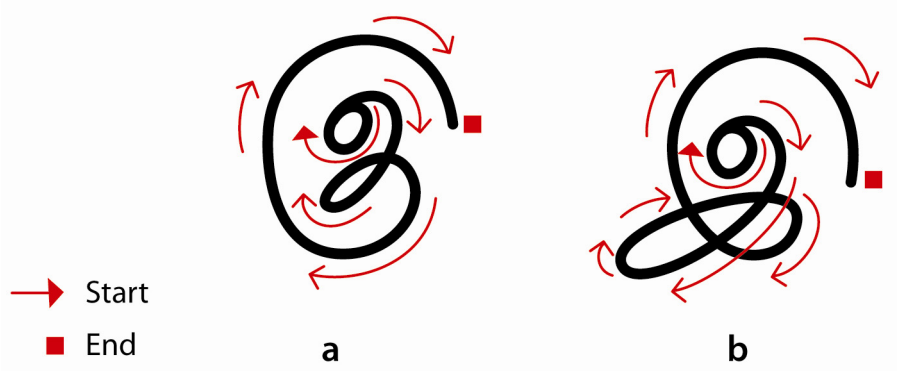


Fig. 6.6: Construction of the vowel ‘i’(இ) in palm leaf manuscripts.

6.1.4 Kaṇ

The small enclosed space in present letter ‘e’(ஏ) is called Kaṇ. At present, this enclosed space was common to several other letterforms (See terminology). In the evolutional chart, it was observed that these letters have developed the counter space at different centuries and in some it was even absent (Fig. 6.7). Kaṇ is a visual element which could have evolved due to the writing process on palm leaves. Mainly because of the following reasons,

1. An interesting observation was that kaṇ element was present only in the letterforms which start with a curve (Fig. 6.8). And also it was found only at the start of a letterform and not at other places. This perhaps could be a result of palm leaf manuscript writing because it was difficult to directly start a curvilinear stroke on palm leaves especially in rapid writing. Therefore, to have a control over the larger curve a small curve was initiated at the start of the letter. The presence of such small curve (in letters which start with a curvilinear stroke) was clearly evident from the evolutional chart. This small curve appears to have gradually developed into a small circle over time.

2. Another reason for its formation could be that when the scriber jumps from one letter to another letter especially to letter which starts with a curvilinear stroke, a small curve was used intuitively. This was due to rapid action of the scriber where the stylus moves ahead of the next letter's start point. This could have made the scriber to take a small curve in clockwise direction to draw the larger curvilinear stroke. This small curve could have eventually developed into an enclosed space.

Fig. 6.7: Presences of enclosed space kaṇ in evolution chart at different centuries. The circle denotes the formation kaṇ in present script.

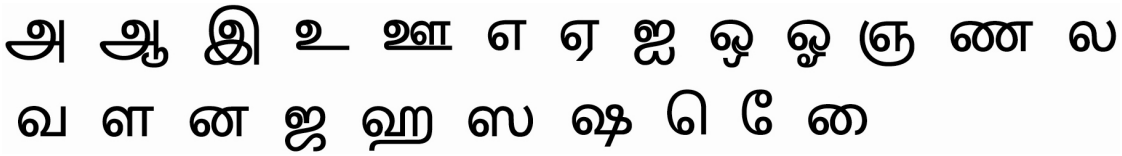


Fig. 6.8: Kaṇ (enclosed space) is found only in letters that starts with a curve.

6.1.5 Top horizontal stroke and Mūkku

In present Tamil script, certain letters have a common horizontal stroke at the top (Fig. 6.9). One of the observations in the evolution of Tamil script by epigraphist Govindaraj states, "At the top of vertical lines of the consonants 'ka'(க), 'ca'(ச), 'ta'(த), 'na'(ந) and 'ra'(ர) a small horizontal stroke is seen. This later developed looking downwards on the left side (Govindaraj 1994:22)." According to Govindaraj the vertical strokes developed a horizontal stroke at the top. This was evident from the evolutional chart where a small horizontal stroke precedes the vertical stroke in the early script (Fig. 6.10). This horizontal stroke could have evolved during the writing process on palm leaves. This was mainly because while writing from one letterform to another a small part of the continuity gets registered at start of the subsequent letterform. This can be understood by the design of italics in the modern context. In Roman script though the italics were physically disjointed they were visually connected by the extension of strokes like in a cursive writing (Fig. 6.11). The same phenomenon of continuity has got reflected on stone inscriptions from palm leaf manuscript writing. Overtime these small projections developed into a stroke making it part of the letterform.

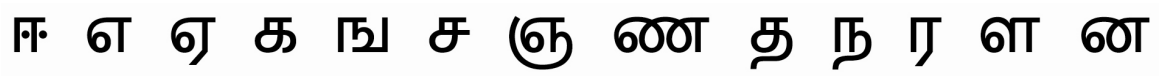


Fig. 6.9: Letterforms with mūkku detail.

On the other hand, there were few exceptions where the vertical stroke remained as they are without any such projections, for example letter 'pa'(ப) and 'ma'(ம). One reason for such exceptions could be the direction of writing where 'pa'(ப) and 'ma'(ம) are written in anticlockwise direction as compared to the other vertical stroke letters like 'ka'(க), 'ca'(ச), 'ta'(த), 'na'(ந) and 'ra'(ர). The other exceptions were the vowels 'u'(உ) and 'ū'(ஊ) where the top projection developed into a curvilinear stroke instead of horizontal stroke (Fig. 6.12).

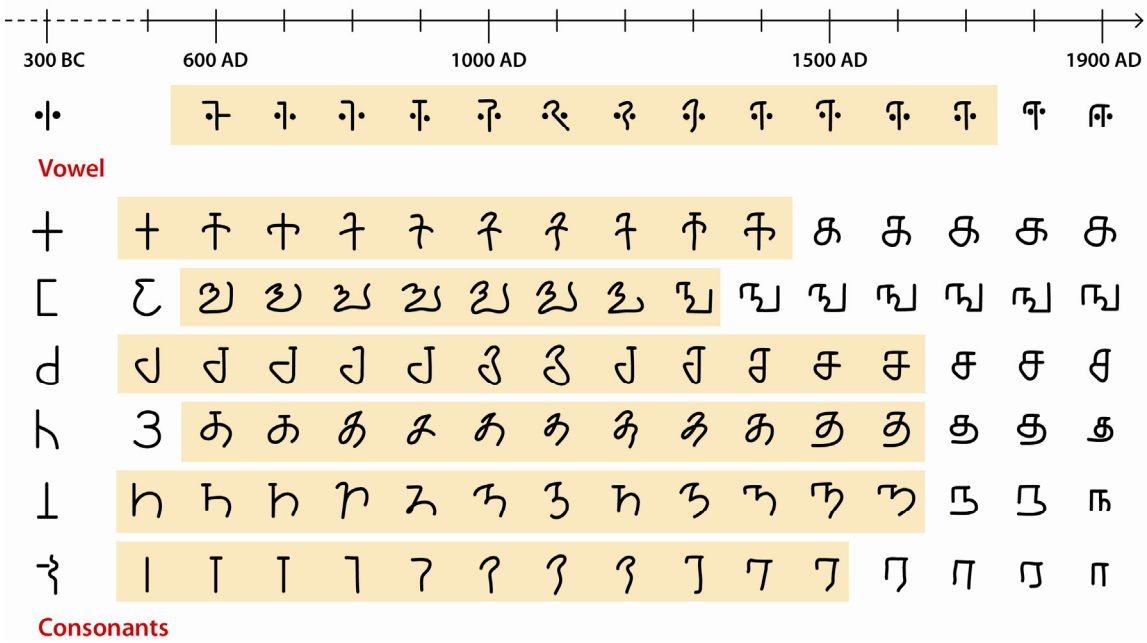


Fig. 6.10: The vertical strokes of the letters written in a clockwise direction developed a small horizontal projection at the left. The transformation is indicated by a band in the above image.

Fig. 6.11: In Roman italics the letters were virtually connected by an extended stroke.

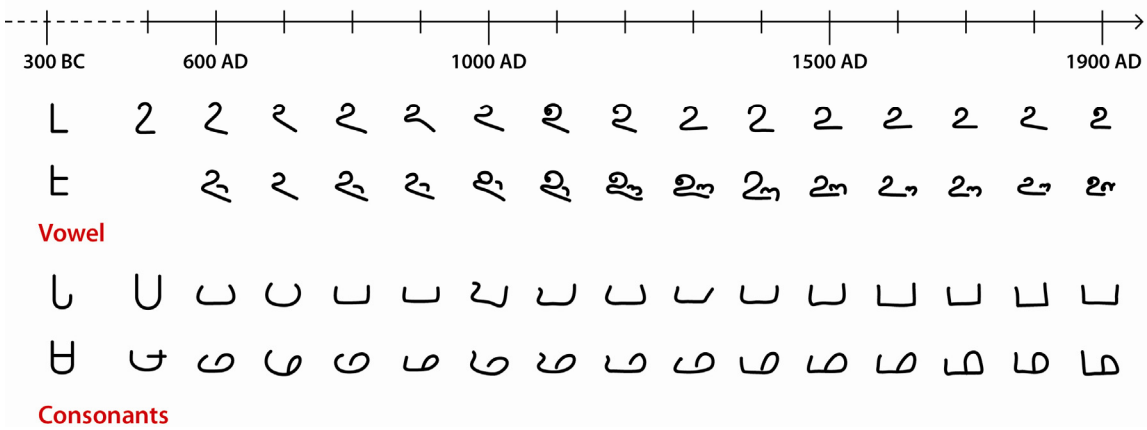


Fig. 6.12: There were few exceptions where the vertical strokes did not have a horizontal projection, like in vowels ‘u’(உ), ‘ū’(ஊ) and in consonants like ‘pa’(ப) and ‘ma’(ம).

The top horizontal stroke further continued and developed into an interesting detail called Mūkku. Mūkku is a small projection of top horizontal bar beyond the vertical stroke (See terminology). Like the evolution of top horizontal stroke, this small projection can also be attributed to writing on palm leaf manuscripts. Whenever scriber draws a horizontal stroke and returns to a vertical downward stroke a small curvature was formed between the strokes (Fig. 6.13). This could be due to the continuous motion and rapid handwriting. In order to write fast, most scribers write a letter in one continuous stroke without lifting the stylus. While in a continuous motion it was difficult for the hand to draw a sharp perpendicular corner between horizontal and vertical stroke. In most cases, the action tends to create a small curve at the end when coming back to draw a vertical stroke. Such details were also observed in the evolutional chart (see Fig. 6.10). This small curve at the corner has gradually evolved into a small projection over time. And eventually became a part of the letterform adding character to it. The rapid handwriting and continuous stroke have led to the creation of such intricate detail.

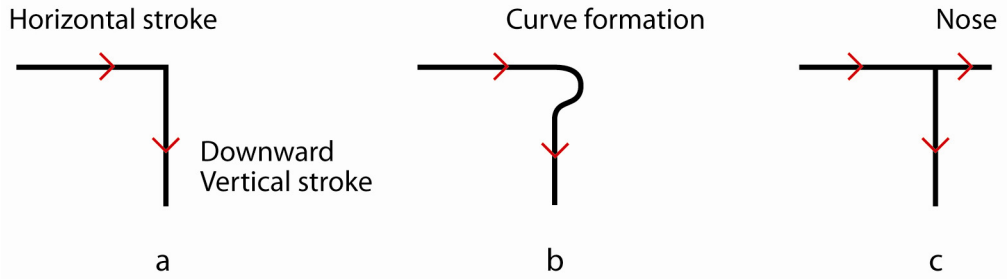


Fig. 6.13: a. Illustration indicates the construction of corner detail.

b. Indicates the formation of a small curve during the process of writing and

c. Shows the formation of mūkku detail.

There were broadly six variations of mūkku of letter ‘ka’(க) were seen from the palm leaf manuscripts visual chart (Fig. 6.14). The numbers in brackets indicate the number of occurrence of the variations in the visual chart.

a. Without projection (6)

b. Pointed corner without projection (11)

c. Formation of small curve between top horizontal and downward vertical stroke (10)

d. Distinct projection of top horizontal stroke (6)

e. Top horizontal and downward vertical stroke form two different strokes (23)

f. Nose with a loop formation (continuity of the top horizontal stroke from above)

Similar to letter ‘ka’(க) there were several other letterforms which had the same mūkku (see terminologies). In palm leaves, other letters had the same variations of corner details like in letter ‘ka’(க). There exists an internal consistency in construction of the corner across letters and palm leaves (Fig. 6.15). Similar corner pattern in manuscript letters emphasis the influence of writing over the letterforms.

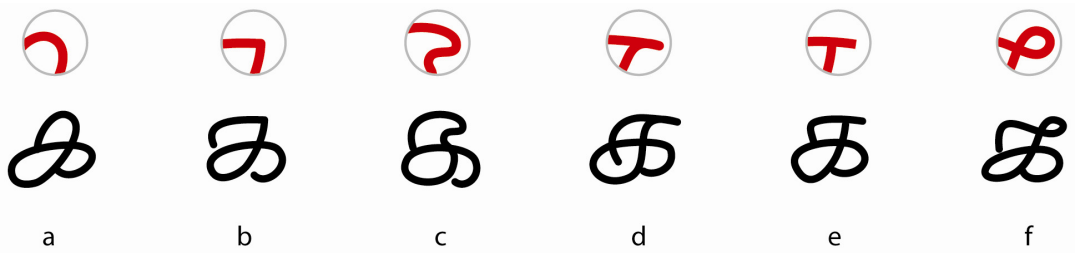


Fig. 6.14: In palm leaf manuscripts there are six different variations of mūkku seen in letter ‘ka’(க). The above circled image shows the close up detail of each variation.

Fig. 6.15: Above visual chart shows similar mūkku being followed within the same manuscripts and across manuscripts. There were few manuscripts where there was inconsistency.

6.1.6 Tail of 'na' (ந)

In palm leaf manuscripts, letter 'na'(ந) either did not have a tail or it was short. The curvilinear stroke which extends as a tail stops close to the baseline like an arc (Fig. 6.16 a). Similar form was observed in the evolutional chart (Fig. 6.16 b) which ascertains that the letter did not have a proper tail formation like in present script. The physical structure of palm leaves could have facilitated the formation of tail. In palm leaf, the horizontal fibers along its length assist in drawing horizontal strokes. Frutiger who had studied Tamil palm leaf manuscripts ascertains, "The formation of the strokes is absolutely fiber–like. Note the few but very elongated horizontals, which have that appearance because they lie in the fiber direction of the leaf and are consequently difficult to discern (Frutiger 1980:96)." Therefore, in the process of rapid writing the horizontal fibers would have forced the scriber to extend the open ended curvilinear stroke. Such extension of the stroke was observed only when the stroke terminates along the grain. This can be understood from another letter 'ṭa'(ட) where its horizontal stroke extends along the grain (See 6.2.3). Therefore, the medium and rapid writing had gradually led to the extension of a tail (Fig. 6.16 c). Further, similar tail formation was also observed in letters 'ta'(த) and 'ṟa'(ற) where the clockwise curvilinear stroke terminates approximately at the baseline. A similar stroke ending leading to similar stroke (tail) formation emphasizes the influence of palm leaf medium and its writing system.

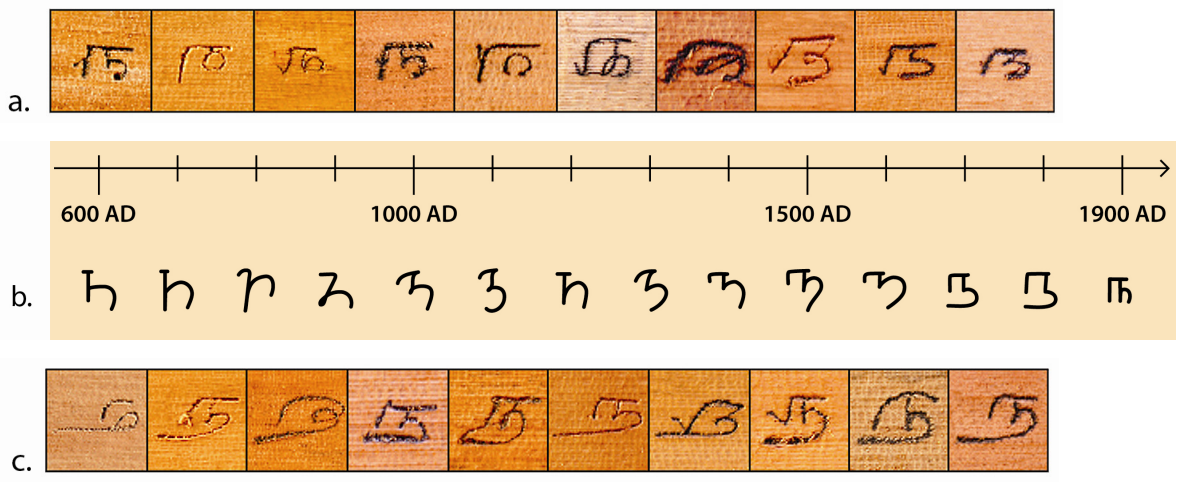


Fig. 6.16: a. In palm leaf manuscripts, letter 'na'(ந) did not have tail formation.

b. The letter 'na'(ந) in evolution chart did not have a tail formation similar to palm leaf manuscripts letterforms.

c. There were palm leaf manuscripts which were also seen with tail formation.

6.1.7 Kūṭṭeḻuttu (ligatures in typographic terms)

In 1978, Tamil Nadu government reformed few kūṭṭeḻuttu characters in Tamil script. There were thirteen kūṭṭeḻuttu which got replaced by the modern letters (See chapter 4). In order to save storage space and time during composition in letterpress printing such measures were taken (Kandiah 1988:4). In western typography, ligatures were created to solve the unsighted space of certain letter combinations in letterpress printing. In Tamil typography, it was due to the writing process on palm leaf manuscripts that led to the creation of ligatures.[2] Ironically, letterpress was one of the prime reasons for removal of such ligatures from Tamil script. Though kūṭṭeḻuttu were removed from present use, they make an interesting study of visual transformation from one form to another and one medium to another. They also provide an insight on joineries and fusion of letters.

In Tamil, kūṭṭeḻuttu have undergone a series of visual transformations from its origin to its present form. Tamil scholars opine that these transformations were due to the writing process which led to formation of kūṭṭeḻuttu. One such explanation was:

> In palm leaf, earlier the 'ai' karam was written with two dots before the consonant (..க), over time the dots became two vertical forms (ாக). These vertical forms later transformed into (ெக), this form of writing is still followed in Malayalam script. These two horns like structure (ெ) got merged into a singular form such as this (ை) in the process of swift writing (Kodapillai 1990:12) (Fig. 6.17).

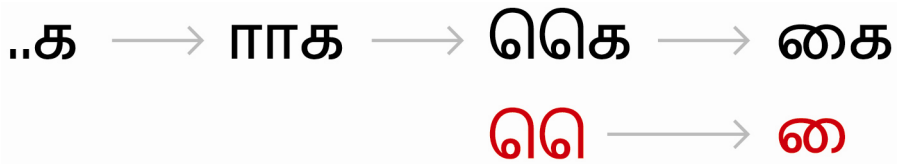


Fig. 6.17: Above image shows the transformation 'ai' karam letterform from left to right.

The above explanation only exists as a theory. The symbol 'ை' is still been used today and is called as 'ai' karam. In palm leaves further combination of the 'ai' karam symbol with other letterforms (forming a ligature) were commonly seen. Interestingly, this 'ai' karam symbol (ை) merged only with certain consonant letters like 'ṇa'(ண), 'la',(ல) 'ḷa'(ள) and 'n̲a'(ன). The curvilinear forms of 'ai' karam and the consonants may have prompted the

[2] Personal conversation with Prof. Kovai Mani, Palm leaf manuscript department, Tamil University and Pulavar Thiru Chockalingam, Tanjore

scriber to merge them together with one continuous stroke. Since, the end and start of these letters form a continuous circles it becomes convenient for the writer to combine them into one letterform. Though only the consonants with curvilinear form merge with 'ai' karam symbol there were few exceptions. Letter with similar curvilinear form such as 'ña'(ஞ) and 'va'(வ) do not combine to form a ligature like others (Fig. 6.18). The possibility of their exceptions could be that the upright curvilinear terminal of letter 'ña'(ஞ) could have restricted the combination letters. And perhaps the ligature combination of letter 'va'(வ) would have confused with ligature formation of letter 'la' (ல). However, the circular forms of the letters facilitated the scriber to combine letters in rapid writing. Therefore, it was certain that kūṭṭeḻuttu are a result of palm leaf writing.

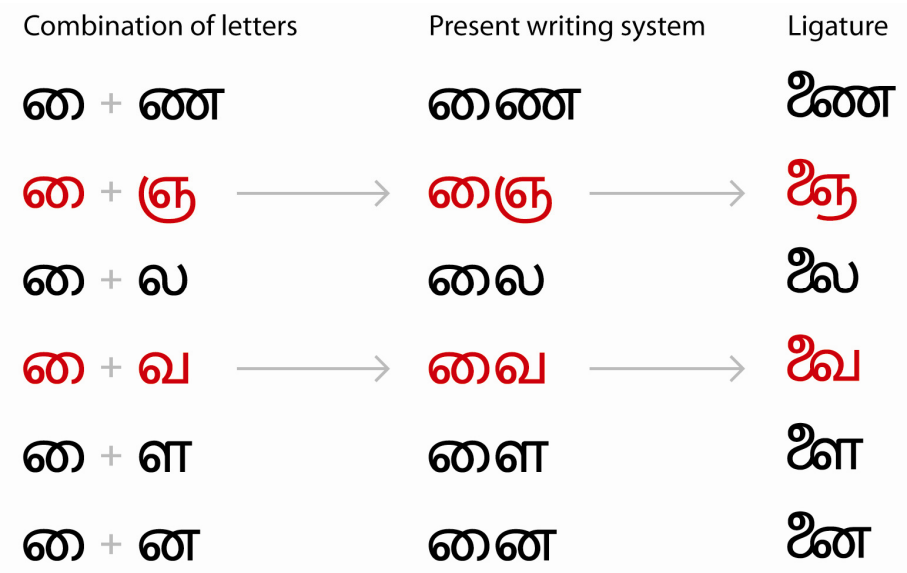


Fig. 6.18: There were few exceptions which do not follow the adoption of combining two circular letterforms. In this case it is letter 'ña'(ஞ) in the second row and 'va'(வ) in fourth.

6.1.8 Variations in 'i' matra

In Tamil script, the short sound 'i' matra is denoted by a hook like symbol 'ி' and this matra symbol remains consistent across consonants (except for letter 'ṭi'(டி)) (See terminologies). But there were few letters like 'ki'(கி), 'ci'(சி) and 'ti'(தி) which had two variations of the same matra (Fig. 6.19). In first variation, the matra starts from the junction or start point of the letter. In second, the matra starts from vertical stem of the letter. These variations could be due to the writing style on palm leaf manuscript. Since manuscripts letterforms were written

with one continuous stroke, addition of matra was no exceptions. This could be observed from the letter ‘ti’(தி) where its tail was continued to form the matra. Naturally, termination of its tail at the bottom left could have forced the scriber to lift the stylus to draw the matra. Instead, the scriber continues from the left end to draw the matra either in one stroke or with minimum lift from the left corner (Fig. 6.20). The continuity of the tail had led to the matra starting from the left junction. There were exceptions to this where letters with similar tail formation like ‘na’(ந) and ‘ṟa’(ற) do not reflect such variations. This was observed only in ‘ki’(கி), ‘ci’(சி) and ‘ti’(தி) maybe because of their identical form. These variations are continued to be followed even today.

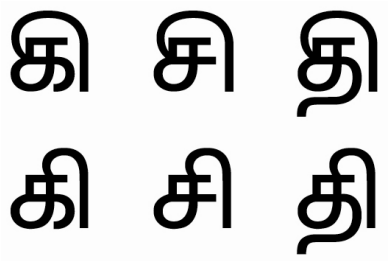


Fig. 6.19: Two ways of representing the ‘i’ matra in letters ‘ki’(கி), ‘ci’(சி) and ‘ti’(தி).

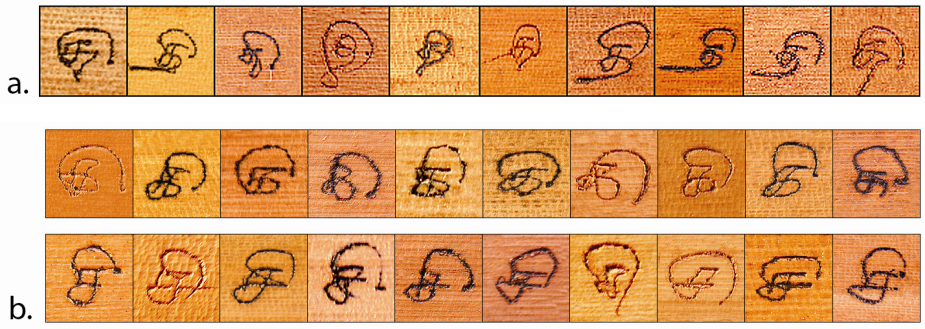
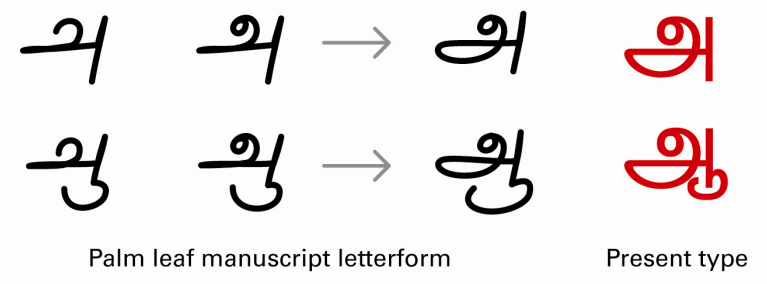


Fig. 6.20: a. Variations of letter ‘ti’(தி) as seen in palm leaf manuscripts.
b. Similar to letter ‘ti’(தி) same variation was seen in letters ‘ki’(கி) and ‘ci’(சி).

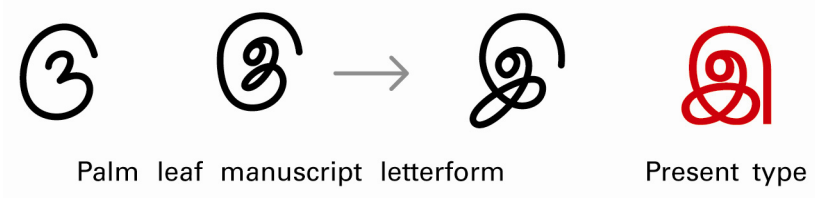
6.1.9 Conclusion

From the analysis it was observed that the writing process on palm leaf seems to have influenced the Tamil script. Through the study following conclusions were inferred:

- The continuation of clockwise circular stroke and a horizontal stroke developed a bowl (counter space).



- The intersect joint of two circular strokes written in clockwise direction developed circular loops (counter spaces) in palm leaf manuscripts.



- Similarly, clockwise vertical downward stroke when continued with a clockwise circular stroke, a circular loop was formed (counter space).

- At the start of a curvilinear stroke, *kaṇ* element emerged due to the writing process with the stylus.

- Vertical strokes written in a clockwise direction developed a small projection on the left which later become the top horizontal strokes. The continuation of top horizontal

bar to a vertical downward stroke seems to have led to the formation of *mūkku* detail (small extension of the horizontal bar).

- The tail in Tamil script seems to have developed because of the continuous action of writer while completing a clockwise circular stroke. The horizontal grains of the palm leaf medium could have further facilitated the action.

- Due to rapid writing and frequent use of certain letter combinations has led to the formation of *kūṭṭe̲luttu* (ligatures) in palm leaf manuscript.

- The variations of the short sound 'i' matra can be attributed to the method of writing on palm leaf manuscripts. This was observed only in three letters 'ki'(கி), 'ci'(சி) and 'ti'(தி).

Chapter 6

Part II:
Mechanization of handwritten letterforms

This chapter analyzes the transformation of palm leaf manuscript letterforms to early letterpress typefaces. As mentioned earlier, scholars opine that the early letterpress typefaces were an imitation of palm leaf manuscripts. The following study examines the conclusion analytically based on a research methodology. And also the analysis extends its study beyond the first two typefaces. The characteristics of individual letterforms from manuscript and typeface were visually compared to study their transformation. These transformations were mostly related to structural changes[1], first, within a letter and secondly across group of similar letters (visual group). The letterforms were chosen based on the observation of Sambandan, Tamilnadan and the letters analyzed in chapter 6. Typefaces between 1577 and 1781 were chosen for the study because typefaces after that period appear to be close to present letterform (See Chapter 7).

[1] Structural change is defined as a change in the basic outline (skeleton) of a letterform (see terminologies)

6.2.1 Vertical joint in letter ‘ña’ (ஞ)

In visual terminology the joinery in present letter ‘ña’(ஞ) is identified as an kiḷai (branch) (See terminologies) where curvilinear stroke stems out from the vertical stroke. In palm leaf manuscripts, the same joinery detail exists in two variations. Most manuscripts had a loop formation and very few manuscripts were seen with kiḷai (Fig. 6.21 a, b). The circular loop was a result of the writing process on palm leaves. As mentioned earlier in palm leaves, scribers write the letters in one continuous stroke, they hardly lift the stylus to draw different strokes. Therefore, it was natural for the scriber to draw a circular path to connect the vertical and curvilinear stroke as it was convenient and faster to write. In palm leaf, fibers run along its length hence the vertical strokes need more effort to draw. Drawing the stroke up and down could have restricted the hand movement and delayed the writing process. On the other hand circular movement smoothen the writing process. In rapid writing, loop formation could have been natural to write. The circular loop formation was not only seen in letter ‘ña’(ஞ) but also in letters such as ‘ṅa’(ங) and ‘na’(ந) which share the same joinery detail (Fig. 6.22). Interestingly, some of the early letterpress typefaces had similar variations like the manuscripts letterforms (Fig. 6.23). From comparison it was observed that the early typefaces imitated the same handwritten detail like in palm leaf manuscripts (Fig. 6.24). The letters were reflection of the handwritten process.

Fig. 6.21: a. In most of the palm leaf manuscripts, letter ‘ña’(ஞ) had a loop formation between the vertical and curvilinear stroke.
b. Very few manuscripts had kiḷai detail.

Fig. 6.22: Letters ‘ṉa’(ன) and ‘na’(ந) which has a similar joinery as letter ‘ña’(ஞ) also have the loop formation in palm leaf manuscripts.

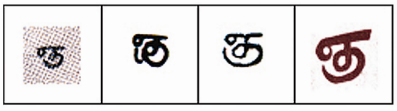


Fig. 6.23: In letter ‘ña’(ஞ), some of the early letterpress typefaces had the same loop formation like in palm leaf manuscripts.

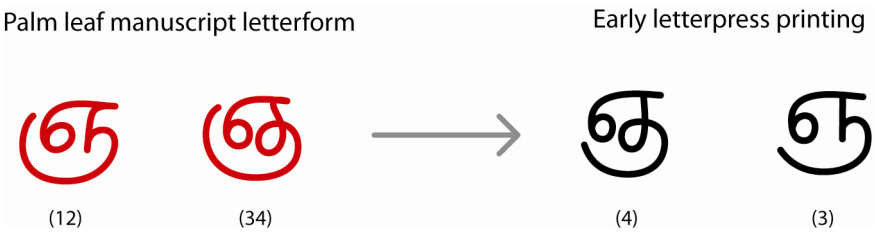


Fig. 6.24: On comparing the variations of palm leaf and early letterpress typefaces, some of the typefaces imitated the loop formation as in most manuscripts. Numbers below the letters indicate the number of occurrences of that variation in the visual chart.

6.2.2 Variations in letter ‘ṉa’(ன)

In letter ‘ṉa’(ன), the link between vertical and horizontal stroke (See terminologies) had three variations in palm leaf manuscripts (Fig. 6.25).

a. In few manuscripts, the link was seen as one continuous stroke merging the horizontal and vertical upward stroke.
b. Use of arc (semicircular stroke) to connect the vertical and horizontal stroke (as seen in present script). and
c. Formation of circular loop like in letter ‘ṉa’(ன) (See 6.2.1).

In early letterpress typefaces two variations of the above were observed (Fig. 6.26 a, b). It was during latter period the non-uniform curve got refined into geometric and distinct circular form (Fig. 6.26 c). From the visual similarity, both variations of early letterpress typefaces were an imitation of palm leaf manuscripts (Fig. 6.27).

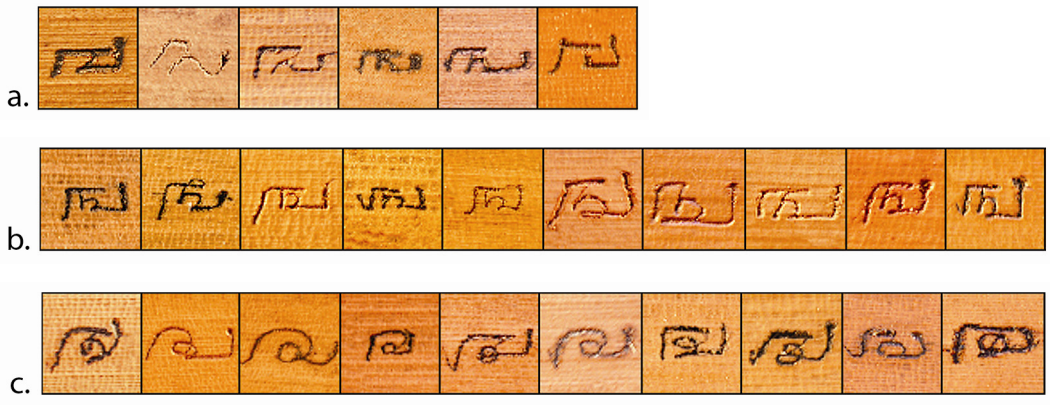


Fig. 6.25: Three different variations of letter 'ṅa'(ങ) were seen in palm leaf manuscripts.

a. The link between the vertical and horizontal stroke was missing or it continued as a single stroke.

b. The link was by a circular stroke like an arc.

c. The link appeared to be a loop.

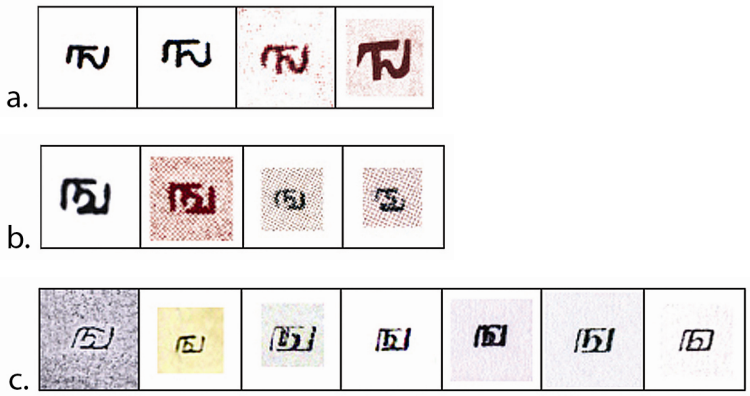


Fig. 6.26: a. In some of the early letterpress typefaces the link between the linear strokes was seen as one continuous stroke.

b. The first three typefaces resembled one of the variations of manuscript letters.

c. The same detail was observed later during the later period.

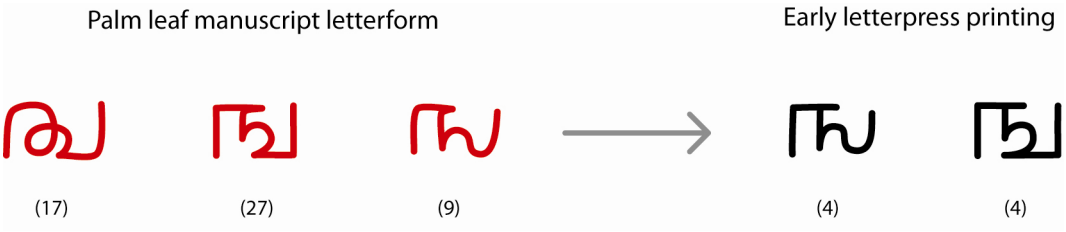


Fig. 6.27: On visual comparison it was observed that the early letterpress typefaces imitated the variations of manuscript letterforms.

6.2.3 Width of letter 'ṭa' (ட)

In palm leaf manuscripts, letter 'ṭa'(ட) was seen with different variations in width (Fig. 6.28). Such width variations were seen within a same leaf and also across leaves (within the same manuscript). The letter did not have a fixed proportion, the horizontal stroke was found in various lengths in different manuscripts. The reason for such elongation was primarily because of the physical nature of palm leaves. Since, the fibers run along the length of leaf it facilitated in scribing long horizontal lines. Unless, the scriber has a control over the writing, one tends to elongate the horizontal stroke.

Interestingly, the typeface used in the first Tamil book *Doctrina Christam* had different widths of letter 'ṭa'(ட). These can be seen in the type specimen of typefaces used in first and second printed book (Fig. 6.29). The early typeface designers notably John Gonsalves and Faria had been truthful to the palm leaf manuscript letterforms that prevailed during that time (Tamilnadan, 1995:62). Vargas, in his dissertation writes that "each character has been cast in a single type. Sometimes the same character presents different shapes when appearing more than once on the same page, suggesting that different moulds or matrices might have been used to cast the same character, or even that the types were cut directly without no moulds or matrices at all (Vargas 2007:23)." His observation suggests the presence of variation in letterforms within a single page. Such variations were only possible in manuscripts which in turn were reflected during early printing. After the first two books such variations were never seen in letterpress printing. The medium did not allow for such variations, only one design was typecast and replicated. In other words, mechanical printing had taken away the charm of rendering letters in different variation resulting in standard visual form. What was also lost in the process of standardization was the creative adaption of the letterform. There were manuscripts where the letterforms were written over the elongated stroke to accommodate the

consecutive letters (Fig. 6.30). This broke the concept of base line alignment as the letter juggled up and down. Alignment of letterforms was a norm of letterpress printing where the texts were printed on specific grid patterns perfectly aligning to vertical and horizontal axis.

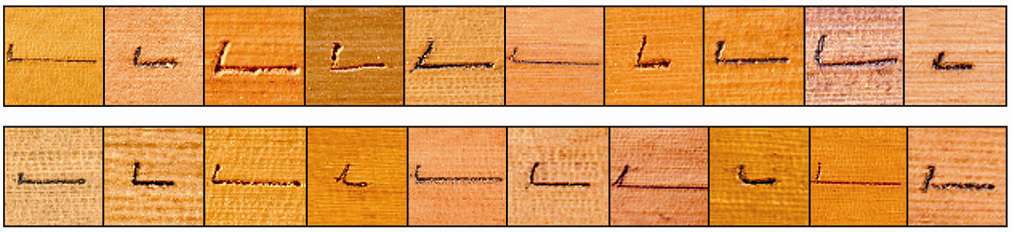
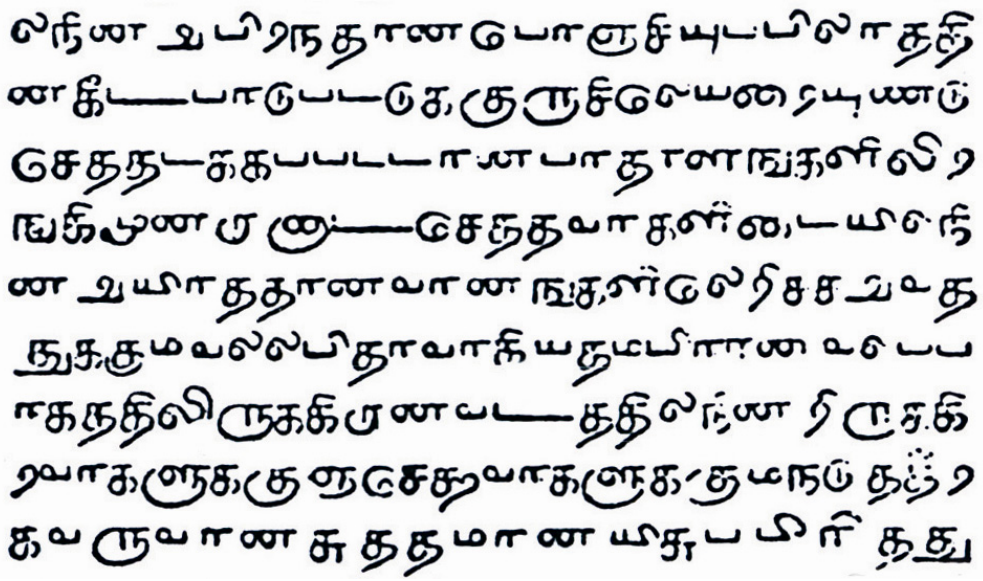


Fig. 6.28: There was no standard proportion of letter 'ṭa'(ட) its width varies from one palm leaf manuscript to other.

a.



b.

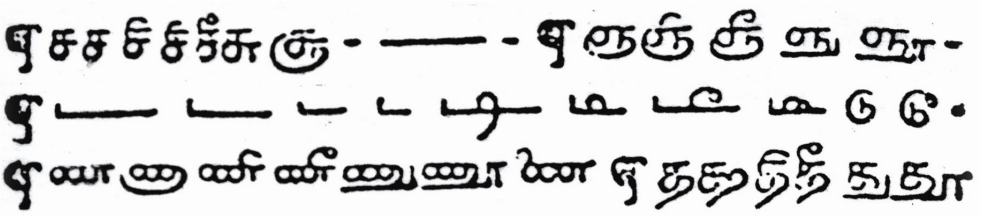


Fig. 6.29: a. In the first printed book '*Doctrina Christam'* three variations of letter 'ṭa'(ட) was present like in palm leaf manuscript.

b. A part of the type specimen page of the second printed book which shows the four variations of letter 'ṭa'(ட) used in the book.

Fig. 6.30: In few manuscripts the width variations of letter ‘ṭa’(ட) were effectively adopted by the scriber to save space and combine letters like in above example.

6.2.4 Variations of ‘e’ karam symbol (ெ)

The symbol of short sound ‘e’ karam (ெ) has undergone quite a few transformations during the shift from handwritten form to letterpress typeface. In manuscripts, terminal of the letterform never touched the baseline and sometimes it was curved in. The symbol did not have a fixed form and were seen tilted to an angle like letter ‘la’(ல). And also the symbol had a big counter space within which some were closed and some were open (Fig. 6.31 a). In comparison with the early letterpress typefaces similar variations of palm leaf manuscripts were found (Fig. 6.31 b). The symbol’s inconsistent visual form in both mediums ascertains the influence of palm leaves over letterpress typefaces.

In general, the addition of ‘ē’ karam symbol (ே) was attributed to C. J. Beschi, European Tamil scholar (See Chapter 4). Scholars opine that Beschi introduced a small loop at the top of ‘e’ karam symbol (ெ) and created another symbol for ‘ē’ karam (ே). By introduction of another symbol Beschi differentiated the long and short sound ‘e’ karam. But from palm leaves it appears that ‘ē’ karam symbol (ே) was an extension of the ‘e’ karam symbol (ெ) (Fig. 6.32). The writing process on palm leaves seems to have provided the cue for such extension. In some manuscripts, the long sound symbol observed to be a continuation of short sound symbol. Therefore, Beschi was likely to have adapted the manuscript letterform. Since, the documented manuscripts were undated it was difficult to stipulate its

origin to before Beschi's introduction. Nevertheless both possibilities appear to have coexisted during that time. The short and long sound 'e' karam symbols became distinct and transformed during the modern typefaces (Fig. 6.33).

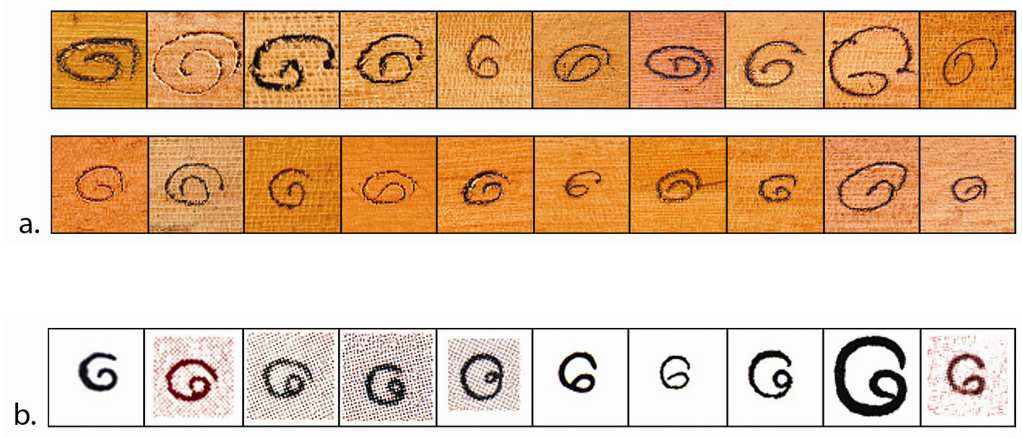


Fig. 6.31: a. The 'e' karam symbol (ெ) in palm leaf manuscript had various forms
b. In early letterpress typefaces 'e' karam symbol (ெ) had irregular visual form and were inconsistent like the manuscript letterforms.

Fig. 6.32: In palm leaf manuscripts, the 'ē' karam symbol (ே) appeared to be an extension of 'e' karam symbol (ெ).

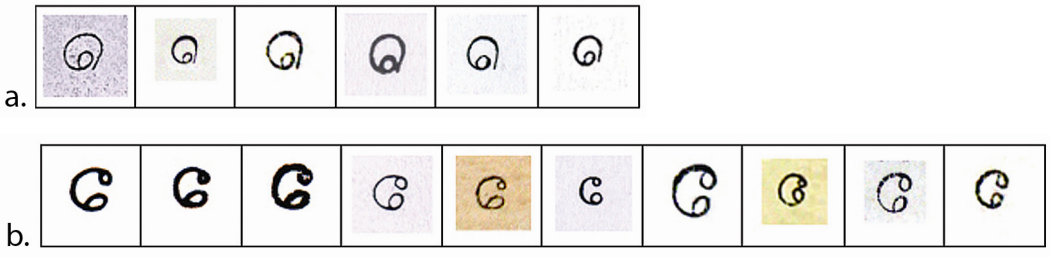


Fig. 6.33: Both 'e' karam symbol (ெ) (a) and 'ē' karam symbol (ே) (b) become standard during the later period.

6.2.5 Variations of letter 'ra' (ഩ)

In some palm leaf manuscripts, letter 'ra'(ഩ) had only one counter space as compared to the present form (Fig. 6.34 a). Similar variation of single counter space letter 'ra'(ഩ) was observed in the early letterpress typefaces (Fig. 6.34 b). The same was also inferred by authors Sambandan and Tamilnadan (See Chapter 4). To be specific the variation was found only in the first three printed books and not in the later typefaces (Fig. 6.35). Another peculiar feature was that the apex of first counter space was pointed in the early typefaces (Fig. 6.36).

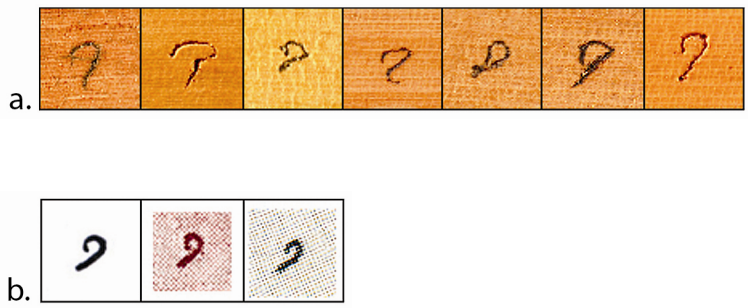


Fig. 6.34: a. In few palm leaf manuscripts letter 'ra'(ഩ) had only one counter space.
b. Similarly in earliest typefaces the letter was seen with single counter space.

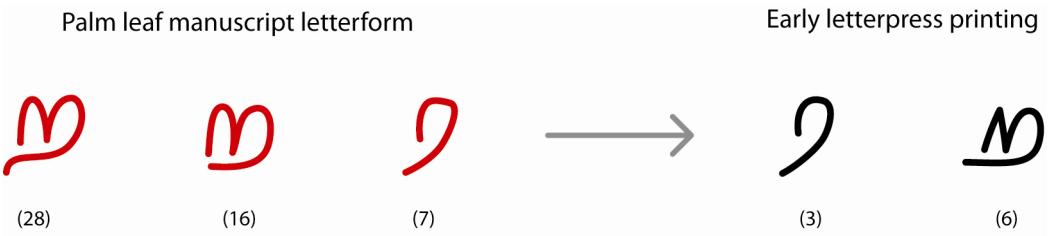


Fig. 6.35: Above is a visual comparison of the letterform in both medium. Only the first three typefaces show a similarity of the manuscript letterform.

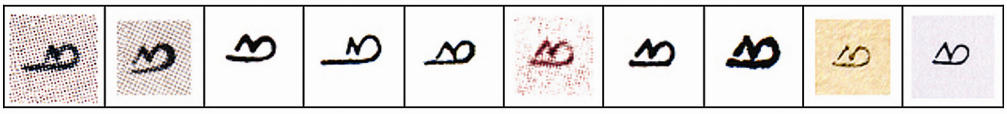


Fig. 6.36: In the latter half of early printing, apex of the first counter space in letter 'ra'(ഩ) was pointed. This detail continued during the later period.

6.2.6 Orientation of letter 'la' (ல)

In palm leaf manuscripts and stone inscriptions, letter 'la'(ல) sits on an imaginary baseline (Fig. 6.37 a). But in some palm leaf manuscripts the orientation of letterform was seen rotated at an angle (Fig. 6.37 b). These angular letterforms could have been exceptions, reflecting particular style of a scriber. The rotated form was also observed in early letterpress typefaces that too only in the first three printed books (Fig. 6.37 c). In later typefaces, the letter was placed on the baseline like in most palm leaf manuscripts (Fig. 6.37 d).

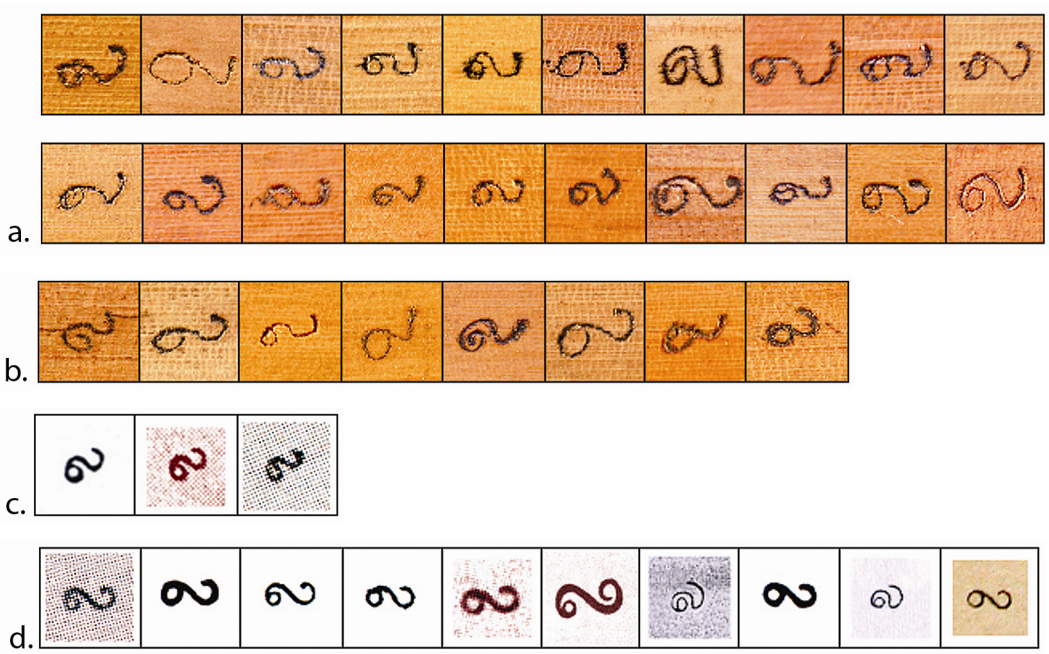


Fig. 6.37: a. In most of the palm leaf manuscripts letter 'la'(ல) sits on a baseline.
b. In some of manuscripts the orientation of letter was rotated.
c. The same rotated letterform in few palm leaf manuscript was seen imitated in the early typeface.
d. During the later phases of printing the letter was placed on the baseline.

6.2.7 Kaṇ

In palm leaf manuscripts, letterforms with enclosed space kaṇ show different variations (See 6.1.4). The kaṇ element was either open or closed, small or big and in some they were even absent (Fig. 6.38). The early letterpress typefaces had numerous variations as in palm leaf manuscripts (Fig. 6.39). This showed that the letters were directly adopted from palm leaves. It was during in the later period of printing the counter space became uniform and consistent.

Fig. 6.38: Image shows the different variation of kaṇ in palm leaf manuscripts. The bottom row in grey is in present letterform.

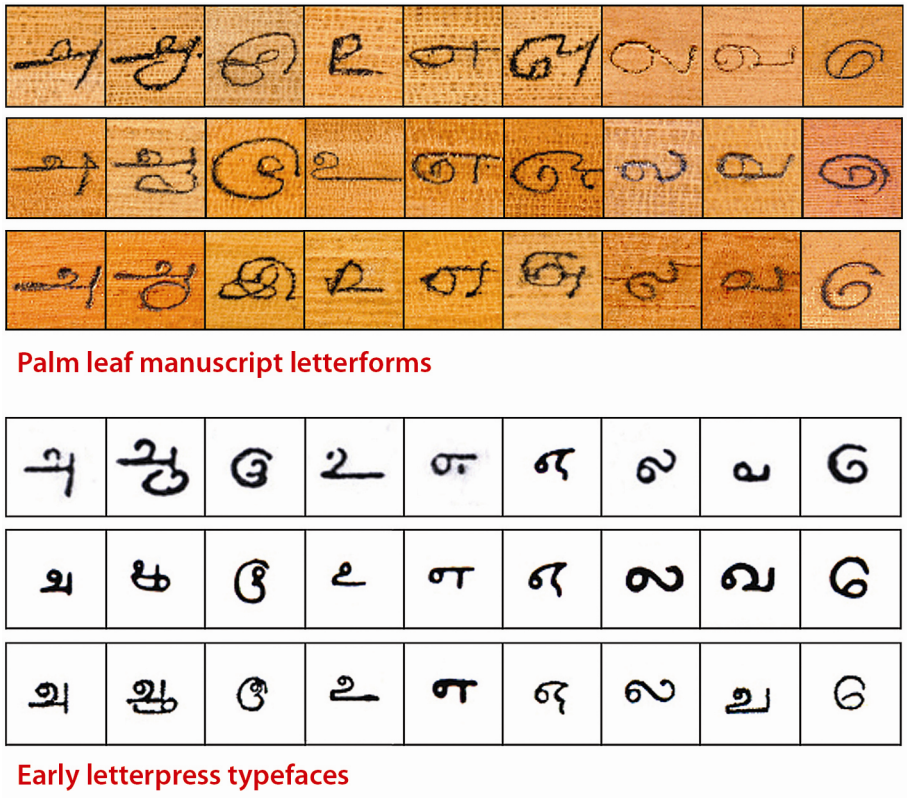


Fig. 6.39: The above visual chart shows the comparison of kaṇ between palm leaf manuscripts and early letterpress typefaces. Early letterpress typefaces had irregular counter space eye like in hand written palm leaf manuscripts.

6.2.8 Formation of letter ‘i’ (இ)

Traditional vowel ‘i’(இ) had a different visual form compared to the present script (See 6.1.3). In palm leaves different forms of the vowel were seen with subtle variations. However, those variations can be broadly grouped into two one with counter and other without counter. From the available print examples, there weren’t any variations of the vowel found in early typefaces (Fig. 6.40). On comparing the variations of vowels between both mediums (palm leaf and early letterpress) it was observed that early letterpress typefaces faithfully reproduced the same letterform as in palm leaf manuscripts (Fig. 6.41). It was during the later period the vowel form transformed into present form.

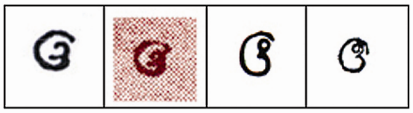


Fig. 6.40: The vowel ‘i’(இ) did not have any counter spaces in early letterpress typefaces and there weren’t any variation in the form either.

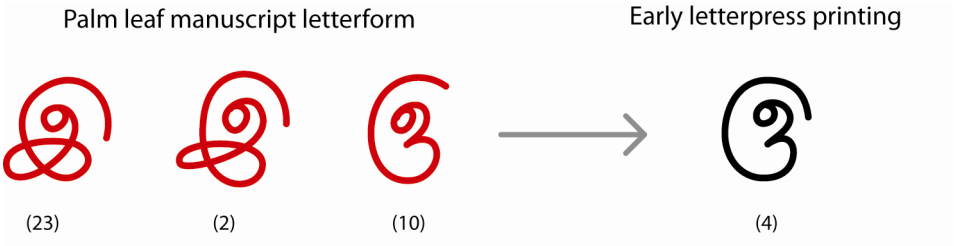


Fig. 6.41: Visual comparison of the vowel in both medium indicates the similarity of early typeface with one of the manuscript letterform.

6.2.9 Bowl of vowels ‘a’(அ) and ‘ā’(ஆ)

The bowl characteristics of vowels ‘a’(அ) and ‘ā’(ஆ) in palm leaves has been discussed in the first part of this chapter. In palm leaf manuscript, vowels ‘a’(அ) and ‘ā’(ஆ) have two variations of written form (See 6.1.1). The variation without bowl was commonly observed in palm leaf than the letters with counter space bowl. In early printing, there weren’t any variations of the vowels (Fig. 6.42). However, in comparison with palm leaves, the early letterpress typefaces resembled the manuscripts letterforms. The traditional handwritten form of the vowels has been imitated during early printing (Fig. 6.43). The counter space bowl was

observed only from the later printing (Fig. 6.44). As printing progressed the bowl element was standardized and became a prominent feature. In fact, the addition of bowl had drastically transformed the proportion of the letter. In long sound vowel 'ā'(ஆ), proportion of the lower hook form (which was free flowing in manuscripts) got transformed to smaller size in printing.

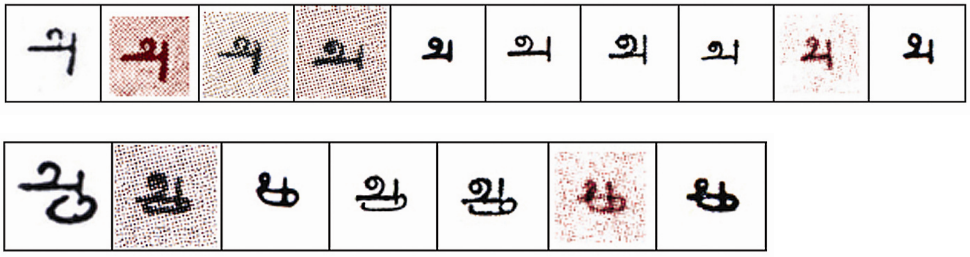


Fig. 6.42: There were no variations of the vowels 'a'(அ) and 'ā'(ஆ) found in early letterpress typefaces. The types were similar to manuscript letterforms without the bowl.

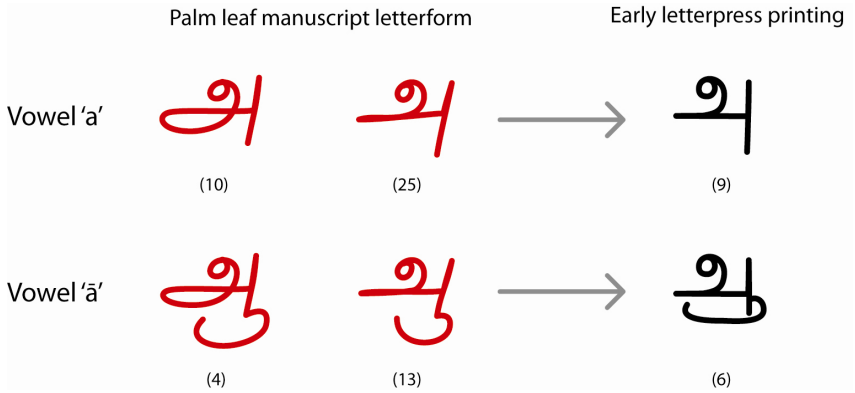


Fig. 6.43: On visual comparison of the variation between both reveal that the early letterpress typeface were an imitation of palm leaf manuscript letterform.

Fig. 6.44: The vowels 'a'(அ) and 'ā'(ஆ) attained the bowl element during later period.

6.2.10 Lower bowl of ‘u’ matra in letters ‘tu’(து) and ‘ṉu’(னு)

In palm leaf manuscripts, there were two variations of ‘u’ matra, one with the lower bowl and other without the bowl (See Chapter 6, Part I). From the visual chart of early typefaces there wasn’t any variations seen in the ‘u’ matra (Fig. 6.45). On visually comparing both the mediums it was found that the early typefaces were same as the manuscript letterforms. Both the variations of palm leaves and early typefaces did not have a lower bowl. It appears that early typefaces had copied the manuscripts letterform. Similar to letter ‘tu’(து) another letter ‘ṉu’(னு) was chosen from the same visual group. And then the manuscripts variation of letter ‘ṉu’(னு) was compared with the early typefaces. Like letter ‘tu’(து), the early typefaces imitated letter ‘ṉu’(னு) just the way it was on palm leaf manuscripts (Fig. 6.46). Over time the characteristics of ‘u’ matra changed and new typefaces began to have lower bowl. This addition of bowl could be observed in the later period (Fig. 6.47).

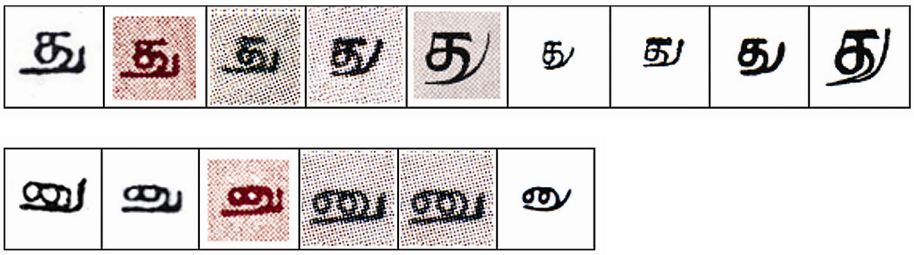


Fig. 6.45: Letter ‘tu’(து) and ‘ṉu’(னு) in early letterpress typefaces did not have a lower bowl and were an exact imitation of manuscript letterforms.

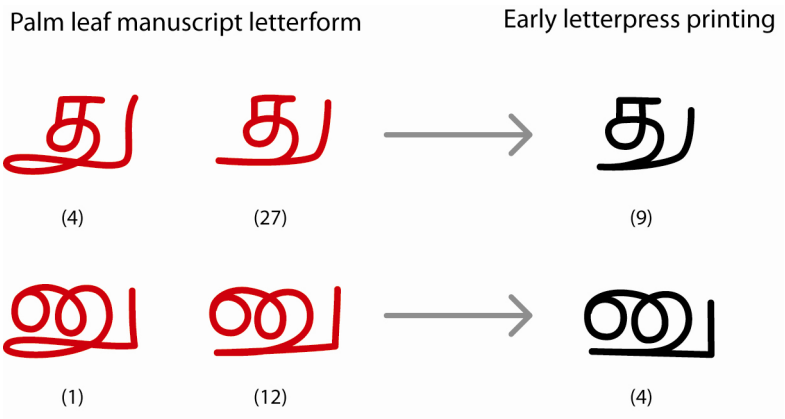


Fig. 6.46: Visual comparison of letters ‘tu’(து) and ‘nu’(னு shows that early letterpress typefaces imitated one of the variation from palm leaves.

Fig. 6.47: The lower bowl of ‘u’ matra began to emerge during the later period.

6.2.11 Conclusion

The transformation of palm leaf manuscript letterforms to early letterpress typefaces were established through the visual comparison of both mediums. From the observations it was evident that the early typefaces were an imitation of palm leaf manuscript letterforms. The influence continued till the late eighteenth century and gradually reduced during the early nineteenth century. Following were findings observed from the visual analysis.

- In most manuscripts, different joinery detail (loop formation) existed in letter ‘ña’(ஞ). This was also observed in some of the early letterpress typefaces.
- The link of letter ‘ṅa’(ங) had several variations in manuscripts, two of which were reflected in the early typefaces.
- In palm leaves, letter ‘ṭa’(ட) did not have a fixed proportion, the same was followed in the first printed books. But soon this variation was standardized to a single letter width depending on the type design and style.
- Short sound ‘e’ karam ligature symbol (ெ) was similar in palm leaf manuscripts and early typefaces. During the process of printing both the symbols got standardized and refined to the present form.
- The letter ‘ṟa’(ற) had a single counter space in some palm leaf manuscripts which were seen imitated in the early typefaces. Later, these forms disappeared and letters with two counter spaces were observed.
- In the early letterpress typefaces, letter ‘la’(ல) was seen rotated at angle. The orientation has been copied from the manuscripts letterforms which had similar angular orientation.

- The kaṇ – a small enclosed space at the start of certain letters, has several variations in palm leaves. The same variations were observed in similar letters in early typefaces.
- The present short sound vowel ‘i’(இ) was seen without counter spaces in palm leaves. The same letterforms had been imitated in the early typefaces.
- In palm leaf manuscripts, lower bowl was absent in vowels ‘a’(அ) and ‘ā’(ஆ). The same was observed in early letterpress typefaces. Over time, the bowl element got added to the vowels.
- In most of the palm leaf manuscripts the lower bowl in the ‘u’ matra was absent. The same was also imitated during the early letterpress typefaces.

Chapter 7

Development of Tamil typefaces in perspective

Tamil typefaces have a very long history but there is very little literature available on the subject. Fr. Schurhammer, G. M. Cottrell, John Murdoch, Sambandan, Tamilnadan and B. S. Kesavan were few scholars who had studied the early Tamil typefaces (See Chapter 4). Their research were limited to the earliest typefaces namely the first two typefaces printed in Goa and Quilon. And also their studies were based on general observations and were more descriptive than analytical. However, their valuable contribution had laid the foundation for Tamil typography and further study. In addition to their research, a detailed study of the early Tamil typefaces has been covered in this chapter. The discussions were based on the available literature, discussions from chapter 6 and visual documentation of early printed books. The present study covers the period from its earliest typeface to middle of nineteenth century where the Tamil typefaces became more or less standardized.

7.1 The early typefaces

The earliest Tamil types were hand cut by John Gonsalves and was used for printing the initial Tamil book '*Doctrina Christam'* in 1577 (Priolkar 1958:9). Gonsalves did not cast the types all by his own; there was a local convert who helped him in achieving the right design.

Pero Luis, first Brahmin of the Jesuit society, assisted Henrique in translating and casting Tamil fonts in Tamil (Sambandan 1997:57). Blackburn cites,

> Pero Luis, first Brahmin covert, worked with Gonsalves for two years at Goa in order to prepare the fonts used in the 1577 catechism, but they managed to cast only fifty characters. Following that printing, Pero Luis went down to Quilon, where he worked with father Joao de Faria, and together they added more letters but were still unable to produce a full set. They are presumably the 'learned Tamils' who were acknowledged in the preface to the 1579 catechism as having helped Henrique Henriques to perfect the orthography and fonts used in it (Blackburn 2005:38, 39).

The type used at Quilon in 1578 was cut by Father Joao de Faria, a companion of Gonsalves. This is mentioned in the last page of second printed book alongside the specimen copy of the types used in Goa and Quilon (Fig. 7.1). Father Schurhammer and Cottrell, who examined the print, state that first eight lines of the specimen were prepared in Goa in 1577 and those used in the subsequent lines, were prepared in Quilon in 1578 (George & Cottrell 1952:148). Limited number of characters in Goa type would have led to the creation of new types by father Joao de Faria. Few scholars state that Quilon types were an improved version of Goa typeface or have subtle differences. On visual analysis, both the typefaces appear to be different. Fernando de Mello Vargas, in his study of the specimen remarks that, "it is possible to notice that the characters from the later type (Quilon type) look more even in proportions and alignments compared to the older one (Goa type), but analysis of the original page would be necessary to make an appropriate comparison (Vargas 2007:23)." As observed by Tamilnadan, some of the differences between Goa and Quilon typeface were:

- The Goa types are slightly bigger, curvy and wide whereas Quilon types are smaller, condensed with less number of curves.
- In Goa types, instead of long sound 'ī'(ஈ), short sound 'i'(இ) is used with a loop at the terminal of the letter (Fig. 7.2 a).
- Letter 'ra'(ர) doesn't have a slope in Quilon types whereas in Goa types there is a slight projection below the baseline (Tamilnadan 1995:60, 61).

In addition to Tamilnadan's observations there were quite few other differences in both the typefaces such as,

- In letter 'ña'(ஞ) the link between the vertical and horizontal stroke was different in Goa and Quilon type.

- Letter ‘ña’(ஞ) has a different joinery detail. In Goa type, the vertical and curvilinear stroke is connected with a loop formation and in Quilon it has an intersection joint.
- Tail of letter ‘na’(ந) in Goa type is elongated whereas in Quilon it is short.
- Orientation of letter ‘l’(ல) appears to be different. In Quilon type it is angular and in Goa the letter sits on the baseline.
- In Goa type, long sound ligature ‘ṟa’(ற) has two counter spaces whereas in Quilon it has only one. The Quilon letterform seems to be an extension of letter ‘ra’(ர).
- Ligatures ‘ṇa’(ண) has different tail formation in both types.
- Ligatures in both the typefaces completely vary in visual form (Fig. 7.2 b).

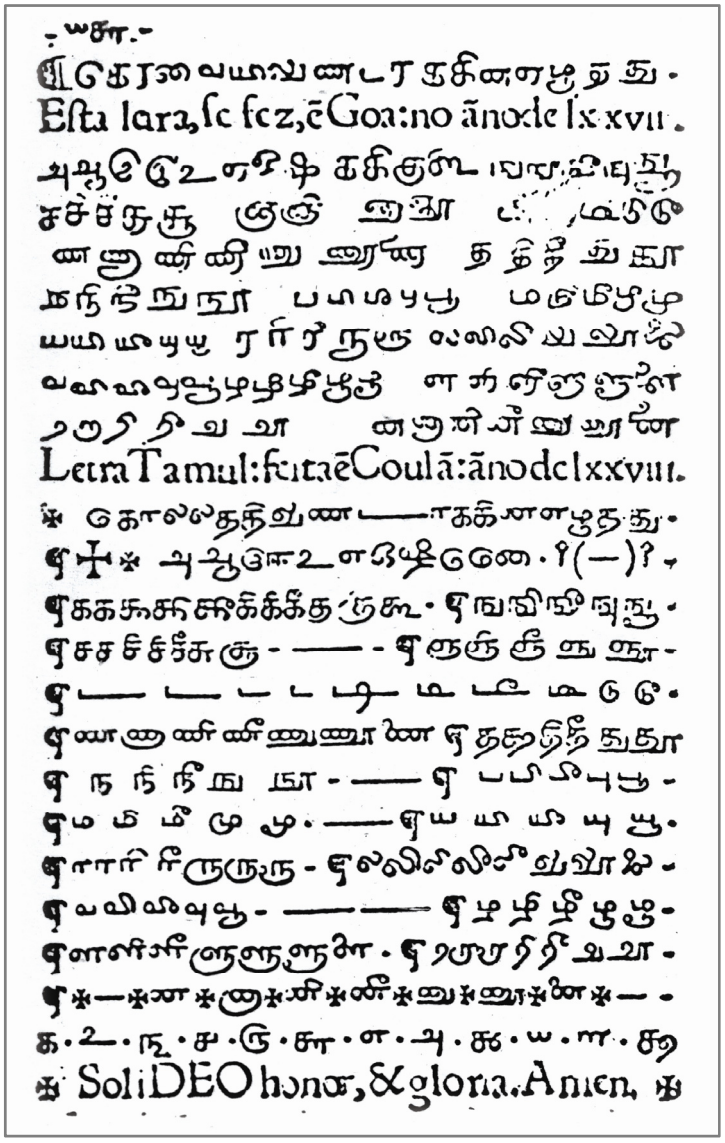


Fig. 7.1: Type specimen of Goa and Quilon typeface.

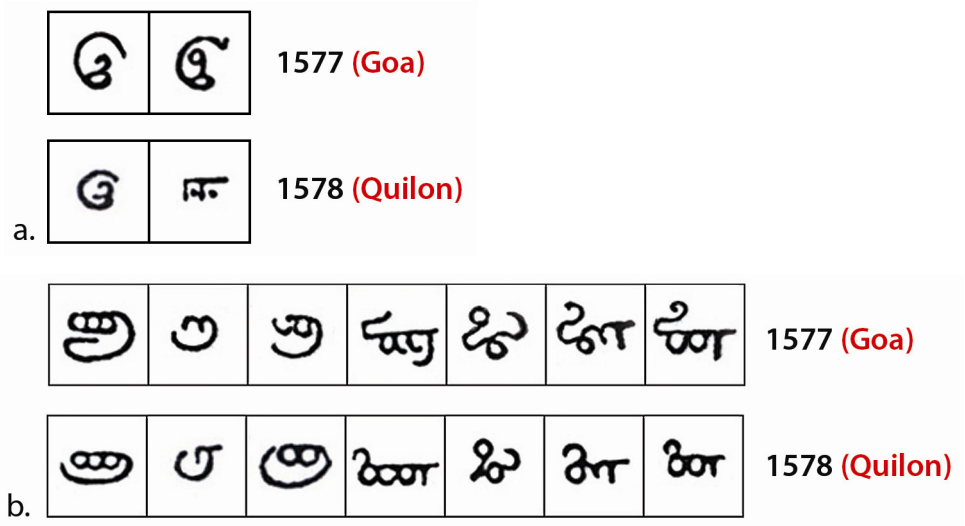


Fig. 7.2: a. In Goa typeface, vowel 'ī'(ஈ) is same as the vowel 'i'(இ) with a loop at the terminal but in Quilon, the vowels are distinct.

b. Ligatures are different in Goa and Quilon typeface.

From the above differences we can infer that the types used in both places were not just an improvisation but different. Father Joao de Faria would have referred to some more palm leaf manuscripts to cut his type. Quilon types had more variations than the Goa types such variations could be possible only if various sources were referred. Inclusions of more ligatures in Quilon types add to the possibility that these were based on a different source. Therefore, in addition to scholars viewpoint, the letters used in Goa and Quilon appear to be two different types perhaps based on two different sources of palm leaf manuscripts. Father Faria did not improvise the Goa types rather cast a completely different type. It is possible that he took reference from Gonsalves design. In terms of design, both the typefaces were non-uniform and disproportionate. And some of the letters appear to be horizontally compressed and have a lesser '⊔' (pa) height.[1] According to Diehl, the crudeness in early types was due to the imitation of palm leaf manuscripts. This was because the early type cutters did not have any reference for the letterforms other than palm leaf manuscripts. She states, "The first type cutters had nothing to guide them except specimens of calligraphy which may not have been perfect as to the form of all the letters."[2]

[1] '⊔' (pa) height is a new Tamil term which is equivalent to 'x' height in Roman script.

[2] Cited from the source, Vargas, Fernando de Mello (2007), *Evolution of Tamil typeface, Origins and development,* Reading: University of Reading, Pg 23

7.2 Quilon typeface

The books printed after 1578 seems to have used father Faria's types. The Quilon types could have been taken to Cochin press where the third and fourth book was printed. According to Blackburn, three different types were used to print at three locations namely Goa, Quilon and Cochin (Blackburn 2005:34). But Tamilnadan differs by stating, the same Quilon type was used to print the third catechism at Cochin (Tamilnadan 1995:63). Kesavan adds that the '*Confessionary*' was the third work to be printed with Faria's Tamil typeface. From visual study it could be observed that the types used in Quilon and Cochin were the same (Fig. 7.3). Notably even after six years, the same types have been adapted for the fifth book at Punicle in 1586. Tamilnadan confirms, '*Flos Sanctrum'* was printed using Joao de Faria's Quilon types at Punicle (Tamilnadan 1995:79). Father Faria's types have been in use for almost a decade at different places. Extensive use of the typeface at different venues indicates the possibility of more works being printed. It also raises doubts whether the design was replicated or the same types were used. Since, father Joao de Faria's typeface had all the required characters including Tamil numerals and variations it could have continued to be used.

In the latter half of early printing, the types used at Ambalakad were different and were designed by a native Indian named Ignacio Aichamoni. Xavier S. Thani Nayagam who discovered a copy of the dictionary at Vatican library in 1954 describes that Tamil and Portuguese types used in the dictionary resembled the seventeenth century orthography and were similar to the books printed hundred years before. He further comments,

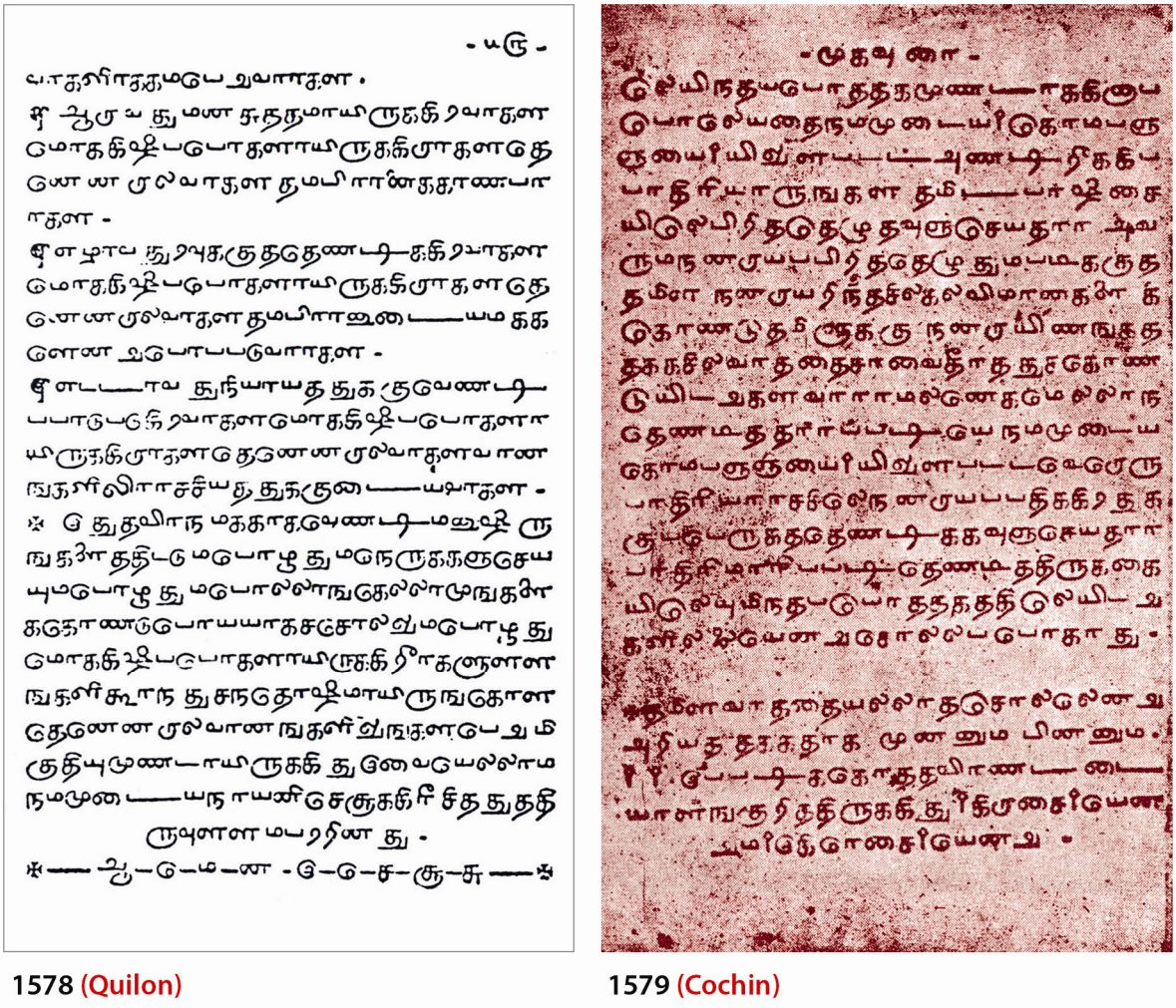
> As a sample of early Tamil Typography this dictionary is inferior to the Flos Sanctorum of 1584. The type is not as clear and the quality of the paper gives it a smudgy appearance; the paper is very transparent. The Tamil portions were engraved on wooden blocks while the Portuguese was printed in movable type. The wooden blocks got worn out by use. The printer was a native Indian, Ignacio Aichomoni. The press is called the Tamil press of the Province of Malabar (Nayagam 1966:9).

On examination of the reprint reveals that the Tamil typeface used were of poor quality (Fig. 7.4). Blackburn quotes Katherine Diehl that there was no improvement in printing after hundred years and good Tamil fonts were in short supply (Blackburn 2005:43). As mentioned by Thani Nayagam, this could have been due to the use of wooden types as compared metal types, which wore out in the process of printing (Thani Nayagam, 1969:10). Apart from the

typefaces made in India, there are two mentions of Tamil types cast and printed abroad. A copy of which are unavailable for study. They are:

1. Rev. John Murdoch's *Classified Catalogue of Tamil printed books*, "The first Tamil types seems to have been cut and cast at Amsterdam in 1678 to express the names of some plants in the large work, *Horti – Indici Malabaric*." And

2. E. Arno Lehmann's book, '*It began at Tranquebar*', "The very first Tamil printing was done by a protestant about 1671 in Europe by John Borstius in Rotterdam."



1578 (Quilon) 1579 (Cochin)

Fig. 7.3: The third catechism, *'Doctrina Christam'* printed at Cochin used the same typeface that were used in Quilon press. *(Image source: Accum Patippum)*

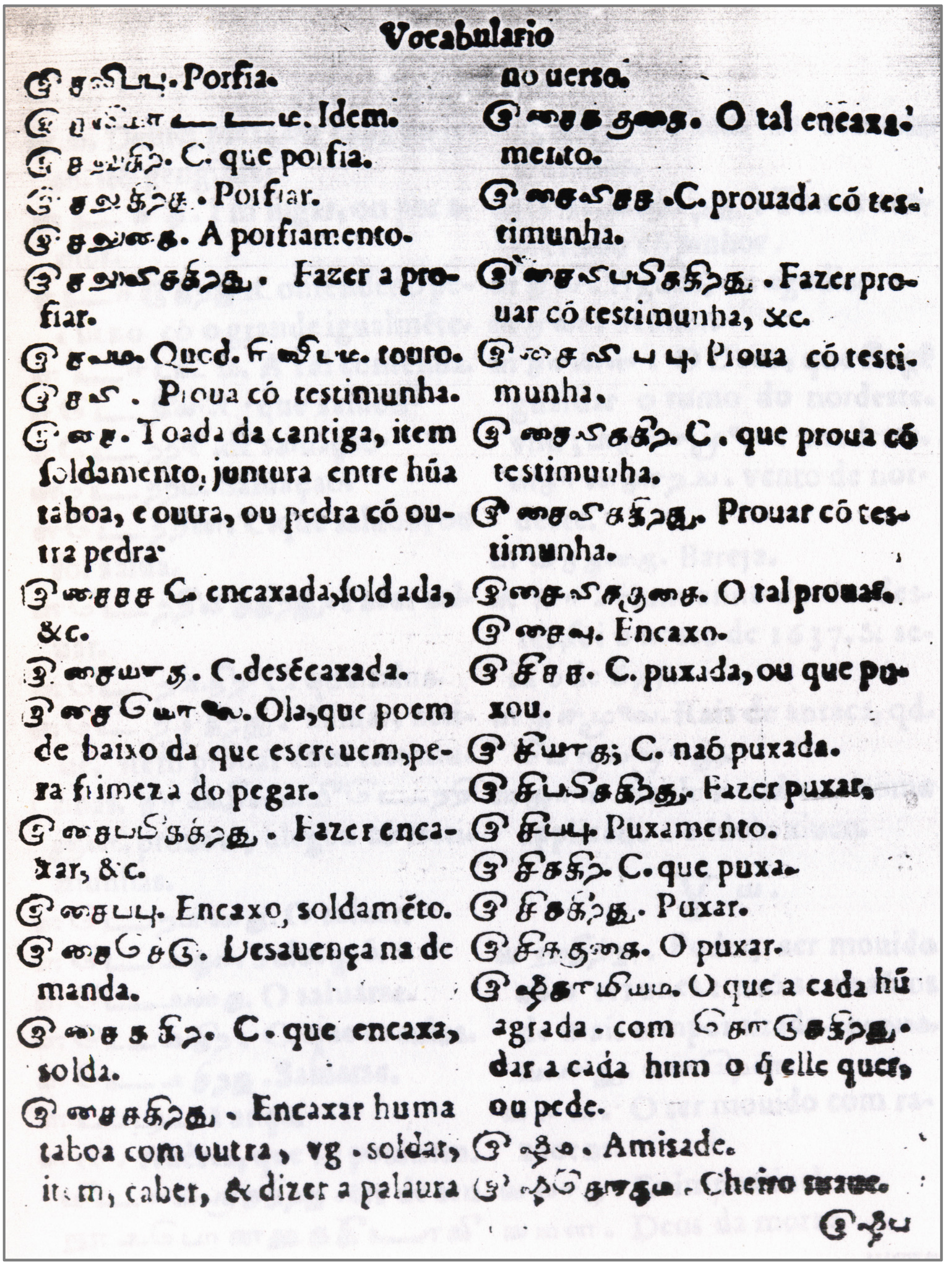


Fig. 7.4: A page from Proenca's Tamil Portuguese dictionary, the Tamil typeface used appeared to be of inferior quality. The wooden types may have got worn out during the printing process which produced illegible and smudgy letterforms.

7.3 Halle typeface

After the Ambalakad press, there was a long gap in Tamil printing. The next Tamil typeface was observed during the second phase of Tamil printing at Tranquebar. In need of Tamil typeface, Ziegenbalg sent hand written samples of Tamil script to Halle to be metal cast and sent back to Tranquebar press (Gnanadurai 2006:97) (Sambandan 1997:71). The Halle

typeface was used to print the first Tamil book by Ziegenbalg, '*The Four Evangelists and Acts of the Apostles'* in 1714. In terms of design, Halle typeface was square, big and crude in execution, but they possessed clarity. They resembled the letterforms in palm leaf manuscripts of those days (Kesavan 1985:46). Their designs were more refined than the early typefaces at Goa and Quilon. The horizontal compression found in the earlier types was not seen in the Halle typeface, the 'ப' (pa) height was fairly large. Vargas comments,

> "In comparison to the early Tamil types, the type cut at Halle seems to be more even regarding stem widths and proportions. However, it looks even more extended than those from Goa and Quilon, and has smaller ascenders and descenders, which make it, look vertically compressed. Different forms for the same character can also be frequently found, suggesting again that different moulds or no moulds at all were used in casting them (Vargas 2007:25)."

A notable typography in *'Act of Apostles'* was the use of different sizes of typeface. The book was printed in three different type sizes which varied considerably from the typefaces of early printing (Fig. 7.5). The type used in the headline clearly distinguishes itself from the other types not only from size aspect but also in design. It was the first typeface where serifs were seen added to the type. This subtle wedge serif was never seen in the later print works. Though a similar headline type was seen in the New Testament printed in 1723, the serif happens to be missing (Fig. 7.6). And also for the first time in the history of Tamil typography, varying stroke typeface was seen in Tamil script (See 7.7.1). Letters ṅa (ங), va (வ) and ligatures have a peculiar corner detail in Tranquebar types, which were not seen in other typefaces.

The Halle typeface was used for the first part of '*The New Testament'* translated by Ziegenbalg. The same typeface was also found in Ziegenbalg's *'Grammatica Dramulica'* printed in Halle in 1716. Since Ziegenbalg did favor the Halle types as they were big and consumed paper, he was keen to cast typeface within the state. Ziegenbalg's zeal and enthusiasm led to the establishment of first type foundry and paper mill in India (See Chapter 4). Johann Gottlieb Adler, a printer at Tranquebar press, cast a new and smaller Tamil type which was the first output of the type foundry. The typefaces could have been based on the Halle typeface as it resembled the latter. The typeface appears to be used to print the first Bible in 1723 and the later works at Tranquebar.

The typeface used in the book *'Ngyana Mandri Selva pungavam'* printed at Germany appears to be same as the typeface used in '*The New Testament'* by Ziegenbalg at Tranquebar (Fig. 7.7). Similarly, Tranquebar typeface and the typeface used for Fabricius's *'English and Malabar dictionary'* at Vepery resembled the same (Fig. 7.8). Extension of the Protestant missionary activities (with its press) from Tranquebar to Madras would have rendered the possibility of using the same typeface at Vepery press (SPCK press). Kesavan elucidates that Tamil typeface of Vepery press had much in common with those of the Tranquebar and Colombo press. He further accounts, "The Vepery missionaries then acquired their own press for Tamil printing and a printer Thomas from Tranquebar; the first item produced being a small catechism by Fabricius in 1766 using type from Halle. In 1772 the first important Tamil work was completed, Fabricius revised version of the Malabar New Testament (Kesavan 1985:62, 63)." This ascertains that the types used during the early stages of Vepery press were same as the Tranquebar press.

Fig. 7.5: Three different fonts were used in *'The Four Evangelists and Acts of Apostles'* which was printed at Tranquebar in 1714.

Fig. 7.6: The headline typeface used in the first printed book at Tranquebar had a serif detail. It was also the first varying stroke thickness font in Tamil. The serif was not to seen in later works but similar varying stroke thickness typeface was seen in 1723.

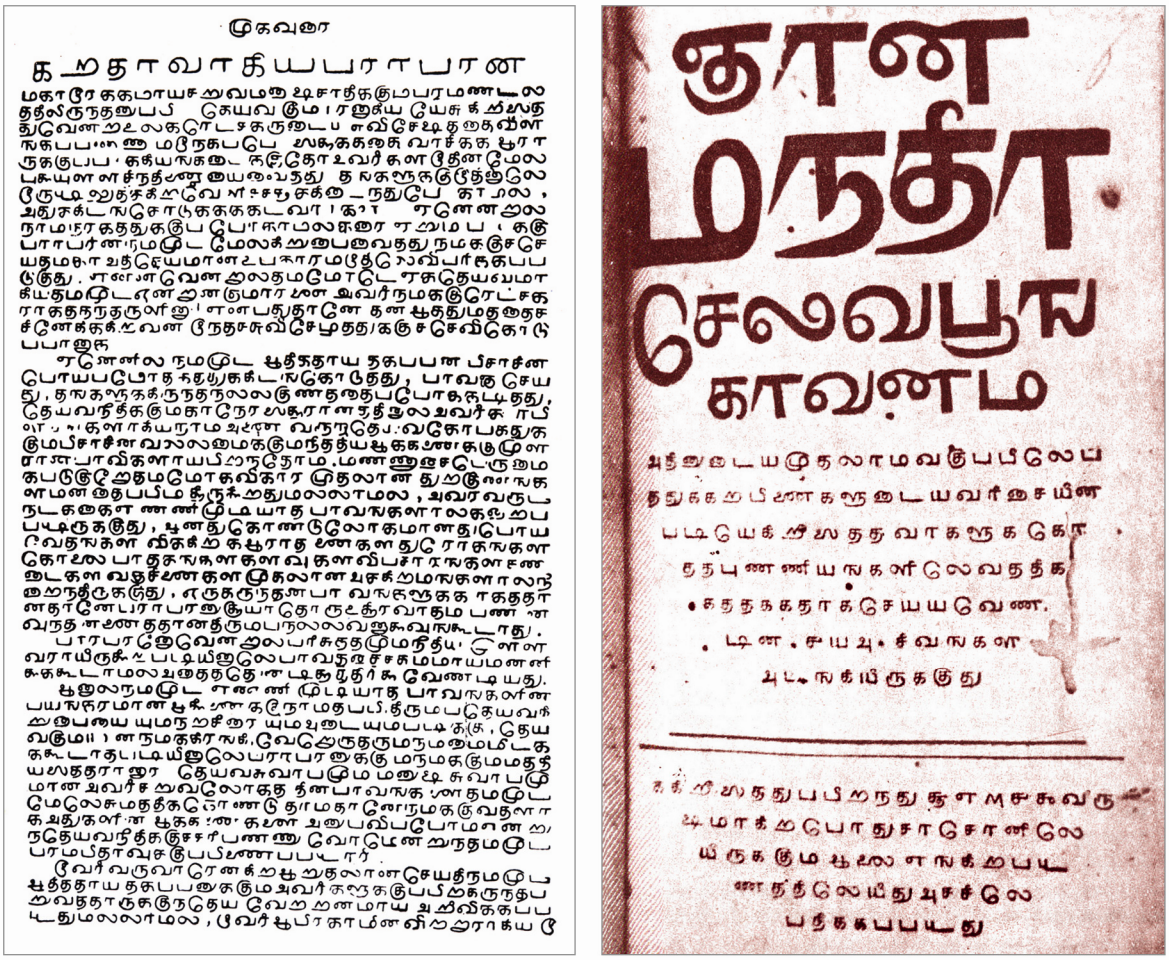


Fig. 7.7: Typefaces used in 1714's *'The New Testament'*, Tranquebar and 1749's *'Nygana Mandri Selva Pongavam'*, were the same.

Fig. 7.8: Fonts used at early phase of Vepery press resembled the Tranquebar font used in *'The Four Evangelists and Acts of Apostles'* in 1714.

The long sound ligature symbol (ெ) was seen for the first time in Tamil printing. Introduction of this symbol is attributed to Beschi, a Catholic missionary (see chapter 4). It was known that the Protestant missionaries who controlled the Tranquebar press were not on good terms with the Catholic missionaries. This was especially with Beschi where the Protestants never got along well. In fact the rise of Protestant printing was because of the difference between Beschi and the missionaries (Blackburn 2005:56). Therefore, evidence of the symbol (ெ) at Tranquebar printing raises the question of its origin. Though Beschi had written many books only one of his books was printed during his lifetime mainly because the Jesuits had no printing press during his time. Only later, his works became popular amongst many and got printed during the early nineteenth century (Ibid 45). Therefore the question of his script reformation to appear on print is doubtful. However, there are possibilities that his introduction of the symbol could have existed in palm leaf manuscripts.

7.4 The foremost radical typeface

The typeface used in the '*Rituale Trangambaricum'* at Tranquebar in 1781 closely resembled the present typefaces (Fig. 7.9). The type design differed drastically from the other typefaces which existed during that period. The typeface appears to be a forerunner of the present typefaces. All the other typefaces exactly imitated the palm leaf manuscripts whereas this type slightly varied. The design lacked human quality (handwritten) and appeared to have been constructed. It was a transition of a hand written form to mechanical type casting form. This can be understood from the following description:

- This was the first Tamil typeface to be seen inclined towards right. The inclination was a characteristic of palm leaf manuscript letterforms which got subtly transformed into the typeface.
- The curves of the strokes were smooth, consistent and regular. The counter spaces were more or less uniform across letterforms.
- Letterforms have clean uniform stroke thickness and are ornate in design.
- Letters ‘a’(அ) and ‘ā’(ஆ) were seen with a bowl for the first time in Tamil printing.
- Letter ‘i’(இ) was unlike the palm leaf manuscript letterform.
- Letter ‘t’(த) has a florid tail which was seen for the first time.
- Ligature symbol ‘ன’ resembled the present form.
- Letter ‘ṟ’(ற) has a peculiar design, unlike present form or the designs of that period.

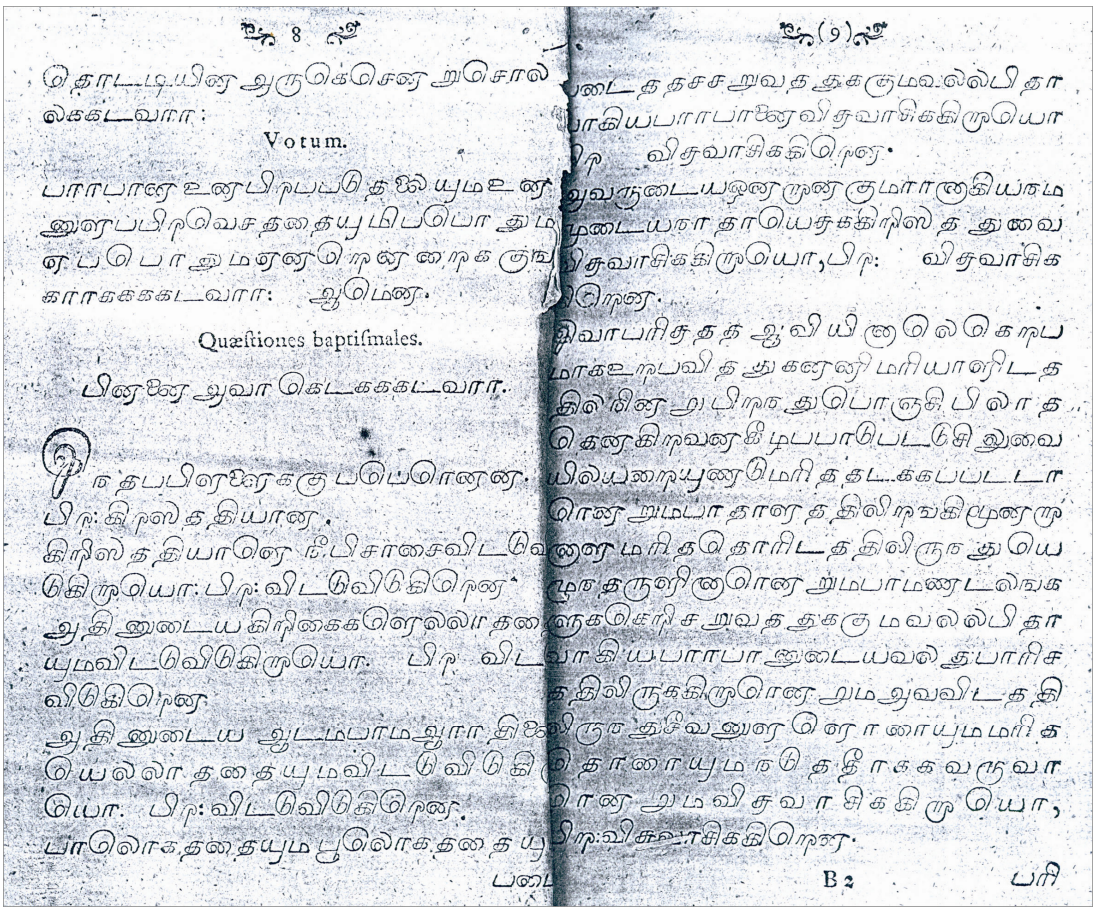


Fig. 7.9: The ‘*Rituale Trangambaricum’* printed at Tranquebar in 1781 appears to be the earliest typeface to closely resemble the present letterforms. *(Image Source: Connemera Library, Chennai)*

Above description makes this font distinct from other typefaces of that era. There was a mention of the type in a catalogue of the Tamil books in British museum, it read, *"Printed in a type apparently derived from the founts at that time in use in Ceylon."*[3] This could probably be the types used by the Hollander press in 1741. B. S. Kesavan remarks,

> The type produced by the Halle, Tranquebar and Colombo have a family likeness, but those produced in Colombo were of a different quality. Many of Beschi's changes are not to be found here. The introduction of diacritical marks to signify lengths of vowels are used. The general impression of these letters appears pleasing as they look more like a neat cursive handwritten script (Kesavan 1985:58).

From the inference of Kesavan, there is fair chance that the typeface described above may be the typeface used in *'Rituale Trangambaricum'*. It clearly states that the types were neat cursive handwriting script, which was true. As mentioned, the type design also differs in appearance and quality. Since there was a difference of 40 years, a doubt arises whether these were the same font. The next similar typeface was seen in 1812, *'Thirukkural'* by F. W. Ellis printed at Madras (Fig. 7.10). The Madras typeface was not flamboyant as the 1781 Tranquebar types; it was simple, standard and clear font. After 1781, there appears to be a transformation in typeface design, typefaces gradually deviated from the handwritten influence of palm leaf manuscript letterforms. The shapes of the letters became more geometrical and refined. And also there was a sense of measurement attached to the typefaces.

Types appeared to be defined by units of measurement. It should be noted that the French printer François Ambroise Didot (1730 - 1804) introduced a new 'point based' typographic measuring system roughly around the same period. Didot's creation was based on the Pierre Simon Fournier's 'point system' which the latter developed in 1737. The Didot point system became widely used in European countries as it bettered the Fournier's point system. Therefore, it is possible that there was some influence of the measuring units on the Tamil typefaces. The system could have gradually got incorporated into Tamil typefaces at later stages. The inclusion of measurements in type could be observed from the visual documentation of the facsimiles.

[3] British Museum, Dept. of Oriental Printed Books and Manuscripts, *A Catalogue of the Tamil printed books in British Museum*, 1909, p. 154.

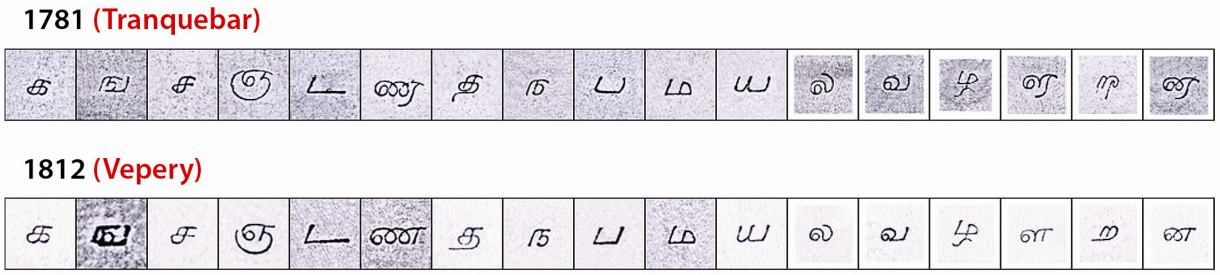
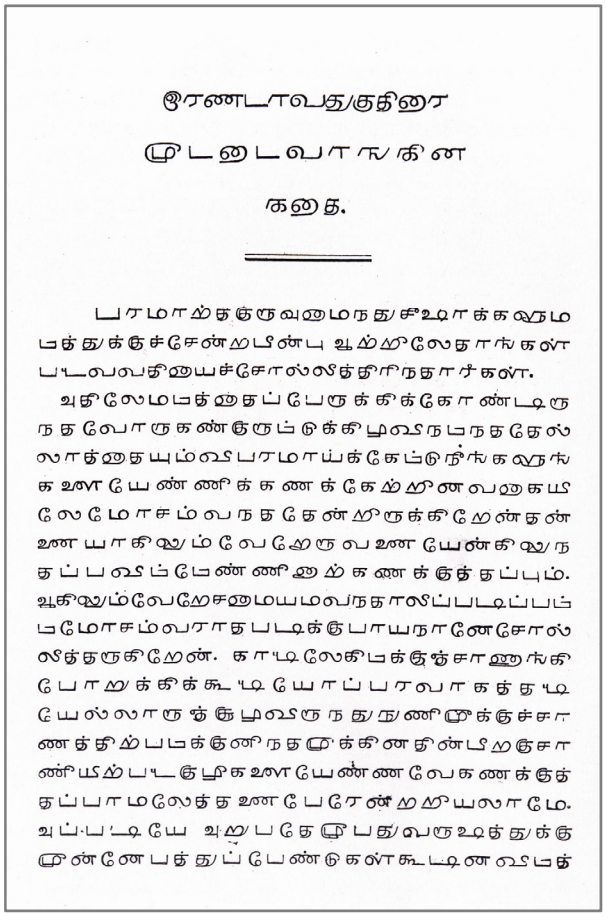


Fig. 7.10: Typeface used in F. W. Ellis, *'Thirukkural'* in 1812 at Vepery was continuation of typeface used in '*Rituale Trangambaricum'* printed at Tranquebar.

7.5 Typefaces of the nineteenth century

Typefaces during the late eighteenth and early nineteenth century were losing its humanists quality that was imitated from the manuscripts. The letterforms were transforming to be more mechanical and formal. During the above mentioned period, the Tamil typefaces cast in foundries abroad were different from the ones cast in India. The differences can be observed from the examples of typefaces that were used for printing in Vepery and London. The typefaces used for printing Beschi's work *'The adventures of Gooroo Paramartan'* in London during 1822, closely resembled the Halle types at Tranquebar. The difference was only in terms of refinements in strokes and joints. This perhaps could have been due to the advancement in technology. On the other hand, the typeface used to print the Tamil literature *'Thirukkural'*in 1812 by an Indian publisher was similar to the types printed in '*Rituale Trangambaricum'* (See Fig. 7.10).

Fernando de Mello Vargas in his dissertation writes, the earliest example of Tamil types was cut by Edmund Fry and Son from London in two sizes. The first one appears to be a close imitation of the type cut in Halle during 1710 and the second one was a similar smaller version. An interesting note found by the author in one of the Tamil type specimen read that these characters, as well as the many ligatures, resemble those of the manuscripts engraved on palm leaves (Vargas 2007:29). This attests that the early typefaces were an imitation of palm leaf manuscripts. On examining Fernando's documentation of the specimen reveal that the typeface by Edmund Fry and Son appears to be used to print the *'The adventures of Gooroo Paramartan'* (Fig. 7.11). The two sizes were designed to be used for title and body text. And also as mentioned earlier the typefaces were similar to the types cut at Halle for printing at Tranquebar during Ziegenbalg's period (Fig. 7.12).



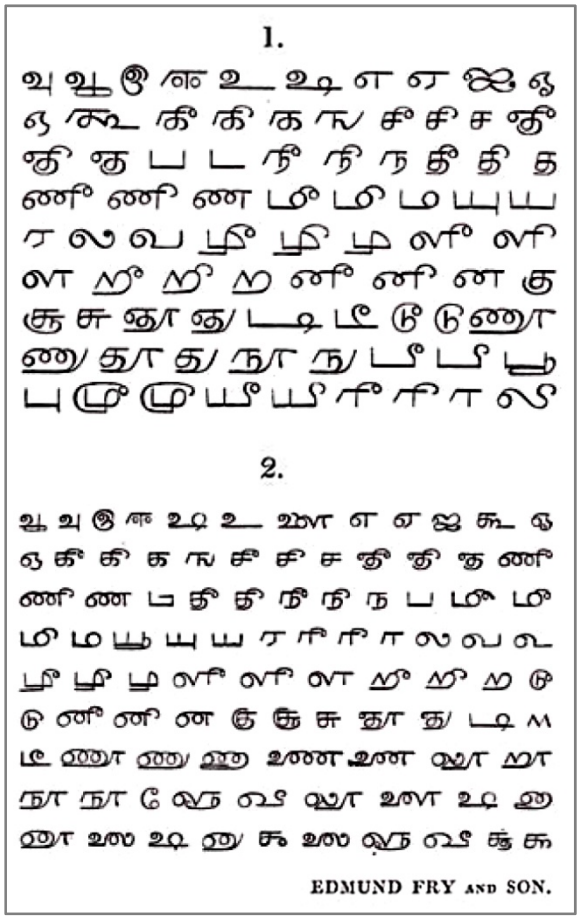


Fig. 7.11: Typefaces by Edmund Fry and Son (on right) were similar to the typeface used in *'Gooroo Paramartan'. (Image Source for the Edmund Fry and Son Tamil type specimen: Evolution of Tamil typedesign, Fernando Mello Vargas)*

Fig. 7.12: Typeface cast in Halle for Tranquebar press, Vepery, types used in Beschi's work that was printed in 1822 and typefaces by Edmund Fry and Son appear to be similar.

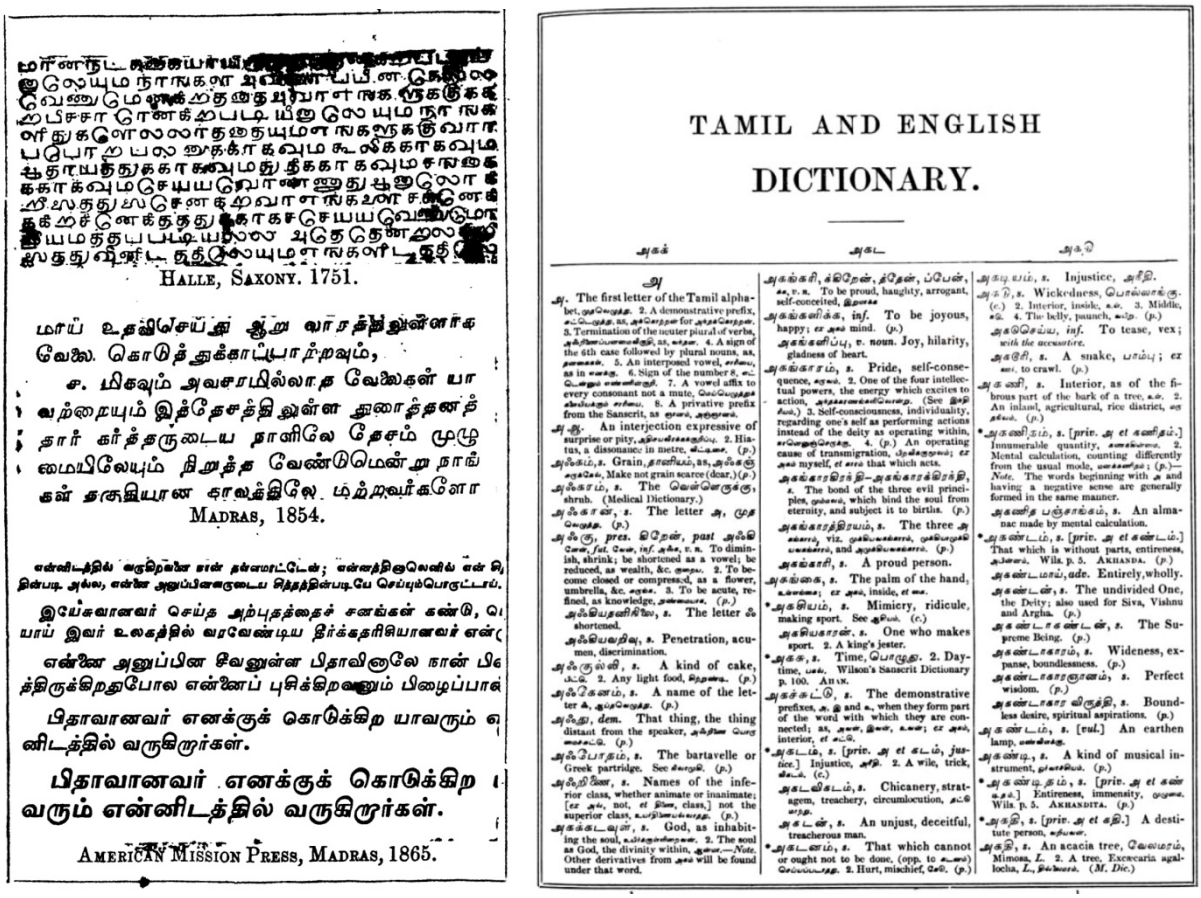
The Tamil typefaces found in Europe especially London were all similar. This could be understood for the type specimens collected by Fernando de Mello Vargas. His documentation and study of Tamil types include specimens from the London based type founders W.M. Watts (from 1862), Gilbert & Rivington (from 1880), William Clowes & Sons (from 1931) and K. K. Hof-und Staats-Druckerei from Vienna (1910). As observed by Vargas it was evident from the type specimens that the types across the foundries were similar with minor changes to them. The types or matrices should have been acquired, purchased or copied from one foundry to another (Ibid 33). Meanwhile in Southern India, there was a significant progression in Tamil type design.

In the second quarter there was a complete shift from manuscript letterforms to mechanical typefaces. The influence of palm leaf manuscripts were not seen anymore, letterforms became more standard and uniform. To be specific, structure of the letters became constant, counter space were uniform, proportion were fixed, relative sizes of letters were determined, baseline alignment became norm and design elements became consistent. Varying stroke thickness typefaces were commonly used and were typically found in title pages as headlines. The quality of Tamil typefaces rose to international standards. During the middle of nineteenth century the locals learned the art of punch cutting and type design from the guidance of an American printer P R Hunt who ran the American mission press. Following extracts from Murdoch's *'Classified catalogue of Tamil printed books'* describes the quality of type design and printing standards during the nineteenth century.

> Mr. P R Hunt taught some of his workmen the difficult art of cutting punches by hand and he himself designed a new face. To some extent it followed the lines of that produced at the S.P.C.K at Vepery at the beginning of the century, but he gave the letters a more regular slope, more even spacing, better alignment and introduced a new and beautiful serif which greatly added to the appearance of Tamil Type. Both composing and printing were of a very high standard indeed, and will, even today stand comparison with the work of any press in the world. In the middle of the nineteenth century there could have been few productions to equal it (Murdoch 1865: lvii).

Further Murdoch, in his classic catalogue shows a comparison of three real examples of Tamil types cut during that period to demonstrate the better quality of American Mission Press (Fig 7.13). *'A Comprehensive Tamil English Dictionary'* by Winslow which was considered to be one the best examples of typography and type design was printed in American Mission Press in 1862 (Fig. 7.13) (Kesavan 1985:70). As mentioned above, Tamil

types and printing were superior in quality and standards which could be compared around the world. Even the renowned Linotype foundry found Tamil types were designed to its best and could not be further improved (Sambandan 1997:338). This certifies the standards at which Tamil printing and type design was carried out. Typefaces of the nineteenth century had a subtle ornamentation and elegance. The norm set during this period was so influential that it is still being followed. It could be discerned that Tamil fonts attained its present form from the early nineteenth century.



HALLE, SAXONY. 1751.

மரப் உதவிசெய்து ஆறு வாரத்திலுள்ளாக
வேலை கொடுத்துக்காப்பாற்றவும்,
ச. மிகவும் அவசரமில்லாத வேலைகள் யா
வற்றையும் இத்தேசத்திலுள்ள தூரைத்தனத்
தார் கர்த்தருடைய நாளிலே தேசம் முழு
மையிலேயும் நிறுத்த வேண்டுமென்று நாங்
கள் தருகியான காலத்திலே மற்றவர்களோ

MADRAS, 1854.

என்னிடத்தில் வருகிறவனை நான் தள்ளமாட்டேன்; என்னித்லுலெனில் என்
தின்படி அல்ல, என்னை அனுப்பினவருடைய தெத்தின்படியே செய்யும்பொருட்டாம்.
இயேசுவானவர் செய்த அற்புதத்தைச் சனங்கள் கண்டு,
யாய் இவர் உலகத்தில் வரவேண்டிய தீர்க்கதரிசியானவர் என்
என்னை அனுப்பின சிவனுள்ள பிதாவினுலே நான் பி
த்திருக்கிறதுபோல என்னைப் புசிக்கிறவனும் பிழைப்பா
பிதாவானவர் எனக்குக் கொடுக்கிற யாவரும்
னிடத்தில் வருகிறார்கள்.
பிதாவானவர் எனக்குக் கொடுக்கிற
வரும் என்னிடத்தில் வருகிறார்கள்.

AMERICAN MISSION PRESS, MADRAS, 1865.

TAMIL AND ENGLISH

DICTIONARY.

Fig. 7.13: Left: Quality comparison of three typefaces cast in different period by Murdoch. *(Image Source: Classic Catalogue of Tamil Printed Books)*

Right: Winslow's *'A Comprehensive Tamil English Dictionary'* printed at American Mission Press in 1862 is considered to be one of the best examples of Tamil typography and Tamil design during nineteenth century. *(Image Source: Evolution of Tamil typedesign)*

7.6 Impact of letterpress printing and western typography

The early printing was more functional, aimed at propagation of Christianity and was dominated by the missionaries (See Chapter 5). In the available literature, there was a scant mention of the natives involved in early print activities. The locals were fascinated by the novelty of the technology but never took that as a specialized profession until the nineteenth century. Indeed, this lack of involvement could have deterred printing from being an art or craft. Printing and Typography was considered as an art and craft in the west, in India this wasn't the same. On the other hand, the association of western design brought in their influences and changes to script and typography. And also the physical nature, scope and limitations of the medium transformed the script to its requirements.

7.6.1 Origin of varying stroke typefaces

Tamil script evolved from a pointed metal tool which can only produce uniform stroke thickness (Fig. 7.14) (See Chapter 3). This was clearly evident from the evolutional chart and the visual documentation of palm leaf manuscripts. Unlike Devanagari script, Tamil was never written using reed pen or a flat cut nib therefore the script never had varying stroke thickness. The Dravidian scripts developed the mono-linear form because of this method of inscribing and the same was also found in the early typefaces (Vargas 2007:13). In Tamil script, the varying stroke thickness was first observed during the letterpress printing. It was during the second phase of Tamil printing (Tranquebar press) the first facsimile of such typefaces was found.

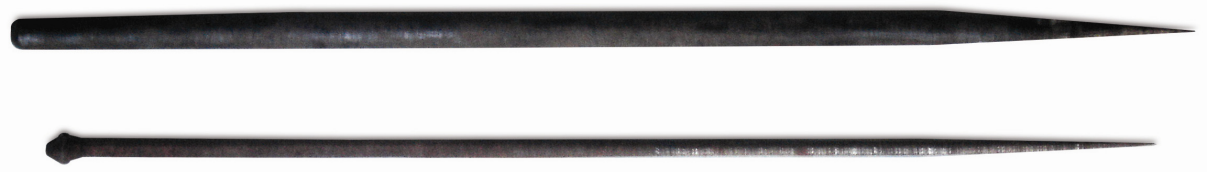


Fig. 7.14: Pointed metal stylus was used for writing on palm leaf manuscripts.

Emergence of such typefaces should have been an influence of the western typefaces. Primarily because, the early typefaces of Tranquebar press were originally imported from Halle by Ziegenbalg (see chapter 5). Therefore, it was certain that the typeface had some influence of the west as it was designed by westerners in their homeland. Examples of such

typefaces were rare and all of them appear to have come from Halle. After these early examples the next varying stroke typeface took a very long time to be seen in print. The second stage of these typefaces was observed during the nineteenth century. The reason for its reappearance could be the design trend that existed in parallel in the west. Mainly because the varying stroke typefaces during that period closely resembled Bodoni, Walbaum and Didot. All these fonts had a high contrast thick and thin strokes (Fig. 7.15).

In west, one of the characteristics of modern typefaces was based on the contrast stroke thickness. It may be noted that the reappearance of varying stroke thickness in Tamil also falls under the same period when modern group of typefaces emerged in west. The striking contrast and radical design should have encouraged or influenced the type designers to cast similar typefaces in Tamil (Fig. 7.16). The modern typefaces (in west) could have inspired and led to the introduction of varying stroke typefaces in Tamil. The use of these typefaces was mostly restricted to book titles, headings and not as a body copy (Fig. 7.17).

Fig. 7.15: Earliest known varying stroke thickness typefaces in Tamil resembled typefaces like Bodoni and Walbaum.

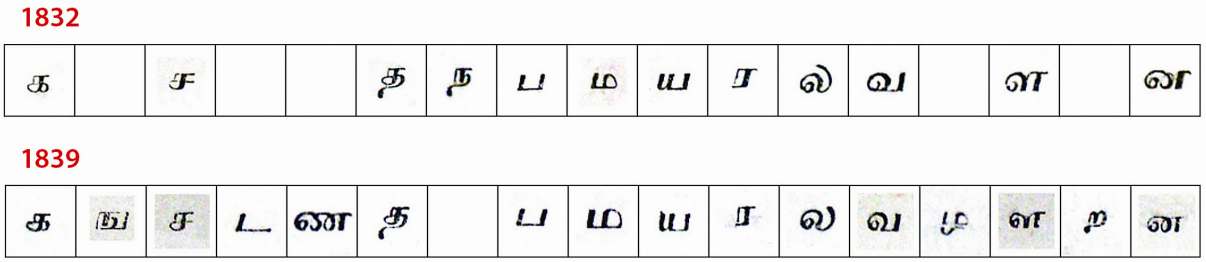


Fig. 7.16: Varying stroke typefaces in Tamil during nineteenth century.

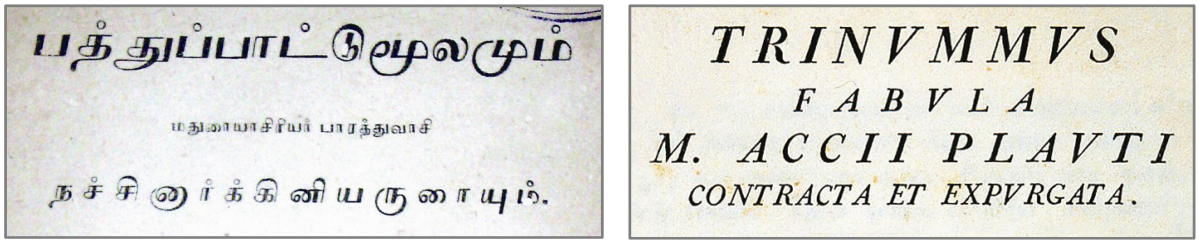


Fig. 7.17: Varying stroke typefaces were commonly used for book titles on cover pages similar to the western cover designs. *(Image Source: GOML, Chennai)*

Determination of strokes thickness in Tamil fonts

In Devanagari and Roman typefaces, stroke thickness was governed by the tools by which they were handwritten (Fig. 7.18). In Devanagari, it was the reed pen and in Roman script it was the flat chisel. In both scripts, the downward strokes were drawn thick and the upward strokes were thin. The thickness of horizontal and angled stroke depended on the angular cut of the pen tip and its hold.

Fig. 7.18: a. Devanagari script has varying stroke thickness because of the tool (reed pen) which had an angular cut tip for writing.
b. Similarly, Roman capitals attained its stroke variations from the flat chisel.

In Tamil script, similar method like the reed pen was adapted to determine the stroke thickness. The strokes written in downward direction had thick stroke and upward, thin stroke (Fig. 7.19). The horizontal strokes were thin in either direction of writing. This thumb rule was seen exempted in letters like 'pa'(ப), 'ya'(ய), and 'va'(வ) where the upward stroke at the right end has a thick stroke (Fig. 7.20). Though these letters in early letterpress typefaces (classical typefaces) followed the conventional stroke thickness, they got modified in later stages. One reason could be that to visually balance these letters the end vertical stroke were

made thicker. And the other reason could be printing technology. The wear and tear of metal type in long run could have influenced the letter design. On observation it was found that the horizontal and vertical stroke at the end formed a weak corner joint (Fig. 7.20 d). This would have made the metal type to break while printing in the long run. In anticipation of such physical damages the punch cutter could have modified the type design.

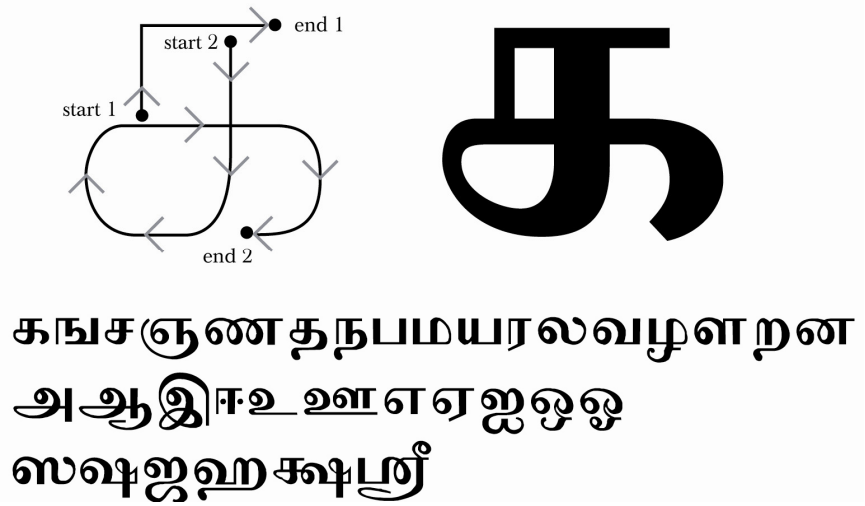


Fig. 7.19: Stroke thickness of a letterform is determined by the direction of stroke constructed. All downward strokes are drawn thick and upward strokes thin.

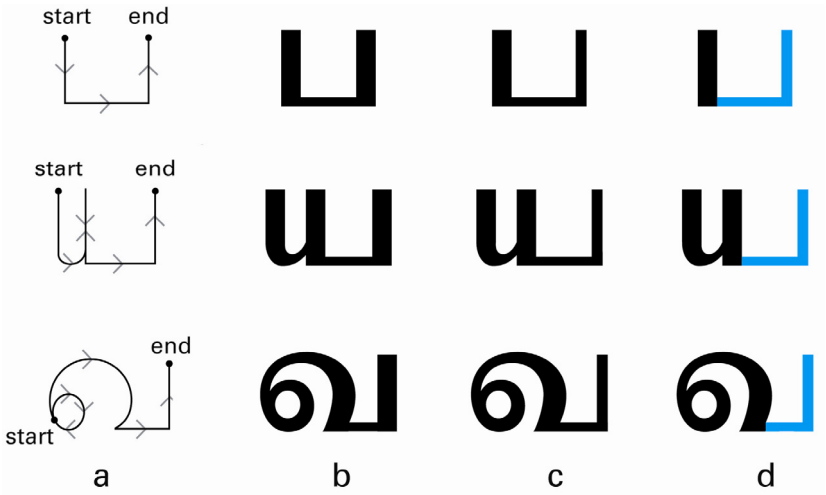


Fig. 7.20: Letters ‘pa’(ப), ‘ya’(ய), and ‘va’(வ) have been an exception in stroke thickness.

a. Skeletal diagram showing the direction of writing.
b. Stroke thickness seen in present typefaces.
c. Stroke thickness drawn based on the direction of stroke.
d. Shaded portion indicate a weak joint created by two thin strokes.

7.6.2 Refinements in typefaces

Sharp corner and joineries in Tamil script can be attributed to letterpress printing. In palm leaf manuscripts and other written mediums like the stone, metal the letterforms have rounded and smooth corners (Fig. 7.21). It is natural that letterform varies according to the strength and limitations of a medium used, this was one of the reasons why scripts have evolved over centuries. The shift from handwritten letterform to mechanical typefaces brought in their own influence on script. Early letterpress typefaces had similar details of rounded corners and irregular counter-spaces like in palm leaf manuscripts. Later as the technology and understanding of letterforms progressed, typefaces were designed for the letterpress medium.

The physical property of metal type casting led to sharp corners, uniform counter spaces, round curves and perpendicular joints (Fig. 7.22). Letterpress printing transformed the script by making refinements in small details. Even though the medium geometrized the hand written forms but it was the punch cutters who played a major role in shaping the script. It could have been a design decision made by type designer to create a visual grammar. The printing machine had only provided them the opportunity to develop uniform designs.

Fig. 7.21: Letters in stone inscriptions and palm leaf manuscripts had roundedness. *(Image Source: Government Oriental Manuscript Library, Chennai)*

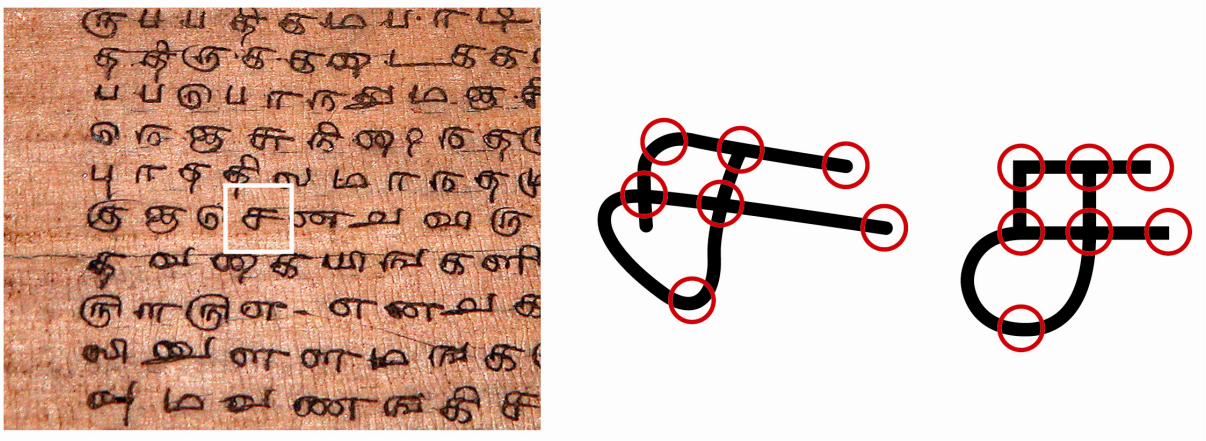


Fig. 7.22: Above examples shows the difference in joinery and corner details of a handwritten letterform and letterpress type.

7.6.3 Influence of Western typography

As mentioned earlier, the letterpress medium had immensely transformed the calligraphic nature of Tamil script. The western origin of printing brought its own characteristics on Tamil Typography. After the early printing phase, Tamil typography was largely influenced by the western typography. Some of the most common influences were word spacing, special characters, numerals, style sheets and format.

Word spacing: The Europeans scholars were the first to introduce word space in Tamil literature. Addition of space made the language simple to understand and read. Perhaps, word space became possible because of the printing. Letterpress provided the opportunity for the western scholars to add space like in Roman script and adopt the change.

Special characters: Europeans introduced special characters into the script. Special characters were elements of written communication. Such symbols were never seen in Tamil palm leaf manuscripts, only combination of letters (ligatures) and special symbols to denote certain units were seen. Only after the commencement of letterpress printing, these symbols appeared in Tamil script.

Numerals: Tamil had its own symbols for numerals (Fig. 7.23). But these numerals were not practiced any more as it got replaced by the Arabic numerals. In palm leaf manuscripts, only Tamil numerals were seen so was the case with the early printed books. Therefore, it was

unclear when such substitution took place. The westerners could have possibly brought in the shift from Tamil to Arabic numerals during the third printing phase (Native printing).

Fig. 7.23: In palm leaf manuscripts, only Tamil numerals were seen.

Book format: Letterpress printing completely changed the concept of book in India. Palm leaf manuscripts and printed book were two different systems altogether. They differed in all aspects from material, size, binding, components, typography, design and method of writing/impression.

Typographic norms: Printing introduced various styles in Tamil typography which were absent in hand written manuscripts. For example headings, sub headings, paragraphs and type styles were results of western influence.

Measurements: The standardization brought uniformity in letterforms. The variations of the hand written letterforms were unified in terms of its measurements. Measurements of Roman script was adapted by Tamil script (Fig. 7.24).

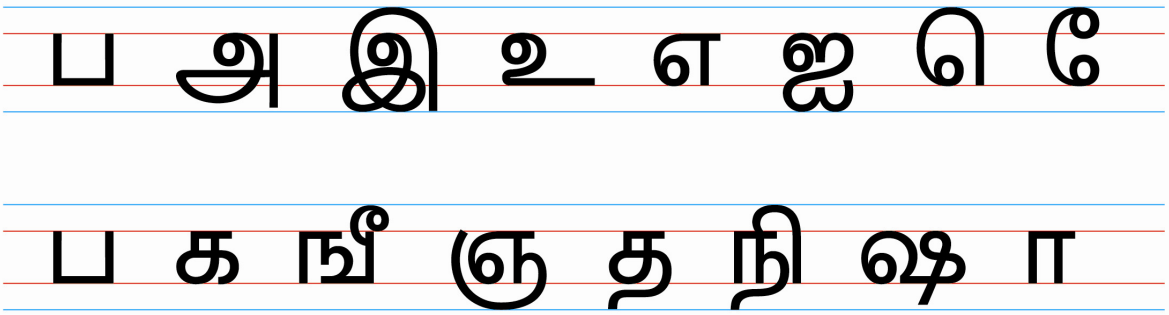


Fig. 7.24: Printing brought uniformity in typefaces by adopting standard measurements across letterforms (current typeface was used to illustrate the above example).

7.7 Conclusion

The characteristics of letterpress typefaces were identified through the analysis of visual documentation and literature study. A chronological description of the typefaces printed from first book to middle of nineteenth century was brought forward. Based on the visual characteristics typefaces were grouped into three periods. The grouping was derived from the available examples of early printed typefaces. Following were the proposed classification of the early typefaces:

1. **Classical typefaces (1554-1781)**
    - The early letterpress typefaces were an imitation of palm leaf manuscripts.
    - Father Joao de Faria's typeface has been widely used for almost a decade at different places.
    - First time varying stroke thickness typeface was observed which was not seen later until the nineteenth century.
    - First time serif detail was observed in Tamil typeface which was not seen in the later typefaces.
    - Typefaces did not have a standard size and relative proportion.
    - Types were crude in design and lacked uniformity.

2. **Transitional typefaces (1781-1832)**
    - A typeface which closely resembled the present typefaces was observed for the first time.
    - Inclined typefaces reflecting the manuscript letterforms were first time observed.
    - A gradual shift from the influence of palm leaves handwritten letterforms was observed in these typefaces.
    - Typefaces appear to be designed by measuring units.
    - Early stages of mechanization and standardization of typefaces can be observed.

3. **Modern typefaces (1832-)**
    - The characteristics of handwritten letterform disappeared from the typefaces.
    - The present typefaces attained its visual form during this period.
    - Varying stroke thickness typefaces became one of the commonly used type variation along with the mono thickness typeface.

- Tamil script attained a standardized form they became more refined and geometrical in design.
- Typefaces had units of measurement.
- The natives learned the art of punch cutting and cast typefaces.

Letterpress printing and western typography influenced Tamil script.

a. Evolution of varying stroke thickness font in Tamil

For centuries, Tamil script had uniform stroke thickness. This was because of the writing tool (pointed metal stylus) used for writing on palm leaf manuscripts. It was during the letterpress printing the varying stroke thickness fonts were developed. This could have been inspired by the western type designs which prevailed during the same period.

b. Standardization and refinements of letters

The standardization brought uniformity in letterforms. The handwritten letterforms were unified in terms of its measurements and design as required for machine printing.

- All the similar counter spaces became smooth and uniform across letters.
- The physical property of metal type casting led to sharp corners, geometrical strokes and curves, clean joineries and standard terminals.
- Measurements and alignment were introduced on scripts like in western typography – 'x' height, baseline alignment, ascenders and descenders. Proportion was maintained in design of each letters – within the letter and across letterforms. This brought uniformity in typefaces.

c. The import of western technology saw its influence on Tamil typography. This led to the inclusion of word space, special characters, Arabic numerals, Book formats and other typographic norms.

Chapter 8

Summary and Conclusions

8.1 Summary

Tamil language is one of the oldest languages in the world and is the official language of Tamil Nadu a southern state in India. The earliest known source of Tamil literature dates back to 300BC to 200AD known as the *Caṅkam*[1] literature (Varadarajan 2001:27). It is in one of this Caṅkam literature, *Tolkāppiyam*[2] the earliest description of Tamil letterforms was found. The modern Tamil still has its roots in Tolkāppiyam and continues to follow the literary history (Encyclopedia of Tamil literature 1990:10). According to Department of Archeology, Tamil Nadu, the earliest known Tamil script is the Tamil Brāhmī script. The available stone inscriptions indicate its presence to 200BC (Mahadevan 2003:168). Over centuries, the rudimentary forms of Tamil Brāhmī script had significantly transformed to a more complex form – present script. To understand this phenomenon Archeologists and Epigraphers have prepared a chart on evolution of Tamil script based on the available stone and metal inscriptions.

[1] Tamil Caṅkam was a congregation or assembly of Tamil scholar's, poet's who displayed and shared their knowledge during the ancient times.
[2] Tolkāppiyam is an epic work on grammar and poetics which describes Tamil language of the classical period.

At present, the evolutional chart is the only source depicting the transformation of script from ancient to present. However, it only serves as a visual documentation but doesn't explain *why* and *how* the transformations has occurred. The limitation of the chart was that it only revolves around the available evidences of stone and metal inscriptions. But to understand the transformation of letterforms, mediums beyond stone and metal have to be studied. It is likely that other traditional mediums such as palm leaf manuscripts and its writing system may have influenced the letterforms. Primarily because,

- The practice of writing on palm leaves exists since the ancient India. Palm leaf manuscripts have been one of the most commonly used medium of written communication across the country.
- The other traditional mediums such as stone and metal inscriptions were an imitation of palm leaf manuscripts which makes palm leaves the primary source.
- Stone and metal inscriptions have been extensively studied by the archeologists and epigraphist on its influence on evolution of letterforms. But the study of palm leaf manuscripts and its influence on letterforms are negligible.
- Scholars generally opine that palm leaf manuscripts have influenced letterforms but a systematic research is required to further understand its influence.

Similarly, another popular medium which transformed the characteristics to Tamil letterforms was the letterpress printing. The modern Tamil letterforms owe its standardization to letterpress printing. The introduction of printing also saw the decline of handwritten palm leaf manuscripts.

8.2 Objectives

At present, there exists a big vacuum of knowledge on palm leaf manuscripts and early letterpress printing. And also the transformation of Tamil letters from handwritten form to printed form. Therefore, the present study seeks to examine the following questions:

1. How did palm leaf manuscript medium and its writing system influence Tamil letters?
2. How did handwritten letterforms transformed into mechanized typefaces during early letterpress printing? Did palm leaf manuscripts influence the early typefaces?
3. What were the impacts of letterpress printing and western typography on Tamil script?

8.3 Literature study

Evolution of Tamil and Roman script formed part of the literature survey to understand the transformation of letterforms over centuries. Tamil Brāhmī, a derivation of the Brāhmī script was used to write ancient Tamil in Southern India. The late Tamil Brāhmī script evolved into a more rounded form called Vaṭṭeluttu (Mahadevan 2003:167, 168). Vaṭṭeluttu was the first script known to have evolved due the material influence and it derives its name from the circular nature of its letterforms. The influence of Grantha script (another archaic script) over Vaṭṭeluttu led to the origin of Tamil script during the 7th century AD (Govindaraj 1994:18) (Fig. 8.1). Along with the study of Tamil script evolution, evolution of Roman script was studied as a case study to compare the evolution of both scripts.

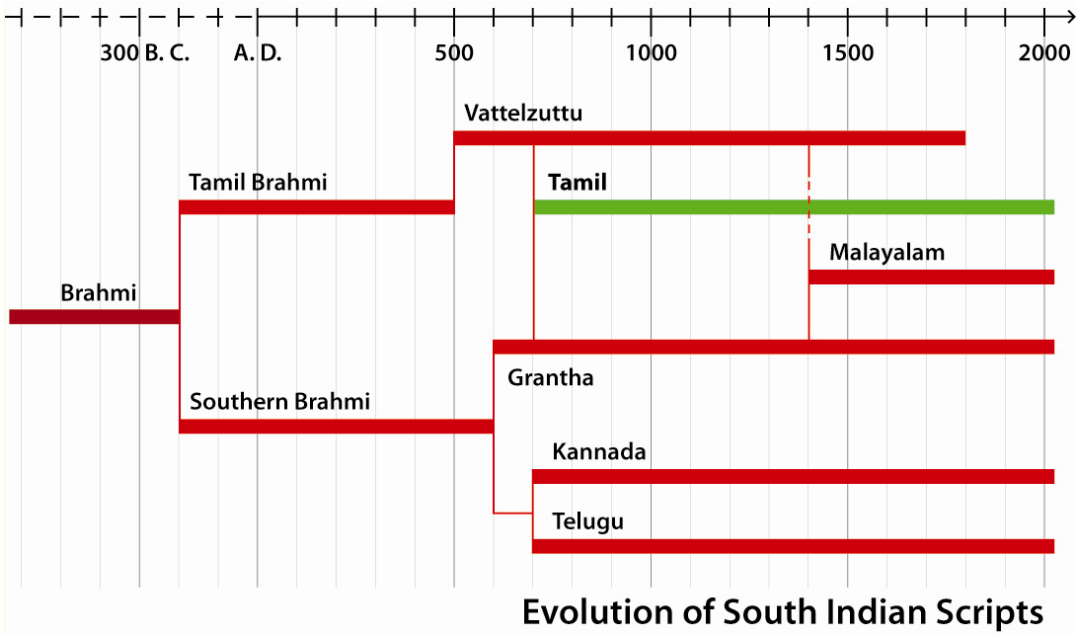


Fig. 8.1: Visual chart showing the evolution of Tamil and other South Indian script. (*Reproduced from the book 'Early Tamil Epigraphy – From the Earliest Times to the Sixth century AD')*

Roman capital letters first attained its form during the first century AD (Sutton & Bartram 1988:7). The letterforms were formal, simple and geometrical in shapes. Roman alphabet existed in two forms, Majuscule and Miniscule which are commonly known as *uppercase* and *lowercase* (Bringhurst 2002:120). Majuscules are large formal capital letters found in architectural monuments basically carved on stone. Miniscule are manuscript

letterforms which evolved from Roman capitals (Frutiger 1985:153). Unlike Roman script, evolution of Tamil script was quite different (Table 8.1). Primarily because, the medium and tools used for writing were different in both script. And also the revivalism of stone inscriptions and manuscript letterforms in west was absent in Tamil script.

	Roman script	**Tamil script**
1. Medium	Tools and materials	
a. Stone	Flat chisel	Pointed chisel
b. Manuscripts	Vellum, Parchment, Paper	Palm leaf
	Flat brush, Quill and Reed with square cut tip/nib	Pointed metal stylus
2. Writing tradition	The writing system is well documented and studied through minuscule to understand its influence on letterforms.	There is no such study exists
3. Revivalism of letterforms	Stone and manuscript letterforms were copied and revived during the movable type printing and in later periods.	The early letterpress typefaces needs to be studied to identify its relation with the stone and manuscript letterforms

Table 8.1: Following table summarizes the similarities and differences in evolution of Tamil script and Roman script.

The evolution of lowercase Roman alphabet is attributed to the rapid manuscript writing. It was the writing tradition which has influenced the Roman letterforms and had reflected in the design of typefaces during the printing. The studies of writing style and influence of tools on manuscript letterforms are well established in the west. A similar study is needed in Indian scripts to understand the influence of writing tradition on letterforms. Therefore, palm leaf manuscripts which have been the medium of writing in Tamil needs to be explored and researched.

8.4 Study of palm leaf manuscripts and letterpress medium

There are three varieties of palm leaves used for writing in India – *Palmyra, Talipot* and *Taliera*. Of the three, the talipot palm is best suited for writing (Agrawal 1984:25). The palm

leaves has to be prepared and processed to make it suitable for writing. Once the leaves are processed they become ready for writing. Basically, two methods were adopted for writing on palm leaves in India (Ibid 31). In Southern India, writing is done by incision with a pointed metal stylus and Tamil is normally written using this method. Writing on palm leaves is a tedious process which requires skill and training. On detailed observation of various palm leaves letterforms several influences of the manuscripts can be identified. The natural material and unique writing style of the medium has brought numerous characteristics to Tamil script. From the characteristics, it was observed that an in-depth analysis of the palm leaf manuscripts medium might bring deeper insights into the transformation of Tamil letterforms.

The conventional palm leaf medium gradually became obsolete after the arrival of letterpress printing. In 1556, the first printing press landed at Goa (Priolkar 1958:3). Soon the press began to spread to other parts of the country through Christian missionaries. In 1578, the earliest Tamil book *Doctrina Christam*[3] by Henrique Henriques was printed at Quilon. In a span of 430 years, Tamil printing has undergone numerous changes in type design and literary content. From literary survey Tamil printing was synthesized into three major phases based on the scholarly overview. Following are the three proposed phases of Tamil printing (Fig. 8.2):

1. **Early printing (1578-1713) –** Jesuit Missionary printing
2. **Lutheran printing (1713-1800) –** Protestant Missionary printing
3. **Native's printing (1800-1900) –** Native printing

The phases were primarily based on several factors like people behind the presses, literary content, time period and geographical location. The existing literature mainly focuses on the missionary activities and has very little study on Tamil type history and typography. The scholar's studies were also limited to the first few typefaces. On the other hand, Tamil letterpress printing has produced several typefaces in first three centuries including the first type foundry and paper mill (Fig. 8.3). And also there weren't any literature on the impact of letterpress medium on the script. Therefore, it was important to study the early letterpress typefaces and also the impact of the medium on Tamil script.

[3] Before *Doctrina Christam*, a Tamil book *Luso Tamil catechism* was printed at Lisbon, Portugal in 1554

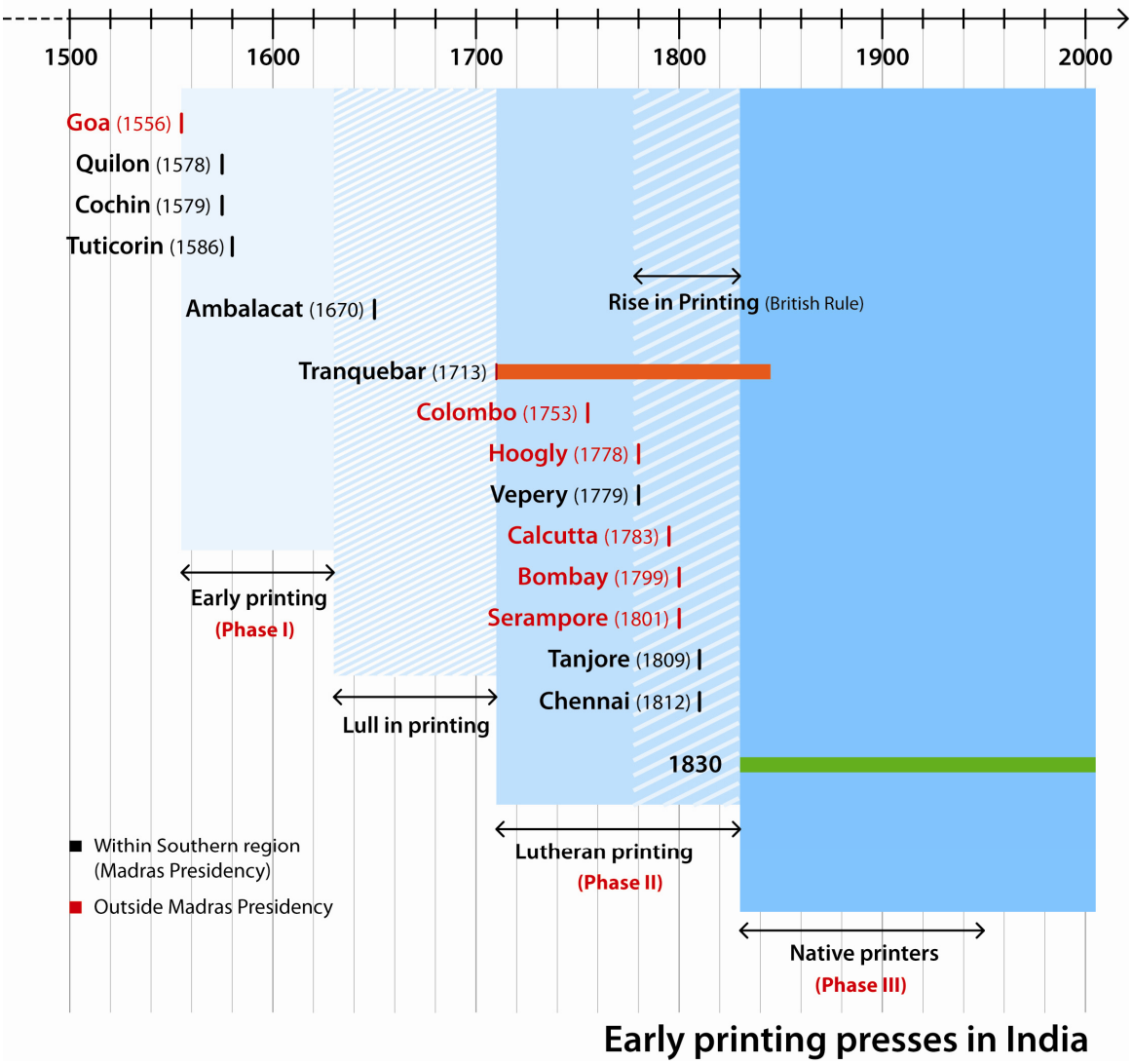


Fig. 8.2: Visual chart showing the proposed phases of early Tamil printing.

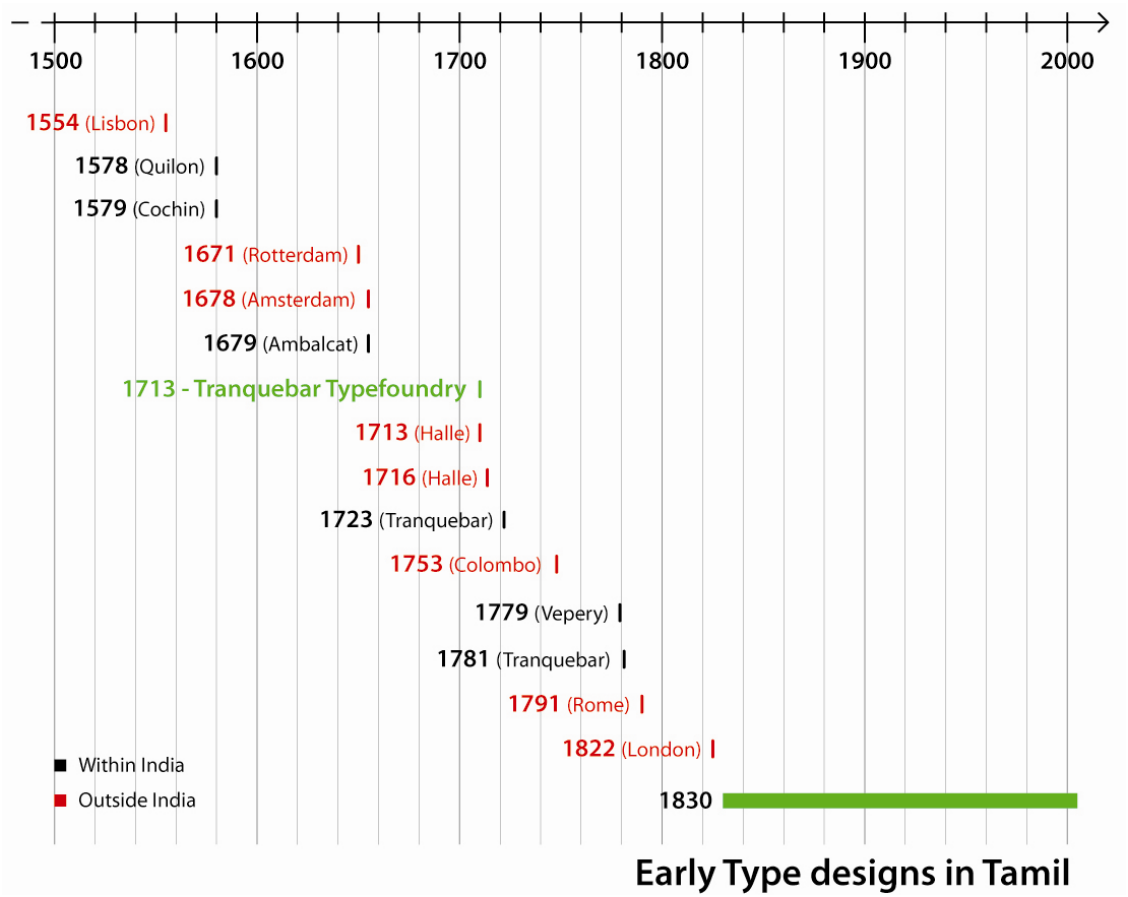


Fig. 8.3: The above images shows the various period and places of Tamil typeface design. There were several Tamil typefaces designed in and outside India.

8.5 Research method

The existing research methods in the field of epigraphy and western typography were studied. Epigraphy is a study of ancient inscriptions and its methods involve the reproduction of original inscriptions. There are three methods of reproductions adapted for this purpose namely eye copying, mechanical reproduction and photographs. Estampages, a most reliable means of mechanical reproduction is normally employed by Indian epigraphists (Salomon 1998:161). These reproduced images are then traced and published as research material (Mahadevan 2003:82). To study the script's evolution, a visual chart is prepared consisting of chronologically placed individual letters.

In west, early hand written manuscripts and printed works were well preserved and documented. This facilitated type historians to visually study the originals or facsimiles and record their observations. The research of various experts on the subject constituted the

history of Roman script. A similar approach was also observed in the study of Indian manuscripts by eminent scholars. After studying the above research methodologies, a combined research method was developed. Following key factors were taken and combined from each of the methods.

Epigraphist approach

- Visual reproduction of manuscript letterforms through photographs.
- Preparation of visual chart (manuscript letterforms and early letterpress typefaces).
- Study of individual letters through comparison of visual forms.

Western type historian approach

- Visual documentation of early printed books from originals and facsimiles.
- Study of palm leaf manuscripts and early printed examples as a whole to understand its visual characteristics.
- Illustrate the manuscript letterforms to study its underlying characters.

8.6 Data analysis

An extensive field visits were made to Tamil Nadu to visually document palm leaf manuscripts and old printed books. From the visual documentation two visual charts comprising palm leaf manuscript letterforms and early letterpress typefaces were developed. The study of palm leaf manuscript letterforms was based the visual documentation (visual chart) of the manuscript images and evolutional chart prepared by the Department of Archeology, Tamil Nadu. Letterforms of palm leaves were illustrated and studied to understand the writing process and underlying structure. By building an internal consistency through several examples the influence of palm leaf manuscript writing was established.

To study the transformation of letterforms from manuscripts to typefaces the characteristics of individual letterforms were visually compared. These transformations were mostly related to structural changes within a letter and a group of visually similar letters (visual group). Firstly, variations of an individual letter was identified from the visual chart of each medium (manuscript letters separately and letterpress typefaces separately). After that, the most common variation was singled out from each medium. The chosen variant of both the mediums was then visually compared to study the similarities and differences. By this, the

transformations of the visual element across both the mediums were established. In case of a visual group, the same process of visual comparison was repeated with other letters from the same visual group. Through visual similarities and differences of variations the transformation was identified. The influence of letterpress printing was studied from the visual chart and visual documentation of early printed books.

8.7 Conclusion

The detailed study of the palm leaf manuscript letterforms reveals that the medium and its writing system have an influence on letterforms. The study also augments the evolution chart prepared by the department of archeology. One of the reasons behind why such transformation of letters occurred was the palm leaf manuscripts medium. The consensus of the scholars is that palm leaf manuscript letterforms were the source for stone inscriptions. It could be observed from the study that the manuscripts letterforms varied according to writing style. The change in writing style on palm leaves got reflected on stone inscriptions, it imitated the variation that was vogue during that period. This cross referencing of hand written letterforms from a perishable and varied manuscripts led to the changes in letterforms, eventually leading to the transformation of script over time. Thus, the present Tamil script is not same as the Tamil inscriptions thousand years ago. This explains why the inscriptions on stone were different over the years as plotted in the chart by Archeologists.

How the transformation had happened could be explained from the analysis of writing system on palm leaves. Like the evolution of Roman lowercase, the need for faster writing in manuscripts has transformed Tamil letterforms. And also the unique writing style, pen hold, writing action, direction and sequence of writing have all contributed to the formation of certain characteristics in letters. Apart from the writing system the physical nature of palm leaves – the horizontal fibers along the length have played an important role in shaping the letterforms. This could be well understood from the conclusions drawn from the analysis of palm leaf manuscripts. Following are the conclusions of manuscript study,

The writing system on palm leaf manuscript has influenced Tamil letterforms during the evolution process. The medium and writing has added and transformed certain elements in the letters which later became a permanent part of the letters.

1. Emergence of enclosed spaces (counter space in letterpress terms) in letterforms

In Tamil Brāhmī, the earliest script of Tamil, very few alphabets e (எ), ē (ஏ), ca (ச), ma (ம), va (வ) and l̲a (ழ) had counter spaces (see chapter 1). In the present Tamil script, almost every letters developed counter space except ī (ஈ), ṭa (ட), na (ந), pa (ப), ya (ய), ra (ர) and r̲a (ற). The counter spaces could have emerged because of the writing system on palm leaves. This was evident from the analysis of letters like a (அ),ā (ஆ), i (இ), tu (து) etc. in part I of chapter 6 that the development of counter space was because of the writing on manuscripts. It could also be observed that palm leaf manuscripts are the medium which is most likely to have such influences.

a. The continuation of clockwise circular stroke and a horizontal stroke developed bowl elements in vowels 'a'(அ) and 'ā'(ஆ).
b. The intersect joint of two circular strokes written in clockwise direction developed circular loops in palm leaf manuscripts. This emerged into several counter spaces within letter 'i'(இ)
c. Similarly, clockwise vertical downward stroke when continued with a clockwise circular stroke, a circular loop was formed. This developed a bowl character (counter space) in letters with similar matra ñu (ஞ), ṇu (ணா), tu (து), lu (லு), r̲ (று) and n̲u (னு).
d. At the start of a curvilinear stroke, kaṇ element emerged due to the writing process with the stylus. Such enclosed space (kaṇ) has become a integral part of several letters.

2. Extensions of details in letterforms

Similar to counter spaces, extension of strokes were due to palm leaf medium. The horizontal fiber of the leaves and writing style has extended and modified certain existing characters of few letterforms.

a. Evolution of top horizontal bar and mūkku detail – Vertical strokes written in a clockwise direction developed a small projection on the left which later become the top horizontal strokes. The continuation of top horizontal bar to a vertical downward stroke seems to have led to the formation of mūkku detail (small extension of the horizontal bar).
b. Extension of the tail in letter 'n' (ந) – The tail in Tamil script seems to have developed because of the continuous action of writer while completing a

clockwise circular stroke. The horizontal grains of the palm leaf medium could have further facilitated the action.

c. Formation of ligatures – Due to rapid writing and frequent use of certain letter combinations has led to the formation of *kūṭṭeḻuttu* (ligatures).
d. The variations of the short sound 'i' matra can be attributed to the method of writing on palm leaf manuscripts. This is only seen in three letters 'ki'(கி), 'ci'(சி) and 'ti'(தி).

In the process of determining the transformation and influences of the medium, new visual vocabulary was developed for Tamil script. At present, terms that define typographical elements are minimal in Indian scripts. So far, the vocabulary used in western typography has been adapted for Tamil letterforms. But Tamil letters are varied in visual form and structure than the Roman letters which therefore requires a suitable native terms. The difference in anatomical structure not found in Roman letters requires an additional typographic terms to recognize the regional letterforms. Therefore a new visual vocabulary was developed to understand and analyze the letterforms. The vocabulary included grouping of similar visual elements and defining new terms. The visual grouping and new terms added to the Tamil typography were,

1. Primitive structure – rectangular, circular or both
2. Composition – vertical, horizontal, inclined or curvilinear stroke
3. Joineries / Nodes – terminal, corner, intersection and curvilinear
4. Direction of writing – clockwise/anticlockwise
5. Letter width – narrow, normal and wide
6. Ascenders and Descenders
7. Counter spaces

Typographic terminology for Tamil

1. Carivu (Slope)
2. Ceṅkuttu Kōṭu (Vertical line)
3. Jaṉṉal (Window)
4. Kaṇ (Eye)
5. Kīḻkūṟū (Descender)
6. Kiḷai (Branch)

7. Kiḷ Kokki (Lower hook)
8. Kokki (i matra)
9. Mēṟkūṟū (Ascender)
10. Mūkku (Beak)
11. Pa Uyaram (X-height)
12. Paṭṭai Kōṭu (Horizontal line)
13. Tūṇ (Vertical stroke)
14. Vācal (Gateway)
15. Val (Tail)

Addressing the other objectives of the research, it was observed that early letterpress typefaces were an imitation of palm leaf manuscripts. The study ascertains the scholar's general observations through a systematic examination. The transformation of palm leaf manuscript letterforms to early letterpress typefaces were established through the visual comparison of both mediums. The influences of manuscripts on typefaces were witnessed till the late eighteenth century. The following findings were observed from the visual analyses that demonstrate the transformation of handwritten letterforms to early typefaces.

1. In most manuscripts, different joinery detail (loop formation) existed in letter 'ñ'(ஞ). Similar handwritten detail of the letterform was observed in the early letterpress typefaces. Such details disappeared during the later periods of printing.
2. The link of letter 'ṅ'(ங) had several variations in manuscripts, two of which were reflected in the early typefaces.
3. In palm leaves, letter 'ṭa'(ட) did not have a fixed proportion, the same was followed in the first printed books. But soon this variation was standardized to a single letter width depending on the type design and style.
4. Short sound 'e' karam ligature symbol (ெ) was similar in palm leaf manuscripts and early typefaces. During the process of printing both the symbols got standardized and refined to the present form.
5. The letter 'ṟ'(ற) had a single counter space in some palm leaf manuscripts which were seen imitated in the early typefaces. Later, these forms disappeared and letters with two counter spaces were observed.

6. In the early letterpress typefaces, letter ‘l’(ல) was seen rotated at angle. The orientation has been copied from the manuscripts letterforms which had similar angular orientation.
7. The kaṇ – a small enclosed space at the start of certain letters, has several variations in palm leaves. The same variations (which were common in handwritten forms) have been observed in similar letters of early printed typefaces.
8. The present short sound vowel ‘i’(இ) was seen without counter spaces in palm leaves. The same letterforms have been imitated in the early typefaces.
9. In most of the palm leaf manuscripts the lower bowl in the ‘u’ matra was absent. In early letterpress typefaces the same matra detail was copied.
10. In palm leaf manuscripts, lower bowl was absent in vowels ‘a’(அ) and ‘ā’(ஆ). The same was observed in early letterpress typefaces. Over time, the bowl element got added to the vowels.

After the initial imitations of palm leaf manuscripts, typefaces began to evolve with respect to the medium. The evolution of Tamil typefaces can be classified into three groups based on their characteristics classical, transitional and modern typefaces. The initial phase saw the imitation of palm leaf manuscripts letterforms, in the second transitional phase, non-uniformity and humanist quality of manuscripts gradually disappeared in typefaces. And finally in the third phase, typefaces become more formal and standardized. Vargas in his dissertation ascertains this phase as the modern style. As printing progressed the usage of palm leaf manuscripts began to decrease. The mechanization of letters gradually transformed the character of letterforms. The medium refined and standardized the letters to a large extent. This could be observed from the design of typefaces during early nineteenth century. The typeface designed by P. R .Hunt for the American Mission Press was of a world class quality. Typefaces from that period onwards attained a standard form which continued to be followed with less or no change.

Apart from the medium’s influence on letterforms, book design and typographic elements of the west became the norm of written communication in regional languages. The traditional concept of book (palm leaf manuscripts) got completely displaced by the introduction of new medium. The initial printed books followed few characteristics of manuscript writing like the absence of word spacing and pulli above the pure consonants.

Soon, even those characters disappeared from the page compositions. Like in western typography, headlines, paragraphs, word space became part of Tamil typography.

The characteristics of letterpress typefaces were identified through the analysis of visual documentation and literature study. From historical point of view the study has identified key events that had shaped Tamil typography and typefaces. The research categorizes the typefaces into three periods based on the visual characteristics. The grouping was derived from the available examples of early printed typefaces. The following points highlight the impact of letterpress medium on Tamil letterforms.

1. The early letterpress typefaces were an imitation of palm leaf manuscripts and its influence continued till 1781. In addition to the scholars observations various other imitation of palm leaf manuscripts were identified in early typefaces.

2. Letterpress printing transformed the casual handwritten letterforms of manuscripts into formal mechanized letters. Following are the influence of letterpress on Tamil script:
    a. Evolution of varying stroke thickness font in Tamil
    b. Standardization and refinements of letters
        i. Width of letter 't'(ட)
        ii. Counter spaces
        iii. Corners, joineries and terminals
        iv. Proportion

3. The research has identified some of the landmarks in Tamil printing and typeface design (Fig 8.4). And through visual study the early typefaces were grouped into three – time based classification. The proposed periods of early typefaces in Tamil are[4],
    a. Classical typefaces (1554-1780)
    b. Transitional typefaces (1781-1831)
    c. Modern typefaces (1832-1900)

4. The import of western technology saw its influence on Tamil typography. This led to the inclusion of word space, special characters, Arabic numerals, Book formats and other typographic norms.

[4] The classification is based on the available examples of early printed typefaces

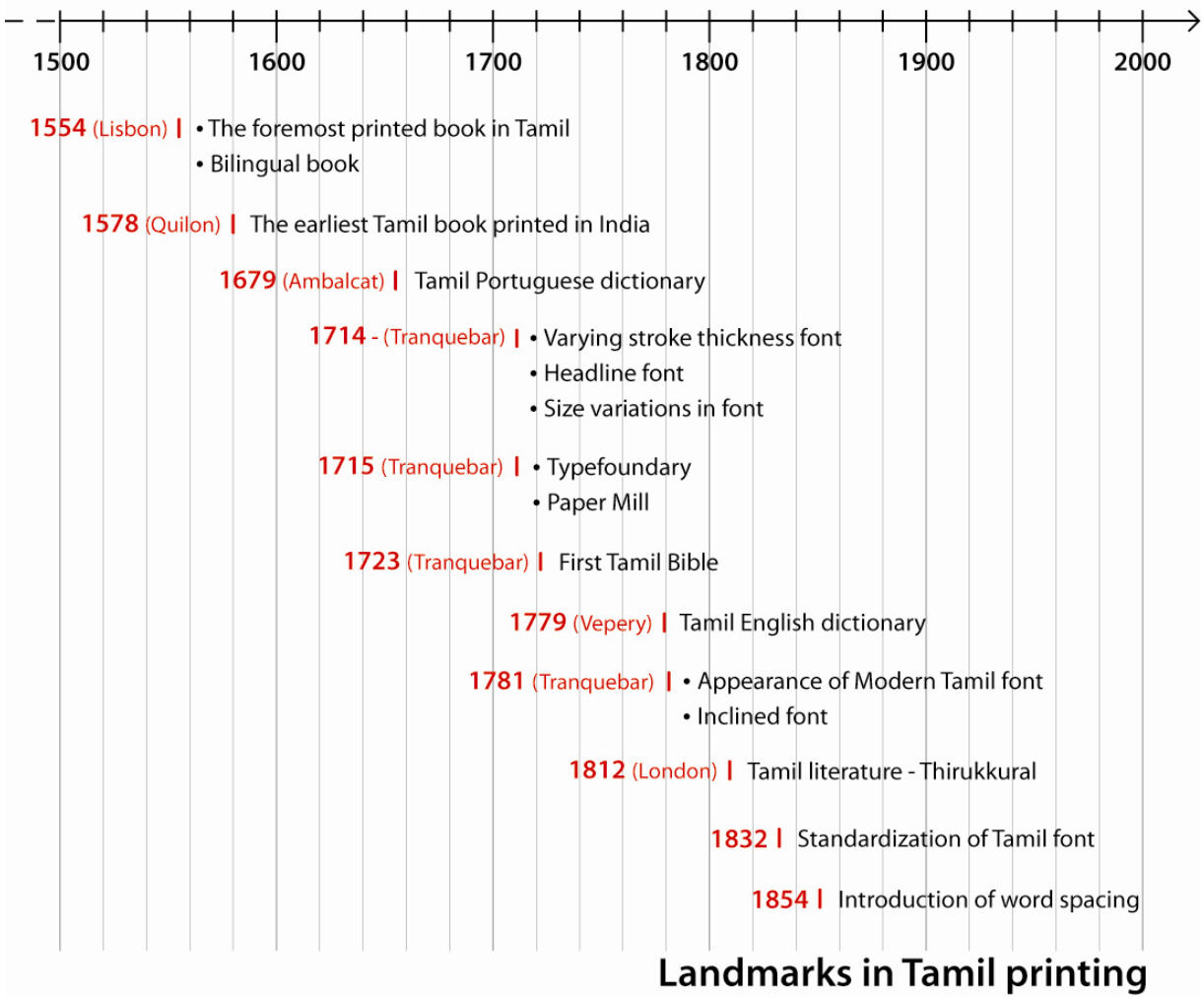


Fig. 8.4: Shown are some of the Landmarks in the history of Tamil printing and typedesign.

8.8 New knowledge contributed through the research

1. Establishing how the writing system on palm leaf manuscripts influenced Tamil letterforms in the evolution process.
2. Defining the characteristics of Tamil letters in palm leaf manuscripts.
3. Identifying the transformation of Tamil letterforms from palm leaf manuscripts to early letterpress printing through exhaustive visual documentation of palm leaf manuscripts and early letterpress typefaces.
4. Contribution towards history of Tamil typeface and printing
    a. Establishing the influence of letterpress printing and western typography
    b. Time based classification of early typefaces

c. Demarcation of Tamil printing phases based on origination of press, period, purpose of print and geography.
d. Chronological visual documentation of early printed typefaces.

5. Contributed to new typographic terminologies for Tamil script.

8.9 Scope for further research

The present research would benefit typographers, type historians, type designers and design researchers in understanding letterforms and its relationship with various mediums. Such understanding may enhance the design of letterforms and also facilitate to revive the obsolete traditional forms that are appropriate for the future. Apart from that there are plenty of research opportunities in palm leaf manuscripts and Tamil typography. At present, there are several thousands of Tamil palm leaf manuscripts in various libraries in India and abroad which needs to be studied. According to a preliminary survey by Indian Institute of Asian Studies, Chennai, there are about 30,000 Tamil palm leaves manuscripts of which nearly three fourth remain unpublished (Encyclopedia of Tamil Literature 1990:128). Even today many of the preserved manuscripts in various institutions and libraries are yet to be published. This shows the extent of opportunities lying before us to study and research in terms of language, literature, calligraphy and typography. Some of the research opportunities are,

Handwriting recognition software

Palm leaf manuscripts provide an excellent opportunity to study handwritings. The enormous collection of manuscripts in repositories offers a variety of styles and variations across periods and regions in one place. The study of letterforms across manuscripts may provide insights on the structural changes thereby identifying the optimal structure of the letters. This optimal data could be programmed to make letters recognizable when digitized. Since, the study would cover maximum possible variations the recognition of handwritten letterforms would also be highly accurate.

Revival of ligatures from palm leaf manuscripts

In the present digital world, the written communication has reduced to minimal especially in small screen electronic devices. More information's are packed within a small screen space by use of short forms and abbreviations, example SMS – Short Message Service on mobile phones. In mobile phones, short and abbreviated messages have become a norm because they

occupy less space and convey the same meaning. And also many times they take less time to type. Similar mode of communication can also be observed in online messenger services like MSN, Yahoo messenger, Google talk and other chat applications. In this scenario, the lost ligatures, symbols and special characters of palm leaf manuscripts will find an important place in the digital media. The revival of ligatures from manuscripts can reduce the space utilization on small screen devices. The same could also be applicable to print medium where space becomes an important criterion, for example, encyclopedia, telephone directory, dictionaries, pocket novels and classified section in newspapers. The following sentence illustrates the concept by the use of reformed ligatures to conserve space.

ஜூலை மாதம் விடுதலை பெற்றோம்

ஜூஒல மீ விடுதஒல பெற்ரேம்

The letterpress medium has eliminated certain ligatures in order to save on metal type and storage space. But in this digital age such storage spaces are never a problem. Therefore, the reformed letters can be brought back to address the present communication need.

Calligraphy and typeface design

The documentation and study of manuscripts can facilitate in developing new typefaces. The calligraphic study of various styles in manuscripts can help calligraphers to generate new ideas for calligraphy, lettering and signboard painting. In fact, palm leaf manuscripts are a boon for any type designers to create new and authentic family of script typefaces in Tamil. The exploration will certainly benefit the typography and type design community.

Development of Onscreen font

The present research of palm leaf manuscripts reveal that the counter spaces in Tamil letters have emerged because of the writing system. The counter spaces have created a new appeal to the letters but unfortunately on a screen display they become distorted because of the medium. On a digital screen these counter space gets filled up (as a thick line) at smaller point sizes thereby affecting the legibility and aesthetics of the typefaces. Manuscript letterforms may provide clues to prevent such distortion and develop a better onscreen font. The letterforms without counter spaces can be adapted for the digital medium for better reading and undistorted typefaces. The following example demonstrates the adaption of manuscripts letterform for onscreen typeface (Fig. 8.5).

Fig. 8.5: Top row shows the current letterforms with counter spaces. Bottom row is an adaptation of the manuscript letterforms for developing a better onscreen font.

Digitizing manuscripts and its content for future reference

As mentioned above, there are thousands of manuscripts that are unpublished. At present efforts are being made to preserve the traditional artifact by micro filming and digitization. In order to make the documentation purposeful, letters needs to be extracted from the documented digital image and made into an editable text. Therefore, there is a need for research to develop a software program that would covert the image text into an editable text. By this large number of manuscripts can be converted into text format for future decipherment and publication.

Extension of present research into other Indian languages

Similar research on manuscripts and letterpress printing can be carried out in other regional languages in India to understand the evolution of their script. The conclusions of the study can be compared to further validate the influence of medium and its writing system on letterforms.

Appendix I

Tamil letters

	அ	ஆ	இ	ஈ	உ	ஊ	எ	ஏ	ஐ	ஒ	ஓ	ஔ
க்	க	கா	கி	கீ	கு	கூ	கெ	கே	கை	கொ	கோ	கௌ
ங்	ங	ஙா	ஙி	ஙீ	ஙு	ஙூ	ஙெ	ஙே	ஙை	ஙொ	ஙோ	ஙௌ
ச்	ச	சா	சி	சீ	சு	சூ	செ	சே	சை	சொ	சோ	சௌ
ஞ்	ஞ	ஞா	ஞி	ஞீ	ஞு	ஞூ	ஞெ	ஞே	ஞை	ஞொ	ஞோ	ஞௌ
ட்	ட	டா	டி	டீ	டு	டூ	டெ	டே	டை	டொ	டோ	டௌ
ண்	ண	ணா	ணி	ணீ	ணு	ணூ	ணெ	ணே	ணை	ணொ	ணோ	ணௌ
த்	த	தா	தி	தீ	து	தூ	தெ	தே	தை	தொ	தோ	தௌ
ந்	ந	நா	நி	நீ	நு	நூ	நெ	நே	நை	நொ	நோ	நௌ
ப்	ப	பா	பி	பீ	பு	பூ	பெ	பே	பை	பொ	போ	பௌ
ம்	ம	மா	மி	மீ	மு	மூ	மெ	மே	மை	மொ	மோ	மௌ
ய்	ய	யா	யி	யீ	யு	யூ	யெ	யே	யை	யொ	யோ	யௌ
ர்	ர	ரா	ரி	ரீ	ரு	ரூ	ரெ	ரே	ரை	ரொ	ரோ	ரௌ
ல்	ல	லா	லி	லீ	லு	லூ	லெ	லே	லை	லொ	லோ	லௌ
வ்	வ	வா	வி	வு	வு	வூ	வெ	வே	வை	வொ	வோ	வௌ
ழ்	ழ	ழா	ழி	ழீ	ழு	ழூ	ழெ	ழே	ழை	ழொ	ழோ	ழௌ
ள்	ள	ளா	ளி	ளீ	ளு	ளூ	ளெ	ளே	ளை	ளொ	ளோ	ளௌ
ற்	ற	றா	றி	றீ	று	றூ	றெ	றே	றை	றொ	றோ	றௌ
ன்	ன	னா	னி	னீ	னு	னூ	னெ	னே	னை	னொ	னோ	னௌ
ஜ்	ஜ	ஜா	ஜி	ஜீ	ஜு	ஜூ						
ஸ்	ஸ	ஸா	ஸி	ஸீ	ஸு	ஸூ						
ஹ்	ஹ	ஹா	ஹி	ஹீ	ஹு	ஹூ						
ஷ்	ஷ	ஷா	ஷி	ஷீ	ஷு	ஷூ						
க்ஷ்	க்ஷ	க்ஷா	க்ஷி	க்ஷீ	க்ஷு	க்ஷூ						
ஸ்ரீ												

Numerals

0	௧	௨	௩	௪	௫	௬	௭	௮	௯	௰	௱	௲

Ligatures and special symbols

ணா	றா	னா	ணை	லை	ளை	னை	ணொ	றொ	னொ	ணோ	றோ	னோ
ௐ	௴	௳	௵	௶	௹	௺						

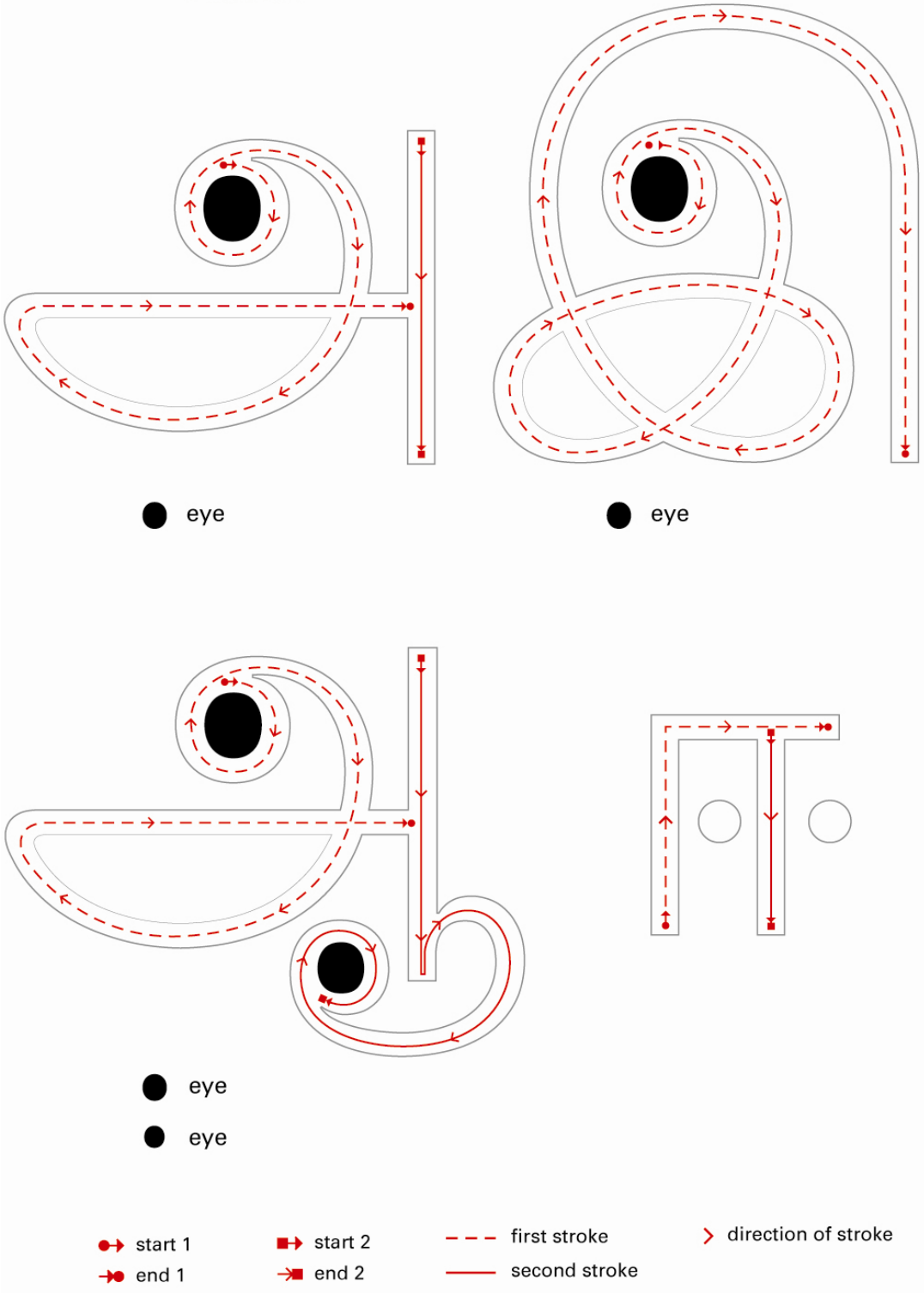
Compound signs / Aytam

்	ா	ி	°	ீ	ு	ூ	ெ	ே	ை		ஃ	

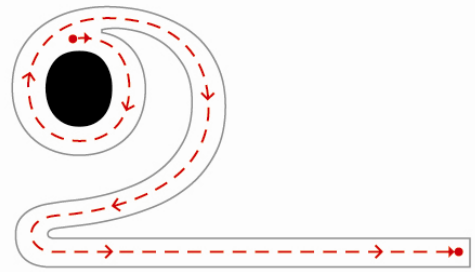
Appendix II

Following is a continuation of the visual vocabulary developed for analyzing palm leaf manuscripts letterforms and early letterpress typefaces. It includes present method of writing Tamil letters, identification of counter spaces, nodal points and various joinery details.

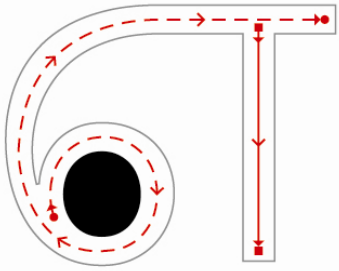
Writing process and counter spaces – Vowels



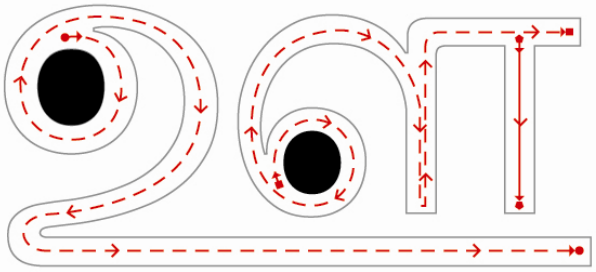
Writing process and counter spaces – Vowels



eye

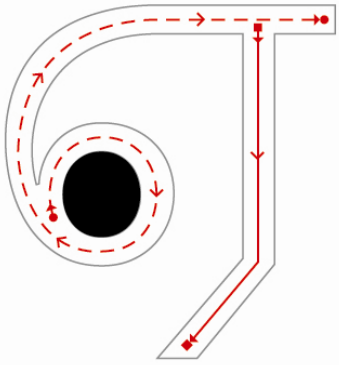


eye



eye

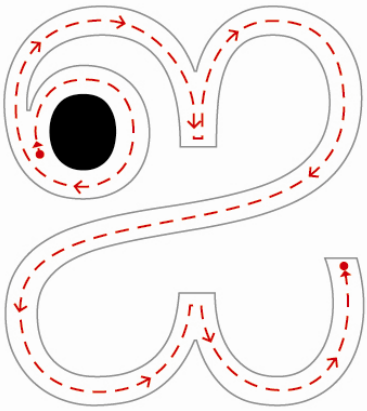
eye



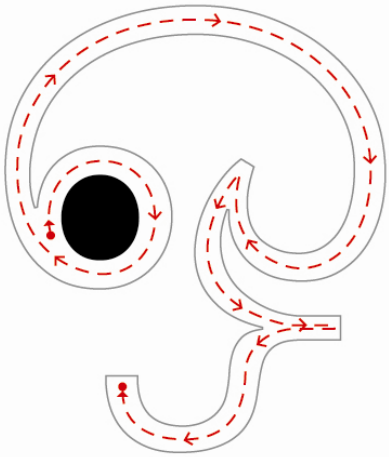
eye

start 1 end 1 | start 2 end 2 | start 3 end 3 | first stroke second stroke | direction of stroke

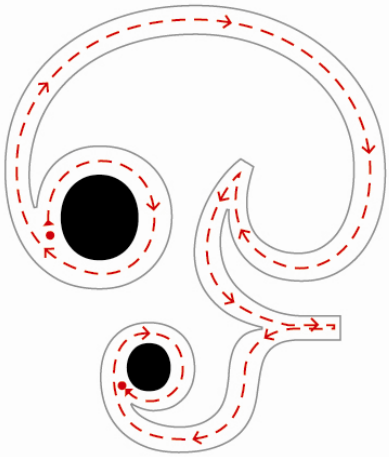
Writing process and counter spaces – Vowels



eye



eye

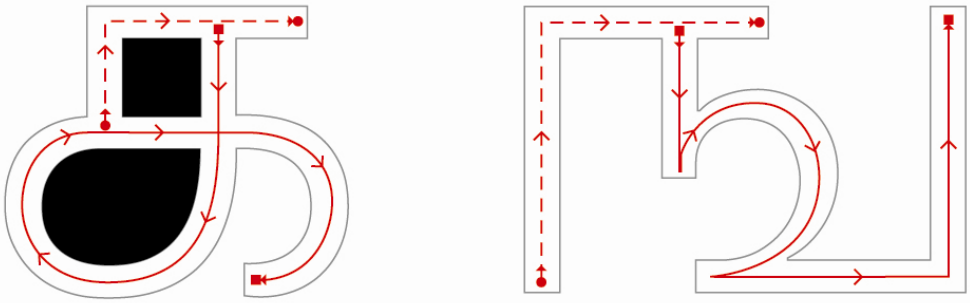


eye

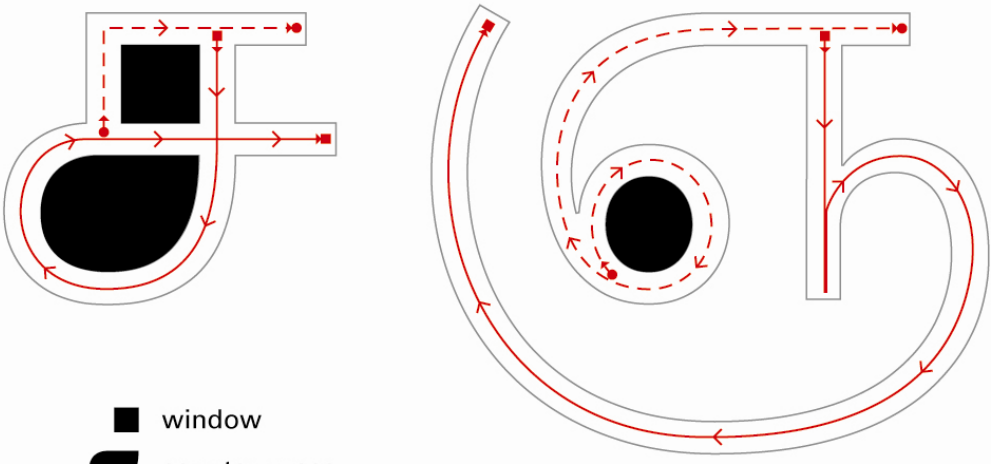
eye

start 1
end 1
start 2
end 2
first stroke
second stroke
direction of stroke

Writing process and counter spaces – Consonants



window
counter space

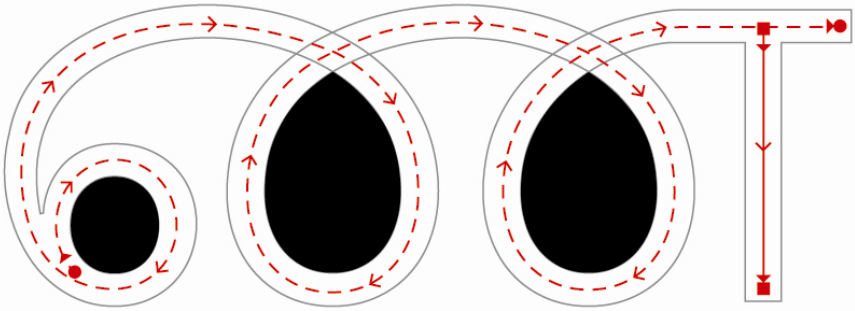


window
counter space

eye

start 1
end 1
start 2
end 2
first stroke
second stroke
direction of stroke

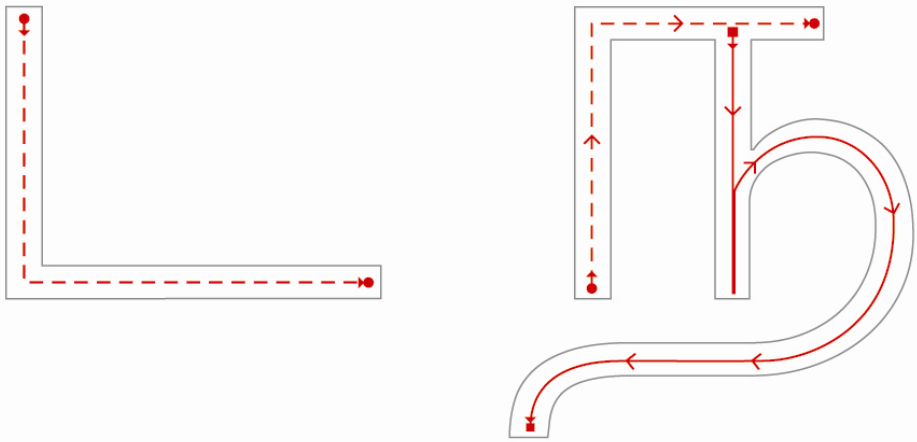
Writing process and counter spaces – Consonants



eye

counter space

counter space



start 1

end 1

start 2

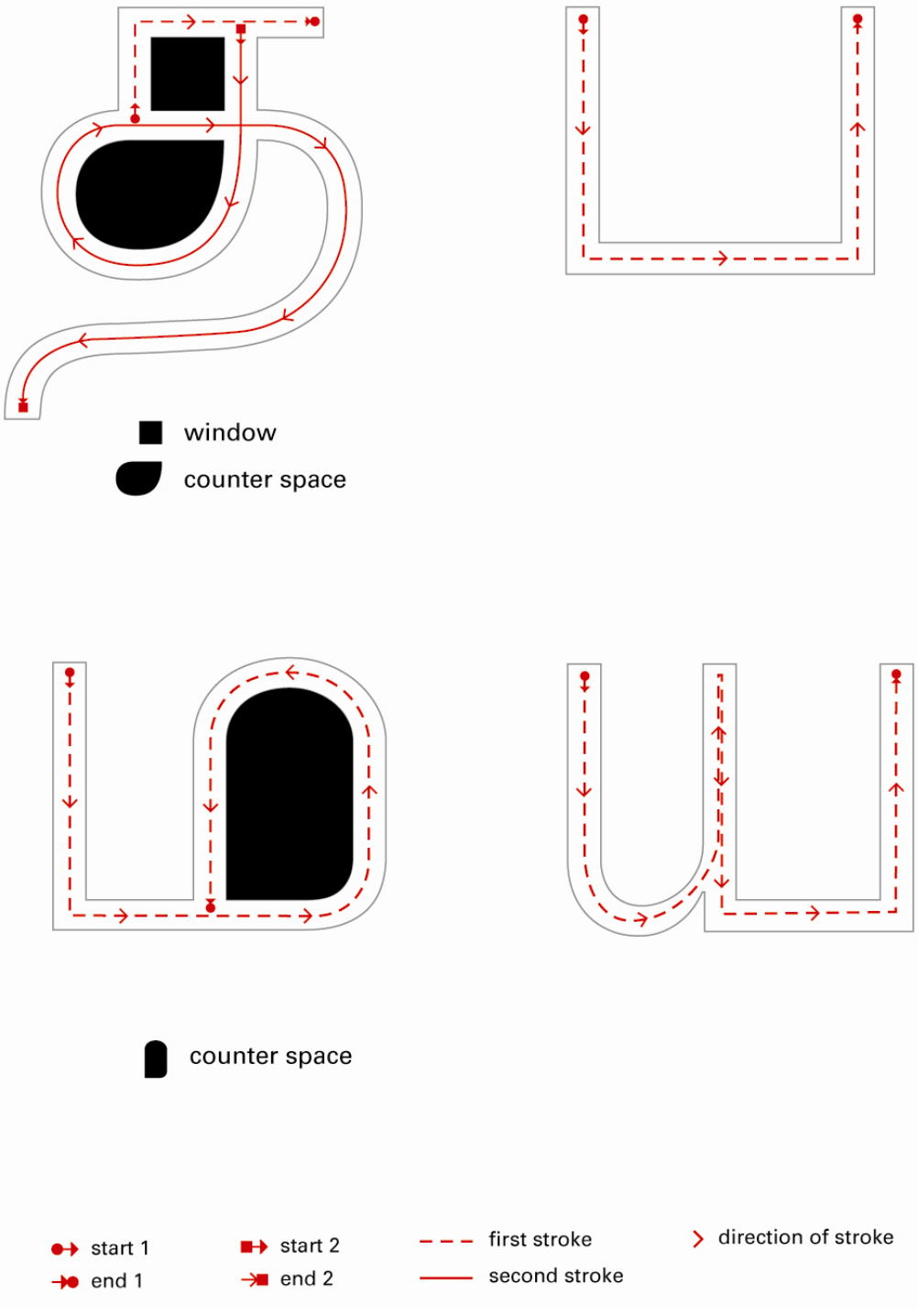
end 2

first stroke

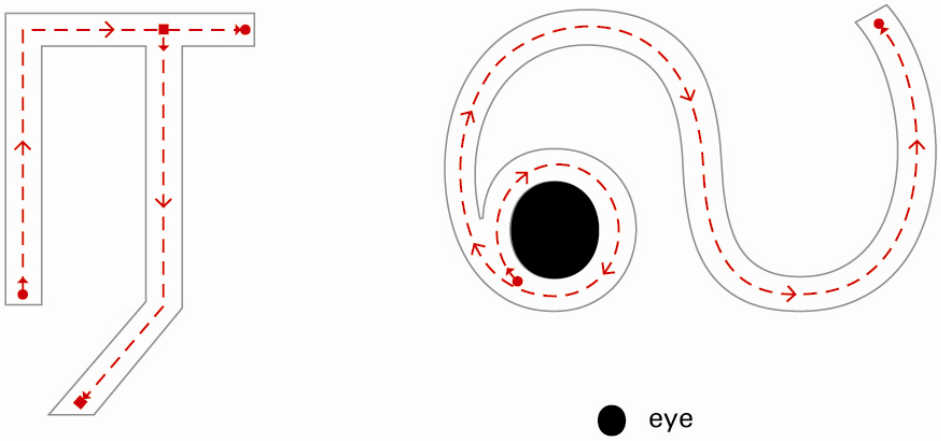
second stroke

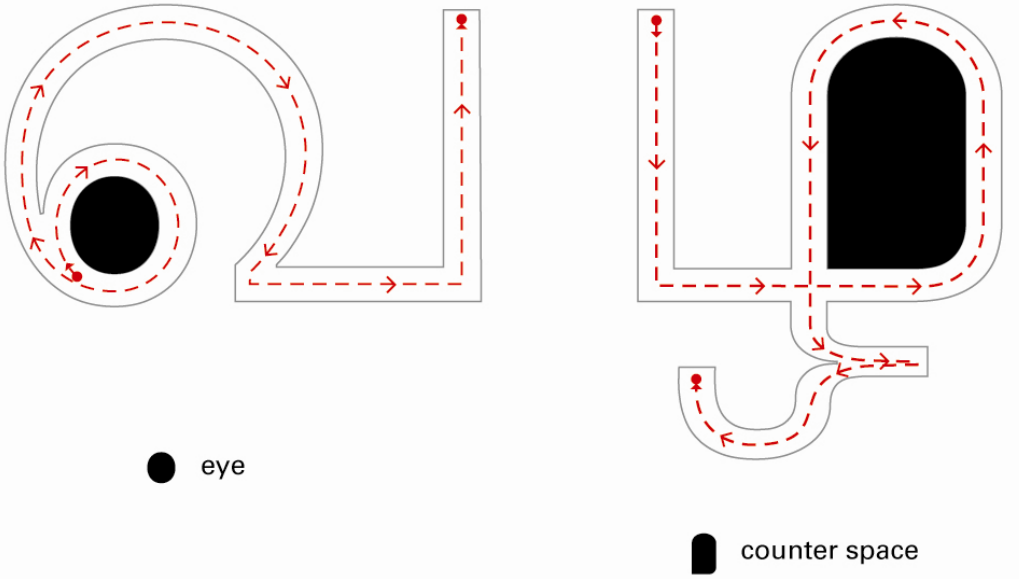
direction of stroke

Writing process and counter spaces – Consonants



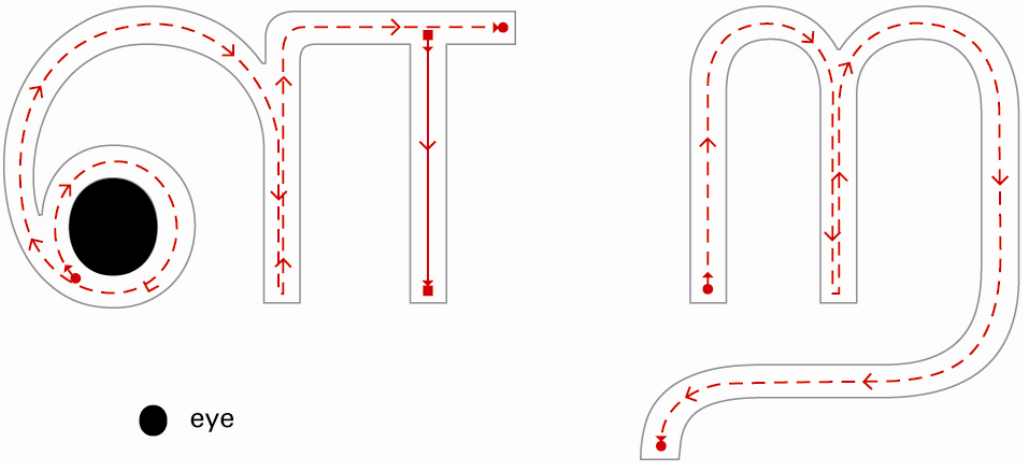
Writing process and counter spaces – Consonants

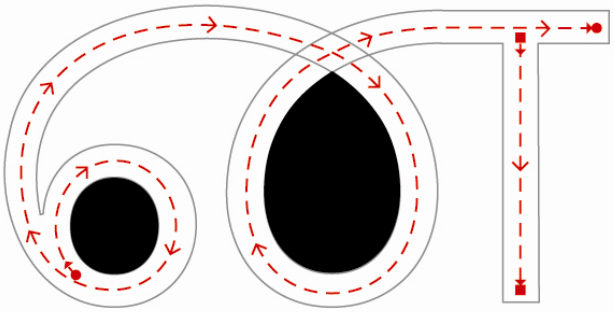




start 1
end 1
start 2
end 2
first stroke
second stroke
direction of stroke

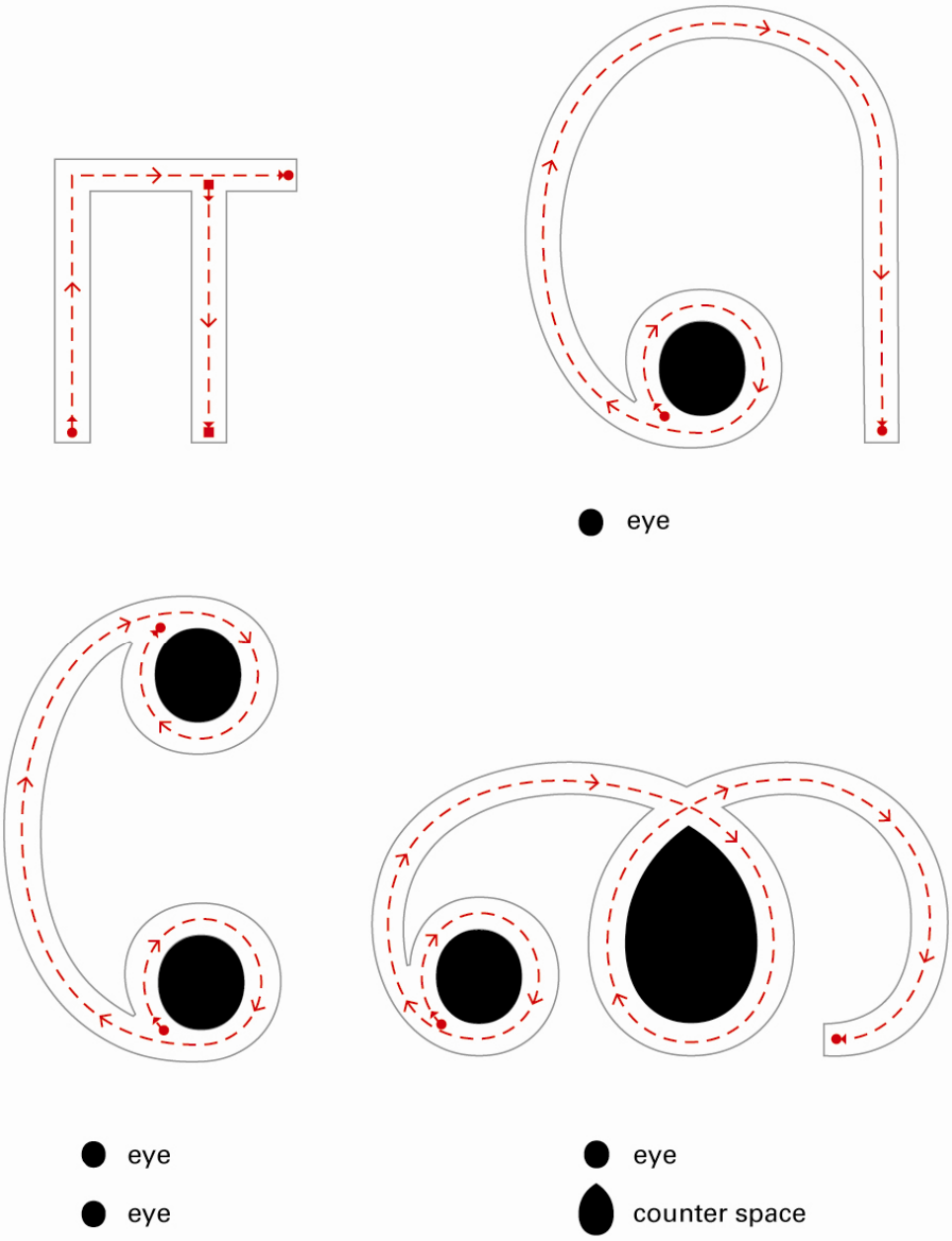
Writing process and counter spaces – Consonants



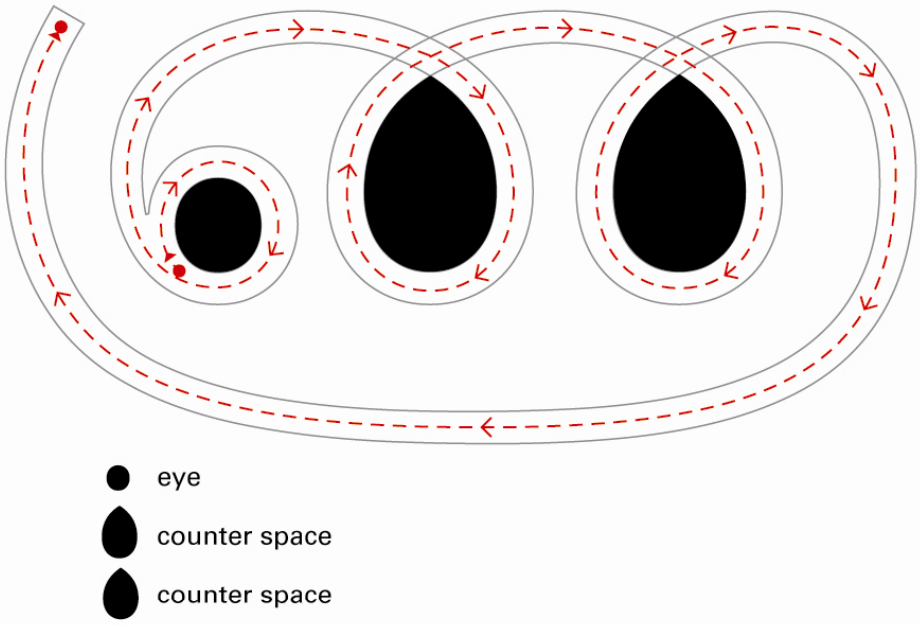


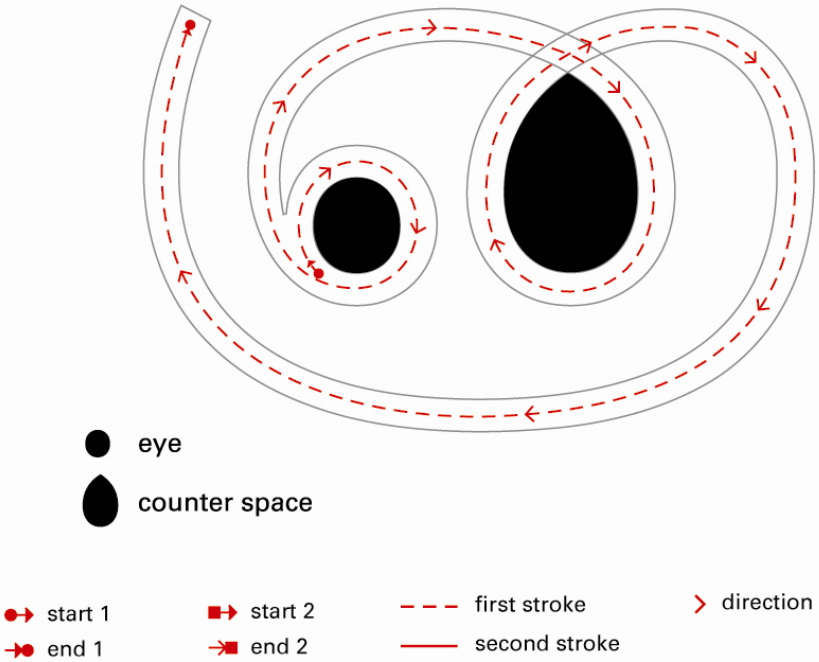
start 1
end 1
start 2
end 2
first stroke
second stroke
direction of stroke

Writing process and counter spaces – Ligature symbols



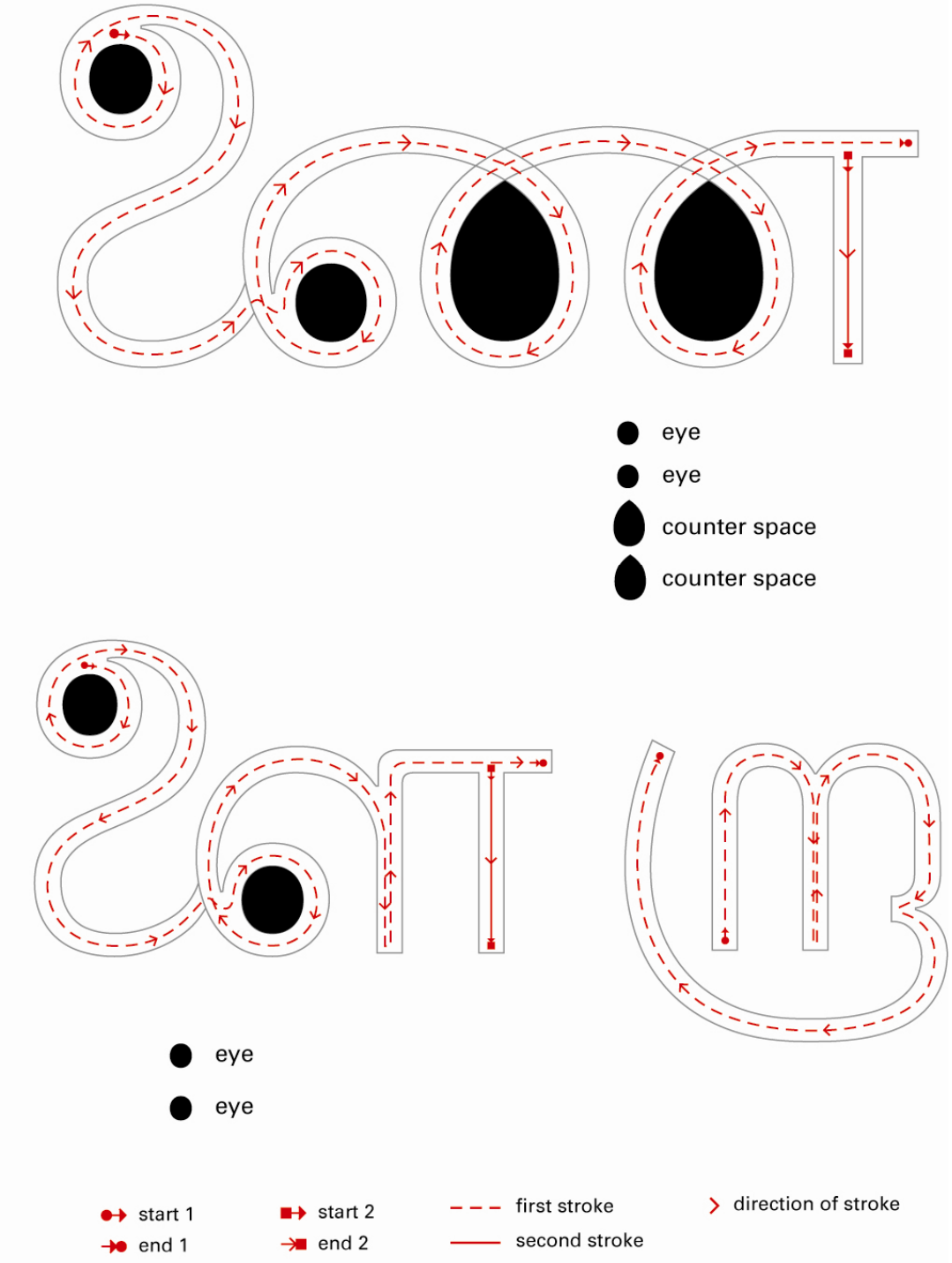
Writing process and counter spaces – Ligature symbols



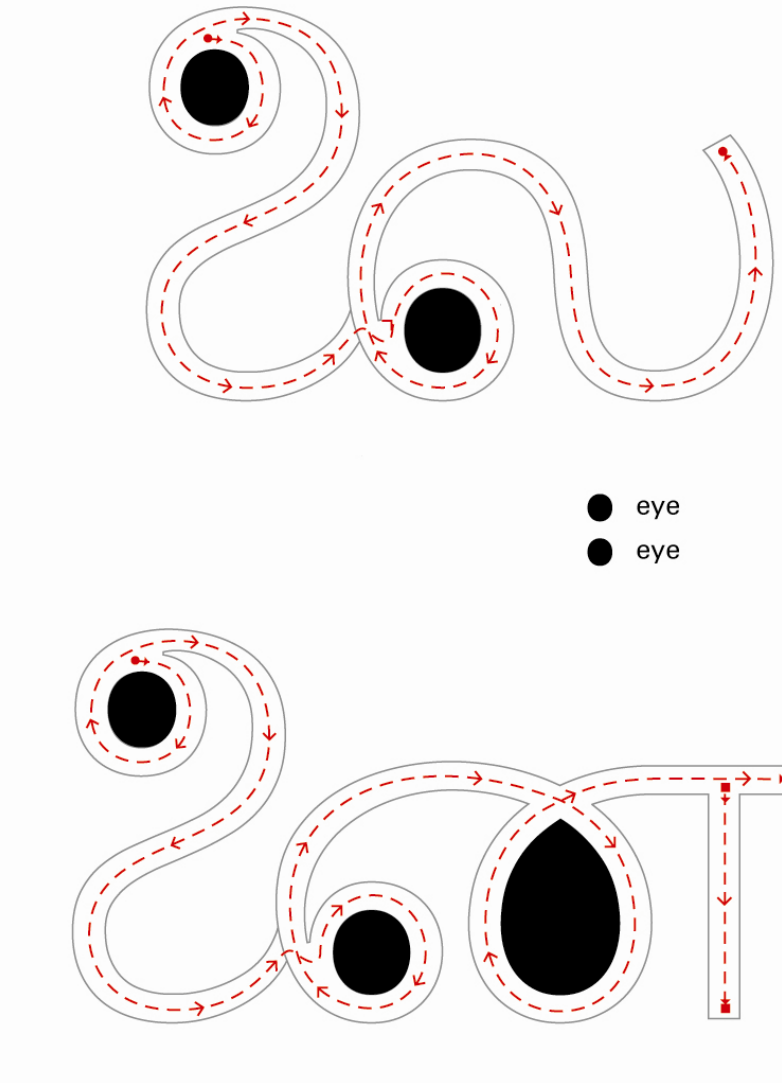


start 1
end 1
start 2
end 2
first stroke
second stroke
direction of stroke

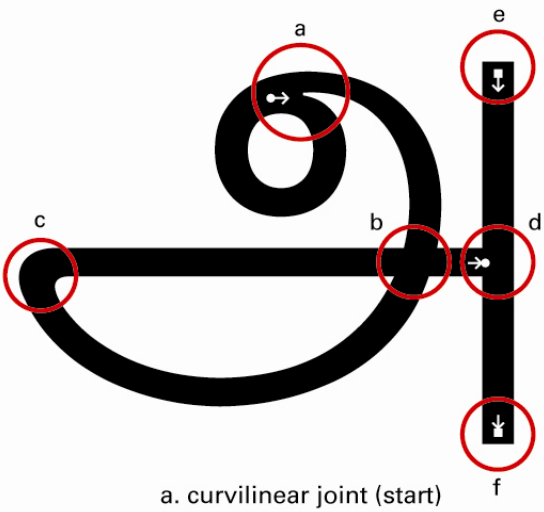
Writing process and counter spaces – Ligature symbols



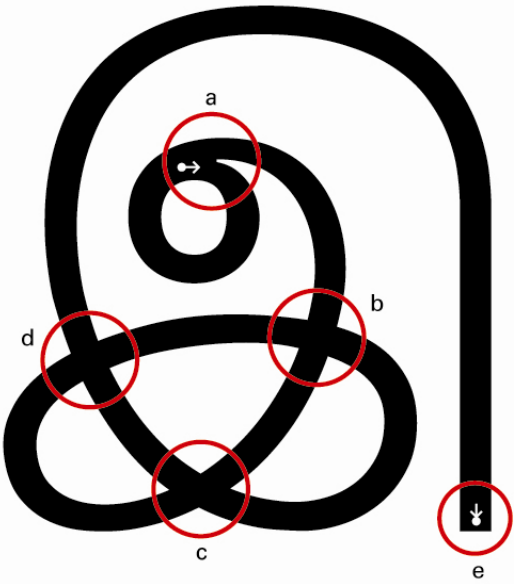
Writing process and counter spaces – Ligature symbols



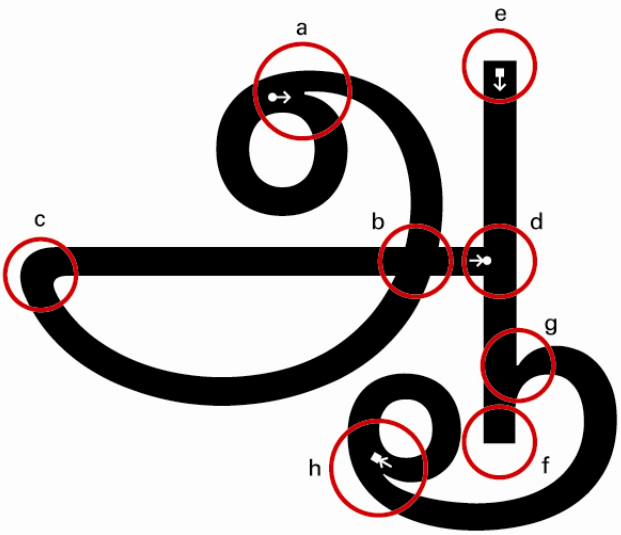
Nodes and Joints - Vowels



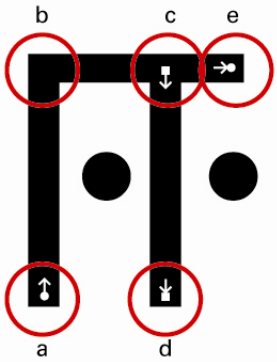
a. curvilinear joint (start)
b. intersection
c. curvature
d. terminal joint
e. terminal
f. terminal



a. curvilinear joint (start)
b. intersection
c. intersection
d. intersection
e. terminal



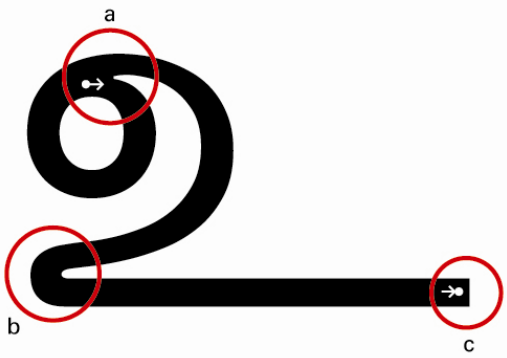
a. curvilinear joint (start)
b. intersection
c. curvature
d. perpendicular joint
e. terminal
f. terminal
g. branch
h. curvilinear joint (end)



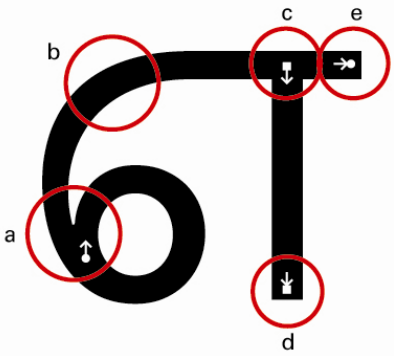
a. terminal
b. corner
c. perpendicular joint
d. terminal
e. terminal

start 1
end 1
start 2
end 2

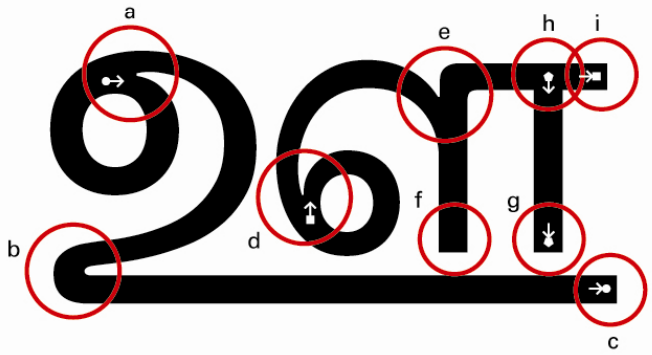
Nodes and Joints - Vowels



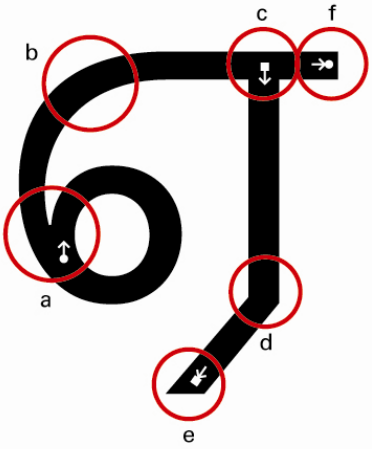
a. curvilinear joint (start)
b. curvature
c. terminal



a. curvilinear joint (start)
b. curvature
c. terminal joint
d. terminal
e. terminal



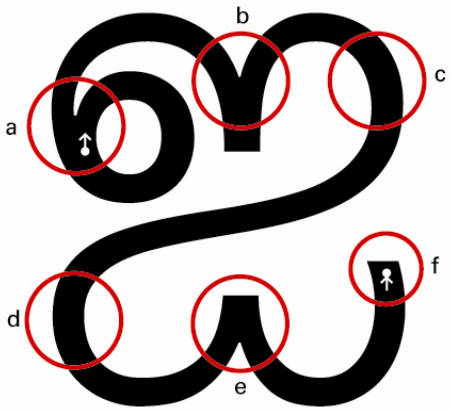
a. curvilinear joint (start)
b. curvature
c. terminal
d. curvilinear joint (start)
e. branch
f. terminal
g. terminal
h. terminal joint
i. terminal



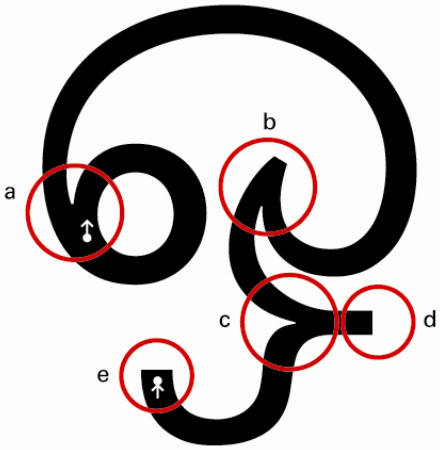
a. curvilinear joint (start)
b. curvature
c. terminal joint
d. corner
e. terminal
f. terminal

start 1 end 1 start 2 end 2 start 3 end 3

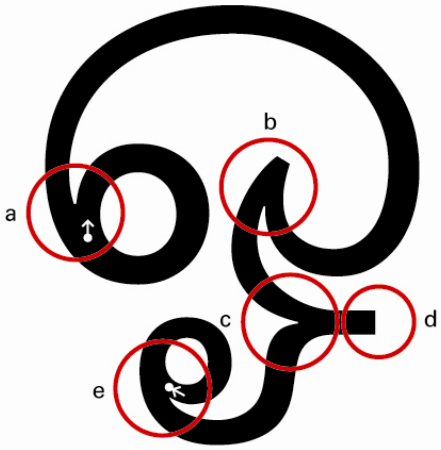
Nodes and Joints - Vowels



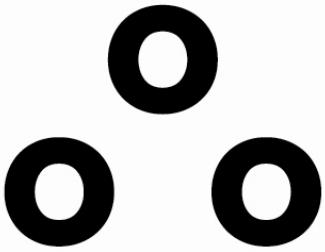
a. curvilinear joint (start)
b. curvilinear joint
c. curvature
d. curvature
e. curvilinear joint
f. terminal



a. curvilinear joint (start)
b. curvilinear joint
c. curvilinear joint
d. terminal
e. terminal

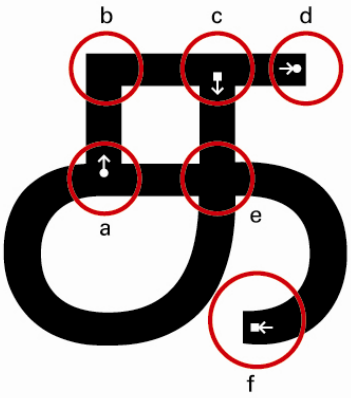


a. branching
b. curvilinear joint
c. curvilinear joint
d. terminal
e. curvilinear joint (end)

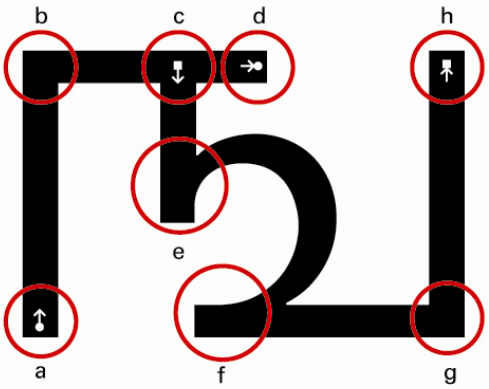


start 1
end 1
start 2
end 2

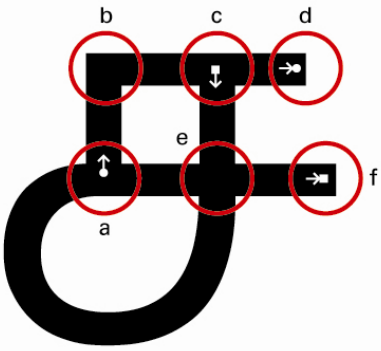
Nodes and Joints - Consonants



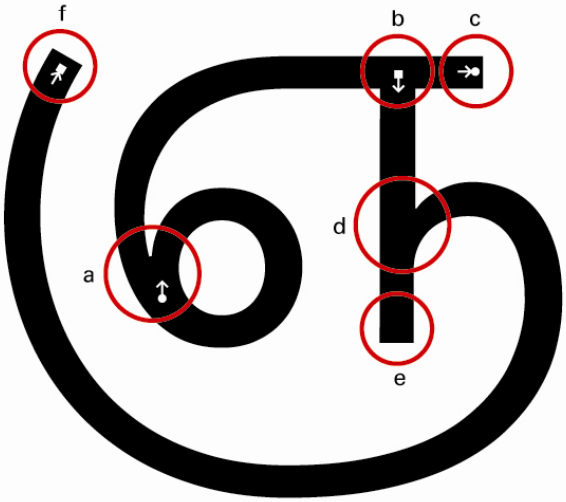
a. terminal joint
b. corner
c. terminal joint
d. terminal
e. intersection
f. terminal



a. termiinal
b. corner
c. terminal joint
d. corner
e. branch
f. branch
g. corner
h. terminal



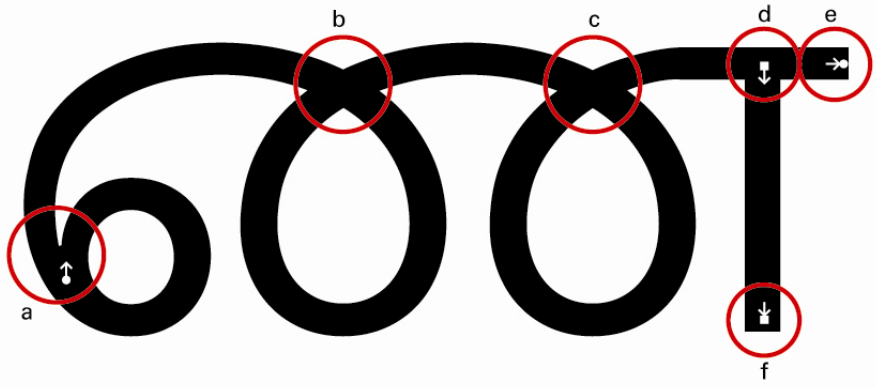
a. terminal joint
b. corner
c. terminal joint
d. terminal
e. intersection
f. terminal



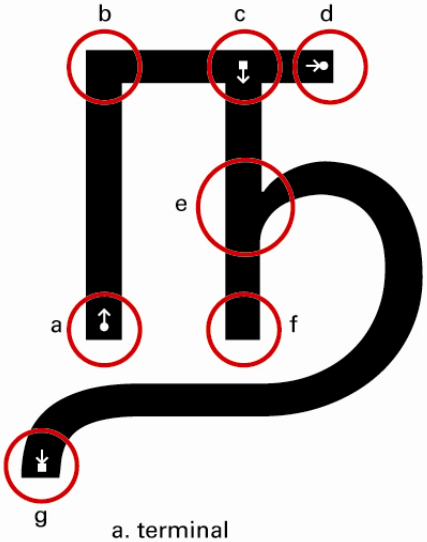
a. curvilinear joint (start)
b. terminal joint
c. terminal
d. branch
e. terminal
f. terminal

start 1
end 1
start 2
end 2

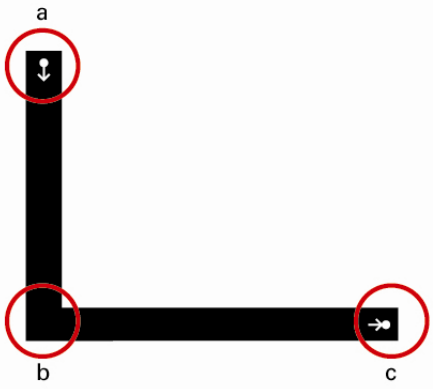
Nodes and Joints - Consonants



a. curvilinear joint (start)
b. intersection
c. intersection
d. terminal joint
e. terminal
f. terminal

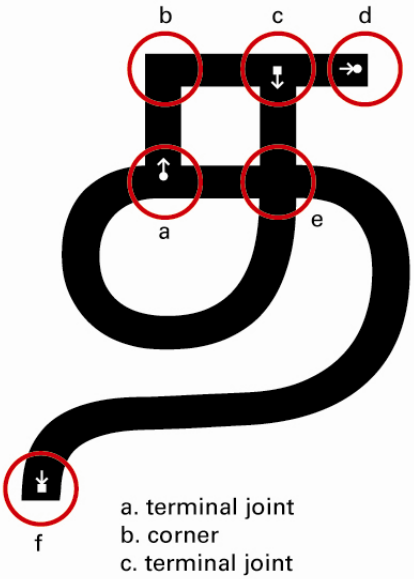


a. terminal
b. corner
c. terminal joint
d. terminal
e. branch
f. terminal
g. terminal

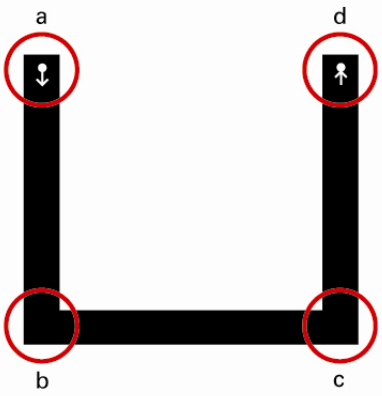


a. terminal
b. corner
c. terminal

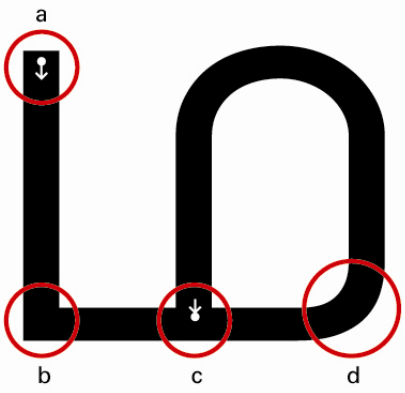
Nodes and Joints - Consonants



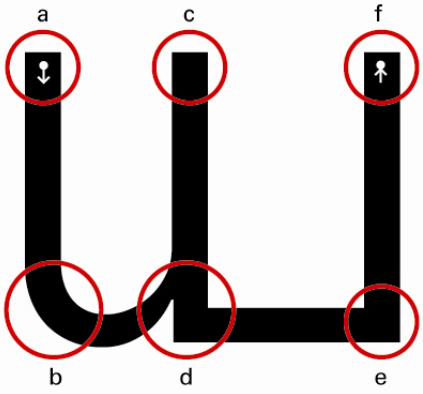
a. terminal joint
b. corner
c. terminal joint
d. terminal
e. intersection
f. terminal



a. terminal
b. corner
c. corner
d. terminal



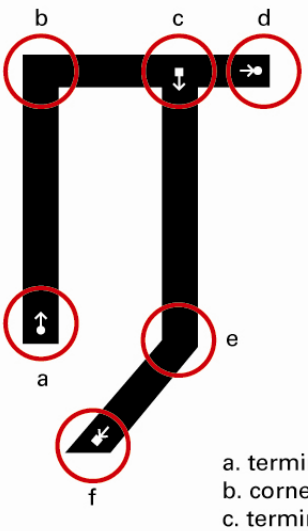
a. terminal
b. corner
c. terminal joint
d. curvature



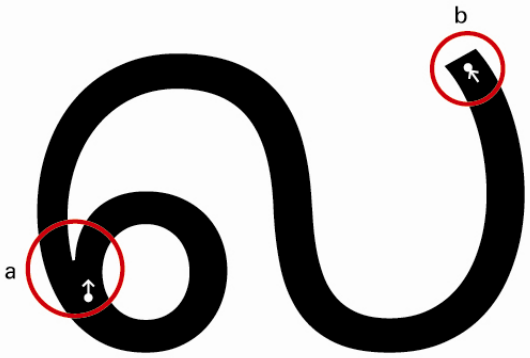
a. terminal
b. curvature
c. terminal
d. branch
e. corner
f. terminal

start 1
end 1
start 2
end 2

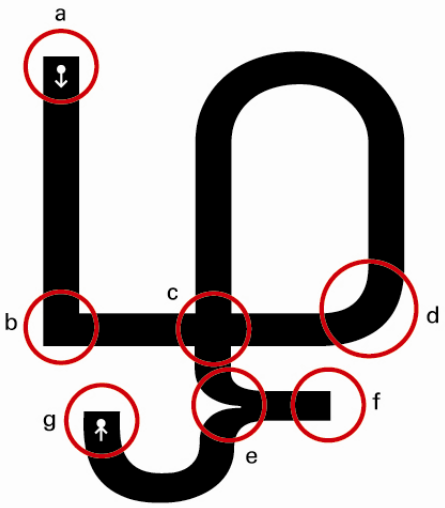
Nodes and Joints - Consonants



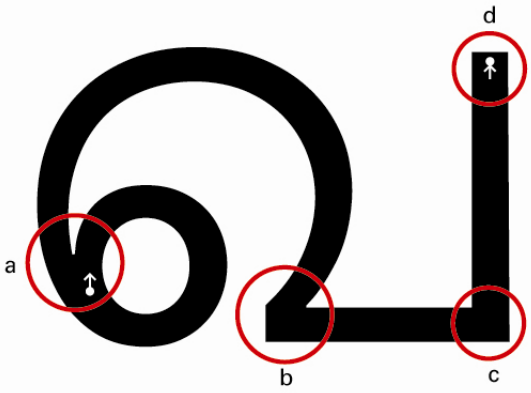
a. terminal
b. corner
c. terminal joint
d. terminal
e. corner
f. terminal



a. curvilinear joint (start)
b. terminal



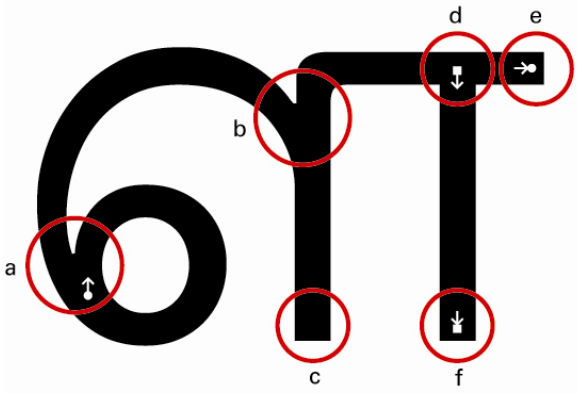
a. terminal
b. corner
c. intersection
d. curvature
e. curvilinear joint
f. terminal
g. terminal



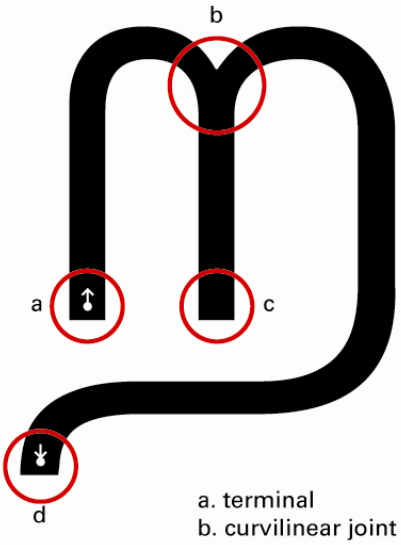
a. curvilinear joint
b. corner
c. corner
d. terminal

start 1
end 1
start 2
end 2

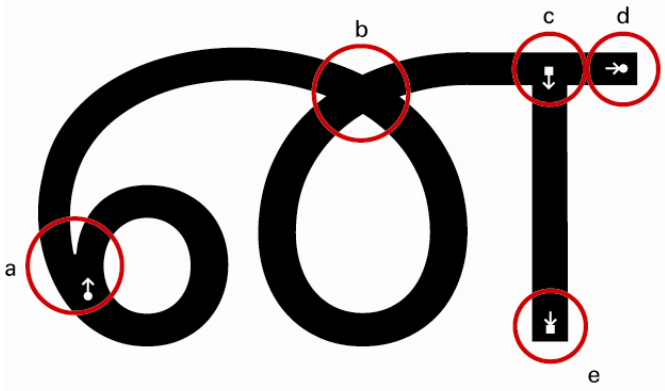
Nodes and Joints - Consonants



a. curvilinear joint (start)
b. branch
c. terminal
d. terminal joint
e. terminal
f. terminal



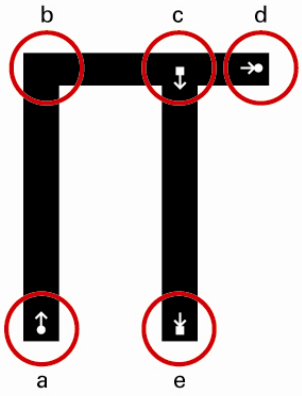
a. terminal
b. curvilinear joint
c. terminal
d. terminal



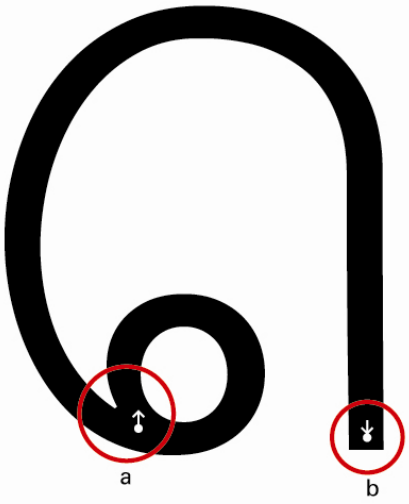
a. curvilinear joint (start)
b. intersection
c. terminal joint
d. terminal
e. terminal

start 1
end 1
start 2
end 2

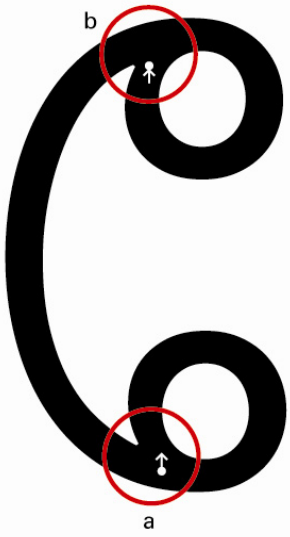
Nodes and Joints - Ligature symbols



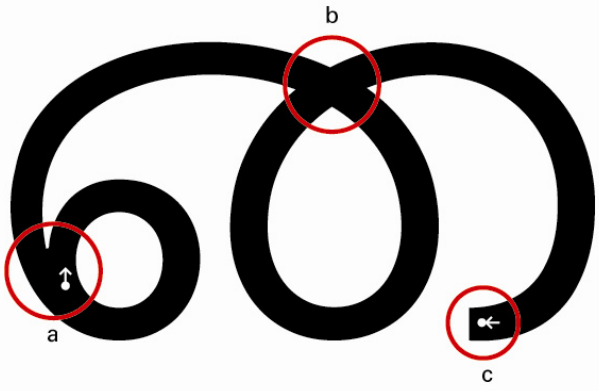
a. terminal
b. corner
c. terminal joint
d. terminal
e. terminal



a. curvilinear joint (start)
b. terminal



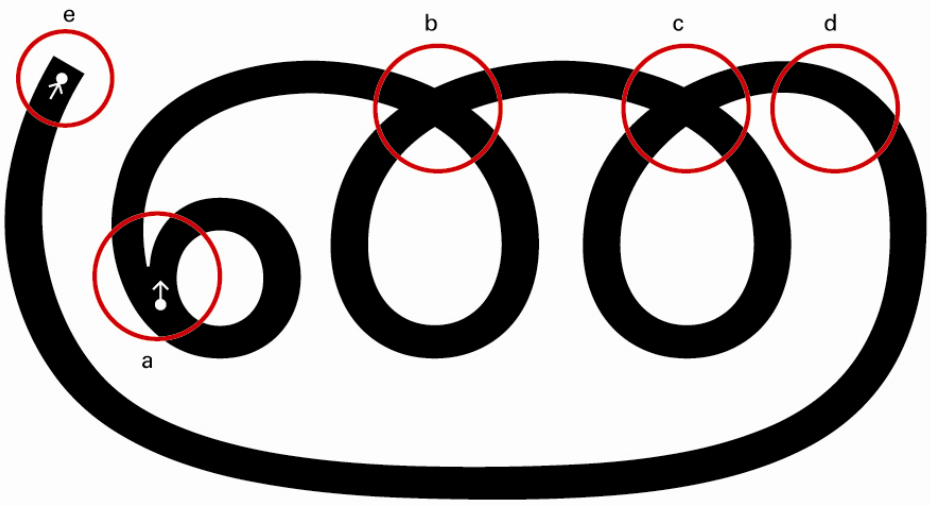
a. curvilinear joint (start)
b. curvilinear joint (end)



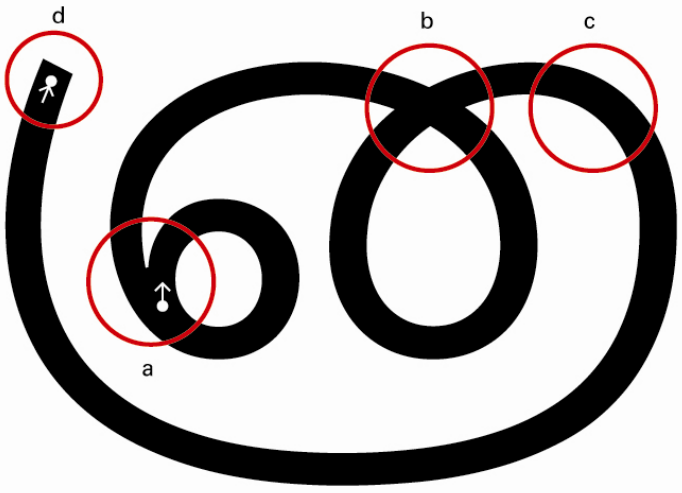
a. curvilinear joint (start)
b. intersection
c. terminal

start 1
end 1
start 2
end 2

Nodes and Joints - Ligature symbols



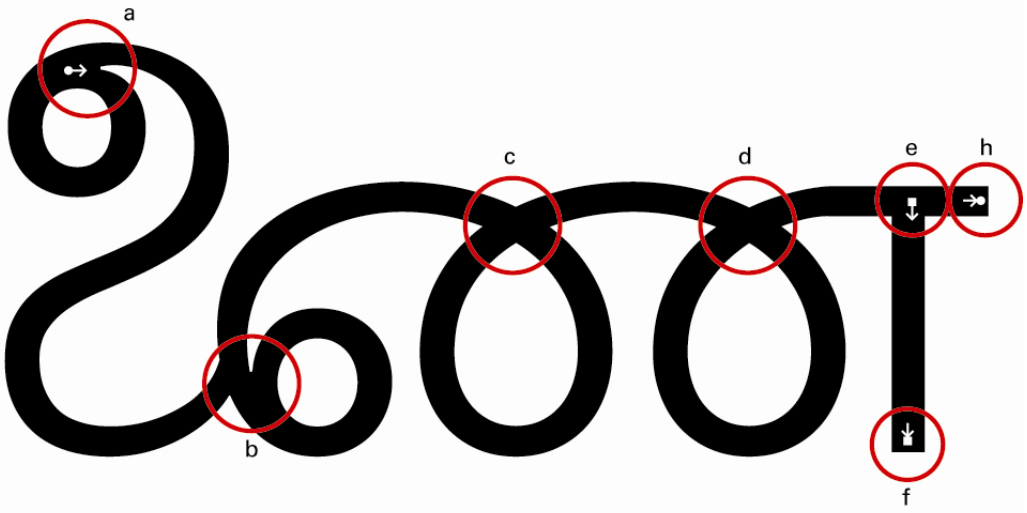
a. curvilinear joint (start)
b. intersection
c. intersection
d. curvature
e. terminal



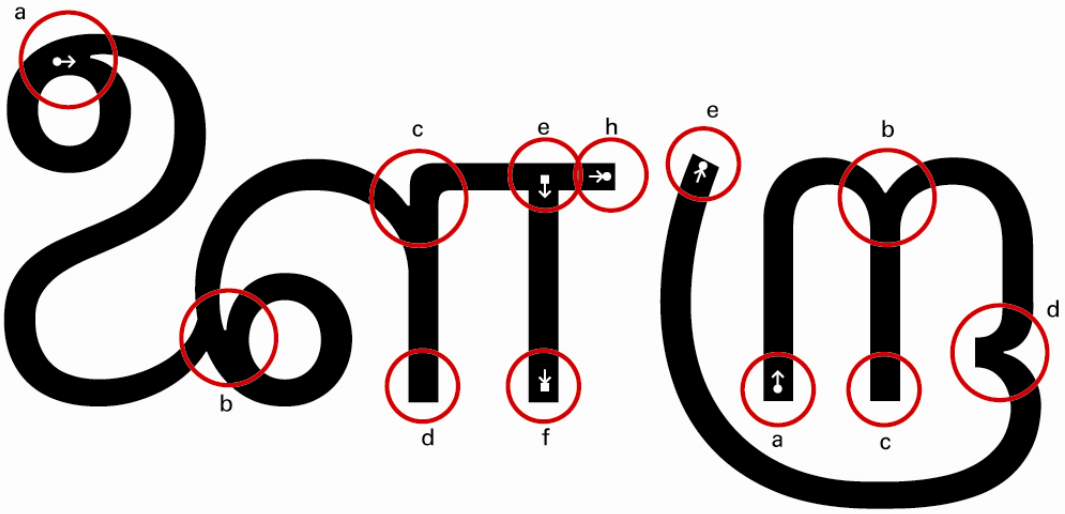
a. curvilinear joint
b. intersection
c. curvature
d. terminal

start 1
end 1
start 2
end 2

Nodes and Joints - Ligature symbols



a. curvilinear joint (start)
b. curvilinear joint
c. intersection
d. intersection
e. terminal joint
f. terminal
h. terminal

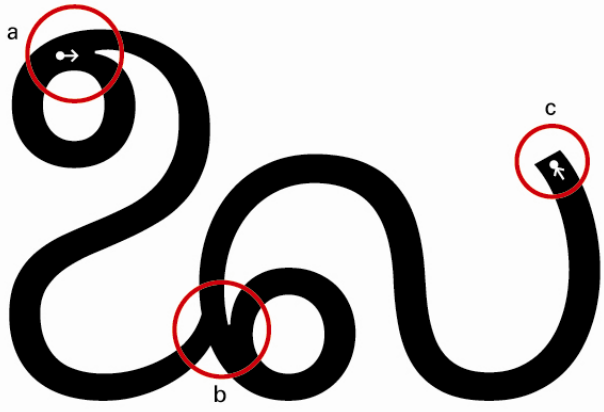


a. curvilinear joint (start)
b. curvilinear joint
c. branch
d. terminal
e. terminal joint
f. terminal
h. terminal

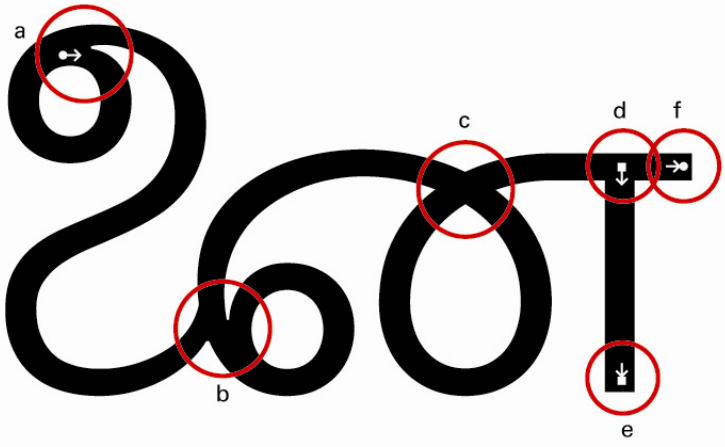
a. terminal
b. curvilinear joint
c. terminal
d. curvilinear joint
e. terminal

start 1
end 1
start 2
end 2

Nodes and Joints - Ligature symbols



a. curvilinear joint (start)
b. curvilinear joint
c. terminal



a. curvilinear joint (start)
b. curvilinear joint
c. intersection
d. terminal joint
e. terminal
f. terminal

start 1
end 1
start 2
end 2

Appendix III

Preparation of palm leaf manuscripts

There are various methods of preparing palm leaf manuscripts for writing purpose. They vary from region to region. Following are some of the methods adopted in India and Southeast Asian countries (Agrawal 1984:24-62).

Orissa – eastern state of India

In Orissa, there are several methods adopted to season the palm leaves. They are

1. People hang the tender palm-leaves in the kitchen, take them out after a few days, clean them and then apply turmeric paste to them. Turmeric paste gives the leaves a light yellow color.
2. Another method that is often used for seasoning palm leaf are, the leaves are dried completely in the sun and are then kept under the mud or silt of pond for 10-15 days, After this they are removed, cleaned and dried again in the sun for some time. Finally, a paste of turmeric is applied.
3. Boil the rough and matured leaves in water for some time. This made the leaves thin and soft. Afterwards they were cleaned with a soft cloth and kept alternatively in sun and dew for a few days. Finally, if it was so desired, turmeric paste was applied on the surface.

Sri Lanka

The usual practice was first to boil fresh young palm leaves in water, or sometimes in lime water, for a few hours, and then to dry the leaves in the shade and cut them as required.

Thailand

The method of processing palm leaves (known as *bai-karn* in the Thai language, the palm tree being called *larn*) is considerably different. The palm leaf is found in nearly all the Thai forests, but the best known variety called the golden leaf, comes from the Lopburi region. The 'golden' is due to the slightly golden green color of the leaves. After being cut from the tree, the leaves are dried in the shade. Their stiff ribs are removed with a sharp knife, and they are then cut to a uniform size. For this purpose, they are collected in bundles of about 50 leaves, put between two wooden boards of the required size and cut with a knife. For processing, a kiln heated by a wood or rice husk fire is used. There are two compartments in the kiln: a lower one for the fire and the upper one for the bundles of leaves. The leaves are fastened together in heavy wooden frames and kept inside the upper compartment of the kiln for nearly 24 hours. The fire is applied at the bottom of the kiln. During the processing the doors of the compartments are kept closed so that the fire is regulated. At the end of 24 hours, a kind of black oil exudes from the leaves and is deposited on the sides of the bundles. The bundles are taken out of the kiln, opened and the black exudation is rubbed off from each leaf with a cloth. The leaf is held over an open fire for a few minutes and is then polished. After this processing, it is found that the leaf is absolutely dry and ready for writing on. It is believed that the leaves were processed in this fashion to 'ripen' them. The process was supposed to be crucial for their preservation.

Deterioration and Preservation

There are various types of deterioration defects develop in palm leaf manuscripts. The main are:

1. Stains and spots
2. Discoloration of the surface
3. Insect damage
4. Damage due to fungus
5. Loss of flexibility
6. Splitting of the various layers of the palm leaf

For removal stains and spots from incised palm leaves, water can be used. For surface written manuscripts a non-aqueous solvent like ethyl alcohol, toluene, acetone etc. has to be used. l.l.l. Tricholroethane has also been recommended for cleaning palm leaf manuscripts.

Discoloration of the palm leaf could be for various reasons, like oxidation accumulation of dirt or frequent application of oil. Incised leaves can be cleaned by the use of dilute detergent solution. For removal of oil, a mixture of acetone and ethyl alcohol is recommended.

Insects are probably the greatest enemies of palm leaves. A detailed survey of insects living on palm leaves indicated that the only insect feeding on them is *gastrallus indicus*. One of the remedies available for the control of insects is fumigation with insecticides. It is reported that fumigation of palm leaf is best achieved with paradichlorobenzene at 65% relative humidity.

Normally fungus is not found in palm leaves. However, if it is noticed, it is cleaned off with cotton swabs moistened with ethyl alcohol. Fumigation with thymol is also helpful.

With age palm leaves become fragile and brittle. Old leaves can easily break into pieces. The edges become so weak they crumble at the slightest touch. The main cause for the loss of flexibility is the break-down of the structure of the leaf. In order to impart to the leaf the original suppleness and also an insecticidal property on oil like citronella oil, camphor oil or lemon grass oil is applied on its surface with a piece of soft cotton cloth. The excess oil is wiped off with a dry piece of cloth.

Often, there are tiny insect holes in palm leaves. To repair these holes, fibers of mulberry tissue paper can be used. An adhesive like diluted Mowicoll is mixed with the fibers. Big holes or broken edges can be made up by using material like thick Japanese tissue paper, natural wood paper veneer or unused palm leaf.

If the entire leaf is weak, it is necessary to laminate it. For lamination, silk gauze or chiffon is pasted using thin starch paste. Another material used for laminating palm leaves, is a special tissue coated on one side with acrylic rubber adhesive. In some conservation laboratories, the palm leaf is laminate between cellulose acetate foils using hot press or solvent.

Another defect often notices in palm leaves is the cleavage of the surface layer from the main body of the leaf. This type of cleavage is due to the breaking of the bond between various layers. Sometimes, the surface layer of one leaf gets stuck to the adjoining leaf. For repair of the

separated layers, an acrylic emulsion adhesive or polyvinyl acetate emulsion adhesive is used. After the separated layer is softened with ethyl alcohol and water the adhesive is applied with a thin brush and the separated layer fixed back.

The fading of writing on palm leaf is another very common defect. In the case of incised written leaves, fading is because of the loss of the ink or carbon black filled in the incisions. By the application of carbon black mixed with oil, the writing can be made visible again.

In the case surface written or surface painted manuscripts illegibility occurs because of the flaking of the ink or the paint. The leaf surface is not absorbent and therefore, the paint or the ink flakes off easily. Nothing can be done to restore this type of loss. However, for preventing the paint and the ink from flaking off, a protective coating of polyvinyl acetate solution or solution of soluble nylon can be helpful.

Storage

For storing palm leaf manuscripts, the best way is to keep each of them between two wooden boards in the manner of the traditional practice. If the manuscripts are kept tightly bound, warping of leaves does not occur. To prevent accumulation of dust each bundle is wrapped in a piece of cloth. An insecticide like paradichlorobenzene can be used within storage cupboards.

Stages of palm leaf manuscript preparation
– from raw palm leaves to written manuscripts

Appendix IV

Questionnaire

A questionnaire was prepared before the field visit to Tamil Nadu. The questions were asked to various people who were experts in Tamil language and printing. This included Professors, Research scholars, Design professionals, Students and Printers. Their responses were taken down on notes. Following are part of the questionnaire where the questions were divided into specific categories.

Tamil Language

1. What is the uniqueness of Tamil language?
2. What are the richness of Tamil tradition and culture?
3. What do you think is unique about Tamil letterforms?
4. How is the Tamil script different from the other languages?
5. What can you understand from the term Tamil typography? Do you think it is different from other languages?
6. How is lettering art taught? What are the basics of Tamil lettering?

History

1. How did the written communication started from the oral tradition?
2. How did the stone inscriptions and metal inscriptions influence Tamil script?
3. When and how did paper come to India?
4. Did other art forms such as sculpture, architecture, painting influence letterforms?
5. What were the political influences on the scripts? When and who made the changes?
6. How are Tamil letters classified or grouped? Is there any visual classification too?
7. What letters got included from the other languages and how?

Palm leaf writing

1. How are palm leaves prepared for writing?
2. How are palm leaves preserved earlier and now?
3. Are there any processes or rules for writing on palm leaf? How is it written?
4. How did palm leaf and stylus govern the Tamil script? What letters got modified?
5. Why there isn't any spacing between the letters on palm leaf writing?
6. What happened to palm leaf writing after the printing came to India? Does anyone still write on palm leaf?
7. What were the elements which got implemented in printing from palm leaf?
8. What is the difference in palm leaf script and the present script?

Printing

1. How did printing spread in India?
2. Who are the people behind the early printing presses in India?
3. What is your observation about the early printed works?
4. How was Tamil characters designed, cast, composed and printed?
5. How did printing influence Tamil script?
6. What are the limitations in Tamil printing?
7. Were there any new innovations in printing techniques as Tamil characters were huge in numbers and different in form?

I would like to sincerely thank the following people for their valuable time, comments and suggestions on my research. List of people visited during the field visit

1) Mrs. Kameshwari
Director
Kuppuswami Shastri Research Institute
Mylapore, Chennai

2) Mrs. Lalitha
Librarian
Kuppuswami Shastri Research Institute
Mylapore, Chennai

3) G. Sunder
Director
Roja Muthiah Research Library
Taramani, Chennai

4) Mrs. Vasantha Kalyani
Epigraphists
Tamil Valarchi Kalzaham
Egmore, Chennai

5) Mr. Namashivayam
Librarian
Tamil Nadu Government State Archives
Egmore, Chennai

6) Mrs. T. V. Geetha
Professor and Head of Computer Science and Engineering department
Anna University
Guindy, Chennai

7) Mr. K. T. Narasimhan
Superintending Archaeologist
Archaeological Survey of India
Fort St. George

8) Dr. Rajavelu
Senior Epigraphist
Office of Deputy Superintending Epigraphist
Fort St. George

9) Dr. Kalyana Krishanan
Professor, Computer Science Department
Indian Institute of Technology Madras
Guindy, Chennai

10) Mr. Elangovan
Managing Director
Cadgraf Digital Pvt. Ltd.
Nungambakkam, Chennai

11) Mrs. Leela Samson
Director
Kalakshetra Foundations
Thiruvanmayur, Chennai

12) Mr. Shankara Narayanan
Director
Tamil virtual university
Taramani, Chennai

15) Dr. John Samuel
Director
Institute of Asian Studies
Shozlingnallur, Chennai

16) Dr. Ganesan
Researcher and Palm leaf manuscript library in charge
French Institute of Pondicherry
Pondicherry

17) Mr. Vijay Venugopal
Researcher (Former HOD of Kamarajar University, Madurai)
Ecole française d'Extrême-Orient
Pondicherry

18) Mr. Y. Subburayalu
Coordinator of the Research on Ancient maps
(Former director of the Epigraphy Department, Tamil University)
French Institute of Pondicherry
Pondicherry

19) Mr. Soundarapandian
Curator
Government Oriental Manuscripts Library
Madras University, Chennai

20) Mr. Prabhakaran
Archives In-charge
Gurukul Lutheran Theological College and
Research Institute
Kilpauk, Chennai

21) Mr. S. Rajagopalan
Senior Epigaphist
State Archaeology Department
Egmore, Chennai

22) Mr. Perumal
Conservator
Serfoji Maharaja Saraswathi Mahal Library
Tanjore

23) Mr. Rajan
Director
Archeological department, Tamil University
Tanjore

24) Dr. Sunderesan
Director
Tamil University Library
Tanjore

25) Mr. Gunasekaran
First grade librarian
Tamil University Library
Tanjore

26) Mr. Ayynar
Professor
Fine arts and Folk arts department,
Kamarajar University
Madurai

27) Mrs. Meenakshi
Assistant librarian
Connemera Public Library
Egmore, Chennai

19) Prof. Venkatachellapathy
Madras Institute for Development Studies
Adyar, Chennai

Appendix V

List of resources

I am thankful to the following people, institutions, libraries and museums for providing me with the resources on palm leaf manuscripts and early print examples in Tamil.

Govt. Oriental Manuscripts Library, University of Madras, Chennai

Pulavar Chockalingam, Tanjore

French Institute of Pondicherry, Pondicherry

Kuppuswami Shastri Research Institute, Chennai

Tamil Valarchi Kalzaham, Chennai

Tamil Nadu Government State Archives, Chennai

Connemera Library, Chennai

Tamil University library, Tanjore

Archaeological Survey of India Library, Chennai

Serfoji Maharaja Saraswathi Mahal Library, Tanjore

Palm Leaf Manuscript Library, Tamil University, Tanjore

Roja Muthaiah Research Library, Chennai

International Institute of Tamil Studies, Chennai

Dr. U.V.S.I. Library, Chennai

Appendix VI

Visual documentation of palm leaf manuscripts

Digital format was used to photograph the manuscripts. The purpose of using digital photography was the images could be viewed in real time to meet the necessary requirement. This saved time and also multiple images were possible to take in the format. And importantly these images were easy to transfer directly to the computer system to review it.

Photographic set-up

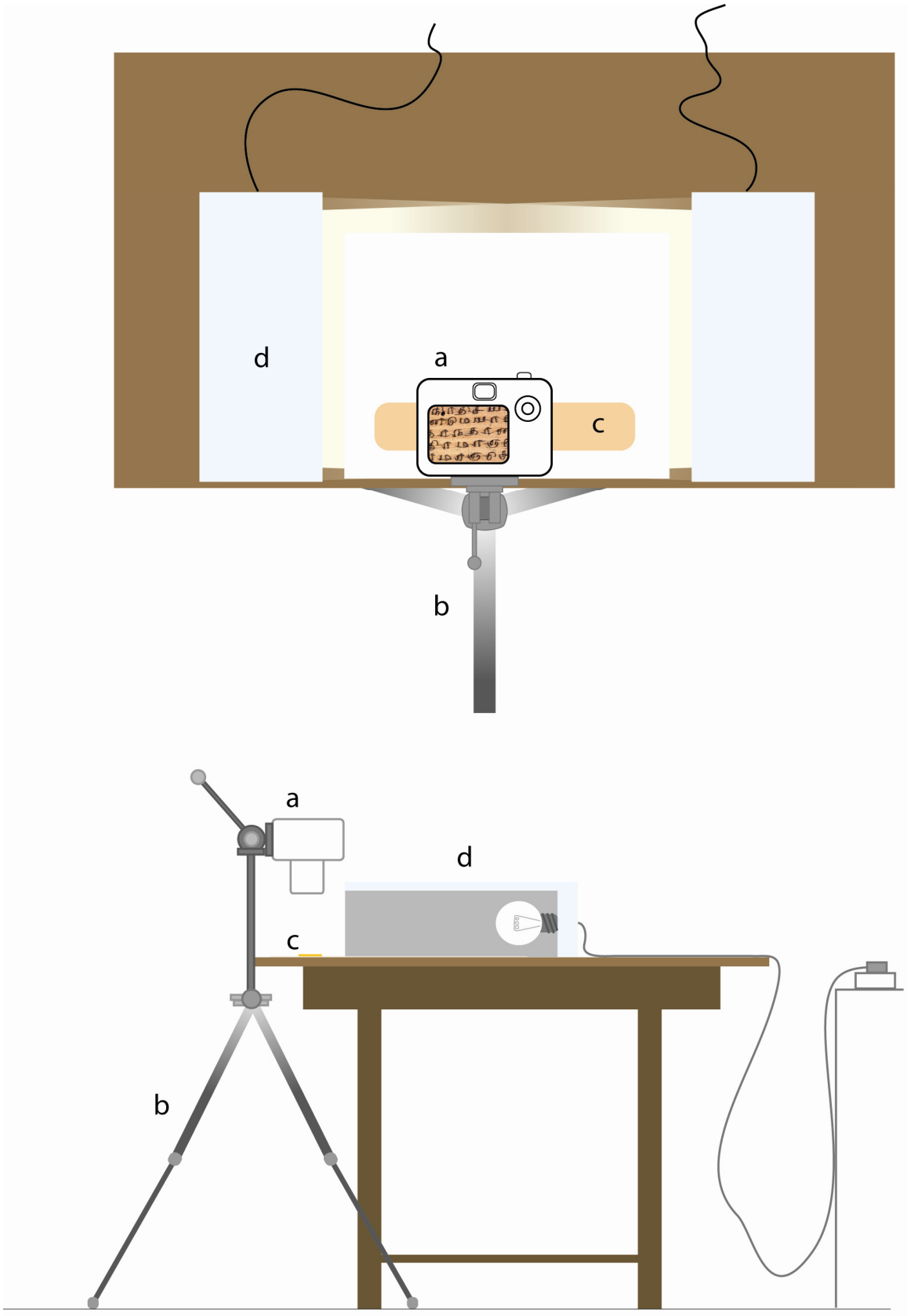
During first few field visits palm leaf manuscript were photographed randomly with a digital camera at different magnification and resolution. After studying those photographic images, a setup was designed which best highlighted the letterforms of manuscripts. A fixed set-up with constant camera setting was designed to attain consistency across the shoot. Once the setup was designed, a pilot photo shoot was carried out with few sample manuscripts to test the quality of end result. After several experiments following setup was adopted.

Final settings

Professional Digital SLR camera, Nikon D70 with AF-Nikkor 60mm f/2.8 Micro Lens and 1 GB memory card was used to photograph manuscripts. The camera was mounted on a tripod to avoid shake and blur images. The camera lens was placed at an approximate height of 10-12cm from the manuscript. The images were shot with following camera settings:

- Manual focus
- High resolution of 2256 x 1496 pixels
- Fine quality
- Single image photo
- Macro option on
- With no Flash

Individual leaves were removed from the palm leaf manuscript bundle and was photographed one at a time. The leaf was placed horizontal on a table with white background. Approximately four to five close-up images of one leaf was shot depending on the length and width of the manuscript. To compensate inadequate lighting light boxes at short distance was used. Initially flash was used but the use of in-built flash created a glare at the centre of the manuscripts. This was because of the treatment of lemon grass oil for preservation purpose which reflected the light. This reflection partly removed the vital information by creating fog at the centre. Therefore, the manuscript was illuminated from either side using a 60watts white incandescent bulb in a light box, designed using thermacol. Following is the illustration of the setup.



a. Digital camera
b. Tripod
c. Palm leaf manuscript
d. Light boxes

Log Book

A notebook/log book was used to enter general information about the manuscripts photographed. The data was manually entered before every photo shoot. From this, indexes of the manuscripts were prepared according to the date and file number. This was then transferred digitally on to the computer system in folder wise.

Date: 08.10.08
Time: 3:00 p.m.
Serial number: 33
Accession code: TD 599 / D 1254
Manuscript Name: Saruvanyana Kavothiram
Dimension: 17.5cm x 3.2cm
Total no. of leaves: 49
Lines per leaf: 7

Leaf no.: 29
File no: 223-227

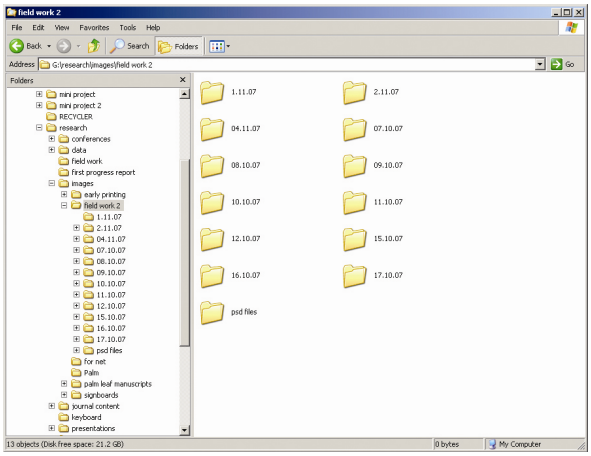
Leaf no.: 29 B*
File no: 228-232

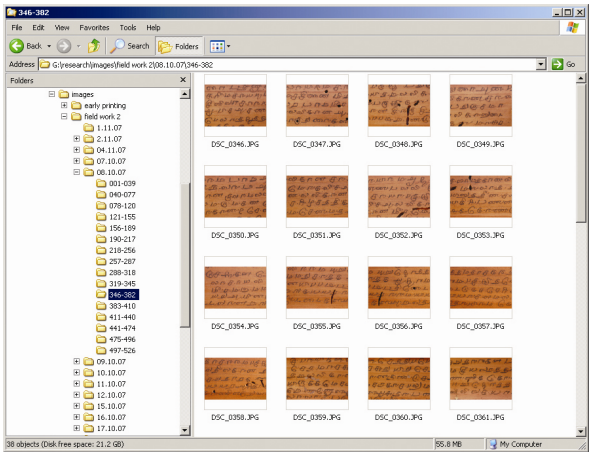
B* indicate backside of the previous leaf

Around 136 palm leaf manuscript bundles were photographed. Approximately 6-10 leaves were photographed from each bundle depending on the size of the manuscript. A total of more than 4500 images were captured using the setup for the research.

File organization

As there were enormous amount of digital files created, it was important to structure the stored information for easy access and retrieval. Digital files were stored in date wise folders as in when the images were shot. Within the date wise folders each manuscript has a folder named according to the file number in the data sheet. Manuscripts were identified using the date and file number using the log book.





Appendix VII

A chronological list of early printed books in Tamil

Year	Place	Title of the book	Author
1554	Lisbon	Da Cartilha de litura dountrina em lingua Tamule Portugues	
1577	Goa	Doctrina Christam	Fr. Henrique Henriquez
1578	Quilon	Doctrina Christam	Fr. Henrique Henriquez & Fr. Manoel De Sao Pedro
1579	Cochin	Doctrina Christam	Fr. Henrique Henriquez
1580	Cochin	Confessionairo	Fr. Henrique Henriquez
1586	Punicle	Flos Sanctrum	Fr. Henrique Henriquez
1671	Rotterdam	Tamil grammar	John Borstius
1675	Ambalakad	Nygana Upadesam	Robert de Nobili
1675	Cochin	Nygana Upadesam (second edition)	Robert de Nobili
1678	Amsterdam	Horti Indici Malabarici	
1679	Ambalakad	Tamil Portuguese dictionary	Antem de Proenca
1713	Halle	Symbolum Apostolicum in Lingua Malabarica	
1714	Tranquebar	The four Evangelists and the Acts of the Apostles	Bartholomeaus Ziegenbalg
1714	Tranquebar	The Malabar New Testament	Ziegenbalg
1716	Halle	Grammatica Damulica	Ziegenbalg
1723	Tranquebar	Biblia Dumulica (first Bible in Tamil)	Ziegenbalg
1740	Colombo	Mathew Catechism	Rev. A Kramer
1749	Germany	Nygana Mandri Selva pungavam	
1749	Colombo	New Testament	
1753	Colombo	Sathiyathin Jebam	Phillip Themello
1755	Colombo	Davidin Sangeethangal	
1759	Colombo	New Testament	
1760	Colombo	Hollander Mission prayers	
1779	Vepery	A Malabar and English dictionary	Fabricius
1781	Tranquebar	Rituale Trangambaricum	

Year	Place	Title of the book	Author
1786	Vepery	A English and Malabar dictionary	Fabricius
1789	Vepery	A Grammar for learning the principles of Malabar Language	
1791	Rome	Systema Bramhanicum	Museiborgiani Velitris
1806	Vepery	Kodugtamil	Fr. C G Beschi
1811	Madras	Tamil Vilakkam	Subhuraya Mudaliar
1812	Madras	Thirukkural	
1813	Madras	Grammar brief	
1815	Madras	Ramayana (Uthrakaandam story)	
1819	Madras	Poorura Chakravarthy Vasakappa	
1820	Madras	Thirukkural (Arappal)	F W Ellis
1822	London	The adventures of Gooroo Paramartan	Fr. C G Beschi
1824	Madras	Sadur Grammar	Fr. C G Beschi
1827	Colombo	Devasagayam Pillai drama	Muthukumaraswami Pulavar
1828	Madras	Question and answers in grammar	Thandavaraya Mudaliar
1832	Pondicherry	Thonnool Vilakkam	Fr. C G Beschi
1839	Madras	Vengaikkovai	Vellaimuthu Mudaliar
1842	Madras	Seeravengira Puranam	
1847	Madras	Vediar Oluzhukkam	Fr. C G Beschi
1852	Pondicherry	Thenvabavani	Fr. C G Beschi
1853	Madras	A grammar of the Tamil language	Rhenius
1856	London	A comparative grammar of the Dravidian	Robert Caldwell
1858	Pondicherry	Tholkappiya Nunool	
1858	Pondicherry	Vocabulaire francais – Tamul	
1859	Madras (P.R. Hunt)	G.U. Pope's third Tamil grammar	G U Pope
1859	Madras (P.R. Hunt)	A Tamil hand-book	G U Pope
1862	Madras (P.R. Hunt)	A comprehensive Tamil and English dictionary of high and low Tamil	Miron Winslow

Appendix VIII

List of Tamil palm leaf manuscripts examined in the study

S. No.	Accession Number	Title
1.	**112**	Rāmāyaṇa Nūṟṟāṭaṭi (commentary)
2.	**TR 3252 / R 9008**	Maruntu Ceymuṟaikaḷ
3.	**TR 292 / R 375**	Periyatirumoḻi Viyākayāṉa Curumpatam
4.	**TR 3444 / R 9310**	Tēvaram
5.	**TR 3432 / R 9272-77**	Akattiyar Nayaṉār Kuḻantai Māntatukku Maruntu
6.	**TR 3289 / R 9053**	Caūṭāmaṇi Nikaṇṭu
7.	**TR 3281 / R 9039**	Makāvākkiyam
8.	**TR 3280 / R 9038**	Tiruvaḷḷuva Nayaṉār Kuṟaḷuṟai
9.	**TR 3297 / R 9063**	Periyapurāṇam
10.	**TR 3305 / R 9073**	Vālmīki Rāmāyaṇam
11.	**TR 3526 / R 941; R 9462**	Cōtiṭam Maruttuvam
12.	**TR 3500 / R 9402**	Itrāmāyaṇa Katai
13.	**TR 3427 / R 9267**	Īcuvara Kītai
14.	**TD 119 / D 2987 – 89**	Cōḷaṅkipuram Tēvastāṉa Kaipītu
15.	**TD 1099 / D 258 – 9**	Titipuvaṇaṅa Kōyil Talavaralāṟu
16.	**TD 1106 / D 2769**	Caturyukap Piramāṇamum Tēcanirṇayamum
17.	**TD 1104 / D 2766**	Kāñcivaratarājacuvāmi Kōyiṟ Paṭittaṉak Kaipītu
18.	**TD 1114 / D 2791**	ṭilli Rājākkaḷ Carittiram
19.	**TD 1108 / D 2776**	ṭilli Rājākkaḷ Carittiram
20.	**TD 1083 / D 2726**	Koṅtēca Rāja Carittiram
21.	**TD 1105 / D 2768**	Karnāṭaka Rājākkaḷ Varalāṟu
22.	**TD 295 / D 502**	Cāraṅkatraya Shakāṉam
23.	**TD 292 / D498**	Maṉmata Nāṭakam
24.	**TD 294 / D 501**	Cāraṅkatraya Shakāṉam
25.	**TD 293 / D 500**	Vaḷḷiyammai Nāṭakam
26.	**TD 291 / D 497**	Pirakalāta Nāṭakam
27.	**TD 392 / D 631**	Virutācala Purāṇam
28.	**TD 393 / D 1162**	Virutācala Purāṇam
29.	**TD 394 / D 635**	Virutācala Purāṇam
30.	**TD 395 / D 636**	Virutācala Purāṇam

S. No.	Accession Number	Title
31.	**TD 396 / D 637**	Virutācala Purāṇam
32.	**TD 596 / D 1231**	Upatēca Cittanta Viḷakkam
33.	**TD 594 / D 1226**	Uṅmaia Viḷakkam
34.	**TD 599 / D 1254**	Caruvañāṉa Kāvōttaram
35.	**TD 598 / D 1240**	Eḻuvakait Tōṟṟam
36.	**TD 597 / D 1232**	Upatēcappa ṟōtai
37.	**TD 364 / D 586**	Tiruccentūr Talapurāṇam
38.	**TD 365 / D 590**	Tiruppācūrttala purāṇam
39.	**TD 366 / D 593**	Tiruvātavūār Purāṇam
40.	**TD 367 / D 594**	Tiruvātavūār Purāṇam
41.	**TD 368 / D 595**	Tiruvātavūār Purāṇam
42.	**TD 426 / D 682**	Tirukkuṟantāṇṭakam
43.	**TD 425 / D 678**	Kaṇṇinūṇ Ciṟuttampu Viyākayāṉa Cukumpatam
44.	**TD 422 / D 673, 695, 706**	Kaṇṇinūṇ Ciṟuttampu Viyākkinyāṇam
45.	**TD 773 / D 1983**	Civajālattiraṭṭu
46.	**TD 776 / D 1976**	Vaittiya Nūl
47.	**TD 772 / D 1982**	Cittarārūṭam (Toṇṭi)
48.	**TD 774 / D 1992**	Uḷḷamuṭaiyāṉ Uraiyuṭaṉ
49.	**TD 609 / D 1296**	Civappirakācak Kaṭṭalai
50.	**TD 610 / D 1298**	Civappirakācak Kaṭṭalai
51.	**TD 606 / D 1275**	Civañāṉa Pōtam
52.	**TD 607 / D 1278**	Civañāṉa Pōtam Cūrṇikaik Kōttu
53.	**TD 611 / D 1039**	Civapparakācam Uraiyuṭaṉ
54.	**TD 612 / D 1310**	Civappirakāca Mūlakkaruttu
55.	**TD 608 / D 1294**	Civapōkacāram
56.	**TD 613 / D1313**	Civapōka Tīpikai

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