॥श्री राम॥

बा हाणें बाळबोध अक्षर घडसन करावें सुंदर जें देखतांचि चतुर। समाधान पावती ॥१॥

वा टोकें सरकें मोकळें। वोतलें मसीचें काळें। कुळकुळीत वोळी चालिल्या ढाळें। मुक्तमाळे जैशा ॥२॥

अ क्षर मात्र तितुकें नीट। नेमस्त पेंस काने नीट। आड्या मात्रा त्याही नीट। आकुळी वेलांटया ॥३॥

प हिलें अक्षर जें काढिलें। ग्रंथ संपेतों पाहात गेले। येका टांकेंचि लिहिले। ऐसे वाटे ॥४॥

अ क्षराचें काळेपण टांकाचें ठोंसरपण। तैसेंचि वळण वांकण। सारिखेंची ॥५॥

वो ळीस वोळी लागेना। आकुळी मात्रा भेदीना। खालिले ∞ वोळीस स्पर्शेना। अथवा लंबाक्षर ॥६॥

पा न शिष्यानें रेखाटावे। त्याचेवरी नेमकेंचि त्याहावें। दुरी जवळी न व्हावें। अंतर वोळीचें ॥७॥

को ठें ३ो। धार्सी आडेना। चुकी पाहातां सापडेना। गरज केल्या हें घडेना। लेखनकापासुनी ॥८॥

ज्या चें वय आहे नूतन। त्यानें त्याहावें जपोन। जनासी पडे मोहन। ऐसें करावें ॥९॥

ब हु बारीक तरुणपणीं। काम। न ये म्हातारपणीं। मध्यस्थ लिहिण्याची करणी। केली पाहिजे ॥१०॥

भों वतें स्थळ सोडून धावें। मध्येंचि चमचमित त्याहावें कागद झडतांहि झडावें। नलगे-चि अक्षर ॥११॥

ऐ सा ग्रंथ जपोनी त्याहावा। प्राणि मात्रांस उपजे हेवा ऐसा पुरुष तो पाहावा। म्हणती लोक ॥१२॥

का या बहुत कष्टवावी। उत्कट कीर्ति उरवावी। चटक लावुनी ∞ सोडावी। कांहीं येक ॥१३॥

घ ट्य कागद आणावे जपोन नेमस्त राखावे। लिहिण्याचे सामे असावे। नानापरी ॥१४॥

सु ज्या कातड्या जागाईत। राखी घोटाळें तागारेत। नाना मुरंग मिश्रित। जाणोनि घ्यावे ॥१५॥

ना नादेशींचे बरु आणावे। घट्य बारीक सरळ घ्यावे नानारंगांचे आणावे। नाना जिन्नसी ॥१६॥

ना ना। जिन्नसी टांकतोडणी। नाना प्रकारी रंगवारणी। विचित्रविचित्र करणी। सिमलोल्या ॥१७

हिं गुळ संग्रहीं असावे। वाळके आळिते पाहों न घ्यावे। सोपें भिजउनी वाळवावें। संग्रह मसीचे ॥१८॥

त गरी रतिश्था कराव्या। बंदरी फळ्या घोटाव्या। नाना चित्रीं ∞ चितारावया। उंच चित्रें ॥१९॥

ना ना गोप नाना बासनें। मेणकापडें सिंदुरवर्णें। पटया कुलपें जपणें पुस्तकाकारणें ॥२०॥

दशक १९। समास १। श्रीदासबोध।

THE SCIENCE AND ART OF CALLIGRAPHY AND PAINTING

DR.SHRIDHAR ANDHARE

The Science and Art of Calligraphy and painting

by Dr. S. Andhare

Monograph prepared in fulfilment of the project
sponsored by the History of Science Division of
The Indian National Science Academy
New Delhi 1996-99

"As the perfect form of writing. Calligraphy may be seen to emanate from the seed-syllable, the **bijakshara**; through sound **nada** made visible; speech made immutable in writing through the letters **aksharas**, finding aesthetic expression."

"From the primordial point **bindu** - the very core and centre of activity - flow the line **rekha** and the curve, in innumerable variations. Being drawn as picitures, they have been abbreviated to pictograms, found expression as ideograms, rebus, syllabic and phonetic writing, and as the alphabet."

R.K. Joshi

Acknowledgements

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I humbly dedicate this book to Muni Shri. Punyavijayji and Dr. Moti Chandra, who have always been my initiators in persuing this study.

And lastly, but for the patient and ungrudging support of my wife Sadhana, this book could not have seen the light of the day. My son Uday, has been of great help to me for making the computer aided material available to me in spite of his busy schedule.

Let me thank all those who have been instrumental in getting this work compelted.

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Shridhar Andhare

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INTRODUCTION

Calligraphy is the fine art of exquisite writing whereas painting is the creativity of mind and soul. It is the fine penmanship that epitomises an expression of elegance of beauty in the development of lines and strokes to give the language and script a symbolism and a functional meaning. The line drawn by a skilled calligrapher and a fine brush stroke of a painter is equally a true marvel of fluidity and sensitive creation, communicating the very action of the masters mind. " Three definite combinations of gradations of variations between thick and thin, up and down strokes, ascenders and descenders that a calligrapher and painter produce through the medium of colour and form, can effect a sense of harmony and style which is unique to every written or drawn form. In short both, calligraphy and painting achieve a meaningful organised pattern of linear, formal and colourful structure for a visual language, may it be the script or a painting".

Calligraphy is as much an art as science'. We observe that the Indian Art and religions have laid adequate emphasis on the artistic evolution of writing from very ancient times. Right from the Indus Valley seals in the form of pictographs to the modern inventions of calligraphic fonts to be used in computers, there have been various periods, dynasties and cultures which bespeak of the great artistic and aesthetic achievement of the art of writing, the extant remains of which are available

Figs. 1, 2, 3 Satavahana coins. ca 2nd c. A.D

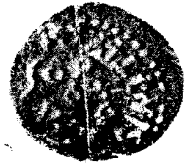

Fig 4 A carver at work, Osian Jain Temple Rajasthan

everywhere. The rock cut edicts of Emperor Ashoka (Ca.3rd century B.C.) in Kharoshti script engraved on massive stone slabs and other such inscriptions found on famous monuments and caves present a variety of writings revealing historic details and styles of a particular era.

In the medieval period (Ca. 8th - 12th Cent.) the abundance of copper plate grants and coinage offer a panorama of symbolic writing in various forms, either punched or engraved or sometimes decorated with animal, bird or geometric motifs. Similarly, engravings on temples, buildings, monuments, tanks and palaces in Rajasthan, especially in the form of **prashasthis** found on the monuments themselves, present adequate evidence of the development of the art and science of writing. It is an established fact that the art of writing is a scientific exercise achieved with the help of technically prepared instruments and tools made to order in keeping with the needs of the engravers, carvers or the writers.

In the subsequent period of Indian culture, the inscriptions engraved on the monuments, however crude, demonstrate unique sources of history unfolding details of architectural monuments, temples, forts, cave temples etc. It is also true that the art of calligraphy and the art and craft in general, was in the hands of **Sutradhars, Stapatis** or **Gajdhars**, who were mainly instrumental in temple building activity in the medieval period. Some of the exquisite examples of such stone

Fig 5 Abdur Rahim Khan-e-Khanan & Painter Daulat with professional tools. Mughal ca. 17th c. A.D

engravings as inscriptions and **prasasthis** found in the later medieval period from Rajasthan and Central India, denote the highest degree of draughtsmanship achieved by the carvers in that period. For example, the **Rajaprasasthi Mahakavya,** engraved on the stone slabs on the bank of the Rajasamand dam near Udaipur, constructed during the reign of Rana Raj Singh (1652-80) is one such great achievement and a marvel of calligraphy. The elegance of form and proportion of letters, their composition and execution on the huge stone slabs, the skill with the chisel may have been used, are all the pertinent questions which only science can answer. These traditional craftsmen who were groomed in the **Guru Sishya Parampara** i.e. the master to pupil tradition, have been engaged in such acts of writing, whether consciously, using indigenous tools and practices which had a sound scientific background and traditional occupational practice of generations.

With regards to early calligraphy on palm-leaf and paper, the use of palm-leaf for writing the holy texts began simultaneously in Eastern and Western India by about the 12th Century A. D. This was when the former, adherants of the Buddhist faith and the latter of Jainism, used palm-leaf to put down their scriptures on to writing firstly on palm-leaf MSS. Thereafter, this practice became a common phenomena in Western India, Gujarat and Rajasthan as well as in the South, where Palmyra palm leaves were engraved with an iron stylus

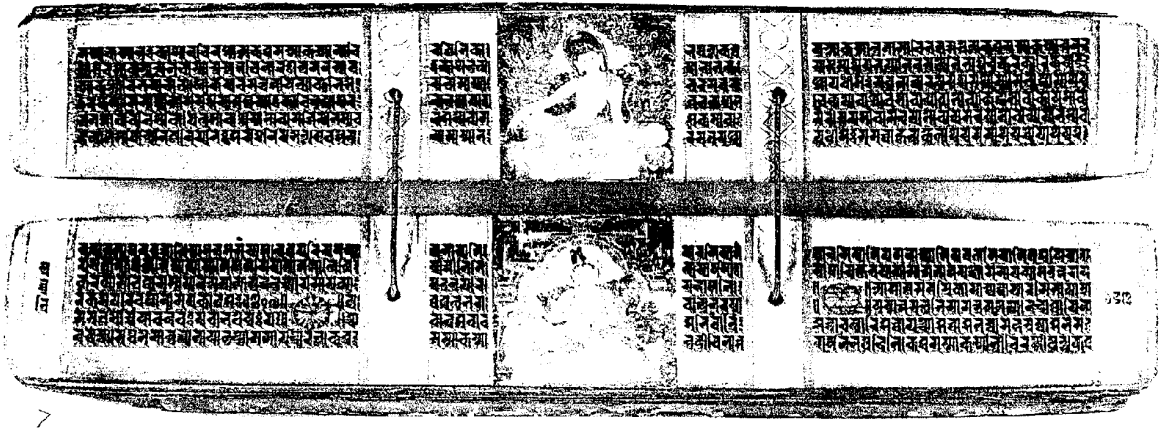

Fig 6 Buddhist palm leaf Ms.

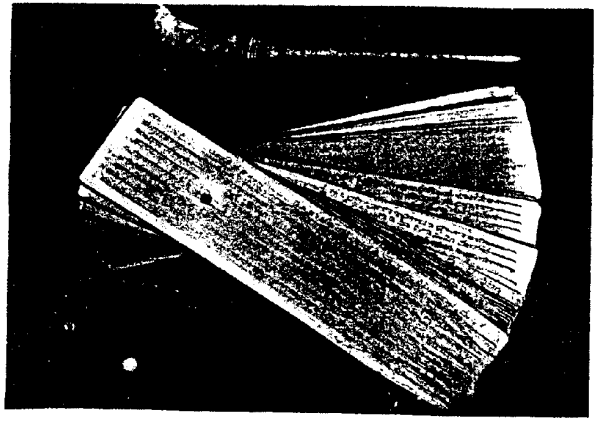

Fig 7 Palm leaf Ms and stylus

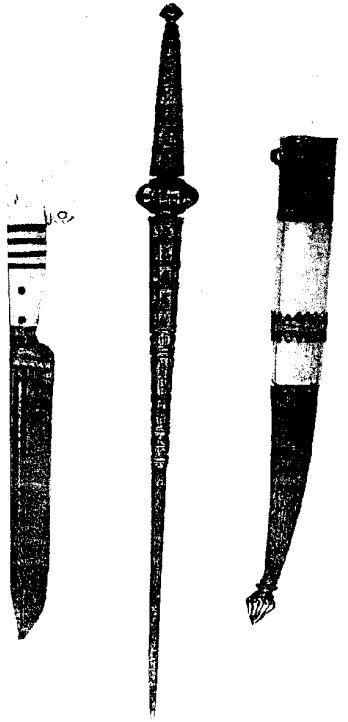

Fig 8 Stylus, knife etc.

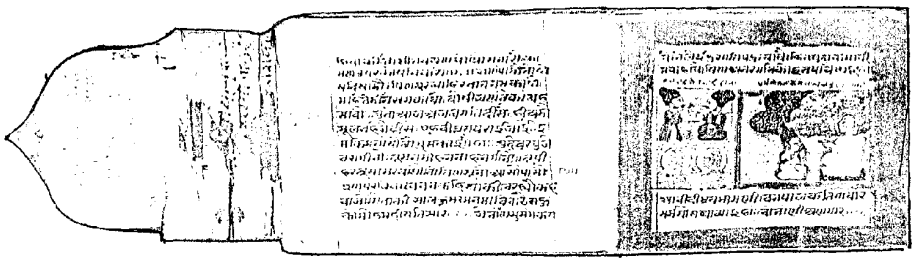

Fig 9 A Gutka Ms

over which powdered lamp black was smeared. The Jains preferred writing with black and red inks mainly though use of golden and silver inks is also observed. Subsequently, with the introduction of hand-made paper for writing, the Jain canonical literature and other secular texts were written down and some of world's exquisite illuminated manuscripts were prepared. Although the language changed from Pali to Prakrit to Sanskrit to Apabhramsha, the basic script known as Jaina Nagri, remained common but later it underwent subtle artistic and formal changes as centuries rolled on.

Availability of indigenous paper at this point of time widened the scope for writing and painting and by about the 15th century, full page illustrations began to appear in the Jain MSS. As a rule, it is noted that as the centuries passed, the size of the folios, number of lines to a page and size of illustrations became bolder and bigger. Added to this, the mass production of Jain MSS. in this period resulted in deterioration in technique and aesthetic standards and by about the 18th century, traditional importance of calligraphic writing is on the wane. However, the last two centuries of Jain art, i.e. the 18th and the 19th centuries witnessed a new phase of socio-religious manuscripts in the **gutka** (miniature) form when the Mathen painters from Jodhpur and Bikaner area began copying and illustrating them for their subsistance. They persued their profession as painters and decorators, mainly catering to Jain

Fig 10 Traditional painter with a pati

cliantele. These scribes were essentially known as **Laiyas** (in Gujarati) whose primary occupation was to write in a decorative style in the religious manuscripts known as **pothis** and other artifacts.

There were other painters also known as **Chateras** in Rajasthan who executed all types of painting jobs from painting the interiors of palaces to decorating the musical instruments, **palkhis, tamjams** as well as the wooden figures of **Gangaur.** Majority of them speicialised in miniature painting and worked either in the Royal Studio or freelancers painting portraits. hunting scenes, darbar and other outdoor pictures. They were groomed in the master to pupil tradition by remaining within the confines of the locality. They learnt family traits and techniques and traditional practises which invariably remained within the family or the guild. Therefore, it has always been difficult to extract professional and technological knowhow from them. That is why, there is a tremendous dearth of published material on this subject. Yet, there appears a kind of uniformity and congruity of style within each school of painting which identifies itself at different periods of time.

To conclude, this study primarily aims at surveying the history of calligraphy in India (excluding Islamic), its growth and affiliation with Jainism in so far as its sacred written material is concerned. Secondly, it looks in to its artistic and technological

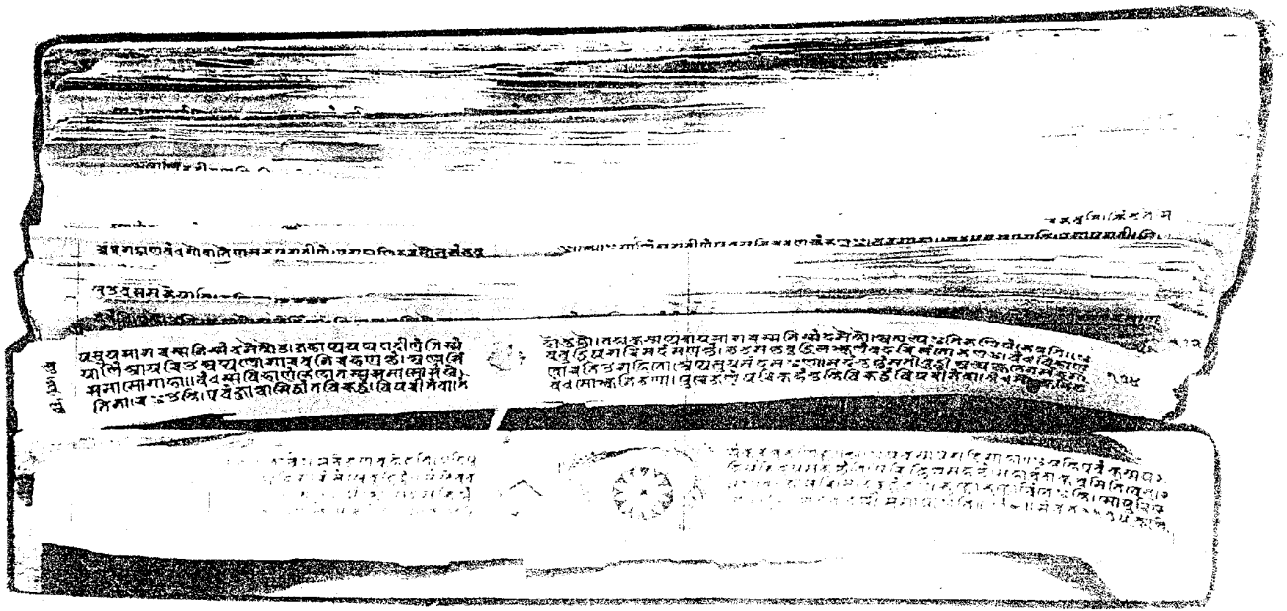

Fig 11 Palm leaf Ms

aspects emphasising writing implements and their usage. Thirdly, it tries to probe in to the details of the profession of painters in Rajasthan with an indepth research in to the technique of their paintings through interviews, personal dialogues and documentary evidences right up to the present day.

Fig 12 Indus seals

1 History of early scripts with special reference to Indus Valley Civilization.

A survey of ancient civilizations of the China, Japan and Korea and the Islamic Civilization of South west Asia and Africa, reveals that these countries have already assigned calligraphy, the status of a major art. The ancient civilization of India and Pakistan, namely the `Indus Civilization` is one of them. The turn of the century witnessed some of word`s greatest archaeological discoveries ; thanks to the pioneering efforts of some of the great archaeologists of the world, like Sir John Marshall, Alexander Cunningham, Burgess, Cousins, Sir Mortimer Wheeler and others that the past has been preserved for future.

Going back to the pre and Protohistory, the famous excavations at Mohanjo- Daro, Harappa (part of which is now in Pakistan), Lothal, Kalibangan, Dhola-vira and others have yielded calligraphic samples as 'Pictographs' in the form of seals and sealings. These extant remains evidence the art and craft of calligraphy going back to ca. 3000 B.C. That these seals, a term universally accepted among archaeologists, were moulded in

Fig 13 Indus seals

17

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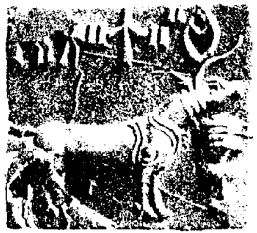


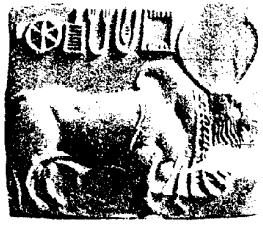
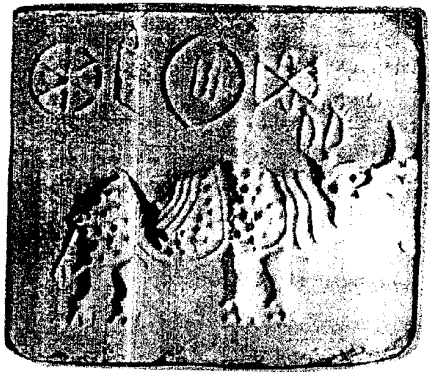


Fig 14 Cylindrical seals

clay carved in stone or cast in kaoline or lime, were intended as tools or instruments for carrying on trade and commerce is undoubtably clear. However, their technique of carving and moulding is as shrouded in mistry as the decipherment of the Indus script. Although a large number of Indian and western archaeologists and scholars have been working on the decipherment of the Indus script since a long time, no decisive and convincing solution has yet been found. Nevertheless, looking to the accuracy of calligraphy and drawing of animals on the seals, it becomes apparent that, this minute work must have warranted precision instruments like chisels and other tools about which the archaeology is silent, Apparently, no such tools or instruments have yet come to light other than the microlyths which may have been used during that period.

Indus seals and sealings :

Seals are a unique feature of the Indus Vally culture. These were used in barter system prevailing at that time. They were prepared out of clay i.e. terra cotta, steatite, kaoline and stone. The steatite ones are the most inagmatic artifacts found in the Harappan civilizations. They are extremely tiny articles measuring (3/4"+1/2)" squre. In most cases they have a pierced boss at the back to accommodate a cord for handling or for use as personal ornament. In case of cylindrical seals, the cord passes through the central hollow and is used for tying it along with the barter consignment. In the case of clay seals, when the



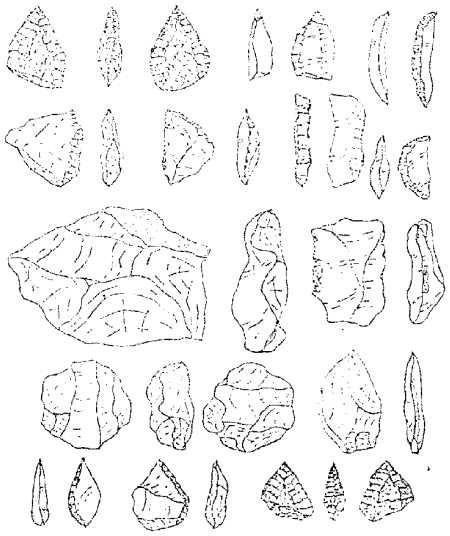


Fig 15 Stone tools and Microliths

carving or lettering was completed, it was dipped in to a solution of alkaline slip and fired to get a fine lusterous finish. This rendered it a terra-cotta colour.

The diversity of animals and letters incised on the seals is astonishing and the technique and beauty of their execution is impressive and awe inspiring. Frequent appearance of a 'bull' and also of grotesque multiheaded or composite animals point out to its probable locale of manufacture. The sealings are small circular and cylindrical objects hollow from inside, having floral or geometrical motifs, when unrolled on wet clay give out the impression on it. These minute and intricate designs are the works of craftsmanship of the Indus man. These seals might be considered as the first art objects of Indian art. In them we find, superbly contained within a format of less than 2" square. features that were to be the hall mark of Indian Art throughout the history.

If the credit of manufacture is to be attributed to contemporary archaeological discoveries of the microliths found at several such sites, cudos to the artisans who produced these wonders of calligraphic marvels of the world.

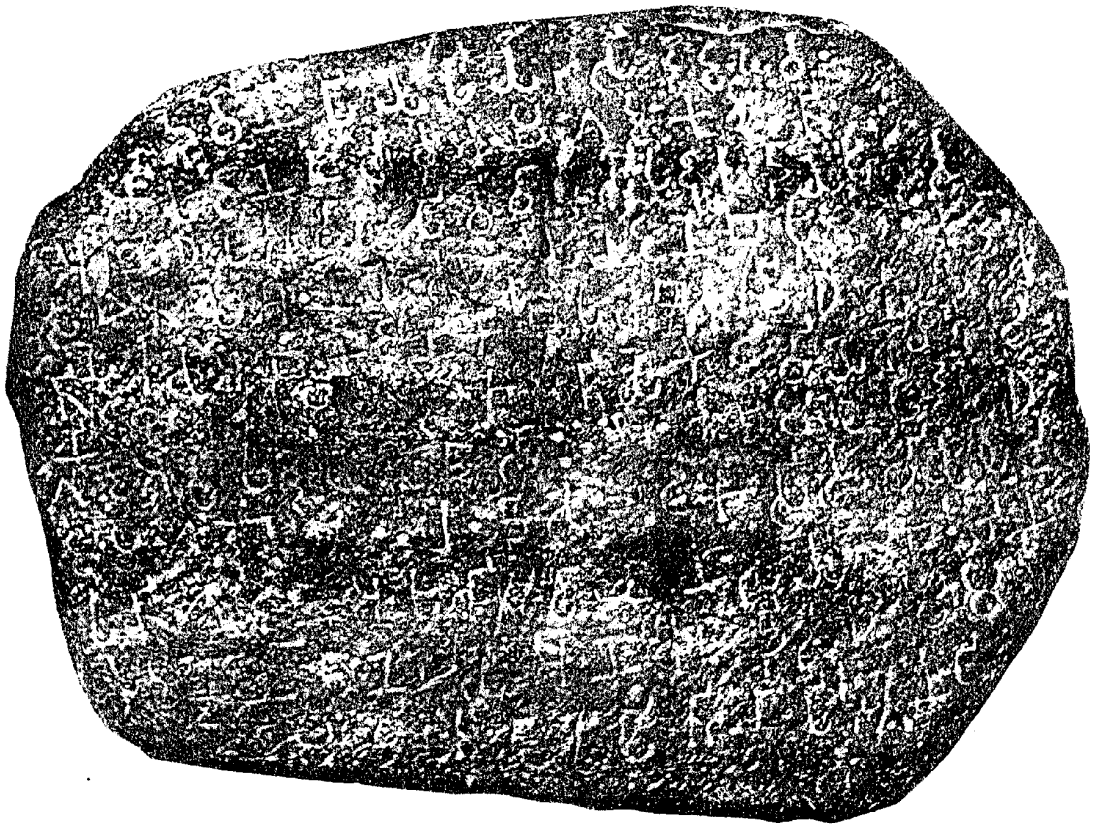
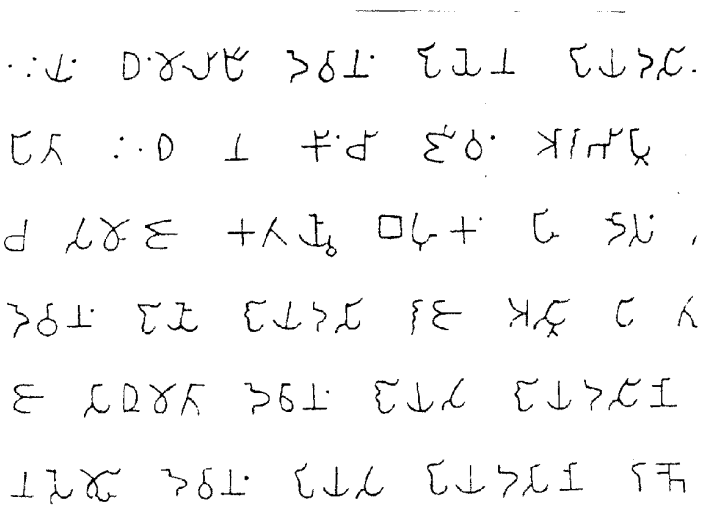


Fig16 IXth rock edict of Asoka found at Sopara, Thane Dist. c. 3rd cent B.C.



1.2 Kharoshti, Brahmi and other scripts

A brief historical survey of religions in India reveals that there were three main civilizations flourishing since ancient times. The first being the Jain oral tradition, the second being the Buddhist, and the third, as Vedic. Of the three, the first two seem to have nurtured the growth of writing and developing the script more than the third one.

According to Oza[1], it was the Vedic script which must have been the most ancient, but we are ignorant about its evolution and progress. However, looking to the available visual and textual data on the scripts and inscriptions in India, it becomes evident that the antiquity of Indian script could go back to ca. 5th cent. B.C. if not earlier.

The Buddhist text of **Lalitavistara**[2] mentions a long list of 64 scripts, in which the Brahmi and Kharosthi are mentioned as first and second. As per Jain tradition, Bhagwan Rishabhadev[3] had taught his daughter Brahmi, (the knowledge of writing the script). Since that time this script is known as Brahmi.

In the ancient period only Brahmi and Kharosthi were popular. The former was written from the left to right while the latter was written from the right to the left. It was mentioned as

1. G. H. Oza : "Bharatiya Prachin Lipimala" (Hindi), III ed. Delhi, 1979
2. Lalitavistara, Ch. 10 gives the list of 64 scripts at p.17 but mentions that most of the name are imaginary.
3. Muni Punyavijayji "भारतीय जैन श्रमण संस्कृति अने लेखन कला" : साराभाई नवाब, अमदाबाद 1950 P. 4 (आवश्यक नियुक्ति-भाष्य गाथा -93)

वर्तमान नागरी और शारदा (कश्मीरी) लिपियों की उत्पत्ति.

नागरी लिपि की उत्पत्ति.

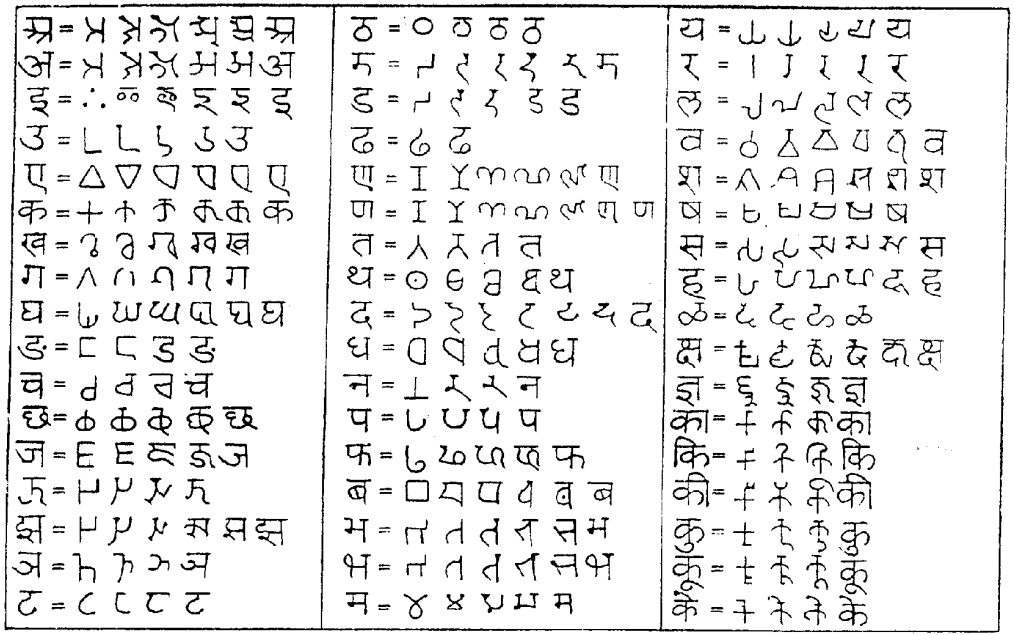


Fig 17 A chart showing the evolution of Nagri script

Fig 18 Rock cut edicts

one from the 'sematic' category and was prevalent in Punjab (Himachal Pradesh or Haryana) for some time but later on completely disappeared. Its place was taken by Brahmi and became popular at all Buddhist establishments in India and in the Central Asia.

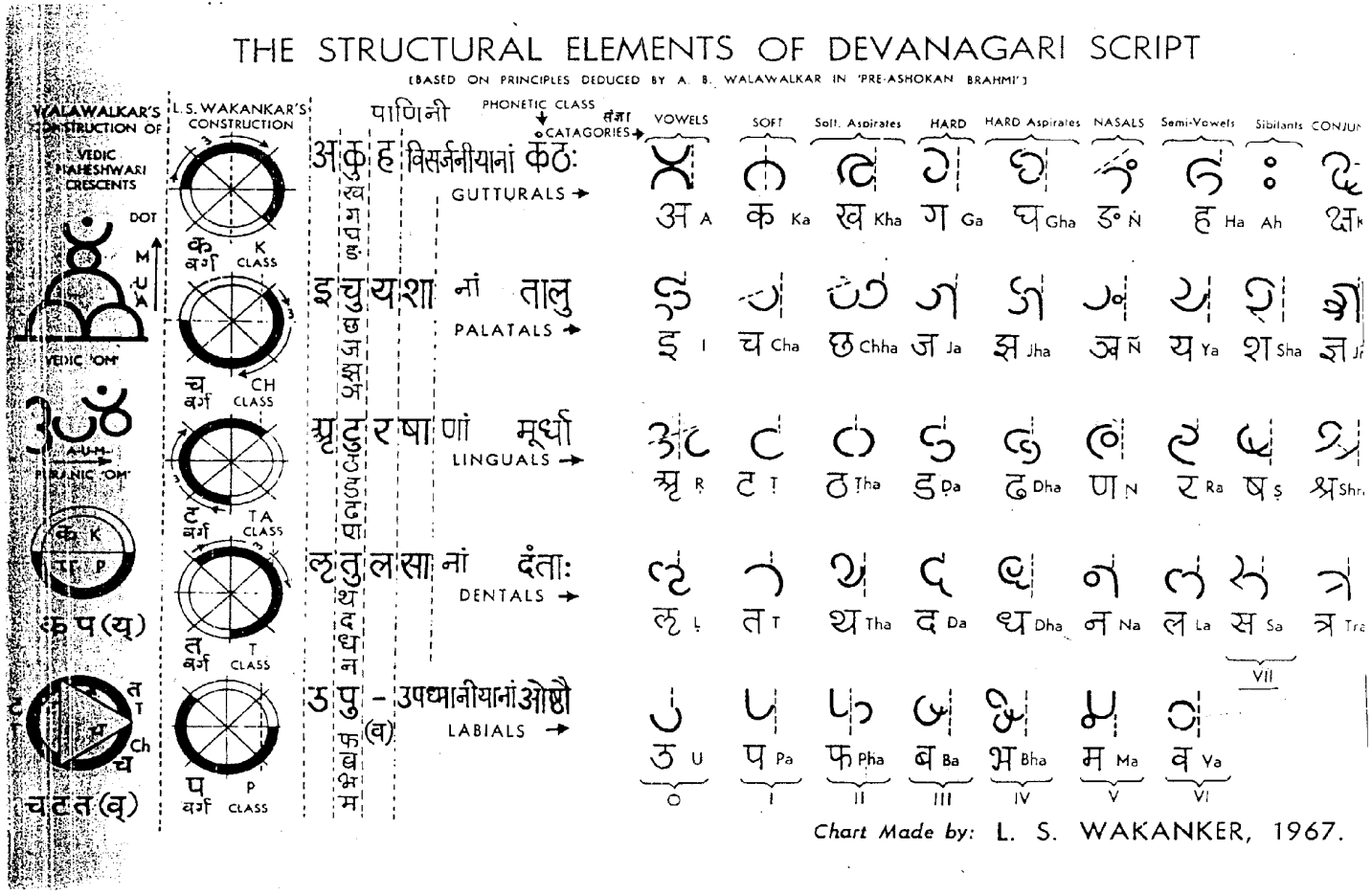
Historians believe that due to trade contacts with Iran, Persia and Central Asia, the prevalent script of those countries may have travelled to India and came in to vogue. This was called the 'armaik' script, from where perhaps Kharoshti may have born. For instance, during the Islamic period in India their language (Urdu or Persian) became popular and assumed the status of the official language.

Originally, the above armaik script had only 22 letters which proved utterly insufficient for the Indian language. Therefore a number of words, vovels and consonants were added to the script to make it more complete and workable.

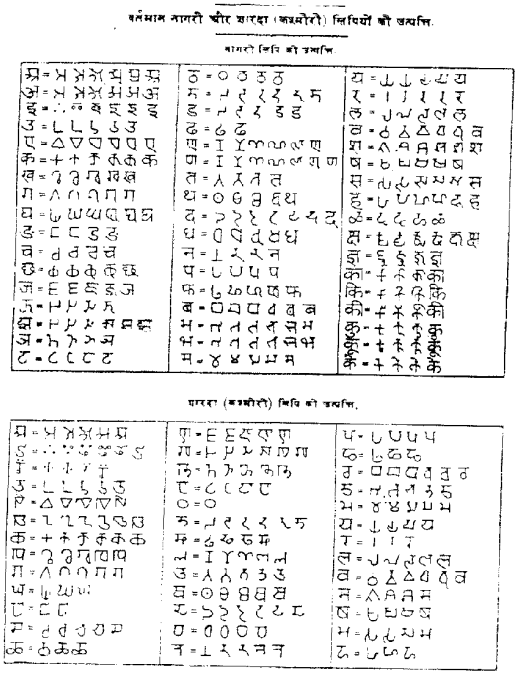
There is yet another school of thought which goes to explain that there was one Brahman acharya named Kharostha, from whose name Kharosthi may have come.

THE STRUCTURAL ELEMENTS OF DEVANAGARI SCRIPT

[BASED ON PRINCIPLES DEDUCED BY A. B. WALAWALKAR IN 'PRE-ASHOKAN BRAHMI']



1.3 Brahmi script:



As a rule, all scripts prior to ca. 500 B.C. to 350 A. D. came under the banner of 'Brahmi ' script. After that Period the script is divided in to Northern and Southern divisions. Geographic locations above the Vindhya mountains are Northern while those below are the Southern scripts. The Northern style includes Gupta, Kutila, Nagri, Sharada, Bangla while the Southern ones are Paschimi (Western) Madhya Pradeshi, Telagu, Kanadi, Grantha lipi, Kalinga lipi and Tamil etc.

However, those who are not conversant with Indian scripts will not believe that all the common languages shown above including the (Kashmiri), Punjabi, Grumukhi, Udiya etc have all evolved from the Brahmi script. Therefore it may be concluded that Brahmi is the mother of all the Indian language.

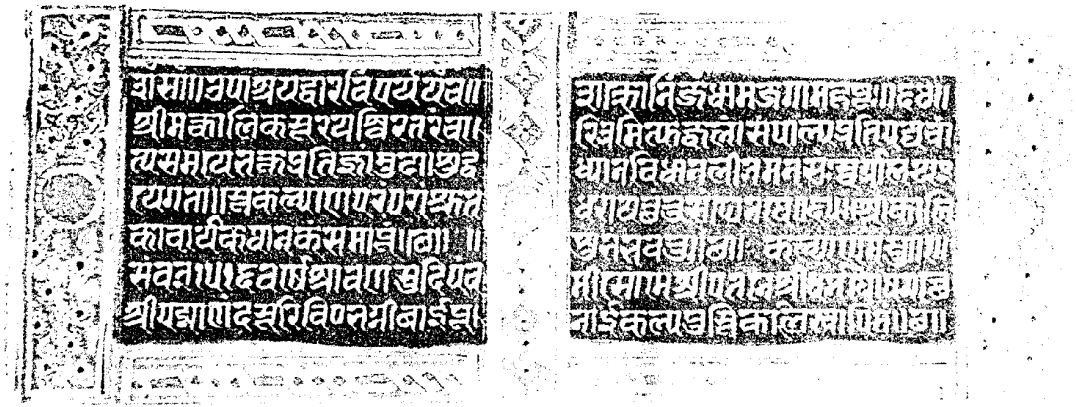


Fig 19 Paper folio written in gold ink

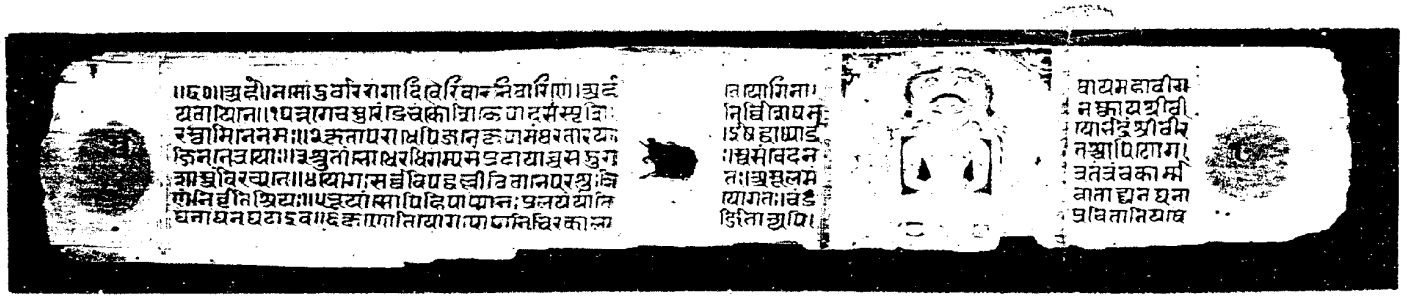


Fig 20 Palm leaf folio with an illustration

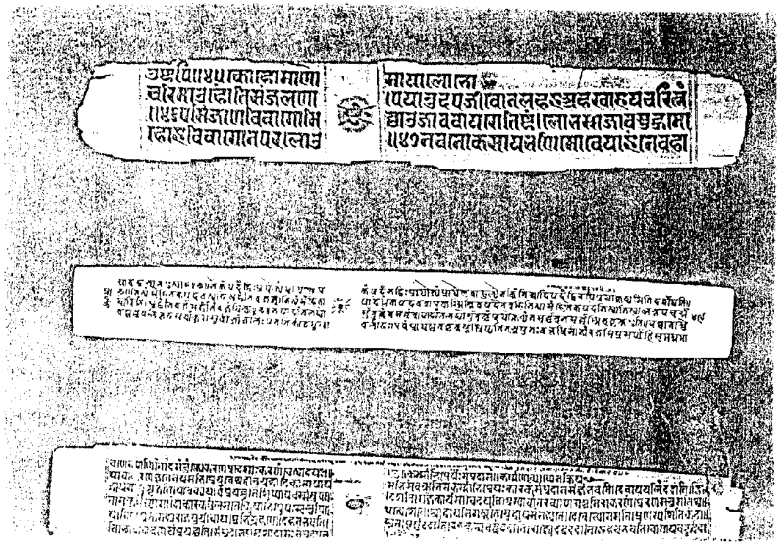


Fig 21 Folios of palm leaf Ms

2 Brief history of Jainism and the necessity of writing down the oral tradition:

Mahavira, (ca. 599 B.C.) was the founder of Jainism. He was a contemporary of the Buddha and both, the Jainism and the Buddhism evolved out of a protest against Brahmanism and rejected its doctrines and scriptures. They both belong to the **Shramana** tradition and have many similarities between them. Over the years, Jainism evolved in to a complete system of religious philosophy, mythology and practice. During its long journey of progress, two major factions were formed. i.e. the **Shvetambaras** (those clad in white) and the Digambaras (those who are sky clad). Both have their own deities, monastic orders (gachhas), sacred scriptures, rituals and festivals.

The Jains aspire to achieve **nirvana** (a state of liberation) from the karmic cycle of rebirth, through a combination of meditation, devotional rituals and severe austerities. In achieving these primary obligations of Jain religious practice, image worship, building of temples and libraries as well as commissioning of ritualistic artifacts, images in stone, metal and wood, paintings and manuscripts on cloth and paper came to be regarded are essential for the Jains to gain wisdom. As a result of this, we find a huge body of such material stored in Jain **Bhandaras**, Institutions, museums and private collections of the world.

Fig 22 A folio of Kalpasutra

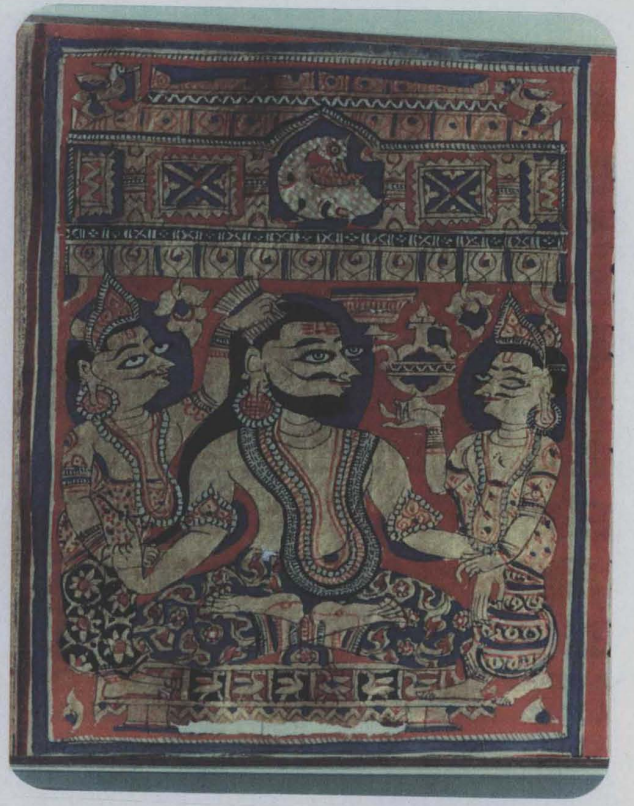


Fig23 An illustration from a golden Ms

Until such time the monks and the literary men were able to remember the oral teachings of Mahavira, the need to write down the canonical literature was not realised. On the other hand, the religion prohibited writing of holy texts as it amounted to **aparigraha** (limitation of possessions), which is one of the essential modes of conduct of the Jains. Naturally the necessity of writing and writing material did not arise.

As a matter of fact, several centuries after the Christian era, a peculiar situation arose. Due to the four consecutive deadly famines that struck the country of Magadha, one after the other every twelve years, normal life had become insecure and unbearable. Naturally, it became increasingly difficult for the old jain monks to survive. Starvation and malnutrition resulted in the loss of their memories and the oral tradition was on the brink of extinction. Not only this but a good number of senior monks died also. Finally, after a long spell of conflicting arguments between the two Sects, the **Shvetambaras** summoned a council of monks at Mathura in the 4th century A.D. and two thereafter in quick succession at Valabhi in Saurashtra, around the same period. It is here, under the guidance of **Acharya** Devardhagani, that the two groups agreed to commission the radiation of the sacred texts. Subsequently, learned monks appear to be writing supplementary texts clarifying certain points from the holy texts in the form of **Niryuktis, Sangarhanis, Bhashyas** and **Churnis** as

Fig 24 A folio of Dev Sano Pado Kalpasutra

supplementarily literature which resulted in a substantial increase in the written material. Though some of the monks specialised in writing and composing their own works themselves, a community of professional scribes **(Laiyas)** sprang up which primarily catered to the Jain **shresthis** in copying down the manuscripts and illustrating them also.

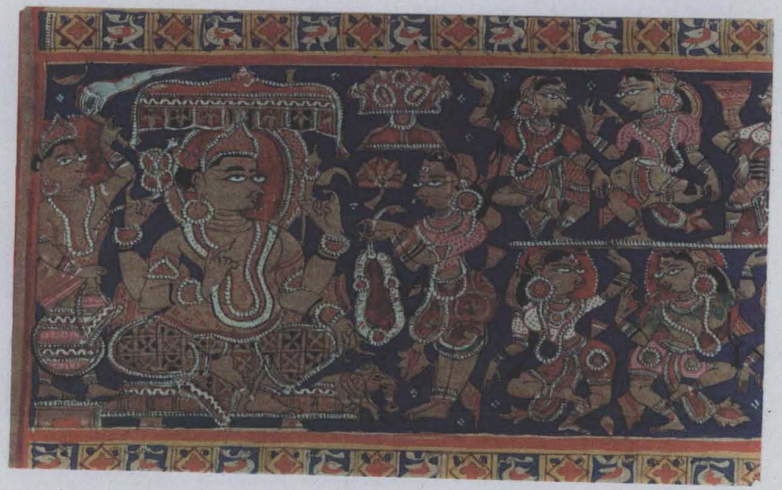


Fig 25 Detail from a golden Ms

Between the 12th and the 14th centuries, Jaininsm received substanial patronage from the kings, queens and ministers of state and the Jain shresthis. These generous endowments enabled the community to build temples and raise monastic establishments. At this point of time the Jain tradition of **Shastra-dan**. gained momentom and it was regarded as an act of religious merit to gain wisdom. The reverance for learning acted as the main inspiration in creating **Shastra-Bhandaras** equiped with illustrated and un-illustrated manuscripts. Right from the time of Acharya Bhadrabahu (ca. 16th century) to Hemachandra, a number of great Jain monks not only filled the **Shastra-Bhandaras** with their own works, but preached the inporance of writing down the munuscripts to the masses. The Ms. of **Upadeshatarangini**[1], mentions that Kumarapala of Gujarat, (1143-1174 A.D.) had established twentyone **Shastra-Bhandaras** and presented each one with a copy of **Kalpasutra**(Jain canonical literature) written in gold letters. As a

1. **Kumarapala Pratibodha** Gaekwad Oriental Series Borada vol 14. P. 96-97. Also see, **Upadeshatangini**. P. 140.

Fig 26 Paper Ms of Kalpasutra

result of this, large number of religious and secular Mss. were prepared and presented to the temple libraries all over the Western India including Jaisalmer, Cambay, Bharuch, Sirohi, Rajnagar, Patan etc.

In view of such a vast book producing activity at this time it is apparent that several Institutions of scribes must have flourished very rapidly, and with the increasing demand for written material, its equipment and the recipes for preparation of inks, pens, paper, palm leaves ets. gained primary importance.

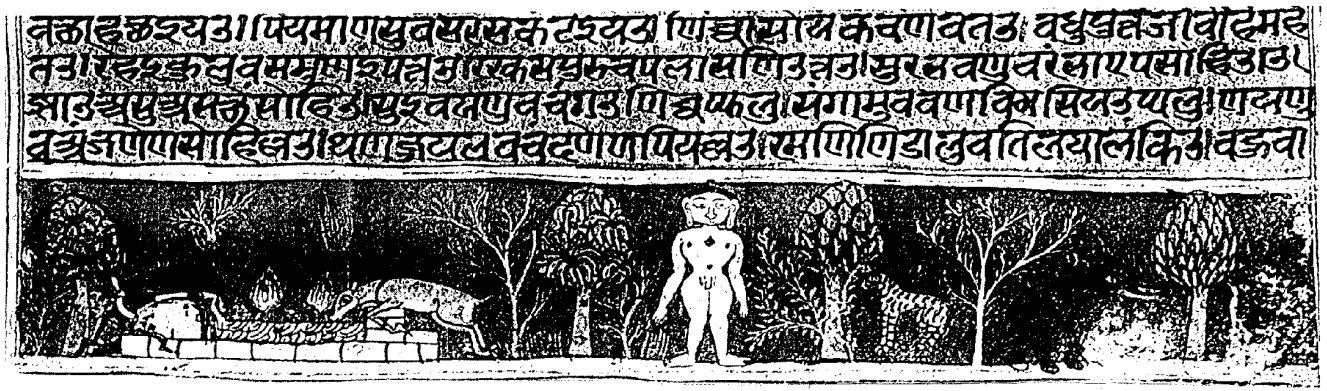


Fig 27 A folio from the Mahapurana Ms A.D 1540

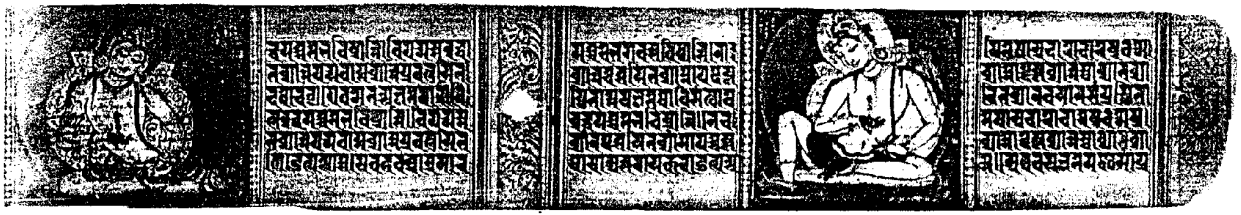


Fig 28 Specimen of a Buddhist palm leaf Ms

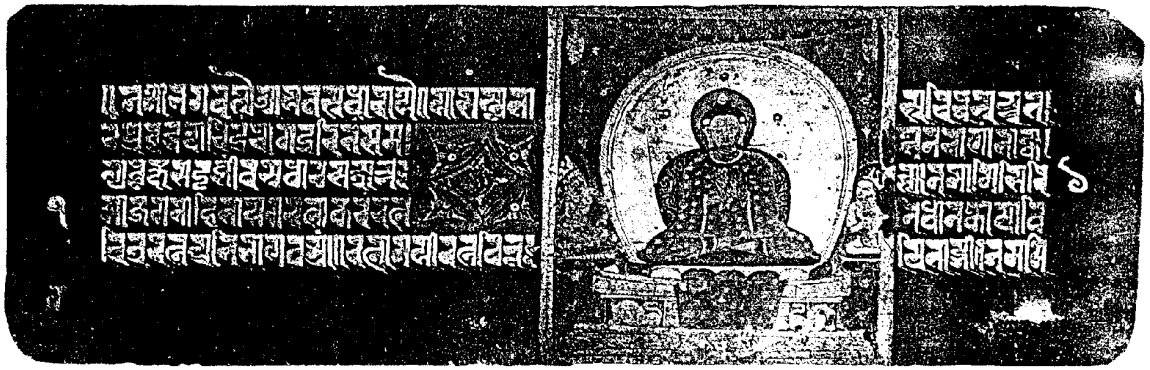


Fig 29 Example of "Kutila" script (paper)

3. Origin of Jain Nagri script :

A large number of Buddhist palm leaf Mss. were produced during the Pala and Sena period (C. 11th-13th centuries) for propagation of the Buddhist faith. Calligraphically these Mss. are of great artistic and aesthetic beauty. The script used in these Mss. is known as **Siddhamatrika** (perfect measure) or **Kutila** (crooked) because of its marked twist at the bottom of each vertical stroke of each character ending in finest of points. At its best the characters proceed with measured and even tread across the leaf, the heavy horizontal and vertical strokes being balanced by the lighter curves between the characteristic portions, of the letter, by the sublinear twist and by flourishes of vowel indicators above the line, mostly marked above the top line. This script was already archaic in the 11th century. However the Buddhist Mss. from Nepal tend to use the early **Nagri** script to much lighter effect, though some use the **Siddhamatrika** also.

However, from the 15th cent, in Nepal, there seems an archaic revival of the **Kutila,** called **Ranjana,** using gold ink on blue-black paper. Although it produced an opulant effect, it is somewhat complex and of no great calligraphic beauty. The subjects written in this script are of very limited range and copied for pious purposes of donation to monasteries, where they remained wrapped and unread and only brought out on the day of the **Pustakpuja.**

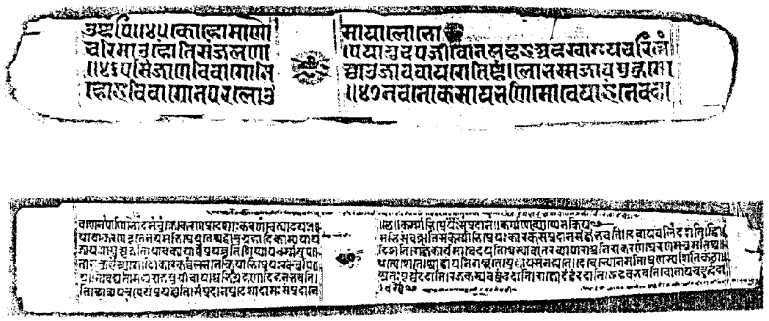


Fig 30 Palm leaf folios, inkwells, and boru pens

3.1 Jain Nagri script and implements of writing

The contributions of Muni Shri Panyavijayji and Dr. Moti chandra on this subject remain of paramount significance. The auther desires to acknowledge their researches which forms the basis of this study.

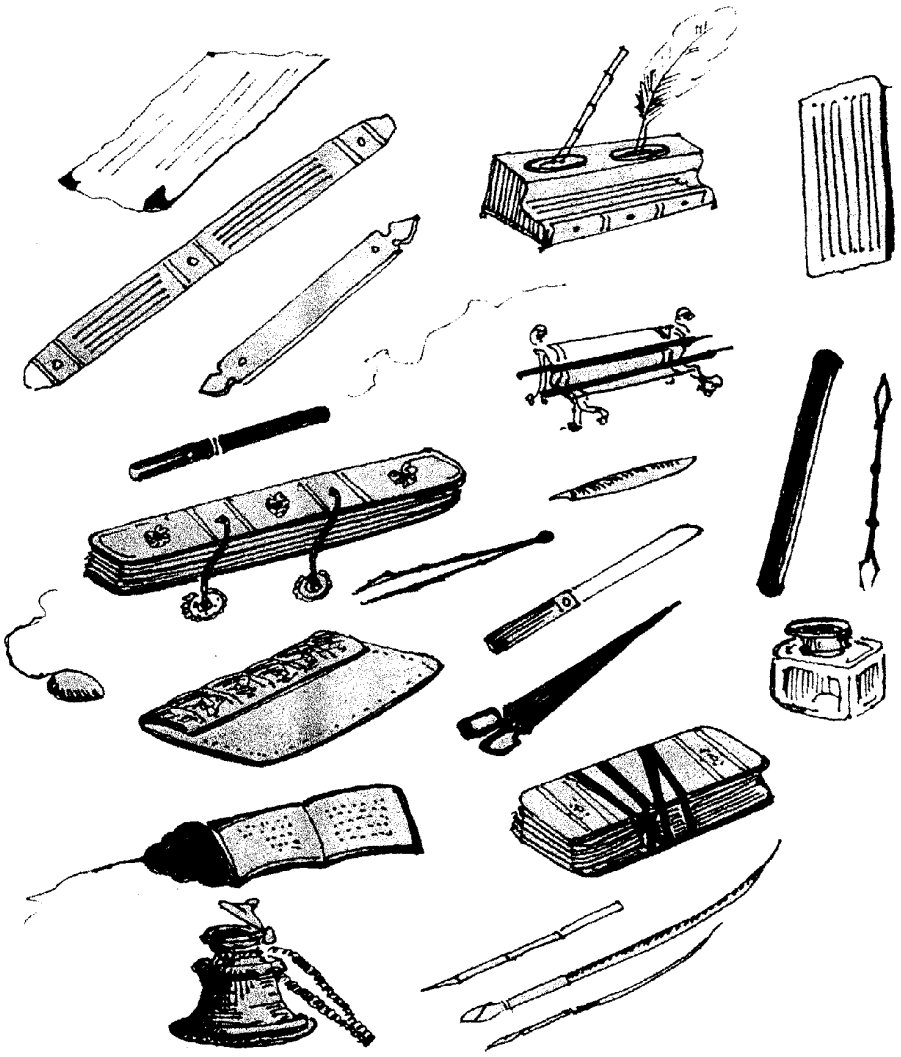
The growth of Jain Mss. in Western India on palm leaf and their painted bookcovers is simultaneous. to that of the Buddhist Mss. in Eastern India. The script used in Western India is an early form of **Nagri.** with certain characteristics that mark it out as **Jain Nagri.** It has special forms of certain letters and diphtongal signs before the letters e of o. This early script is identified as **Padi matra** in local jain terminology. This elegent and monumental script remained characteristic of the Jain literature until the 18th Century.

Before we deal with the implements for writing, let us make a note of an interesting **shloka** quoted by Muni Punyavijayji[1]. The **shloka** is in Sanskrit and reads as under:

"कुंपी, कज्जल, केश, कंबलमहो, मध्येच शुभ्रं कुशं ।
कांबी, कब्म, कृपाणिका, कतरणी, काषृम तथा कागणम् ॥
कि कि, कोटरी, कल्मदान, क्रमणे, कहि स्तथा कांकशे ।
एतै रम्यक काक्षरैश्च सहित: शास्त्रच नित्यं लिखत ॥१॥"

1. Muni Punyavijayji. "Bharatiya Jain Shramana Sanskriti ane Lekhana Kala" (Gujarati) :Sarabhai Nawab, Ahmedabad, 1950 P. 55

Fig 31 Writing implements



1	Kumpi	=	कुंपी	Khadiya	=	is an inkpot.
2	Kajal	=	काज्जल	Lampblack	=	Ink.
3	Kesha	=	केश	=		Hair of the head
4	Kambala	=	कंबल	=		A piece of blanket to sit
5	Kusham	=	कुश	=		piece of white wood
6	Kambi	=	कांबी	=	आंकणी	= A wooden footrule
7	Kalam	=	कल्म	=	लेखणी	= A pen
8	KrupanGika	=	कृपाणिका	=	छुरी	= A knife
9	Katarni	=	कतरणी	=	कातर	= A pair of scissors
10	Kashtam	=	काषृम्	=		woodwen board or a pati
11	Kagalam	=	कागलम	=		Paper
12	Kiki	=	किकि	=	आंखो	Eyes
13	Kotari	=	कोटरी	=	ओरडी (Guj)	place to sit and work.
14	Kalamdan	=	कलमदान	=		A pen box for keeping writing material
15	Kramana	=	क्रमण	=		Legs
16	Katti	=	कट्टि	=	केड	= Waist
17	Kankro	=	कांकरी	=		Sharpening stone

The author of this **shloka** is unknown. He has used the common letter K (क) and has enumerated seventeen items starting with the letter K, which is worth noting. Majority of formulae and terminologies published in the above publication are in Gujarati, Prakrit or Sanskrit which are translated in to English. There are certain pertinent questions which face us when we think of the art and science of writing and painting, such as, when did the Jains accept and start the art of writing ? What was the script that was adopted in the beginning? What was the support on which the books were written? Which ink was used? What kind of pens were used? How were the MSS. preserved for several centuries etc. The solutions to all these questions and curiosities are not found at one place or in one single book, but these are available through ancient texts where we find direct or indirect references to writing techniques and material. In short the Jain **sutras** are the sources from which factual and practical information is gathered, for several years. It was then put in to pratice by the scribes, and over the years several norms were fomulated by them which withstood the taste of time.

The **Rajaprashniya sutra** mentions "Books meant for reading of Gods" Which implies implements made of gold, silver etc. which can logically be understood as usual tools requird for writing.

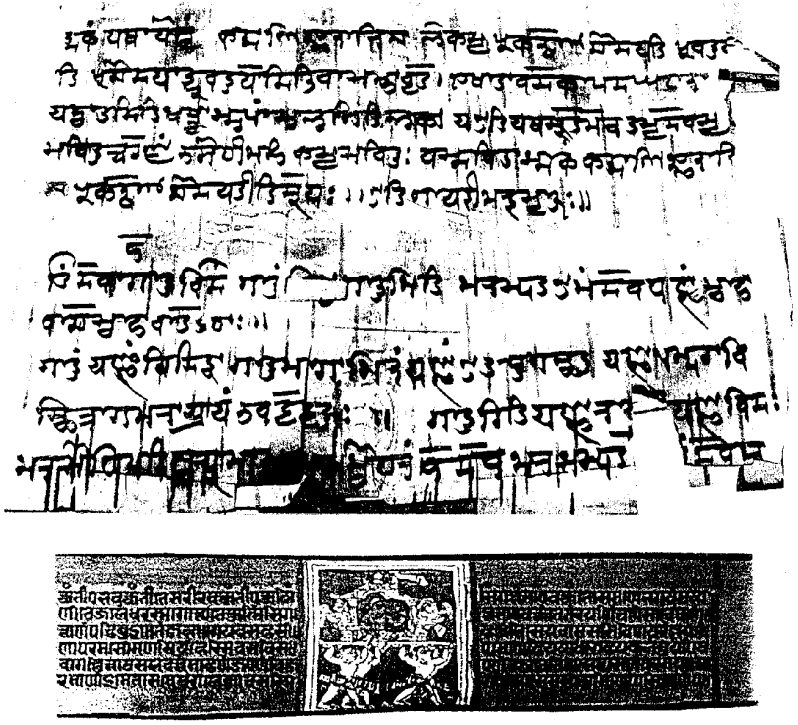


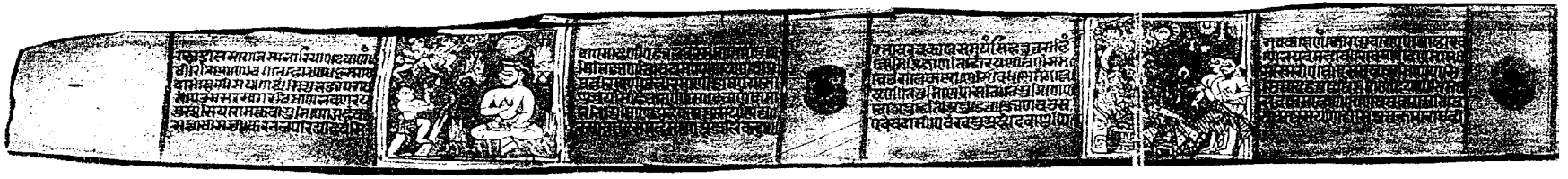
Fig 32 Bhruja Patra and palm leaf samples

Support :

Firstly it mentions **Patra**, which can be palmleaf or **Bhurja-Patra** (brich-bark) or paper on which writing was done. **Patra** is a folio or a leaf, a collection of such leves constitute a **Pothi**. Paper or palmleaves are the seats of **Lipi** i.e.script, The seat of **Lipi** is called as **Lipyasana,** which in English could be termed as carrior or support, may it be palmleaf, paper, wooden board, metal sheets or cloth.

Palm-leaf :

Palm-leaf was used as a carrier in the absence of paper in the early period. The Palmyra palm tree which provided palm leaves for writing and painting is known as **tala,** in Sanskrit, has its Gujarati equivalevt as **tad.** Of the two types of **tads, Sri tad** and **Khar tad;** the latter grows in Gujarat and elsewhere but. is unsuited for various reasons. **Sri tad** grows abundantly in Madras, Ceylon, Burma and Bengal.



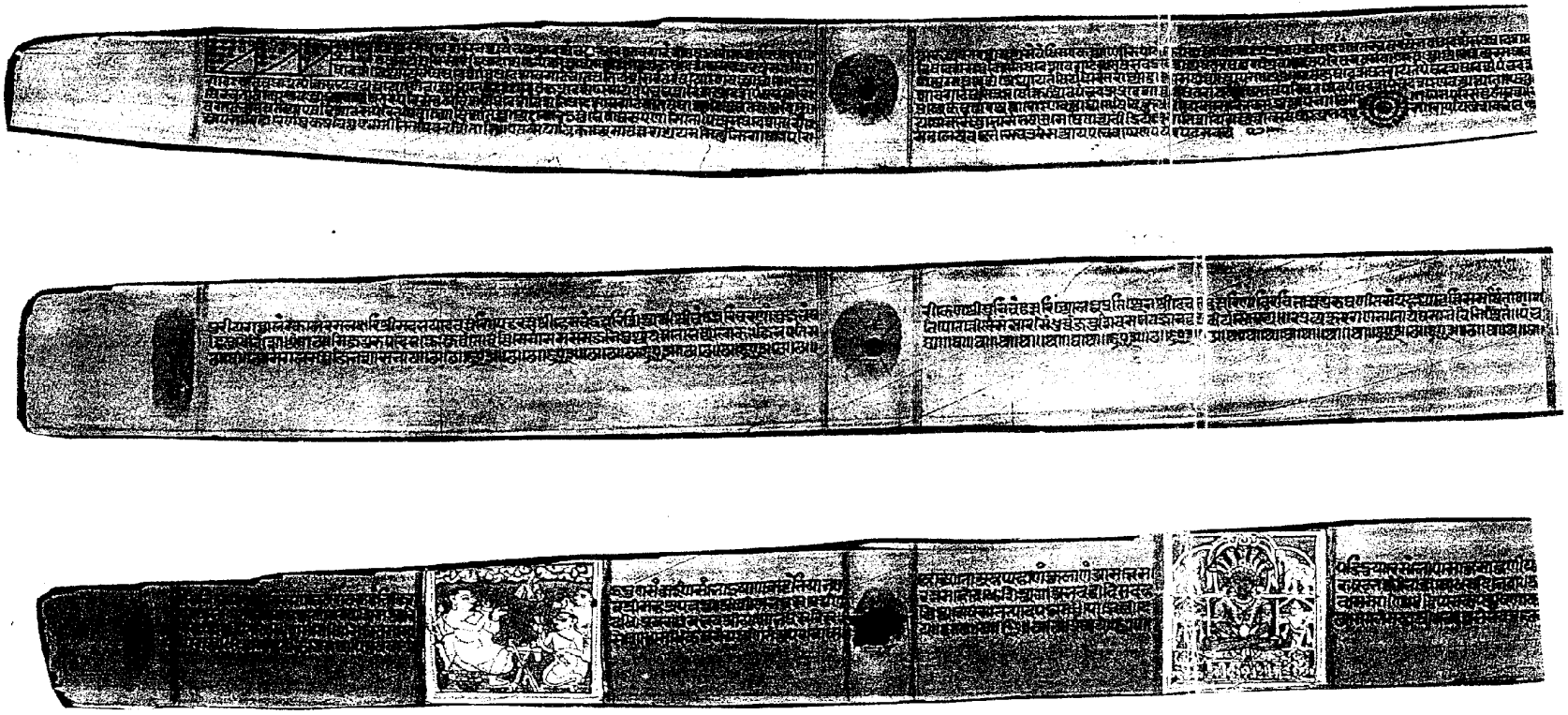


Fig 33 Palm leaf folios

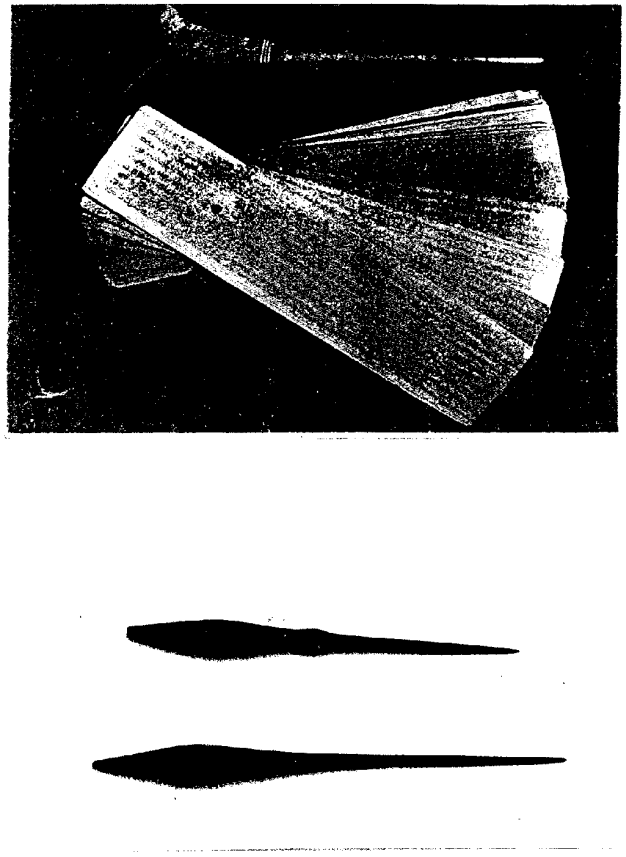


Fig 34 Palm leaf Ms and Stylus

Its fonds are smooth and delicate, measuring approximately 36"X3" at times. Its fibers do not decay easily and its elasticity prevents it from breaking even under pressure. The fonds of this palmyra tree yielded palm leaves for writing. One of the methods of preparing palm leaf folios is to obtain young palm leaves and bury them in sand for curing them. Subesquently, the leaves were trimmed and used for writing with a stylus made of iron. This practice of incising the script on the leaf with an iron stylus tool was prevalent in the South and Eastern India.

The text was first incised on the leaf in parallel lines with a pointed iron stylus known as **Keel** in Gujarat, and was rubbed with powdered carbon ink. The powder would then be imbeded in the incised letters. Alternatively, the scribes used liquid ink. In Karnataka the ink was manufactured from the oil extracted form two types of fruits. The oil was heated and mixed with various powdered substances including roasted turmeric and harde. The mixtrue was heated again and used as ink.

Fig 1 Painted wooden book cover

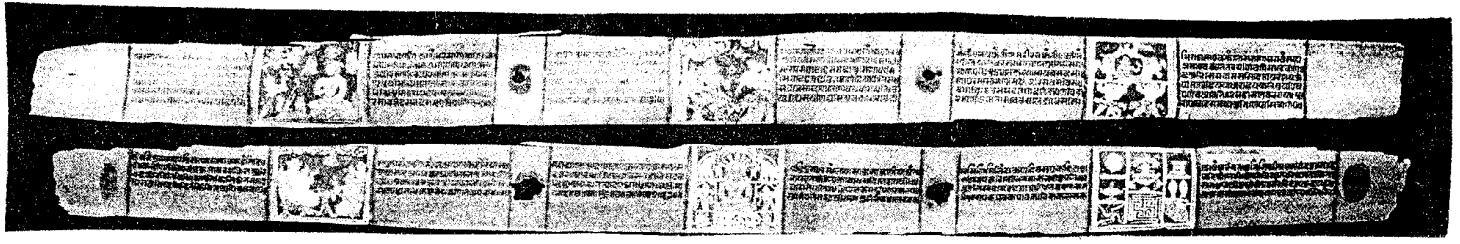


Fig 2 Illustrated palm leaf Ms. Showing string holes

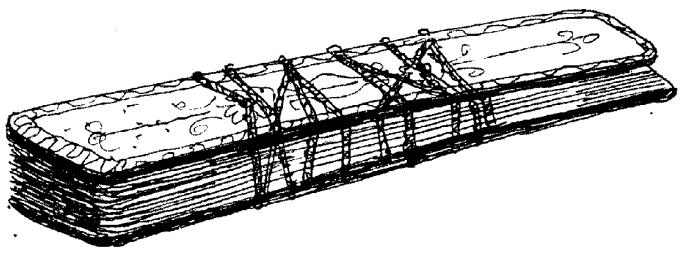


Fig 3 Typical method of tying the Ms

Wooden Panels: काष्ट पट्टिका, कांबिका

Plain or painted wooden boards were included among the writing implements of the scribes. In the olden days, merchants scribbled their daily transactions on wooden boards which were later transferred on to account books.

Patli, Kambika, book-cover : कंबिका

We have seen earlier that early Jain literature was written on palm leaves, as paper was not available then for writing. In order to keep these palm leaf folios togather in a particular sequence, like a book, a couple of long and narrow panels of wood were used on the top and bottom, of the pile of leaves, as book covers. They are known as **patlis** or **kambikas.** These are usually painted or lacquered in bright colours and decorated with jain symbols like the **ashtamangalas,** eight auspicious symbols, the 14 sacred dreams as also the incidents from the lives of Jain Tirthankaras in a narrative style. Some of these patlis go back to the 12th century A.D. (Fig. 1) The folios were pierced at two or three places (Fig. 2) in the center through which a cord passed through the pile of folios to hold them in between the two covers, which also has similar holes. The cord is tightly wound round the boards to keep the folios in position and protect them from climatic changes and human handling.(Fig. 3)

Fig 1 A painter at work

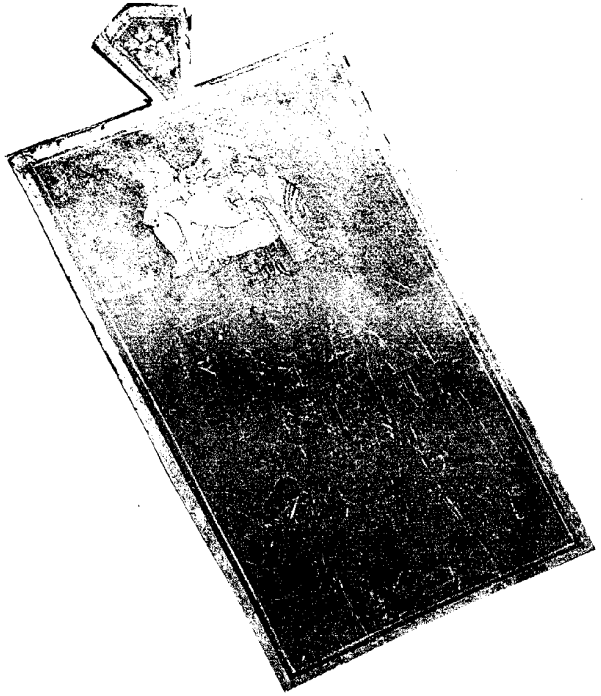
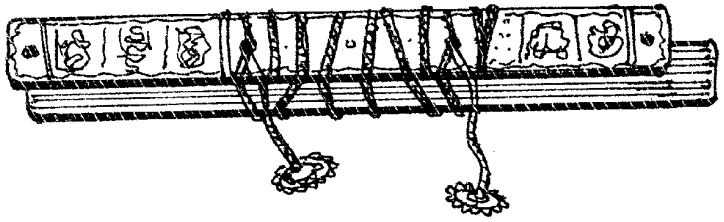


Fig 1

Fig 2 Granthikas

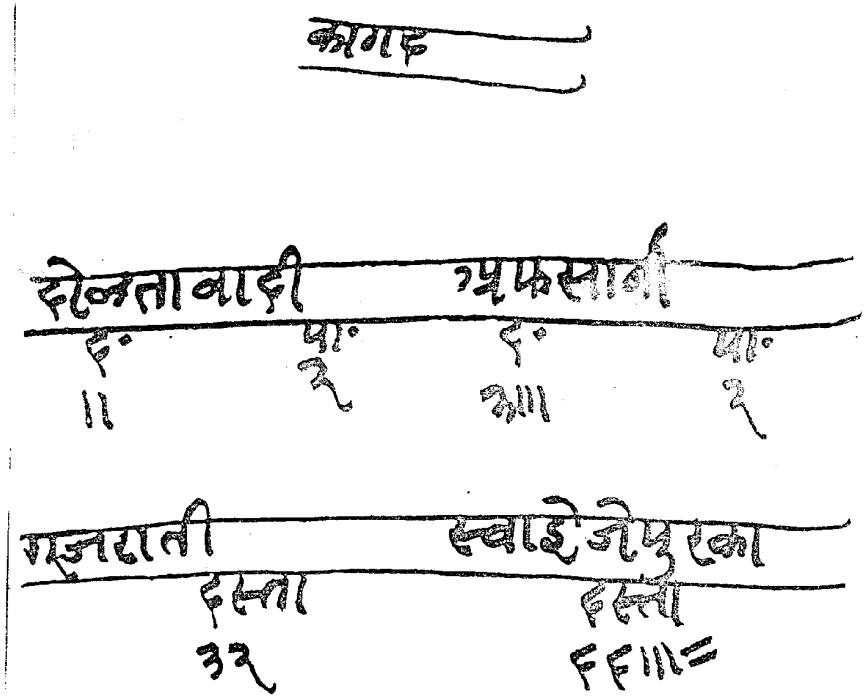


Pati : पाटी

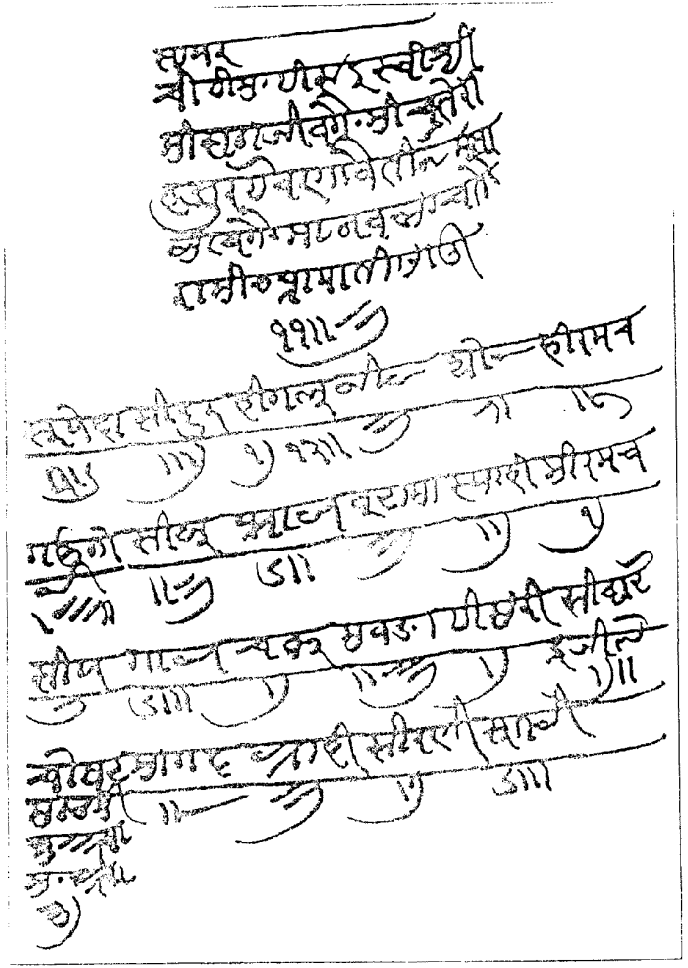
A plain longish wooden board having a slightly decorative top, of about. 24"X15" (aprox) was known as a **Pati.** It is incised or carved with the alphabets in **Devanagri** characters for the amateur scribes to train their hand in the traditional flow of writing. Similar **patis** acted as drawing boards for the traditional painters, **chataras**, from Rajasthan, for painting miniature paintings. (Fig.1) Larger wooden boards were prepared by joining more planks togather for painting large pilgrimage patas for displaying them in Jain temples and monastic establishments on sacred occasions. Examples of such **patas** are available in temples at Surat and elsewhere.

Granthikas : ग्रंथिका

Someties pom-pons, tassels or ivory rosettes (button like circular objects) were attached to the end of the cord, known as **Granthikas** or **Granthis**(Fig.2) which apart from rendering aesthetic quality to the book preserved the cord from slipping through the holes. In South India and Orissa, long and narrow teak wood or rose wood or **Raktachandan** panels are used for this purpose.



Toji Jamakharcha Surakhana : Record, dated 1761 A.D. Coll. Rajasthan Archives, Bikaner.



Page from *Kharcha Surakhana* : Record of income and expenditure of *Surakhana* of Jaipur dated [illegible] A.D. Coll. Rajasthan archives, Bikaner. This page records the names of colours and the amount spent on each of them separately in Rupees and Annas.

Paper : कागज

The Arabs learnt the art of paper making form the Chinese and the first paper making factory was opened at Samarqand and the second at Bagdad in 794 A.D. It is also accepted that some parts of Western India obtained knowledge of paper manufacture from the Arabs. The ruler of Kashmir is said to have imported paper workers from Samarqand. Some of the Jain literary sources from the 15th and 16th century provide information of the use of palm leaf and paper in the 12th century, the authenticity, of the above statement is doubted by Muni Punyavijayji, whose knowledge of Jain MSS. is unparalleled. According to him there were no paper MSS. prior to the 13th and 14th centuries in the Jain Bhandaras that he knew of.

Various centers of paper manufacture are mentioned in India which are identified by their place names, such as, Daulatabadi from Daulatabad, Adilshahi from Karnataka, Nizamshahi from Nizamabad, Ahmedabadi from Ahmedabad etc. All these varities came under the title of 'Hindi paper'.

Fig 1 Lady holding a pata

Raw materials used for different types of paper were bamoo, jute, flax, rags etc. Kashmiri paper was manufactured from the waste cocoons and was therefore soft and strong. Best quality `Kalpi' paper was made from discarded fishing nets and was known as 'Mahajal'. This was very white in colour. Ahmedabadi paper was made from rags at the Sabarmati Ashram. Another type of Ahmedabadi paper which was used for making account books was very smooth for writing.

Cloth : कापड

Both, the Jain or the non-Jain literature is full of references to cloth painting in the early period. They are known as **patas** or **patachitras,** intended to illustrate socio-religious themes for the monks as well as the masses.

Padalipta, (ca, 2nd century A.D.) in his history of Tarangavati[1] mentionsof a nayika who is said to have used a **chitrapata.** Similarly, Silanka Suri[2] (ca 9th century A.D.), a respected Jain monk, mentions of paintings depcting the life of Neminatha, the 22nd Tirthankara. However, apart from these textual references we have an actual represntation of a 'Lady holding a painted pata'[3] as one of the illustrations from the Ms. of Palam **Mahapurana** dated 1540 A. D. This clearly indicates

1. Tarangavati (abridged by Nemichandra Suri in the 11th Cent. A.D.
2. **Chaupanna Mahapurusha Chariyam.** Ms. no. 758, Hamsavijay collection Baroda, ref. Courtesy U. P. Shah
3. Saryu Doshi, The Iconic and the narrative in Jain Painting **Marg.** vol XXXIV, No. 3. Bombay 1986 p. 32

Fig 1 Satrunjaya Pata on cloth ca 18th c.A.D

Fig 2 A detail of a Vijnyaptipatra

the existance of the tradition of cloth painting in the early period. But cloth being perishable matrial, a few examples of cloth paintings are surviving, whose antiquity does not go beyond the 14th Century A.D.

A substantial quantum of this type of Jain Monumental Painting[4] belongs to the category of painted scrollas and **patas**. It includes long and narrow scrolls on cloth and paper called **Vijnyptipatras** (letters of invitations or pardon), Farmans (grants) **Panchatirthi Patas** (paintings depicting pilgrimage centers), Tantric or Mantra **patas**, cosmological **patas**, charts etc.

Since acquisition of long and narrow strips of paper was not easy in the olden days, two, or three or even more sheets of paper were pasted togather lengthwise. to obtain a desired length. Similarly, cloth was also cut as per requirement and used. Such long and blank scrolls were available with the painters who painted them as per specific orders of the customer. These are called as **tippanas** in Gujarati.

4. Shridhar Andhare, Jain Monumental Paintings P. 77 The Peaceful Librerators ed. P. Pal. 1994. L.A.C.M. New York.

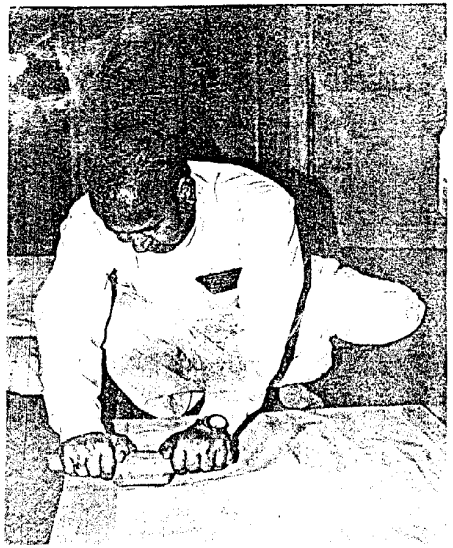


Fig 1 Burnishing process and hand burnishers

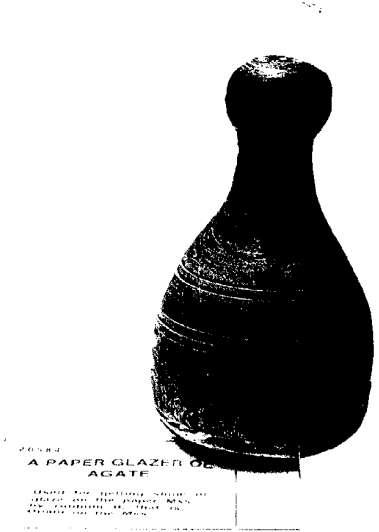
Ghunto, Opni : घूंटे Burnisher

All paper manufacturers or sellers get their stocks of paper burnished before selling it in the open market. Raw paper needs to be burnished i. e.its sufrace has to be made smooth so that the pen runs smoothly on it and ink does not spread.

Old stock of paper lying in godowns often gets affected by moisture during rainy season and paper gets swollen. While writting on such sheets not only spreads the ink on it but also creates blobs on the surface and spoiles the writing. To remedy this, paper sheets are dipped in to solution of alum water for some time and when they are in semi dried condition they are burnished with large size agate burnishe rs (Fig.1) Some times **Kasoti** stone (which goldsmiths use for testing purity of gold) or large shells, **Kaodis**, are also usd for this purpose.

In the case of golden letters appearing on Jain manuscripts and in miniature paintings, gIden portions need to be burnished to get more gloss. This is done with the help of a dog-tooth burnisher, which is made in the shape of a dog's tooth made of agate stone attached to a wooden handle (Fig. 2)

In case of large paintings on cloth and paper such as Jain **patas** or Vaishnava **Pichhvais** (discussed earlier), large size burnishers are used as indicated in (Fig.1)



kaodi

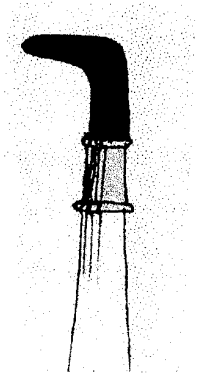
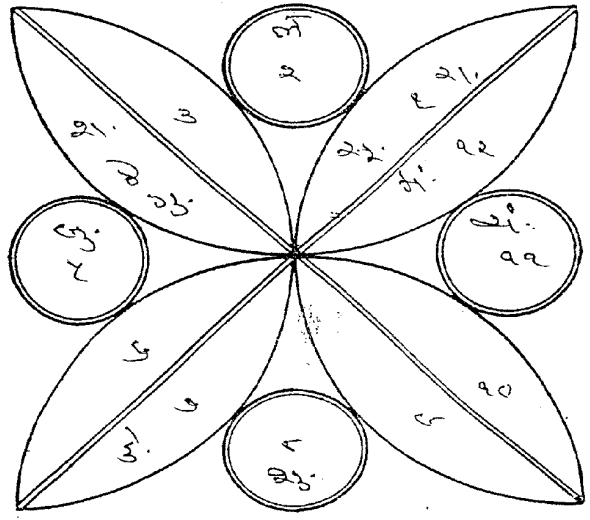


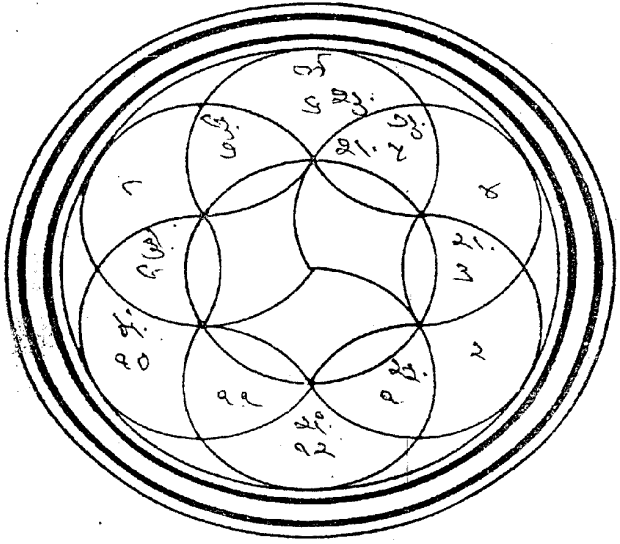
Fig 2 Dog tooth burnisher

॥ अथ नवमांशचक्रमिदम् ॥



॥ नूनं नवांशे तु कलत्रसौख्यम् ॥

॥ अथ द्वादशांशचक्रमिदम् ॥



॥ स्याद् द्वादशांशे-पितृमातृसौख्यम् ॥

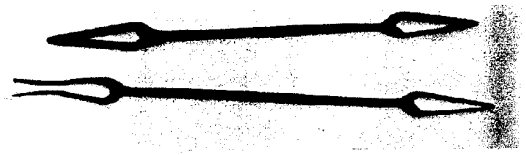
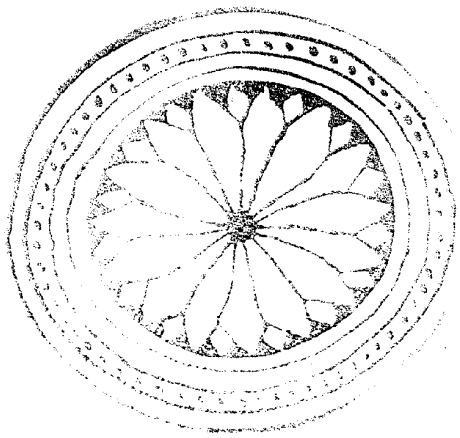


Fig 1 Pair of Yugavala

Fig 2 Prakara



Yugavala, Jujval - Ruler युजवल

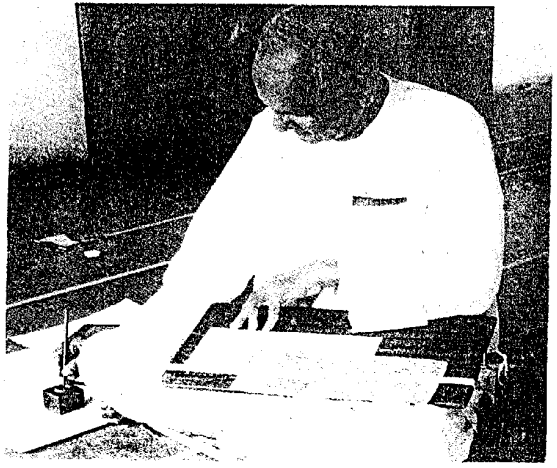
For drawing straight lines on paper, cloth and other materials, the Boru pen made of reed gets spoiled and does not last long. Therefore a kind of bowpen has been devised for this purpose.

It is called **Yugavala** in Sanskrit, which seems to have been abbreviated as **Jujval** in the local dialect. This instrument is generally manufactured by the ironsmiths of Marwar, especially of Jodhpur (Fig.1)

It is made by joining two thin pieces of iron like a fork in the shape of a spearhead, tapering towards the end in a fine point. The ink is put in to the gap and it is used for drawing lines with a ruler. This instrument is generally used for maiking geometric patterns in a horoscope, Jain yantras etc.

Prakar Padkal : Bowpen compass. पडकाल

Made in the similar fashion like the **Yugavala, the Prak** or the **Padkal** is used for drawing circles and curves while drawing Jain yantras, cosmological charts maps and such other material. One leg of the fork has a point while the other has the pointed fork to put in the ink or colour. (Fig. 2.)



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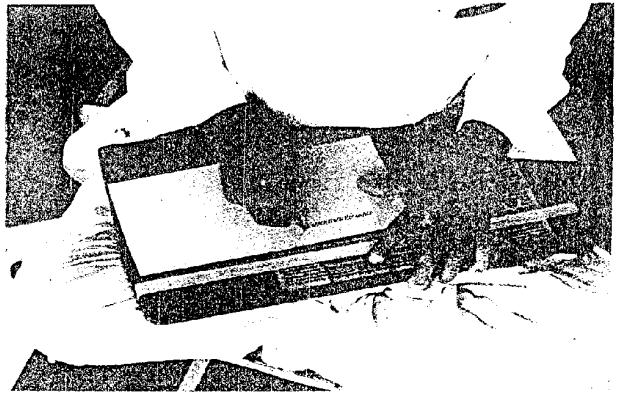
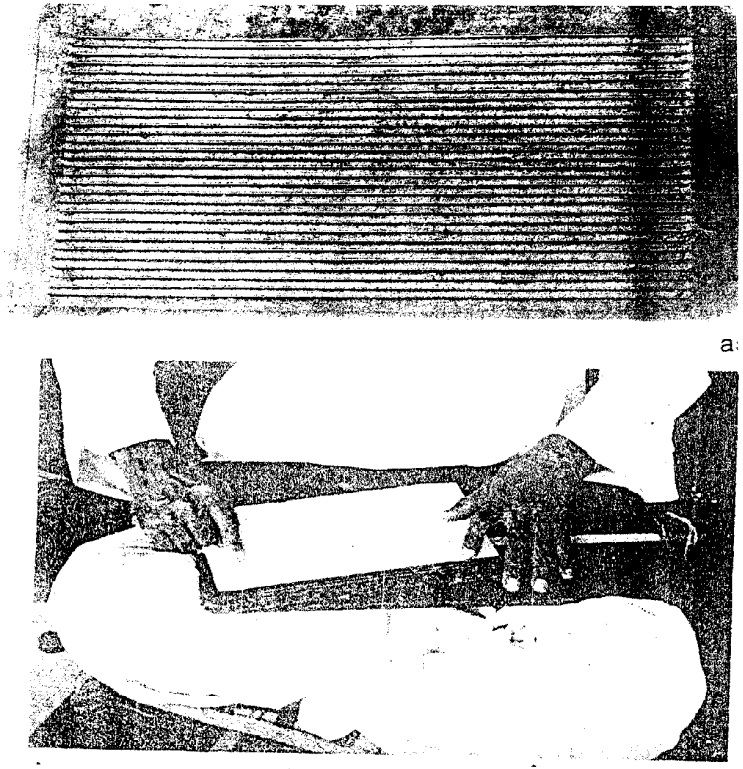


c

Phatiyu, Oliyo, or Rekhapati - रेखापाटी

A ruler board



a

b

Fig1 A,B,C,D Ruler board and the process of writing

One is astonisehd to see the uniformity of lines and letters of the Jain Nagri script written by the scribes. It is the work of the Oliyo which is a kind of lineboard to produce equidistant lines on paper.

Required sizes of wooden or papier-mache boards are cut and thin holes are pierced at equal distance on two smaller sides of the board.

A medium size string is inserted through these holes and tied firmly at the back of the board. In orded to secure the stirngs., in their position the surface (upper) is coated with a thin slip of rice paste or the tamarind paste or any thick colour. When the board gets thoroughly dry, sheets of paper are cut to the size of the board. Each sheet is then held on the lines with the left hand and the rest of the paper is pressed over the threads with the right to get the impressions on the paper. Similarly by reversing the paper, we can get lines in between also. Once the impressions of lines are seen, the scribes start writing on the sheets. When the text is completely written down they are kept in between the two bookcovers, and the **pothi** is tied with a string. The lines disappear after a certain period.

Types of kalamdaans

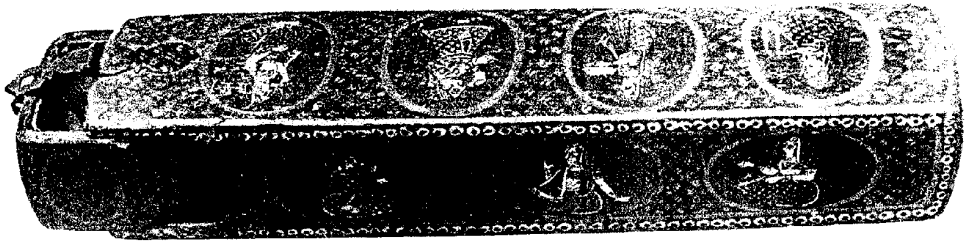


Fig 2

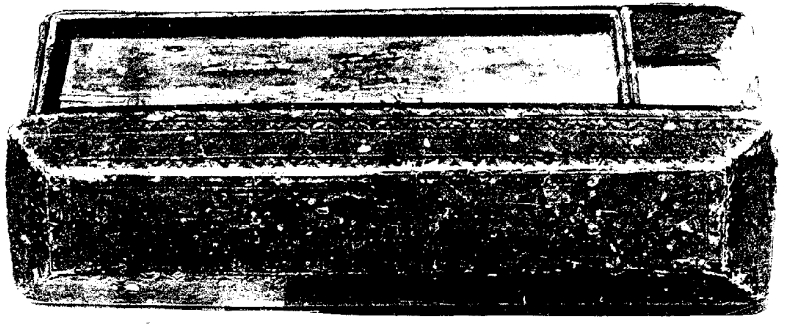


Fig 3

Kalamdan : कलमदान Box for keeping writting material.

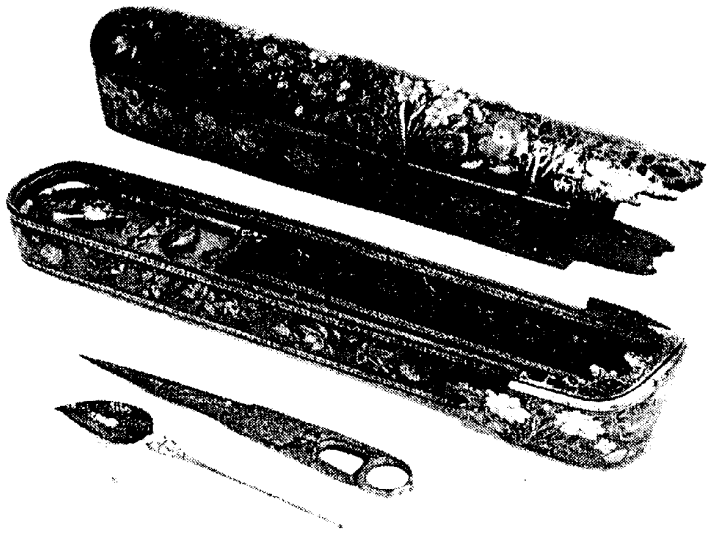


Fig 1

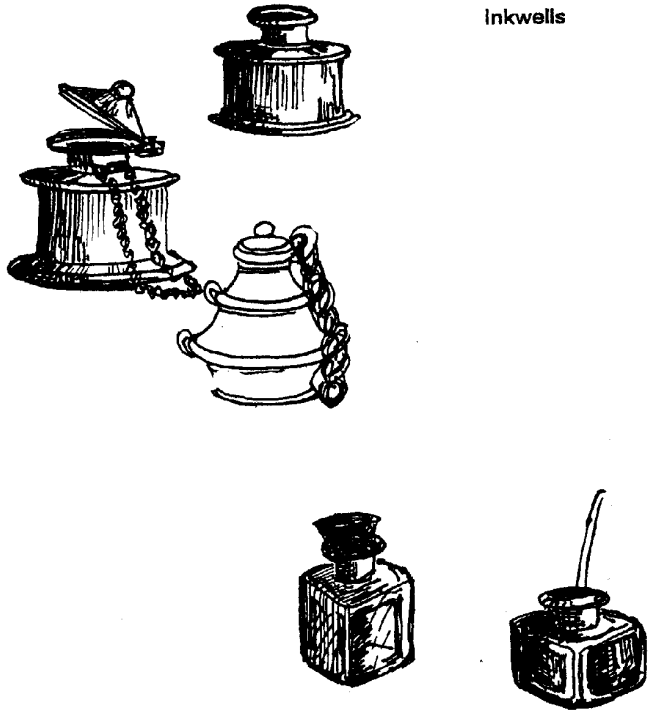
Along with the discovery of writitng material there arose a necessity for keeping the writing material in a box and secondly, for carrying it form one place to the other. Two types of **Kalamdans** came in to use. One was a portable box while the other was intended to be placed on a writing desk in an office or commercial establishment.

Kalamdan perhats originated in Persia and came to India in the Mughal period when both the Hindus and the Muslims encouraged calliagraphy. At this time the technique of writing and painting had reached the zenith of perfection. Mughal **kalamdans** (Fig 1) were made of steel by the smiths and were decorated with damascened work of gold. Bider, in the Deccan was a center for bidriware which produced **kalamdans** of gun metal inlaied with silver wire. Kashmiri **kalamdans** were made of papir mache manly, and were decorated with intricate floral motifs. (Fig 2,3)

Fig 4

During the Maratha period **Kalamdans** were made of brass. (Fig. 3) They are either tubular or octagonal in shape having lids on one side and are perforated all over the body. At times the inkpot is attached to it at one end. Painters (chitaras) made their own portable boxes from bamboos. Two halfs of a thick bamboo piece are carved from inside and are cut horizontally to fit on eachother and are secured with two circular clips towards the end of the container. The hollow of the bamboo is used for keeping writing and painting materials. (Fig. 4) The desk type of equipment is generally found in a set comprising an inkpot, mostly made of brass, a sand pot with a perforated lid and a holder stand on which pens and nib holders were kept. (Fig. 5 , 6)

Fig 5,6



Inkwells

3.2 Preparation of ink and colours

Black ink: मशी Mashi

Preparation of black ink for writing on palm leaf. paper and cloth, varies from material to material. Therefore, let us first examine the ink prepared for writing on the palmleaf. Textual references in this regard take us back to the 15th/16th centuries. But these references are at times vague and when experimented, result in a failure due to non availability of material and ingnorance about the ingradients mentioned in the old recipes. However, some of these references quoted by Muni Punyavijayji are presented here.

१. "सहवर भृंग त्रिफला, कासीसं लोहमेव नीली च ।

सम कज्जल बोल युता, भवति मसी ताडपत्राणाम् "

A rough translation of the abvoe can be,

Sahavara is an aqatic plant known as **Kantasaria** (Guj), Juince of **Jalabhangaria** i e. aqatic plant. **Triphala** i e a powder of three fruits, **Kasisu,** pieces of some medicinal wood and iron filings, all of these are boiled togather till they become like a paste. This is then mixed with indigo juice in equal propertions to which are added lampblack and **bijabol**(an ayurvedic herbal item) in equal proportion. In this way black ink is obtained. Likewise there are at least five types of preparations given by Muniji, but the most common recipe is as under:

Kajal (lampblack) and **Bijbol** are taken in equal proportion to which is added **Gunder** (natural gum) in double proportion of the two. Then seeds of **Bijabol** are soaked in water, grouned and strained through a thin cloth. This mixture is them put in a copper **kadhai**, (a flat copper container) and covered with a copper foil and ground with a limewood (**batta**), a wooden stock for quite some time Thus, the black ink is prepared. This solution is dried in the sun and small tablets are formed.

Another formula which is very common in Rajasthan is as under:

काजल कत्था बीजा बोळ, उसमे पडे गूंद को झोल ।

बांगरिया भी जल पडे, अक्षर अक्षर मोती जडे ॥

This recipe talks about lampblack, **kattha**(catechu), **Bijabol** and natural gum; and says that the docouments written with this ink not only repel the insects but also burns them. Therefore, scribes do not use **kattha** in the ink as it has a strong acidic action which burns the paper after few years. In short, the Jain **laiyas** have perfected their own technique over the years by trial and error method and have prepared a number of such formulas. They also give instructions about the Do's and Don'ts while preparing inks.

Likewise there are formulas for making gold and silver inks, red ink, **ashtagandha** and **yakshakardama**, the two special inks made for very special purpose.

Ashtagandha = अष्टगंध

Is made of 1. Agar 2. Tager 3. Gorachana 4. Kasturi 5. Raktachandan 6. Chandan 7. Sindur and 8. Kesar.

Yakshakardama = यक्षकर्दम

Is made of 1. Chandan 2. Kesar 3. Agar 4. Baras 5. Kasturi 6. Morchamkol 7. Gorachan 8. Hinglok 9. Ratanjani 10. Sonarivarakha and 11. Ambar.

Unfortunately, the recipes in books do not indicate the weights and proprotions of ingradients to eachother, But the scribes have been making these items basad on their own experience.

In addition to the materials for writing preparation of inks etc, there are certin very special and functional objects which are used by the Jain monks over the centuries, such as:

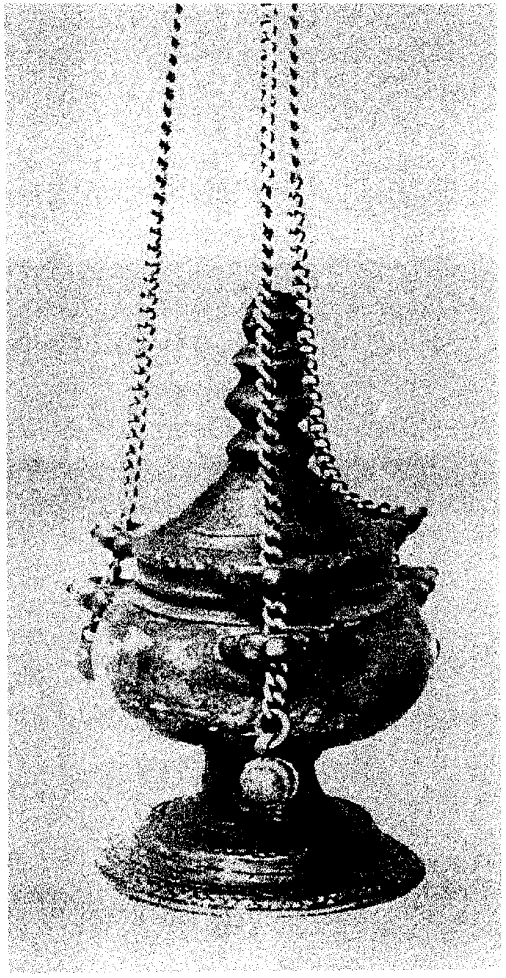


Fig 1

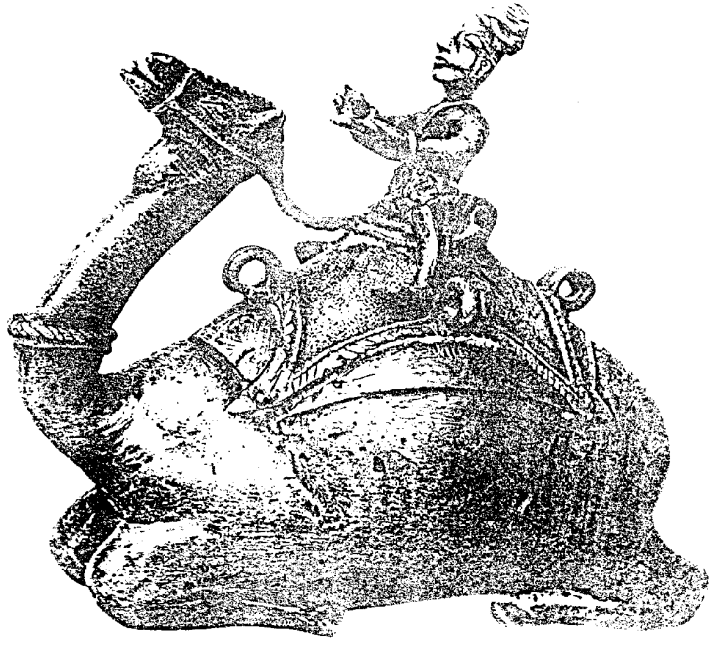
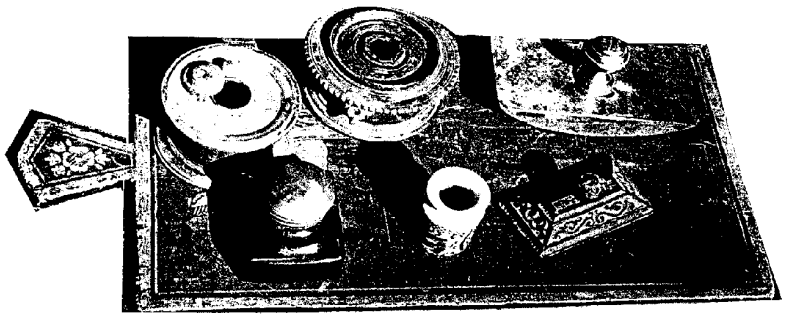
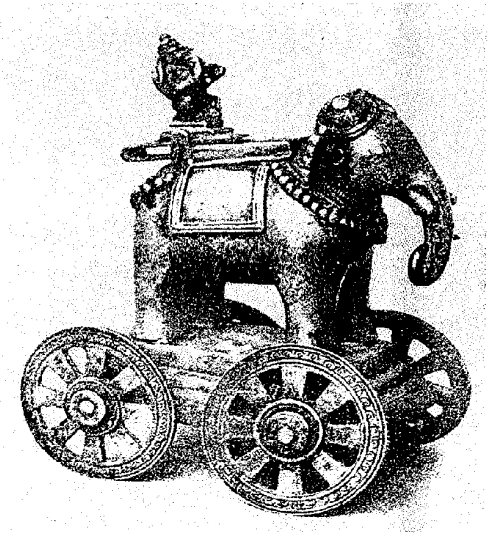


Fig 2

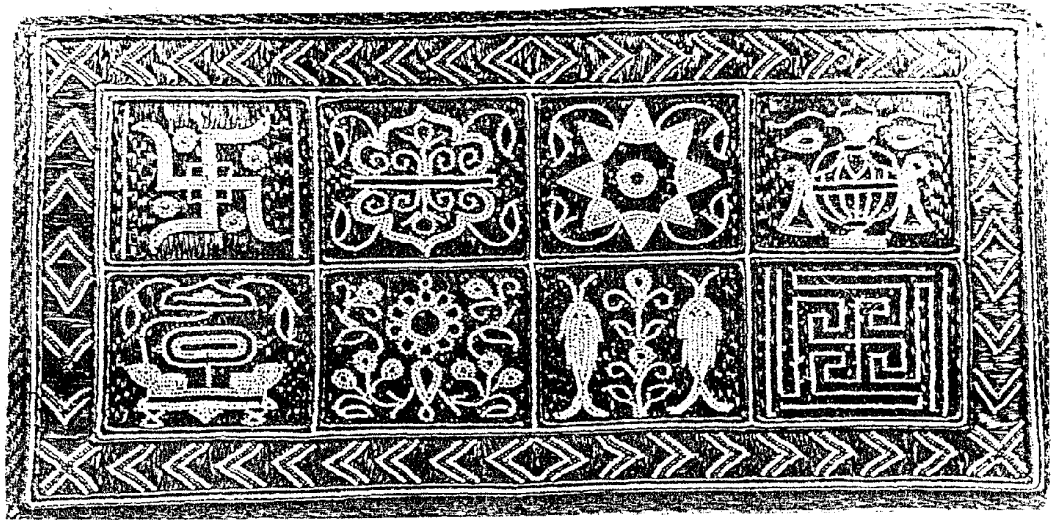


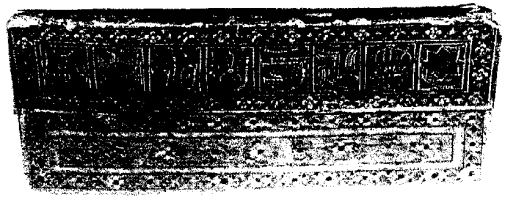
Types of inkwells



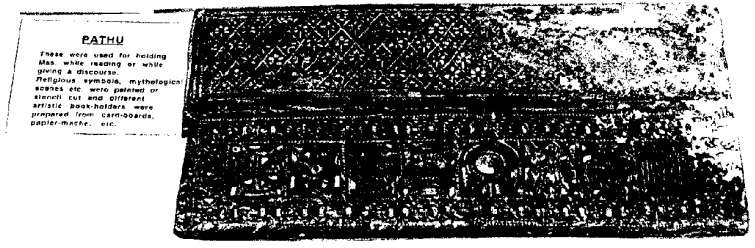
Khadiya: of Mashibhajan = Ink pot दवात

Since ink is prepared with great care using special and expensive ingradients, it is essential for storing it in ink pots for long time. We are ignorent about the shape, size and material of the inkpots in early period but it is certain that inkpots must have existed earlier. However, from the 17th centyry onwards we come across a variety of ink containers as objects of decorative arts along with the **kalamdans** refered earlier. By and large inkpots were made of metal (brass) and were turned on the lathe by the **Tambats** (those who make brass and copper utensils at Nasik in Maharashtra) and the **Kansaras** of Gujarat. Inkpots made of glass and crystal came from the European countries atleast from the 17th centuy onwards. Exquisite **kalamdans** coupled with inkpots were made in the Northwest Fronteer Provinces out of pure steel damascened with gold. Gujarati **Khadiyas** are made in beautiful temple shaped designs in brass, while Kapadvanj in Gujarat produced such items in glass and porcelain. With the advance of technology all over, plastic and other materials have dominated the field, giving rise to fountain pens, ball pens, and many other types of pens for writing.





Pāṭhum embroidered with tiny pearls.
Ahmedabad.

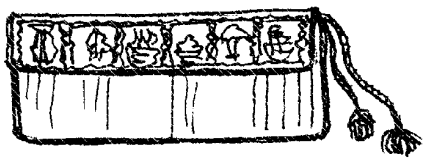


Chandan and Sakhal: Lid and a chain to hang the inkpot.

Chandan is the lid of the inkpot while **Sakhal** is a thin chain or a string tied round the neck of the inkpot to hang it above, lest it should be trampled by someone if it is kept on the ground. Therefore, Inkpots are generally hung above somewhere.

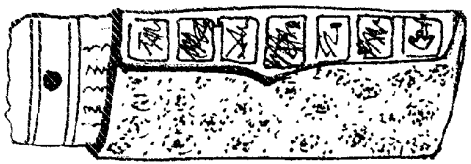
See pg 26

Pathu, putha = Covers for protection of Mss. folios



1

2



3

These bookcovers are invariably used by the Jain monks while giving religious discourses, or when they are studying the Ms. They act as bookjackets; when the Mss. folios are temporarily held by the monks while preaching, they are placed in **Patha**, or **putha** to protect them from perspiration of the hand or securing them from flying away by the gust of wind.

Puthas are made of various materials from compressed paperboard to wood to metal, even gold and silver. Some of them are beautifully decorated with textile designs. made of cotton or silk. They are of three types :

1. **Dodhia** i.e. with one and a half folds 2. **Bevada** i.e. with double folds and 3. **Adhiya** i.e. With two and a half folds. In the first type the upper flap is almost 1/4 of the longer side of the board and is invariably decorated and embroidered with gold or paintings of the **ashtamangalas** (eight auspicious symbols of the Jains or the fourteen dreams), while the inside

Gold plated pathu

Embroidered pathu

is kept blank. In the second type, both the flaps are equal. In the third type, the folio remains more secure as this has a short flap that overlaps the two (Figs.1,2,3)

These objects are the most decorative among the Jain materials. They are decorated with Kutchi embroidary in silk. woven with **kinkhab** or jari work, studded with beed and mirror work and at times carved in sandlewood in open work with mica ground. In normal cases they are lacquered and painted with Jain subjects.

Kavali, Kamali, Kabali : कवली: A temporary cover for the Mss. folios.

When one wants to get up for something while reading the Mss. there is every likelyhood of the folios getting mixed up or flying off. Similarly during monsoon season, so that the folios should not get exposed to humidity, the **kavali** provides a protective covering. (Fig.1)

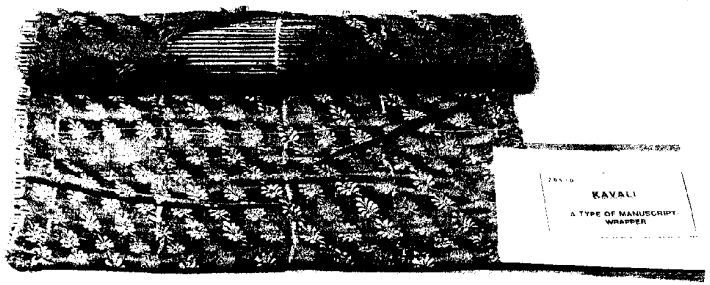


Fig 1

The **Kavali** is made by weaving thin strips of bamboo like a Chinese curtain, lined with a cotton or silk cloth from inside, To give an exact parallel, it is like a chinese calander which we see in some houses. When the Ms folio is wraped in it, it saves it from various hazards. This tradition goes back to the 14th century.

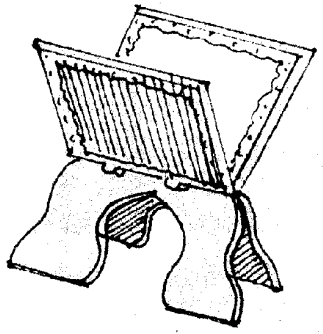


Fig 1 Sapla

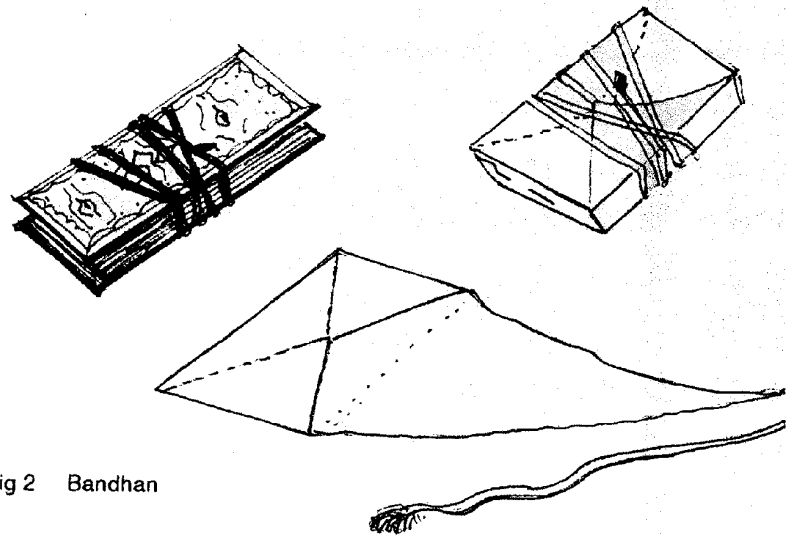


Fig 2 Bandhan

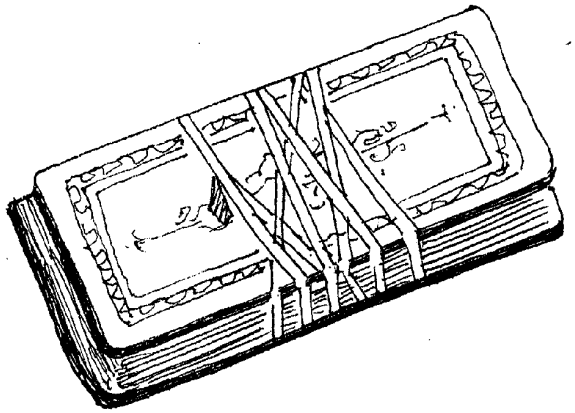
Sapla and Sapli: सापला, सापली A book rest.

Sapla larger, **Sapli** smaller, are made of teak or any other wood including sandalwood and jade stone are carved or made in open-work with traditional designs. The two parts of tho book rest are hinged at the centre, which open and close, Thus making it more portable.

In order to protect books and manuscripts from lying on the ground, where dust, humidity and insects could affect them adversely, a wooden book rest has come in to use. It keeps the book away from the ground, and the reader does not have to hold it nither does he needs to bend his neck to read. This item is more associated with Islamic tradition, as we often see **Quran** or other books kept on it in the mosques or Islamic educational institutions. It is called a **Rhel** in Urdu / Persian language. The 14th century Jain literature mentions of this object

Bandhan, बंधन, Cloth covering to wrap Mss.

We observe that most of the Mss. are invariably wrapped or tied in a cloth **bandhan.** It can be of cotton or silk depending upon the importance of the Ms. It is stitched in the shape of an envelope with its closing flap made longer than the two sides, attached with a long tape or a string. The bag is slightly larger than the size of the Ms. so that it could be pushed in to it easily. The flap is then wraped around tightly and the string or



the tape is also wound round tightly. The knotted end of the tape is then inserted in to the tape to keep it tight.

In addition to the items enumerated here, there are many other items. However, it may be clear from this study that the techniques of writing and painting go hand in hand as the scribes and painters do not belong to separate water tight compartments. They are complimentry to eachother. Secondly, tradition plays a major roll in it which is backed by textual sources and thirdly, the art flourished due to the patronage of the Jain community at all times.

3.3 Typology of Jain manuscripts on the basis of visual apprearence (part.1)

After describing the main types of Jain books, Mss, Muni Shri Punyavijayji presents a classification of Mss. folios based on the textual and visual content which is as under: (part.1)

1 Tri patha,

2 Pancha patha,

3 Shuda,

4 Chitra pustak,

The book or the Mss which has the main text written in bold letters and its criticism written above or below the main text is called the **Tri patha** book. (Fig 1) Similarly the Ms having the main text in bold letters in the center and the criticisms on top and bottom as well as on the two sides, is called the **Pancha patha** Mss or book.(Fig 2) The third type of Ms is called the **shuda** Ms. because it has evolved from the trunk of an elephant, which is long and contineous. Therefore the Ms. which is written in a contineous manner without any division or break is called the **Shuda** Ms. It is generally regarded that this tradition of **Tri patha** and **Pancha patha** Mss. was in vogue since the 15th century A.D.

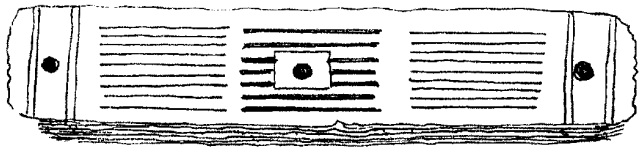


Fig 1

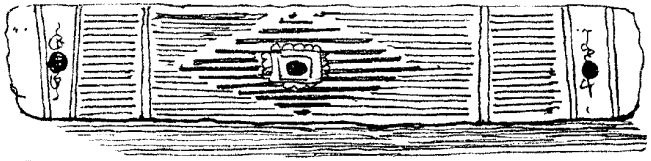


Fig 2

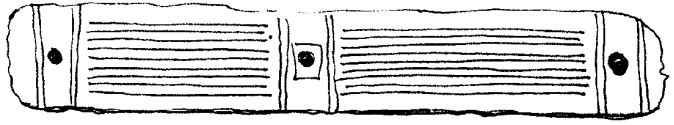


Fig 3

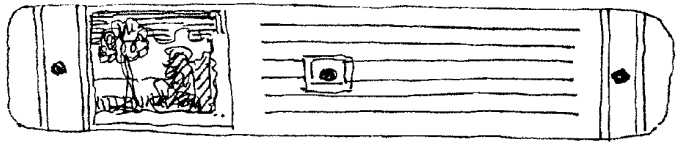


Fig 4

Chitra-pustak

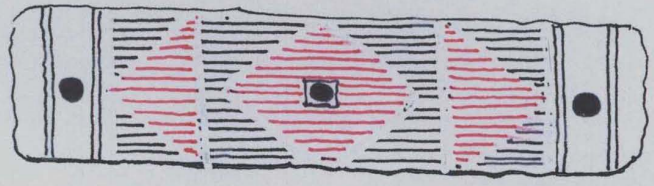
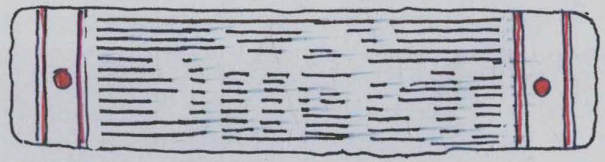


Fig 5



The fourth category of **Chitra pustak**, may not be understood as illustrated Mss. alone which includes Mss. which are visually aesthetic and made more beautifiul by virtue of their internal decoration such as writing, colouring and overall design. It is this peculiarity of painting, writing and calligraphy that makes it a **Chitra pustak.**

Some times the scribes use their ingenuity in calligraphy by keeping interesting vacant spaces in the from of squares, circles, rosettes, lotuses as well as geometrical patterns while composing the text on a single folio (ig 5) At times the writer leaves his own name or the name of the book in the center and weaves the text around it. While rendering these artistic designs in between the text or sometimes decorating the **hasias** (margins) with hunting scenes with excellant drawings and paintings the scribes exhibittheir mastery over miniature painting also.

When paper came to be used for manuscripts the smaller and narrow format of the palm-leaf was discontinued. The size of the letters become big and painting and marginal decoration gained prominance. In the history of miniature paintings of the world the early Jain manuscript illustrations claim a unique position.

Dev Sano Pado Kalpasutra

After the middle of the 15th century, rich and opulant Mss. were commissioned by the wealthy Jain community. These comprised mainly the sacred canonical texts of the **Kalpasutra** and the **Kalakacharya katha**. Such books with profuse use of gold and silver inks on deep crymson or violet or light blue ground became a matter of dignity and pride. Some of the known specimens of these are the Mandu **Kalpasutra** of A.D. 1439:[1] the Jaunpur **Kalpasutra** of A.D. 1465;[2] and the most magnificient of all Jain manuscripts of the world, the **Devasana pada Kalpasutra** of ca. 1475[3] A.D. of Ahmedabad display an extraordinary skill not only of painting but also of calligraphy as well. Some times the entire folio is treated graphically as one, in which both, the text and the pictorial illumination, and in some cases, the marginal decorations play a significant role. The quality and style of writing and painting however goes on changing in the subsequent periods of Jain history.

In this connection it is worthy of mention here to emphasise the importance of one great Ms. of the world, refered above known as the **Devasana pada Kalpasutra** which is preserved at the Devasano pado Bhandar in Ahmedabad. This exquisite Ms. has more than 234 folios including the text which is written in golden ink on blue ground. Its main peculiarity is its

1 Karl Khandalavala and Moti Chandra, **New Documents of Indian Paintings** (a reappraisal) Bombay 1969
2. **ibid**
3 **ibid**

Fig 1

marginal illustrations. The entire manuscript is profusely painted all over. Narrow margins on the top and bottom of the folios have a variety of hunting scenes showing Persian influence.

The left and the right vertical areas have stylized representations of unique tree types, never to be seen or visualised elsewhere. It has boats, seascapes, landscapes, which are second to none in the whole range of jain miniature painting of the Sultanate period. (Fig 1.).

Although the above Ms. belongs to a Jain religious subject its illustrations have a marked Persian influence which is accepted all over the world. There are a few such Mss. that we know of but the above example is undoubtably the best of the period that one can be proud of.

3.4 The Jain system of calligraphic writing and classification of manuscripts, (Part. 2)

There are five types of books that have been quoted by Muni Punyavajayji, the references of which appear in the Jaina literature quite friquently. According to one such source, these five types are as under. (Part. 2)

1. Gandi, 2 Kachhapi, 3 Mushti, 4 Samputa Phalak, 5. Chedapati,

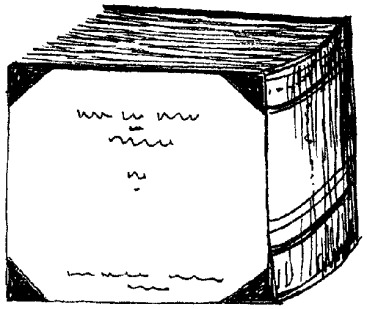


Fig 1

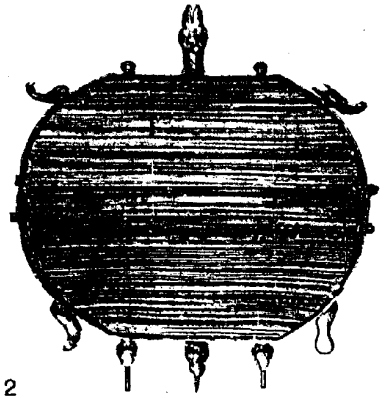


Fig 2

Gandi Pustak : A book which is rectangular and longer in shape, and is equal in thickness and breadth is called the **Gandi pustak.**(Fig.1)

Kachhapi Pustak : Sometimes the palm leaf folios are cut and arranged in the shape of a tortoise. They are arranged in such a way that they are longer in the centrer and go on tapering towards the end. These leaves are then secured by iron fasteners. The tow long screws pass through the leaves, which look like the legs of the tortoise. Such Mss. are mostly found in South India. (Fig. 2)

Mushti pustak : The Book or Mss. that could be contained in the mushti i. e. the first of the hand is a **mushti pustak.** It should be four fingers long or round in the shape of a scroll.

Fig 3

Small **gutkas** or hand **pothis** resembling diaries or pocket books are included in this category. Such Mss. usually contain religious or secular subject matter including Jain hymns etc. for daily recitation. They are easy for carrying on person when one is travelling. Even in 20's and 30's scribes used to come to the doors of rich people to write such Mss.(Fig. 3)

Fig 4

Samputa Phalak : Books of manuscripts written on wooden planks are called **Samputa phalak** type, in which we find some of Jain yantras, **mantrapatas Jambudvipas, samavasaranas, lokapurushas** etc. painted on wooden planks. These can be included in this category. (Fig. 4)

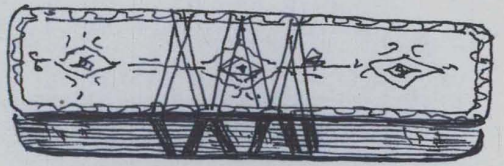
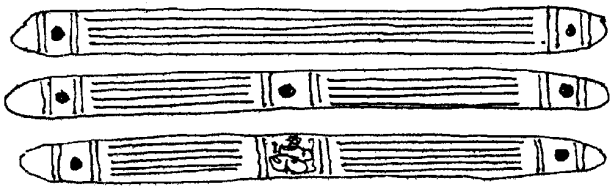


Fig. 5

Cheda pati : : This category is applicable to common Jain Mss. like the **Sangrahani sutra**, the **Uttaradhyayana sutra** and **such like**, which have smaller number of folios, or they are incomplete. (Fig. 5)

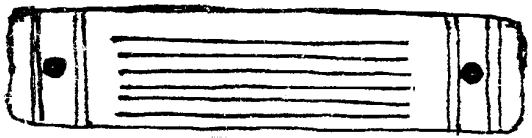
3.5 Typology of Jain MSS. based on visual appearence suggested by Muni Punyavijayji. (Part 3)

1. अखंड पाठ, मूलपाठ अने सचित्र मूल पाठ :



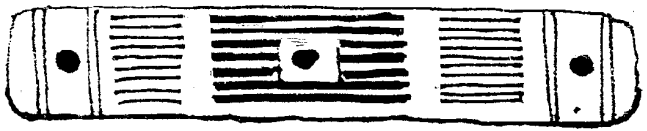
A Ms. folio, whether palm leaf or paper, which has the main text written in bold letters in one contineous column or divided in to two coloumns; Some times with an illustration in the centre, with out the criticism is called the Akhanda path.

२. मूलपाठ कागज :



A paper folio with the main text, with out the criticism.

३. त्री पाठ



Main text written in bold letters in the centre with two columns of criticism written on either side of it. is called the Tri Patha MS.

४. पंचपाठ :

Main text written in bold letters in the centre and the criticism written in four columns in smaller letters on all sides, is called the Pancha patha MS

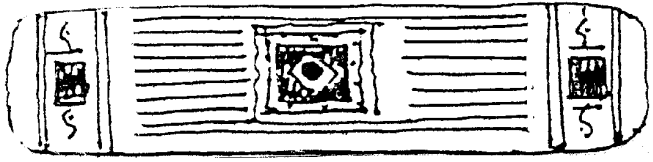
५. सचित्र मूलपाठ, कागज

Folio having an illustration on one side and the main text in bold letters appears to the right is called, main text with illustration.

६. मध्यफुलिका तथा रंगीन बोर्डर

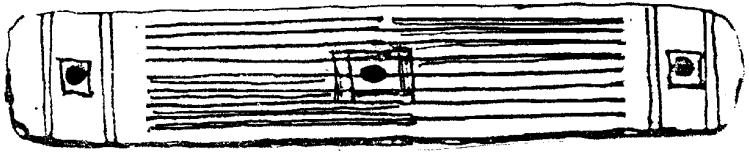
Folio having a rosette or a square in the with coloured margins.

७. चित्रयुक्त अंकस्थान



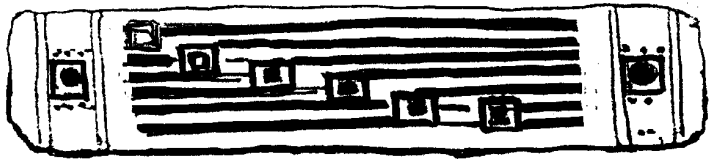
Decorative numericals on sides.

८. रक्त धवल अक्षर



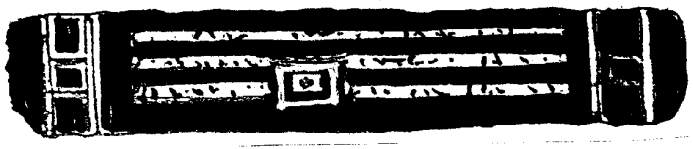
Folio with red and black ink decoration and writing

९. सुवर्णाक्षर गर्भित



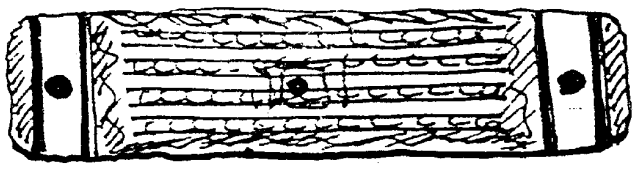
Folio interwoven with golden letters.

१०. श्वेताक्षर



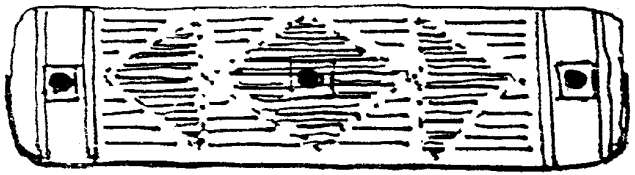
Folio with white spaces on black paper with coloured cartouches.

११. सुवर्णरेखांकित



Folio decorated with golden lines and decoration.

१२. रिक्तलिपी चित्रमय

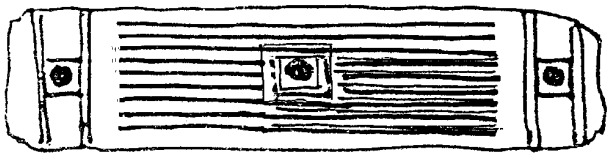


Folio written with empty spaces forming geometrical patterns.

१३. जयचंदनाम गर्भित

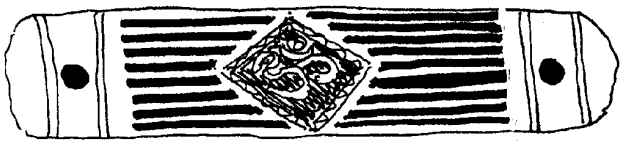
Folio interwoven with the scribe's name Jaichand in the centre.

१४. रक्त धवल मसी



Folio written in red and black ink.

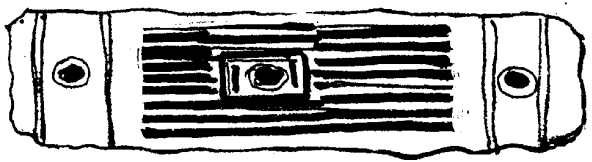
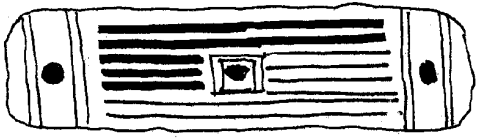
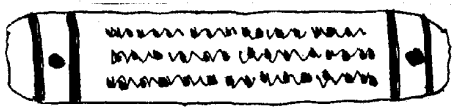
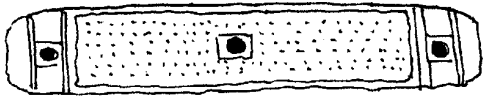
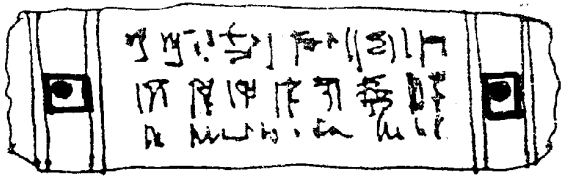
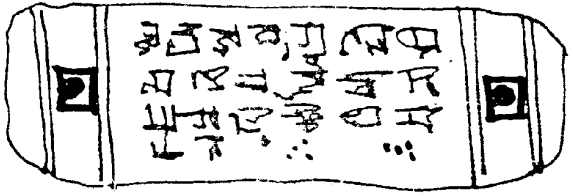
१५. रिक्तलिपि नाममय



Empty space left in the centre with calligraphic writing.

१६. कृष्ण मसी

Use of black ink for writing on a page.

१७.	काथ की शाही		Folio written with ink made out of Catachu.
१८.	लाख की शाही		Folio written with ink made out of Lac.
१९.	रक्त-कृष्ण मसी		Red blue and black ink on paper.
२०.	स्थूलाक्षर		Folio written with bold letters.
२१.	सुक्ष्माक्षर		Folio written with micro letters.
२२	लंबाक्षर		Elongated Calligraphy.
२३	उंधाक्षर		Folio written with inverted letters which can be read by looking in the mirror.

3.6 Community of scribes, Laiyas and Mathen painters of Marwar and Bikaner.

We have seen that by about the 10th century. Jaina monks had realised the eudcational value of the Jain **Bhandaras** (repositories of Jain literary works). The benefactors of such institutions took pains to explain to the learned Jains the importance of their religious and secular texts which had been collected by them for several centuries. Such foundations encouraged the Jain **shresthis** and laymen to order copies of seacred texts and present them to the Jain monks who in turn deposited them in the Jain **Bhandaras** for preservations and posterity. At the same time, in order to give impetus to their activity, the **Jnana-Pujas** (Worship of knowledge) were held from time to time, which kept the interest of the laymen alive for learning.

It is worthy of note to mention, the names of Jaysimna Siddharaja and Kumarapala, in this connection, the renowned rulers of Gujarat of the medieval period. Jaysimha Siddharaja (1093.1137 A.D.) is said to have employed about three hundred scribes to copy out books and manuscripts on religious and secular subjets for the Imperial library. These copies were subsequantly destributed to scholars all over India.[1] Kumarapala (1143-1172 A.D.) is said to have established twenty one **Jaina**

1. **Prabhavaka Charitra** (Singhi Jaina Series. Bombay) 1940.

Bhandaras[2] and had employed seven hundred scribes to copy out religiouus books. Some of these were written in gold letters and were destributed to libraries at Patan, Cambay, Bharuch, Surat, Ahmedabad, Channi[3] etc.

It will be apparent from the above references that the Jains encouraged learing which resutled in production of a large number of illustrated or unillustrated MSS. Naturally to cope up with the increasing demand for writers, the community of scribes grew up repidly

Writing about the Jain scribes, Muni Shri Punjavijayji mentions[4] that we come to know about the scribes and their details through several colophons (the end of any MS has details of the book, its date of copying, the name of the donor the name of the scribe etc) of MS. These colophons reveal that the Jains patronised the **Kayasthas**[5], **Brahamans, Nagars, Mahatma**[6] **Nayaks, Bhojaks** and **Mathen** painters for several generations. They belonged to a special occupational caste and tried their level best to please the Jain shresthis by writing and

2. **Kumarapala Pratibodha** (Gaekwad Oriental servies) Borada vol 14. P. 96-97.
3. Also see, **Upadeshatrangini.** P. 140.
4. Muni Sri Punjavijayji. **Bharatiya Jain Sramana Sanskriti ane Lekhana Kala** (Gujarati). Sarabhai Nawab. Ahmedabad. 1950
5. Moti Chandra and Karl Khandalavala **An illustrated Manuscript of the ranyaka Parvan** in the collection of the Asiatic Socety Bombay. 1974.
6. Shridhar Andhare. **Chronology of Mewar Paintings.** Agam Kala Prakashan, New Delhi, 1987. P. 39, 43.

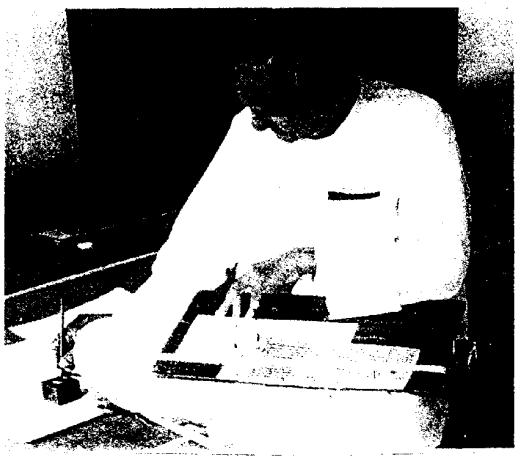
copying Jain as well as non Jain literature and also painting pictures in the manuscripts. They took pride in calling themselves as Jain writers or Jaina **Laiyas**. Thus, a large quantum of Jain literature was produced on all subjects and destributed to varions Jain **bhandaras** all over India.

Unfortunately, due to ravages of time, frequent Mughal invasions, natural aging and biodeterioration, so also accidental damages, caused by fire and floods, destroyed a considerable portion of this heritage and was smuggled out in the past. However, inspite of all these adversities, a lot has been preserved in Jain libraries and **Bhandaras**, which is second to none in the world.

Due to new discoveries of printing technology and its rapid progress, the scribes profession surffered a set back. As early as the beginning of the 20th century, a trainaed scribe charged Rs. 3 to 4 for copying one thousand **shlokas**. In the 40's they charged Rs. 7 to 8 for doing the same work. Presently i. e. from 1950 onwords the rate has gone up to Rs 15 to 20 for writing one thousand varses. As of to day. there are very few scribes left even in places like Patan who can write well. The cost of material, technaque of preparation of inks etc is getting extinct day by day.

Laiya Goverdhandas Laxmichand Trivedi of Patan :

Among the most celebrated and honoured scribes of Gujarat comes the name of Govardhanas Laxminchand Trivedi, who worked under the patronage of two renowned gurus, namely, Muni Shri Kantivijayji and Shri Chaturvijayji of Patan. He belonged to Brahman caste and was not only proficient in the art of calligraphy but was a skilled restorer. He could read abraded letters on palm leaf MSS, and bring out their meaning. In addition, he was conversant with **Vaidak** shastra, Astrology, **Mantra**, **Tantra** and **Yantra**. Apart from the above, he was an excellant draughtsman and could design and paint the yantras by himself.



Shri Laxmanbhai Bhojak

In Mewar, Mahatmas[1], Gorjis, Yatis, etc belonged to the Laiya community and performed the above vocations from time to time.

Shri. Laxmanbhai Bhojak of Ahmedabad

In the modern times, the name of Shri Laxmanbhai Bhojak(75) of the L.D. Institute of Indology is known to all in the Jain community and the monkhood. He is the only surviving exponant of the erstwhile tradition of scribes along with his elder brother Pt. Amrutbhai Bhojak (now 90) Both residing at Ahmedabad and helping the Jain monks in various matters.

1 Shridhar Andhare, **Chronology** 1987. This refers to the illustrated MS of Arsha Ramayana in 7 chapters painted at Udaipur and its visinity from A.D. 1649-51 where the scribe is Mahatara Hirananda according to the colophons of these chapters.

Shri Laxmanbhai is credited with knowledge of Manuscriptology i.e. decipherment of old scripts from palm. leaf folios, copper plate grants and stone inscriptions. He is also welversed in the technque of writng and preparation of various types of inks, colours and writng materials. He had the good forture of learning under the guidance of Muni Jinavijayaji and Muni Shri Punyavijayji, the two celebrated scholars of the Jain religion. Shri Laxmanbhai has a mine of experience and knowledge about the Jain mythology. He is an expert in narration of Jain subject, matter on miniature paintings and is very well respected not only in Gujarat but also in the whole of India among the Jains (Fig 1).

Preparation of colours for painting

(Form the Ms. of **Yatimayagala-Sagar**[1])

Although abundant references are available in the medieval literature which throw light on the technique of preparation of colours and other writing equipment. There is also a lot of information available in the Jain texts. These passages found on certain stray folios of MSS, or in chapters dealing with colours and pigments have been translated by Muniji in his book.

1. Brijmohan Jawalia. मध्य कालीन चित्र कर्म में प्रयुकत् रंगो की निर्माण विधि. राजस्थान, **शोधपत्रिका** उदयपुर, जुलै दिसंबर १९७७. The MS of **Yatimayagala Sagar** (ca.18thcent) in a Gutka form is in the possession of One Shri Ravikant Sharma resident of Shahpura (Rajasthan) See pp 61-63.

One such unpublished manuscript of **Yatimayagala Sagar** was discovered by Dr. Brijmohan Jawalia, the ex Director of Rajasthan Oriental Research Institute, Udaipur, which suppliments some valuable information of preparation of colours in the 18th century. The information is given below :

Like the **shilp-ratna**, a treatise on colours and technique of painting, the MS. of **Yatimayagala Sagar** also gives five main colours, such as, Red (of two types), yellow, white, and Syah (black) which are by and large produced from Hinglu (vermilion Sindur (Red lead) Pevadi, Pyavdi (yellow) Safeda- white and Guli (i.e. Indigo blue).

By mixing certain colours with each other the following colours are obtained such as alta (lac dye), Janghal i.e. Verdigris, Green, Hartal, orpiment, syah-black, like ink and Gerua i.e. Indian red.

Some of the colour mixtures given in the above MS. are as under :

Blue colour	:	is prepared by the mixture of Godanti (?) Hartal orpiment (from Gujarat) and chokshi gali, i.e. pure indigo in the proportion of 2 parts of Hartal to 1 part of indigo blue.
Gulabi, Pink	:	is made with pure quality of white (safeda and alta ki pothi (?) (Guli).

Colour of the leaf	:	Pyavdi (Yellow) 1 tola, and guli½ tola makes the colour of leaves (i.e. **pan ka rang**) leaf green.
Narangi-Orange	:	By maxing 2 parts of sindur(red lead) with 2 part of Pyavdi, Orange colour is made.
Khaki	:	Safeda 1 tola, pothi gota (!) 2 and 1 tak of guli will make khaki coluur.
Godhuma (wheat colour)	:	Safeda I tola, Sindur I tak. and Pyavdi I tak makes Godhuma colour.
Syah rang	:	Colour of ink i.e. black : safada1 tola, Sindur I tak plus one drop of Pothi makes black colour.
Sua rang- parrot green	:	Janghal (Verdegris green) I tak, and Pyavdi I tak make sua colour. i.e. Parrot green.
Asmani, skyblue	:	Recipe-I Sulpher I tola and guli 2. tak. Recipe-II safeda 1 tola, plus 2 taks of Guli make sky colour
Baingani. deep violet	:	Hinglu. 1.tola, Guli tak,2 I ratti (measure) of alta pothi and safeda will make Baingani colour (of egg. plant) (dark purple fruit vegetable)

Preparation of colours for Paintings

The present state of our knowledge on preparation of colours for miniature painting in general and Western Indian or Jain manuscript painting in particular, is based primarily on the researches, interpretations and translations of passages from the medieval texts like the **Vishnudharmottara Purana**[1], the **Manasollasa**[2], of kavi Someshvara and the **Silparatna**[3] etc. on the one hand, and some practical interviews and field work conducted by scholars[4] with the traditional painters to extract valuable data on making of colours and to understand the technique of miniature painting from them on the other. There are two monumental researcheres done in this field. One, by Dr. Moti Chandra on the technique of mughal painting[5] and on `Jain miniature painting`[6] and the other, by Muni Punyavijay ji on the art of writing and painting of Jaina manuscripts[7] which largely deal with Western Indian painting in Gujarat and Rajasthan.

1. Stella Kramrisch : The **Vishnudharmottara**. (Pt. III) Calcutta. 1924.
2. Shirgondekar : **Manasollasa**. Pt.II Gaekwads Oriental series. LXXXIV. Baroda. 1939
3. Srikumara : **Silparatna**, ed. by. M. T. Ganapati Shastri Trivendrum. 1923. summarised by K. P. Jaiswal. JORAS. Vol. IX. pt. I Patna. 1923
4. **Shridhar Andhare : Mewar Painters, their status and genealogies, Facets of Indian Art**, Victoria & Albert Museum, London 1986. PP. 176'-184.
5. Moti Chandra : **Jain Miniature Painting from Western India**. Sarabhai Nawab. Ahmedabad. 1949
6. Muni Punyavijayji : **Bharatiya Jain Sramana Sanskriti ane Lekhana Kala**. (Gujarati), Sarabhai Nawab. 1950. also see **Jaina-Chitra-Kalpadruma**. S. M. Nawab. Ahmedabad-1936
7. S. K. Andhare : Technique of Rajasthani Painting. **Technology in India. (Ancient and Medieval Periods)"** Anantacharya Indological Research Institute. Series. No. XV Bombay 1984.

Histroically speacking, the art of miniature painting is an all India phemominon spread over various regions covering different periods of History , identified as Schools of painting, which incorporate local culture, dialect and mannerisms of that region. Thus, we come across a variety of techniques, systems and regional terminologies used by the artisans in their respective vocations. To which is added their family terminology preserved in the memory of senior members in the form of **Sutras** (Formulas) couplets, **dohas**, chaupais etc, which, when deciphered, unfold certain recipes and skills, preserved as oral tradition.[8] This master to pupil tradition or the गुरु शिष्य परंपरा has preserved the roots of our art and craft in India over the centuries.

These regions are briefly identified as under : Mughal, covering the entire Northern India, Rajput, i.e. Rajasthani covering the states of Rajasthan, Pahari i.e. of the Hill states, Deccani, covering the states in the Deccan and South India, covering the state of South India on the whole.

An attempt in made here to study the traditional technique of miniature painting and preparation of colours prevalent in Rajasthan and Gujarat which has a strong Mughal

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8. Shridhar Andhare : Badrilal Chitrakar, Bhilwarawala, A paper presented at IAAH. Seminar on Technique held at the Sarabhai Foundation, Ahmedabad in 1982. (unpublished).

background. It should be noted at the out set, that the procedure of obtaining colours and making them usable for different purposes is a closely guarded secret of the artist families who are very reluctant to reveal their processes. When questioned, they some times recite **dohas** or couplets which furnish some hints and names of ingradiants used in colour making such as;[9]

काजल कत्था बीजा बोल, उसमे पडे गूंद का झोल
बांगरिया भी जल पडे, अक्षर अक्षर मोती जडे

This is a general recipe of making black ink for writing on paper. It, briefly indicates the following ingradinents like **Kajal** i.e. lamp black; **Katha** i.e. catechu, **Bija-bol** i.e. a nut like fruit called bol. A few drops of natural gum (in water) are added to this solution. The above ingradients are first ground, then heated and allowed to dry. When in use, few drops of **nim gum** are added. It is said that writing done in this kind of ink is insect proof and letters stand out prominently.

In the medieval period pigments were largely obtained from minerals and ochres. Occasionally, some vegetable colours were also used (for particular paintings), such as indigo, lac-dye and carmine. By and large they fall in to two categories : 1. Natural pigments, chemical compounds and vegetable extracts and 2, artificial pigments made from salts and pigments owing

9. **ibid**

their colour to vegetable or insect dyestuff. It has been found out that majority of colours used in Western Indian or Rajasthani painting are derived from minerals or natural salts. These minerals are often found in the visinity, in the form of stones which are pulverised to fine dust before use. Impurities from these natural stones are removed by a process of levigation. Natural pigments invariably contain sand and humus, for which the earth (mud) is dissolved in water, sand deposits at the bottom and the peat and the mould tend to float which are skimmed off. But, before the earth settles down, water in quickly drained off in another container. This process is repeated several times till the colour is cleared of all impurities. It is then dried in the sun and taken for use. A somewhat similar method is given in **Silparatna**[10] "After the yellow ochre and wood have been brought from the river beds and the hills, they should be washed in pure water, pulverised and then reduced to fine powder. This dust is then disolved in a container full with water and allowed to settle for a short time.By this process colour will float over water and the dirt will settle down. This process is repeated several times till colour paste attains purity. The paste is then besmeased on a raw earthen pot and allowed to day."

Black, white and red colours were widely used in Western Indian manuscripts. and there is enough information

10. Moti Chandra. : ob-cit p. 76

and material available for study. In the early Jain manuscripts there is sufficient use of white pigment, the nature and scientific classificion of which has still not been made. Use of zink white or lead white is not mentioned in the early literature. However, the **Manasollasa** or the **Abhlashitartha Chintamani**[11] ca. 12th cent A. D. mentions of shell white being used in that period Shell white, सीप का सफेदा, was also used in Mughal painting of the 16th and 17th Century.

Muni Punyavijayji has published some information obtained from two strary Ms. folios[12] mentioning the use of lead white as **Safeda** in Mughal painting of 16th and 17th centuries which was used in making colour mixtures of variours shades for use in paintings and MS. illustrations.

However, Zink-white has certain drawbacks. Firstly, it has a tendency of tarnishing when exposed to gases in the atmosphere and thereby changing the colour values of the work; secondly, it, being poisonous, proves hazardous to workmen and thirdly, it does not mix well with certain colours like verdigris and orpiment. Therefore, it is concluded that burnt conch, shell, kaolineor chalk were mainly used as white pigment in a majority of paintings, **Silparatna**[13] mentions **dhavala varna** i.e. white colour, being used as priming material for pictures and it was composed of white earth the exudation of elephant apple and

11. Moti Chandra : ibid,
12. Muni Punyavijayji : Jaina Chitra Kalpadruma I. P.P. 47.
13. Moti Chandra : Ob-cit P. 76.

gum of nim, serving as binding media. A breif method of preparation of zink white is as follows: good quality of (Kasagar) Zink-white is thoroughly ground and sifted through thin muslin cloth. The powder is then dissolved in the solution of Dhau gum in a procelain blow till it becomes like thick milk. This mixture is then slowly drained in to the another container so that the impurities settle at the bottom. This is repeated several times till pure zinc-white is obtained.

Muni Punyavijayji in his valued **publication**[14] has given a number of formulas taken from Sanskrit and Prakrit literature and from some stray folios of Mss. which describe the method and ingradients of preparation of inks for writing and painting. Various types of inks like black ink called Mashi (मषी) red ink, golden and silver inks have been discussed. There were separate recipes for writing on paper, palm leaf, cloth and on wooden objects. **Manasollasa**[15] however, only speaks of lamp black (Kajal) which was used as black pigment in medieval period. The method of obtaning black colour, according to **Silparatna**[16] is given below. A globular earthen pot, with its inner surface smeared with dry cowdung is placed with its mouth on the flame of an earthen lamp filled with oil. The lamp soot (black) stuck inside is collected and allowed to dry. It is then mixed with **nim**[17] water, gum and pure water; levigated and then dried.

14. Muni Punyavijayji : Ob-cit, P 38 15. Moti Chandra : Ob-cit P. 77
16. ibid 17. Muni Punyavijayji : Ob-cit P. 38, 39.

A few formulas published by Muniji on preparation of black ink are given below :

सहवर भृंग त्रिफला, कासीसं लोहमेव नीली च ।
सम कज्जल बोल युता, भवति मषी ताड़पत्राणाम् ॥

व्याख्या : सहवरेति कांट्य सेहरिओ (धमासो), भृङ्गेति भांगुरवो त्रिफला प्रसिद्धैव, कासीसमिति कासीसम येन काथदि रज्यते । लोहमिति लोहचूर्णम् । नीलीति गलीनिष्पादको वृक्षः तद् रस : रसंविना सर्वेषी मुक्तव्य काथः क्रियते स च रसोऽपि सम्भवतित, कज्जल-बोलयोमध्ये निक्षिप्यते ततस्ताऽपत्रमषी भवतीति ॥

Before actually translating this formula, it is necessary to sound a word of caution that the old texts, made use of a number of ingradients welknown to Ayurveda in the form of herbs, fruits, nuts, roots, juices etc. which were commonly used then. Some of them are difficult to obtain now. However, a rough translation of the above will explain the recipe to a certain extent.

Substances like Kataserio (Dhamaso) a thorny bush, growing on the banks of lakes or rivers: **Jalabhangra no ras**, i.e. juice of a plant. Triphala a well known mixture of Harda, Behada and Amla Kasisu (?) and Lodanu Churna i. e. Iron powder, are boiled till a thick paste is made. This paste is then mixed with **gali nu ras** i.e. Juice of an Indigo plant in equal proportion to which is added lamp black and bijabõl in the same proportion. Thus, the ink for writing on palm-leaf is made.

In addition to the above examples there are at least four or more recipes given by the author in his publication. Which are not discussed here. However, golden and silver inks were commonly used by the Jain scribes in decorating their holy books and writing of the texts.

Red pigment :

Medieval Sanskrit texts describe various shades of red. Natural red stones, red clays and red limes contain oxide of iron. Painters therefore select such clays or stones in which there is sufficient quantity of iron oxide. By and large there are three to four varieties of reds used in painting and writing : Red ochre, Geru, is widly used in ancient works as its shade is light and warm. This colour, was however not used by the painters in Western India. As per **Silparatna.**[18] red ochre was levigated on stone for one complete day and then pure colour was obtained by frequent washing.

Red lead : Sindur, was predominantly used in the paper period in Rajasthan and Gujarat. This colour was prepared by roasting white lead in open air till it attained a deep colour. Vermilion is a form of crude cinnabar and is called Hinglo, or Hingola, amongst the painters, It is bright red in colour and is used predominantly in the Jain paintings and **pothis**[19] for border decoration and backgorund colour. In, making this pigment,

18. Moti Chandra : Ob-cit P.78. 19. ibid. P 85

crude cinnabar is properly lavigated in a mortar with sugared water or lime juice. When cinnabar settles down the yellowish water is carefully drained off. For successful proccurement of this pigment, this process is repeated at least 15 times to obtain purest cinnabar. It is again levigated with sugared water or lime juice, throughly mixed and formed in to tablets for use.

From the list of colour published by Muni Punyavijayaji lac-dye or alta was used as red and was mixed with other colours to obtain several shades. Long lists are given by him in the above publication which describe shades and subshades of colours.

Although vermilion was useful and much dersired colour for a variety of uses among the painters and patrons, it failed to produce the depth, and transparancy, desired. Therefore to obtain dark and warm reds, painters invariably mixed organic colours like red lake etc. with vermilion. The word lake has been derived from lak i. e. shellac and shellac is **laksharasa**[20] in sanskrit. Which is procduced in the following manner. A kind of dark red insect encrustation found sticking to smaller branches of certain trees like pipal etc. is collected and stored in glass containers which are then kept in the hot sun during summer months. The shellac melts and settles down while the watery red

20. **ibid** P. 79.

fluid floating above is collected and used as **alta**, which is crimson lake, colour. Muniji has given the recipe of preparing **Lakshrasa** in his book in detail.

Pothi : is a variety of indian lake obtained from the darkened berries of the poi creaper grown commonly in domestic house hold. Muni Punyajijayji has called it **Pothi** in his list of colours.

Kermis : is another insect dye stuff from which the Rajasthani painters have derived the name as **Kirmiji** which was in vogue in Maharashtra as mentioned in Marathi literature. Indians imported **kermis** under a different trade name called cochneil which did not survive for long as colouring meterial.

Kirimdana : is a common pigment known to Mughal and Rajasthani painters. It is also an insect dyestuff and obtained from insects which breed on cacti. Only the females yield colour known as Kirmiz or Gulali.

Al most all medieval texts on painting point out to indigo being the chief blue colour of the painters in the middle ages. **Nil**, indigo and **Nili** are the three names which appear in literature frequently, Indigo colour is extracted from a certain plant known in botany as indigoferae. It grows near lakes and rivers and are abundantly found in Bikaner (?) It was primerily used as a dye stuff for cotton but later used as blue pigment for painting.

Ultramarine azure knownas Lajvart or Rajvart (Raj) is a kind of blue used to depict sky even in Ajanta murals. It has therefore an ancient origin.

The Lapis-Lazuli blue from which ultramarine is extracted is almost exclusively found in **Badakshan** and Persia. Persian Laz vart meaning lapis lazuli, is the source of ultramarine ozure. It could also be said that the stones were imported from Persia so also the ready made colour, But there is no mention of its manufacture in the Sanskrit literature or texts. All paper period Jain Mss and Mughal painting of good quality seem to use lapis lazuli for sky from the 15th Century onwards. Technically lapis - lazuli blue contains other material such as calcite white and iron pyrite which sparkle like gold but do not render a fast blue colour. When applied on paper it, produces a granular feel like sand paper.

Yellow Pigment : A colour extracted from yellow ochres i. e. yellow **Khadias.** This was used extensively in Rajsthani Painting. **Vishnudharmottara,** mentions. orpiment, **haritala-Hartal** in Rajasthani language, as yellow pigment. In early Jain paintings and manuscripts **hartal,** or orpiment, was mainly used for correcting texts. There are two kinds of orpiments, **dagdi** and **vargi;** only the latter is used as orpiment. It is found in nature in the form of stone which is actually sulphide of arsenic. It comes in shades of yellow but mostly tend towards orange. Raw, **Khadia,** sparkles like mica and gives a golden effect.

Peori, Pyavdi : Peori, Pyavdi in Rajasthani language is common yellow clay which is used for normal work on paper and cloth has a bright yellow shade.

Gau-goli: Gau-goli is obtained from cows urine[21]. In the early days cows were tied under mango trees on a particular type of claybed for days togather and were fed an ripe mango leaves. The claybed rendered a pure yellow pigment by the usual process. Since this treatment proved detrimental to cows, the process was stopped. But the colour obtained by this technique was easily the best known yellow.

Green is not an original pigment. It was always obtained by adding blue and yellow. Terraverte green as a separate colour was known to exist in the Ajanta/Ellora phase (ca.7th Cent.A. D.)

Harabhata : Commonly used by Rajasthani painter is actually malachite green. This mineral apprears in several forms in nature and the shade varies to a great extent. From geological point of view azurite is the parent and malachite is a changed form of the original blue deposit. This colour is pale, bright opaque and crystalline. It was extensively used to depict green pastures, mounds, fields etc.

21. Rai Krishnadasa : **Bharat Ki Chitrakala.** (Hindi) Allahabad. 1972. P. P 76.

Verdigris : Green called **Jangal** is an acetate of copper prepared by treating copper pieces with vinegar. This colour is pleasing when it is fresh but it has few drawbacks. It has a tendency to blacken due to age and become acidic. Most of the MS. pages or paintings in which verdigris green is used become fragile and ultimately crumble at the portions where the colour is applied.

In addition to the important colours dealt with above, there are several lists of mixed colours published in several books. In fact in the Jain literature, we come across loose sheets, manuscript pages without the beginning or the end which render mixtures of colours and names, of ingradients etc. Which are yet to be studied in detail.

However, a few such examples are presented here.

See p.77

Residence of Ramkrishna Matheran at Bikaner

Mathen painters, their status etc.

Jain rehtoric literature contains a large number of socio-religious manuscripts in the **gutka** form (Miniature form), Many of which are profusely illustrated and written by the scribes or painters of the Mathen or (Matheran) community of Jodhpur and Bikaner area; of the 18th and 19th centuries. This community was hitherto unknown in the history of Bikaner painting.

Mathen artisans are those who were earlier ordained by the jain **gachha** (section of jains), but were expelled from it for transgressing the rules of conduct Subsequently they were allowed to adopt normal life as **grahastis.** A majority of them took to manuscript writing and painting.[1]

The author has discovered a number of dated manuscripts[2] from different museum and private collections which reveal some partinent information about this community of painters and scribes. which was not known earlier.

We have seen earlier, that these scribes were called Mahatmas, Gorjis, Yatis etc. but in Bikaner they are addressed as Mathen or Matheran. They were not only associated with but

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1. Sadhvi Sriji, Manohar Sriji. **Sri Dada Guru Chaitra** (Guj) Sri Vichakshan Smruti Prakashan, Ahmedabad 1991. pp. 45, 4b
2. Shridhar Andhare. **Sri Nagabhinandanam** Dr. M. S. Nagaraja Rao . Felicitation, vol. Bangalore. 1995. P. 81-88

were patronised by the jains. They are not jains but due to their profound selfless service and religiousity towards jain religion they were accepted in to it.

They are addressed sometimes as Matheran which has an adverse connotation being the illiegitimate progeny of the jain yatis. However, according to a new theory, it is said that they originated in Gujarat some 500 years ago[3] and then dispursed in Rajasthan in search of patronage and finally settled in Bikaner/Marwar area in the 18th century. At a later date, they undertook writing and painting works for the Hindus also and produced some excellent illustrated MSS. Some of them were proficient in education, Ayurveda, Tantra/Mantra while some oswal jains had made them their gurus and their children learnt hand writing from the Mathen scribes.

Today the Mathern community has spread all over India and has compiled a comprehensive list of their community members.

Sharma[4] (1993) writing about the work of this category of painters and artisans calls it a native style that grew

3. Niranjan Vyas - Rajasthan Vishwa Vidyalaya Jaipur. unpublished Thesis.

4. K. C. Sharma Vaichariki (Hindi) Bharatiya Vidya Mandir Shrdha . Pratisthan, Bikaner. Vols 3-4 ; p. 1 to 4.

indigenously in and around Bikaner. These painters did not ristrict themselves to the decoration of palace interiors or **hawelis** of rich merchants alone, but catered to the needs of common people also. Not only did they paint or decorate during social events like marriage or birth occasions but also rendered to the needs of religious ceremonies, festivals and other events. Surprisingly, for all this work, the painters got one coconut, 4 annas (1/4 of rupee), one seer of grain and in cetain cases, small quantity of gur (jaggery) in return.

Looking to the style of painting of the Mathen painters it becomes obvious that they may have been influenced by the Muslim painters of Bikaner[5]. Their execution however is rather perfunctory and rough and lakcs the refin ed quality of the Bikaner school. In the course of prolific architectural activity in Bikaner during the reign of Karan Singh (died 1657), his successor Gaj Singh (1745-80) and his followers, the interiors of palaces were painted by the Mathen people. Karan Mahal was renovated in 1755 and the **chaubara** of Karan Mahal Chowk, the Phool Mahal, the Sheesh Mahal of Gaj Mandir and many other edifices bear an unmistakable mark of the Mathen painters.

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5. Karl Khandalavala. Moti Chandra and Pramod Chandra, **Miniature Painting.** A catalogue of the Sri. Motichand Khajanchi collection held by the Lalit Kalal Academi, Bombay 1960.

They were not only adapt in painting ,writing and copying religious and secular manuscripts but illuminating them with gold also. They painted scenes on the walls and gilded them. Preparing jain ritualistic artifacts, letters of invitation (Vijnyptipatras), horoscopes as also the jain **yantras** on cloth, paper and metal was their most familiar occupation They painted Ganesha, Lakshmi, Sarasvati, Riddhi-Siddhi, Kala-Gora, Bhairava, Durga, Shiva family, jain Tirthankaras and local heros like Ramdev, Gogapir etc.

During the survey the following MS. were studies:

1. **Salibhadra ni Chaupai**

painted at Bikaner, in Ca. 1773.

Painter's name, Jogidas son of Akhairaj.

Coll: Prince of wales Museum, Bombay. No. 5123.

(There is one more similar MS. in this collection No. 58.3)

2. **Pawar Jagdev ri bat**

Painted at Bikaner. V. S. 1831=1774.

painted by Mathen Ramkrishna resident of Bikaner.

Naolakha coll. Calcutta.

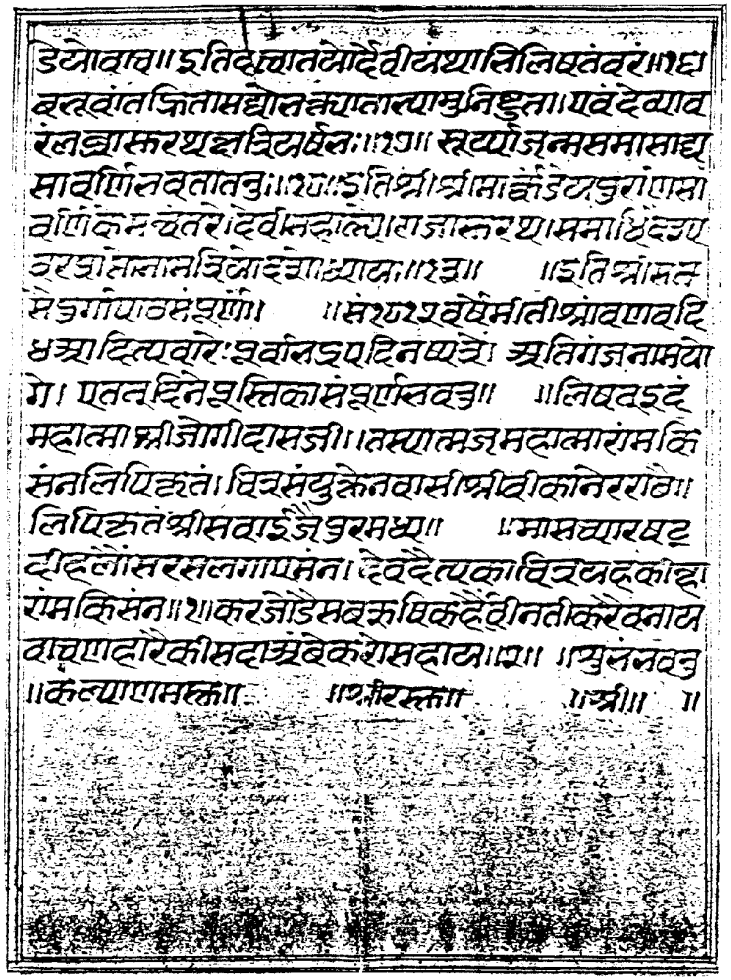


Fig 1

3. Tulsi Ramayana.

Loose leaf MS. containing 264 folios Ca. 1780 A. D.

Horizontal format attrubuted to Mathen style. Sri Bhavani Museum, Aundh, (Maharashtra.)

4. Rasa Ratan Kavys.

Set of two folios from an illustrated MS. by Kavi Puhakara Bikaner, ca. 1778. Perhaps painted by Mathen painters, private collection, Bombay.

5. Barahmasa

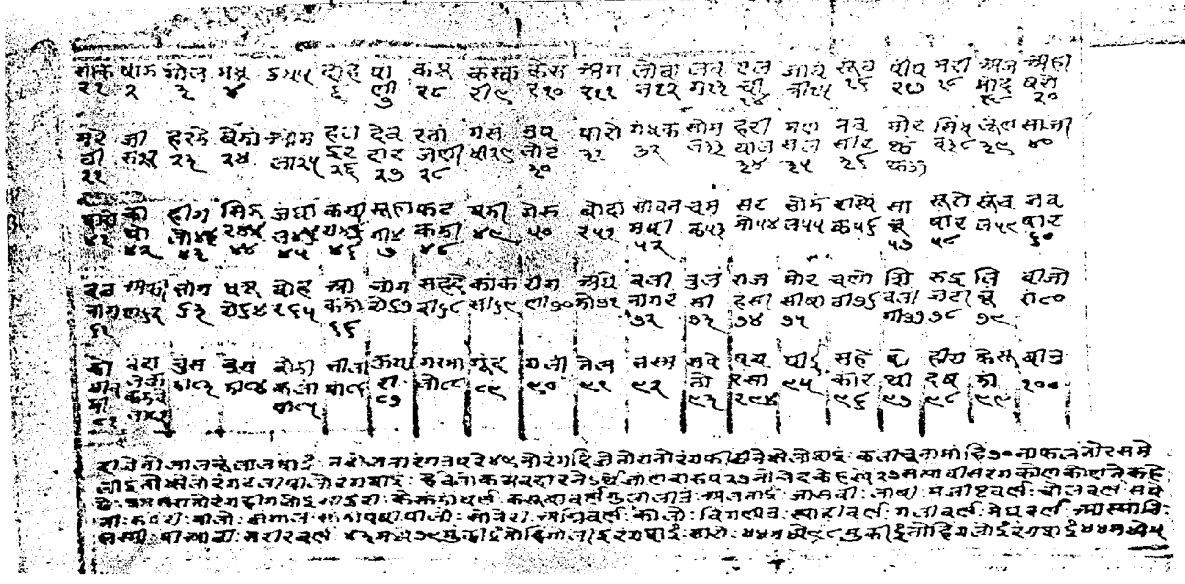
A Barahmasa set from the collection of National Museum Delhi. No. 59. 283.1 has an inscription giving a date A. D. 1770 painted at Bikaner by Mathen Ramkrishna.

An addition to these samples, many Museum, private collectors and jain bhandaras have a lot of material painted by Mathen painters. which deserves a detailed study.

A colophon of the MS **Mankandeya Purana** from a foreign collection reprodanced here. is an example of the Mathen work. (Fig. 1)

Folio 1

Folio 2



3.7 Folios of old manuscripts containing recipes of colour making.

We have said earlier that there is a large body of manuscripts or stray folios in certain Jain repositories which describe old recipes of colour manufacture and admixtures. Most of them, that are being dealt with here are in Rajasthani language of the 18th and 19th centuries. This material is being presented here with the kind courtery of Shri Laxmanbhai Bhojak of Ahmedabad. Who has been a guiding force behind this study.

Document No. 1: Two Stray folios Rajasthani/Gujarati language ca. 18th cent. A.D.

Folio 1. The first is a kind of a chart or a table divided vertically in to 20 columns and herizontally in to 5 rows of written material giving the name of the ingradient above and its corresponding numerical below.

Folio 2. The second folio (apparently belonging to the same manuscripts) has the instructions to add two different numbers to get the desired colour or its shade. In this way the composer or the writer has made it easy for us to prepare desired colour or colour shade.

There is also a comprehensive list of materials or ingradients used in this chart (see appendix I)

Document No. 2: A single manuscript page of a **gutk** a manuscript; Rajasthani/Gujarati.ca - 18th/19th cent. A.D.

This small folio describes the recipe of making Alta colour or juice. It starts with "अथ आलता नो रस करवा विधि ॥" i.e. This is the method of

Document no. 3

Folio 3

अथरंगकरवानीविधि॥ सपेदोटां सींदुरटां ३ पी
उमीटां १॥ एकगंवांटीयेतो गोरो रंगथाय॥ १॥ हींग
लोटां सपेतोटां एकगंवाटीयेतो फगलीरंगथाय
॥२॥ सपेतोटां पोथीटां २ एकगंवांटीयेतो गुलाबीरंग
थाय॥३॥ सिंदुरटां पीउमीटां एकगंवांटीयेतो ना
रंगीरंगथाय॥४॥ पीउमीटां गलीटां एकगंवाटीये
तो पाननोरंगथाय॥५॥ हींगलोटां गलीटां २ पोथीर
तिर सपेतोरतिर एकगंवांटीयेतो वेंगणीरंगथाय
॥६॥ सपेतोटां गलीटां एकगंवांटीयेतो आसमानी
रंग॥७॥ गंधकटां गलीटां २ एकगंवांटीयेतो आसमा
नीरंग॥८॥ जंगालटां पीउमीटां एकगंवांटीयेतो
चुआपंखीरंगथाये॥९॥ जंगालटां पीउमीटां एक
गंवाटीइंतो चोलुरंगथाय॥१०॥ सपेतोटां साहटीटां
हरमजीटां एकगंवांटीइंतो ~~कंक~~ हाथीनोरंग॥११
॥सपेतो साहटीटां २ पोथी १ एकगंवांटीइंतो कस्तूरी
रंगथाय॥१२॥ सपेतोटां सींदुरटां २ पोथीनोटीपां २
एकगंवांटीइंतो नारंगीरंगथाए १३॥ सपेतोटां पोथी
टां ३ गलीटां २ एकगंवांटीइंतो धुमारंगथाय १४
साहटीटां सपेतोटां पोथीटां एकगंवांटीइंतो पार
वेजीरंगथाय॥१५॥ सोनेरी सरेस नै गाली नै थालीमां
लगाडीइ पछे सोनावरगमाहे घातीने मजबूत वा
टीइं पाछे पाणीतेनोराखीइ पछे वाटतां जइयी आने
वाटतां जइ इये फरीमसलीने तापउपरे राखीये पछे उ
तारीये तो सोनेरी साही थाय॥१६ सपेतोटां अबर
पटां ३ एकगंवांटीइंतो अरगजानोरंगथाय॥१७॥
पीउमीटां पोथीनांटीपां ३ एकगंवांटीइंतो चंद्या
नोरंगथाय॥१८॥ ~~सपेतोटां ३ पीउमीटां~~ १ गलीटां
२ पीउमीटां २ पोथीनांटीपां ३ साहतुटी ४ २ सींदर
नाटीपां २ एकगंवांटीयेतो आंबानोरंगथाय १९
सपेतोटां पीउमीटां २ एकगंवांटीयेतो पांडुरोरंग
थाए २० इतिरंगकरवानाविधीजाणवी॥ श्रीरस्तु:

preparing the juice of Alta. Which is a kind of red colour applied to the feet or hands of ladies on ceremonial occasions. In paintings it is used as red of a different variety. (see Appendix II)

Document No. 3: A single vertical folio Rajasthani/Gujarati, Ca. 19th cent. A.D. (Collection: Shri Nemivijaynand Kastursiri Jain Gyana Mandir, Surat)

This describes at least 20 recipes of colour making from top to bottom, a few are given here as example.

अथ रंग करवानी विधि छे॥ सपेदो टां. सींदूर टां ३ पिउडी टां. १ एकठा वारिसो त्तो गोरे (?) रग थाय.

In this way a complete list has been composed. (see appendix II)

This folio at No. 15 (Shloka or Sutra) describes preparation of golden ink. सोनेरी शाही.

Appendix - I : Translation of Document No. 3.

अथ रंग करवानी विधि छे. (Gujarati)

सपेदो टां, सींदूर टां, रू। पोउडी टां १॥

एकठा वाटीये तो गोरो रंग थाय ॥१॥

हिंगलो टां, सपेदो टां, एकठा वाटीये तो मुगली रंग थाय ॥२॥

सपेदो टां, पोथी टां, एकठा वाटीये तो गुलाबी रंग थाय ॥३॥

सिंदूर टां, पीउडी टां, एकठा वाटीये तो ना रंगारंग थाय ॥४॥

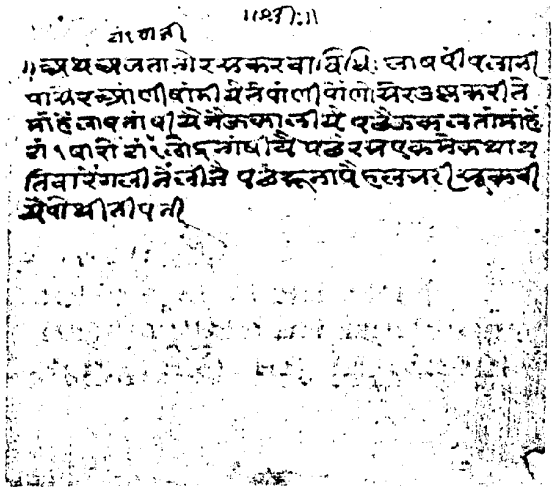
पिउडी टां, गली टां, एकठा वाटीये तो पान नो रंग थाय ॥५॥

हिंगलो टां, गली टां, ? पोथी रति?, सवेदो रति?, एकठा वाटिये तो वेगणी रंग थाय ॥६॥

सपेदो टां, गली टां, एकठा वाटीये तो अस्मानी रंग थाय ॥७॥

गंधक टां, गली टां, २ एकठा वाटीये तो अस्मानी रंग थाय ॥८॥

Document no.2
Folio 2



जंगाल टं, पीउडी टं, एकठा वाटीये तो सुआपेरवी रंग थाय ॥९॥

जंगाल टं, पीउडी टं, एकठा वाटीये तो सेलू रंग थाय ॥१०॥

सपेदो टं, साहटी टं, हरमजी टं, एकठा वाटीये तो हाथीनो रंग थाय ॥११॥

साहटी टं, पोथी टं, ? एकठा वाटीये तो कस्तूरी रंग थाय ॥१२॥

सपेदो टं, सींदूर टं १, पोथीनो टीपो १, एकठा वाटीये तो गोहू रंग थाय ॥१३॥

सपेदो टं, पोथी, टं ३, गली टं १, एकठा वाटीये तो खाखी रंग थाय ॥१४॥

साटी टं, सपेदो टं, पोथी टं, एकठा वाटीये तो परहेजी रंग थाय ॥१५॥

Preparation of golden ink.

सोनेरी सरेसने गालीने थालीमा लगाडी सूई. पछे सोना वरख माहें धालीने मजबूत वाटीई पासे पाणी उनों राखीई. पछे वाटता जाईये अने वाटतां जाईये. फेरी मसलीने ताप उपरे राखिये, पछे उतारिये, तो सोनेरी साही थाय ॥१६॥

सपेदो टं, अबरख टं, ३ एकठा वाटीये तो अरगजानो रंग थाय ॥१७॥

पीउडी टं, पोथीना टीपा, ३ एकठा वाटीये तो चूयानो रंग थाय ॥१८॥

गली टं, पीवडी टं १, पोथीना टीपा ३, साहीनू टीपू १ सींदूर ना टीपा २, एकठा वाटीये तो त्रांबानो रंग थाय ॥१९॥

सपेदो टं, पीउडी टं १, एकठा वाटीये तो पांडुरो रंग थाय ॥२०॥

इति रंग कर्यानी विधी जागवो । समाप्त ।

Document No. 2: Translation - (Appendix II)

अथ अलतानो रंग करवा विधि. लाख पींपलानी पासेर आंणी खांडीयै ते पाणी पोणो सेर उष्ठा करी ते मांदे लाख नाखियै नै उकालीयै पछै उकलतां मांहे टं. १ खारो, टं १, लोद्र नाखीयै पछै रस एकमेक थाय तिवारे गलीने लीजे पछै रूना पैहळ भरी सुकनीयै पोथी नी पनी (?) ॥

4. Miniature Painting

4.1 Survey of Mewar, Marwar and Bikaner Schools and their contribution to Jain Painting.

The early wall painting phase of Ajanta, Bagh, Sittanavasal, Ellora and Brihadeshwara starting from the 1st century AD/BC, comes to an end by the closing years of the 9th century. This unique and are inspiring the caves, chaityas, pillars, ceilings etc., depict Buddhist Jataka Stories and decorative elements of floral and geometrical patterns. Executed in earth colours (natural hues) and incorporating the norms dictated by the text of the **chitrasutra** of the **Vishnudharmottara Purana** (Ca. 4th cent. A.D.) Which, in all its details, stands as a guide to the painter in so far as the technique and aesthetics of wall painting in concerned.

A hundred years after this monumental activity, springs up a tradition of miniature painting on narrow wooden boards and palm leaves starting in Eastern and Western India almost simultaneously in the 11th and 12th century A.D. The former adhering to the monastic paintings of the Buddhist faith while the latter propagating Jainism in the form of illustrated manuscripts adorned with pictures and exquisite calligraphy. This marks the beginning of miniature painting tradition in India for the first time. It is however inconceivable to accept such a vast difference in the concept, technique and size of the murals on

the one hand and the miniature paintings and calligraphy rendered on narrow palm leaf on the other. This tradition was nurtured by the Jains and the Buddhist alike, for several centuries. The existence of huge Buddhist and Jain repositories in India stand testimony to the above.

Here after, there is a continuous development of miniature painting in the paper period (Ca. 1300 A.D). The Jain style, now identified as the Western India style, continued well up to the Pre-Akbari i.e. Sultanate period (ca. 1425-1625), producing cloth and paper paintings of various categories predominantly in the States of Rajasthan, namely, Mewar, Marwar and Bikaner.

These three states were the strongholds of the Jains where they not only travelled (on foot) as far as Jaisalmer, instituting **Jain Bhandaras** and monastic establishments but were also responsible for ensuring a constunt supply of Jain material like, manuscripts, **patas** (cloth paintings), scrolls and other artifacts required for religious and social purposes. Also, the unending religious support of the shah community of Jains and the Royal patronage proved to be a valuable source of encouragement to such secular activities which fostered the growth of scribes community and painters, simultaneously.

Rana Mokal (1397-1433) and his successor Rana Kumbha (1433-1468) were the most powerful and cultured rulers of Mewar. Under their tolerant policy towards all religious sects,

we see the flowering of all religions. Particularly, the Jain religious literature of the **Tapagaccha** and **Kharataragaccha**[1] monks had reached the heights of popularity during this period. This is the reason why we see huge repositories of Jain manuscripts all over Rajasthan.

In the beginning of the 16th century, the divine love of Radha and Krishna found its greatest exponent in vallabhacharya[2] (ca, -16th, 17th century), the founder of the cult of **Sri Nathji**. His followers were the famous **Ashtachap**[3], poets (eight famous poets of **brajabhasha**) who concentrated mainly on the **Bhakti** aspect of the doctrine. Towards the end of the 16th century, under the guidance as Keshavadasa, the auther as **Rasikapriya** and **Kavipriya,** and many other poets and writers, **Brajabhasha** poetry became the main source of inspiration to Rajasthani painters. For this, the artists had to devise a suitable mode of expression. The heiratic Western Indian style with its rigid formulae could hardly cope up with the lyrical and expressive element of the Vaishnava poetic works and therefore a new mode of expression had to be evolved which could combine the Vaishnava devotion and the tender romantic appeal of common expression. These elements are perceivable in the painted documents[4] of that period. Slowly, the popularity of

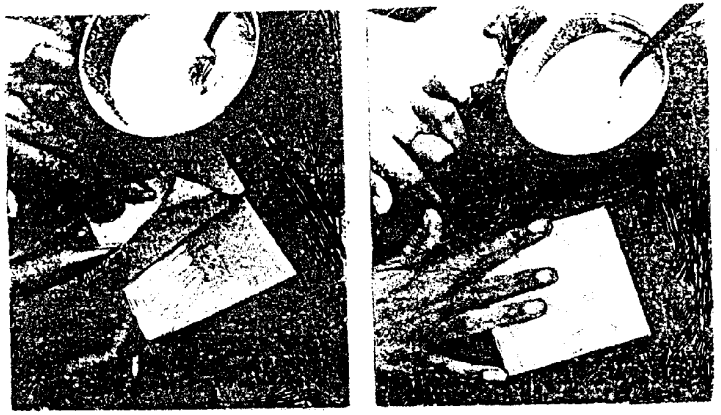
1. Ram Vallabh Somani. **Maharana Kumbha** (Hindi) (Jodhpur 1968. P. 191)
2. Kanthmani Shastri. **Kankroli Ka Itihasa** (Kankroli 1939 P. 13)
3. Shridhar Andhare. **Chronology**. P. 41.
4. Shridhar Andhare. **Chronology**

paintings in Rajasthan spread to nearby States of Bundi, Malwa, Kishangarh, Nathdawara etc., and continued up to the 19th century. Scrores of paintings were produced by the **Chitaras** (painters) in all States which reflected the religious, social and cultural ethos of that period. Naturally, families of painters, their styles, status, and social conditions grew rapidly and the art of miniature painting become popular not only in Rajasthan alone but all over the world. Against this backdrop of historical events, the Jains and their patronage was the main impetus to the art of painting and calligraphy which grew and reached the zenith of workmanship.

4.2 Technique of miniature painting, MSS. and large paintings on cloth.

Preparation of Wasli board i.e. paste board.

The first and foremost requirement for miniature painting is the support i.e. paper, about which we have discussed in the chapter on calligraphy. In principle, the same quality of paper was used for drawing and painting in India in general and in Rajasthan in particular.



Preparation of Wasli board

Thin sheets of hand made paper are cut to size and are pasted one on top of the other with the help of a flour-paste called **Lei** in Rajasthani language. This makes the board thicker. While pasting the sheets it should be ensured that there are no air bubbles in them. Generally three to four papers are pasted in this way to obtain a thick board. The last surface on which a picture in to be painted should also be coated with the paste and burnished so that it does not absorbe the first paint wash. This is known as **astar** or primer.

The **Lei** or the flour paste or **chikki** as it is generally called, is made in various ways : 1) of wheet floor, 2) of maida floor 3) of arrowroot powder and 4) of singhada floor i.e. a thorney fruit of an aquatic plant-Tarpanataus[1]. These fruits grow in lakes in the courtry side. The traditional, common method of preparing **Lei** is to obtain clean wheat floor, mix it with water

1. Sumahendra. **Miniarture Painting Technique** Jaipur. 1990 P. 10

Fig1

and put it for heating in a large pan with boiling water. It should not be put directly on fire. In order to make the **Lei** disinfectant (from funqus or insects), a small quantity of alum, **fitkari,** is added to it while the paste is being heated. The solution then becomes semi-transparent and sticky. It is then allowed to cool. Some times a small quantity of bluevitrol **(Morchud)** is added to make it insect proof. The paste prepared in this manner lasts for a long time. The consistancy of the paste is of great importance. A thicker or thinner paste results in producing defects in the **wasli** board:

Once the **wasli** is prepared, there are two methods for commencing the work. In one method the **wasli** board is directly held in hand and the work begins while in the other method the **wasli** is pasted on the wooden **takhti** (board) by applying paste along the inner corners or along the border so that it the does not move while drawing and painting. In this method painting cannot be burnished. In case of smaller pictures the **wasli** can be put on a marble slab with face downwords and burnished with an agate burnisher - called **Ghoti** (in Rajasthani language).

But Bandhna - making a key sketch.

When the board is ready, the **guru** or the master artist or the **ustad** gives a rough sketch on this board as per desired theme. The drawing in made in black or brown colour with a brush with written indications of colours in those portions, (See

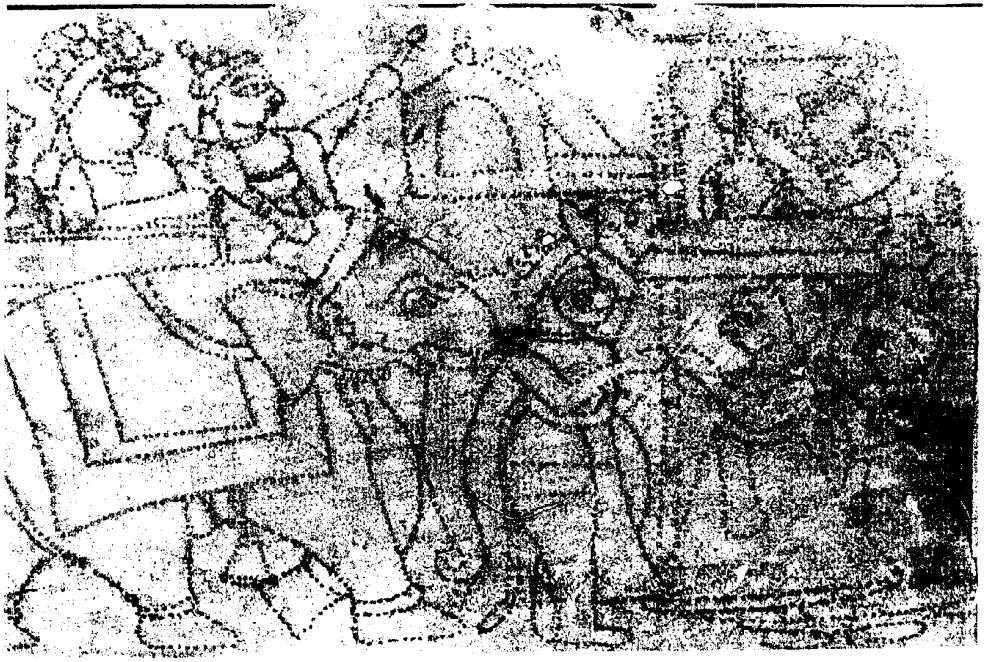


Fig 2,3

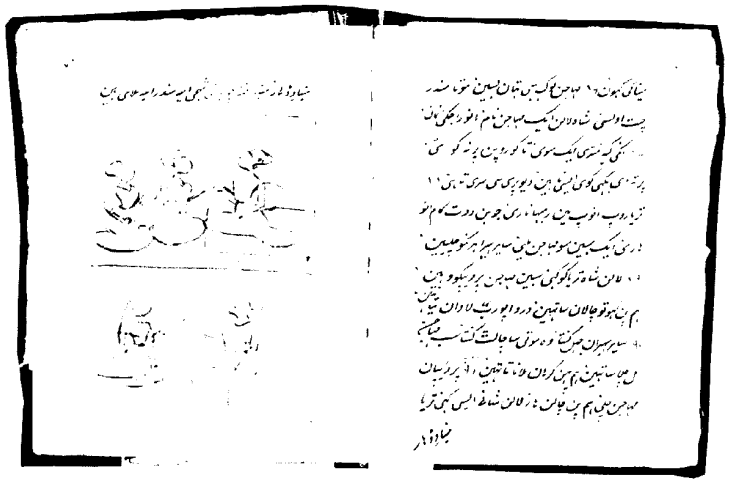
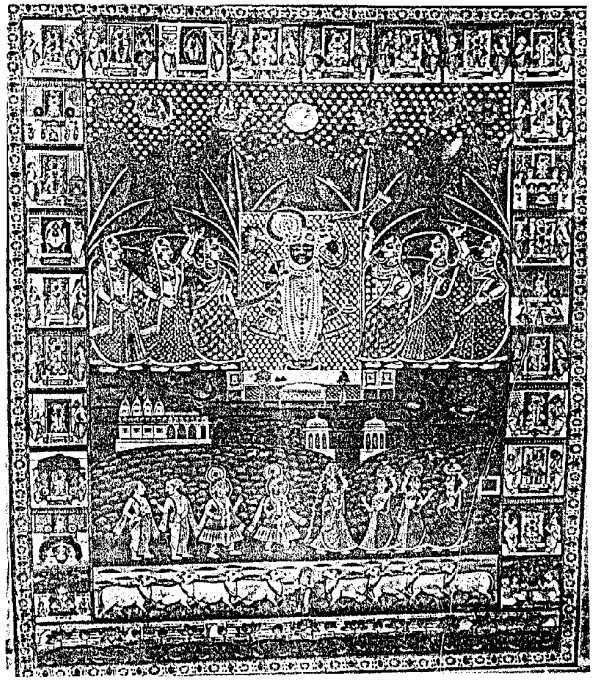


Fig 1.) and the painting is handed over to his **chelas** - pupils, to fill in colours. After each application of colour wash the picture is put on a flat marble surface and burnished from the back. With this, the colour gets, fixed on the paper firmly. In this way when all colours are filled up the **ustad** makes a final drawing with a fine brush and finishes the work.

Khaka zadna - reproducing drawing from a pounce.

Khaka or charba are the words coming from the mughal technique. These are perforated drawings. The outline of the figure is perfarated with thin needle holes. In short these are trasings to obtain duplicate pictures of portraits or other scenes. Once the master artist has made final drawing (say of a portraist), the same is repeated several times. Therefore, the perforated drawing in put in position and powdered lamp black is moved over it kept in a small pouch of thin cloth. An impression in obtained below which is later on completed in line and finished like original painting. **Khakas** are generally made of ornamental repeats; decorative elements, jewellery articles, and other art objects which are repeatedly required by the painters. They are usually made of paper but in some cases thin parchment has been used by the mughal painters. (Fig. 2.)



A typical Nathadwara Pichhwai

Prosses of burnishing cloth paintings

Ghoti

In Rajasthani language is a burnisher. During the course of manufacture of any painting either on paper or on cloth, it is burnished with an agate burnisher from the back. It is laid flat on a smooth marble slab and is rubbed over with an agate stone burnisher which is fixed to a wooden handle. Generally, a circular flat stone piece of agate, about 3" diameter, in sunk in to a circular wooden block with its polished smooth surface projecting slightly out of the block below. This is a hand burnisher which is used for burnishing small pictures.

There are three types of burnishers used by the painter and the scribes. The first is a single hand operated one, used for smaller pictures and for burnishing golden calligraphic letters. The second is a larger variety which is made of a single solid block of wood having two handles. In this case the agate stone projects below as said above and the user can exert sufficient pressure on the back of a cloth **Patas** or **Pichhwais.** It is also used from the front, after applying flour paste on them, to block the poars of the textile. These are quite commonly used at Nathadwara, near Udaipur. The third type is called the dog tooth burnisher which is in the shape of a dog's tooth. This is a British made instrument and is used for burnishing golden letters and photo frames etc. The Indian counterpart of the above is the tooth of a wild boar and its nails. Burnishers are made out

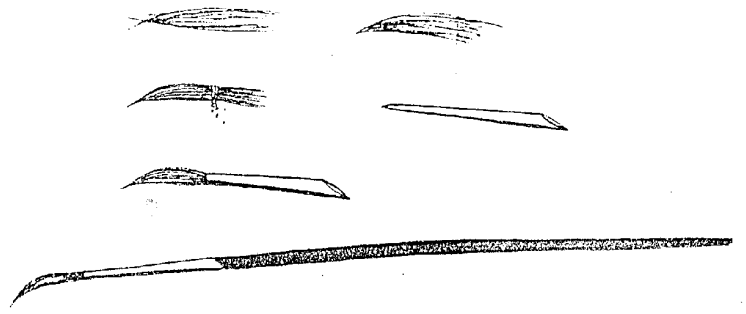


Fig 1

of these two objects for burnishing golden ornaments on paintings and **Pichhwais.**

2.

Tulika - Kalam - Peechi - Brush.

In Sanskrit the words **tulika** or **Leknani** are used for a brush, however commonly used ward among the painters is **Kalam** or **Peechi.** It is said that different brushes were used by the painters for painting different portions of the picture and that there were many types of brushes: The text of **Samarangana Sutradhar**[1] mentions three types of **Lekhanis** namely; **Sukhma, madhyama** and **sthula** i.e. fine, medium and bold in the execution of any picture. (Fig 1)

Presently a new system of numbering the brushes has been adopted, perhaps based on the old Windsor & Newton Co. system, which categorised the types of brushes. The thinner the brush the lessor the number and the bigger the brush the greater the number. The range of brushes usually starts with a double '00' to 10 and above. (Fig 2.)

By and large, only squirrel hair brushes are preferred by the traditional painters, though the use of sable hair or hog hair is also known. The technique of acquiring squirrel hair is rather complex and tedious. Not only does it require experience and patience but also a practice of preparing your brushes. There is

1. **Samarangana Sutradhara.** Gaekwad Oriental Series No. 24, 32, Baroda 1924

an abundance of common squirrels in Rajasthan every where and we often see tham frolicing all over the place. To obtain the hair of their tail-end, the first and foremost is to encage the animal. Than it is released through a cloth bag which is held at the month of the cage. It is then held in the right hand and after wetting the tail end the hair is clipped of with a scissors and preserved in paper packets. These packets are then opened on the day of the **Dawat Puja** or the **Chopda Pujan** day before Diwali. After the traditional **Puja** the work of tying the brushes starts.

Brush making is also an art where experience counts. Bunches of squirrel hair preserved earlier are once again wetted and the bristles are tied togather in a single knot and moved on the thumb nail of the left hand and rolled to detect if any hair gets split out. The excess ones are removed and by frequent rolling the bristles on the thumb nail, desired quantity is tied in a double knot. The same procedure is followed twice to get the correct amount of hair and the point. Then a final knot is tied at the other end of the bunch of hair.

To fix this bunch of hair we require a holder. Therefore, the quill of a pigeon feather, called **Pergaza** , the translucent front portion of a feather, is cut and dipped in water over might. By this method it gets loose and does not break. Then the point of the plait of hair is tied with a string which is passed through

the broad end of the quill and taken out from the narrow end. The size of the hair and the hole in the quill should match well so that they do not move. Before the plait of hair is inserted through the quill, the end is secured by tying hard and applying a drop of rabit skin glue **saras** on it. A bamboo stick in then inserted in to the quill to make it in to a brush with handle. At the end, the brush is held in the left hand with its point upwords and facing against light. The excess bristles which come out from the bunch are cut off and then a perfect point in obtained.

Certain precautious are to be taken while making brushes. Squirrels jumping about on plastered walls of houses in the city generally spoil the bristles (**hair of the tail**) of the squirrels tail. They become split and short which are not recommended for use. Therefore those animals which thrive in gardens and farms are preferred. Similarly the hair of tender squirrels is used to achieve thinnest possible point of the brush. Because of the natural tendancy of the bristles to be slightly curved; such curved and pointed brushes are found ideal for miniature painting rather than the straight ones.

Sable hair can be compared with the hair of a mongoose or **Nevla** in Rajasthani language, whose hair can be used for making brushes. Similarly, camel and hog hair are also in use for different purposes.

Palette of a Rajasthani painter

Methods of colour preparation :

Although we have discussed preparation of colours in the earlier chapter, the present technique, is based on practical experience of some of the artists, and therefore, it appears more result oriented. Dr. Sumahendra Sharma, a traditional painter, of Jaipur school, after a prolonged practice of several years on all types of miniature paintings including the wall paintings, has put up his experiences in this chapter, I acknowledge his effort and take help of his writings on occasions.

Generally, colours are available in nature in stone farm. They are to be ground on a **sil-batta** (grinding stone) or in a mortar to grind them in to powder. This power is them dissolved in water along with gum and filtered. This process has to be continued till a pastey sand free residue is obtained, which is them dried in the sun and made in to tablets. At the time of use, required quantity is taken and mixed with dry gum.

This small quantity is usually made in a shell where we can use the thumb or first finger to rub the pigment and gum with pressure. At times a considerable pressure is needed to rub the pigment to turn it in to a fine paste. This process is known as **Tav-dena** or tempering. It is for this reason that Rajasthani paintings are called tempera. Colours like white i.e. **Khadia**, yellow **Peela,** yellow achre. **Ramraj,** Indian red, **Geru,** Terra-verte, **Hara-bhata** etc. are prepared through the above technique

There are four categories of colours used in miniature paintings. They are :

1) Natural pigments in mineral form or chemical compounds.

2) Vegetable extracts :

3) Oxides of metal :

4) Metallic colours :

Earth or mineral colours :

White : Chalk white, $CaCo_3$, calcium carborate, is locally known as **Khadia.** It is available in two types; **Phool-Khadia** and **Kath Khadia,** of the two, the former is used in painting. **Khadia** mines are located near Jaipur and in Mewar.

Black : This basic colour is obtained by burning an oil lamp to collect the soot i.e **Kajal** which is mixed with gum acacia - **babul ki gond** and used as black colour.

Shingraf : **Hansraj Hingur,** is available in stone form. It is very heavy like mercury. This also comes in two varieties such as; **Roomi** and **Katha.** There are needle like projections in the **Roomi** type which is used for painting. This is mixed with sheep milk and lemon juice is added to it.

Ramraj Is some what like yellow ochre. It is available in stone and powder form in the market easily.

Geru Is known as **Hirmich** which is similar to Indian red and is locally available in the market.

Hara-Bhata This stone colour is almost like the English Tera-verta shade. It requires a lot of grinding filtering and mixing but it does not need any binding media while applying it on paper.

Multani-mitti This off-white earth is locally available in Bikaner. It does not require any treatment before use and is usually used as an **Astar** (primer) on paper or cloth before starting any work.

Lajward Is a kind of blue colour which is also called **Rajwart.** It is some what inferior to Lapis-Lazhli and requires thorough grinding and binding media. It is available on the banks of the river Indus and in some parts of M.P. Originally it was imported from Firangana. situated near the river kox.(?)

Yellow colour Is basically orpiment or mineral oxide, which is prepared out of Pevd.

Hartal **Hartal** is an ancient colour. It has two verities, **Godanti** and **Varkey**. The latter is generally used in miniature painting.

Manisal This resembles the simgraf variety which also has the needle like molecular structure. After a good deal of grinding it gives out deep yellow colour.

Siloo Emerald green : This has a Chinese origin. Si loo means stone and Loo is green. Therefore **Siloo** is green colour which resembles emerald green. In Iran it is called Danafirang. This was imported from Central Asia. Artificial Siloo is being used in late Nathadwara **pichhwais** largely from the 19th century onwards.

Vegetable extracts: Vegetable colours are obtained from various barks of trees and aquatic plants, their juices and gums as (lacs) which have the capacity of dyeing and painting.

Blue - Neel - or Desi neel : Particular type of aquatic plants were cultivated along the banks of waterbodies in villages. It's few branches are tied in bundles and kept emersed in water under pressure, in large pans for a day till water assumes wine colour. To this, a couple of buckets of lime water is added, which is stirred constantly by two people using there feet, from morning till noon. Soon, the water becomes blue. After addition of one more bucket of lime juice, the water becomes pinkish to blue and blue coloured crystals accumulate around the inner edges of the pan. The water is then drained out and the blue

residue is allowed to remain over night which is collected and turned in to cakes known as **Batashi neel**. Such plants are found in Pali, (Marwar) Udaipur and at many locations in Rajasthan.

Oxides or Chemical compounds :

Oxides and chemical compounds are obtained by burning, pulverizing or mixing different minerals by chemicals process.

1. **White pigment** : Lead and zink are burnt to obtain white colour. Oxides of zink and lead are commonly used in preparation of while pigment.

2. **Suidur** : is lead oxide, and is slightly lighter in shade than vermilion. The process of preparing sindur is given by Ali Mohammad Mir Panch in detail. see Sumahendra[1]

3. **Jangal** : A type of green resembling sap green in largely used in miniature paintings. Its process of manufacture in brief is as under:

   Copper powder, **Navsagar** (Sal-amoniac) are taken in a copper pot in particular proportion to which is added lime juice. The month of the pot is sealed with cloth for nearly 40 days. Afterwords the contents are drained out and ground with lime juice and dried in shade to make tablets.

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1. Sumahendra **Miniature Painting Technique** 1990 p. 23

4. **Ultramarine blue:** This colour is very largely used in Nathadwara **pichhwais** and paintings of the 19th century. The French invented this in 1818 and the Indians imported it and used largely at Nathadwara.

5. **Gaogoli** : Although prevalent among the painters and art historians since long, its proper source of manufacture is still in doubt. The much talked about **Gaogoli** - which is obtained from cow's urive is discussed earlier. However, **Gaogoli** and **gorachan** have a great resemblance. It is said that **Gaogoli** is a gland located in the centre of the cow's head. It is also known as **Gomastakasya Pittam.** Which is used for writing **yantras,** titles of sacred books and Horoscopes etc.

The Dictionary meaning of **Gorachana**[2] says 'yellow mineral' which is obtained from cow's urine or the bile obtained from Cow's head. Also **Gorachana** is found in the pituitary glands situated in Cow's forehead. This liquid dries up on the death of the animal. If **Gorachana** is added to this liquid it does not lose its colour.

However, speaking more scientifically, Prof. R. B. Johnson[3] (USA) on his analysis of 16th and 17th century mughal paintings and 18th century Rajasthan paintings, has found out

2. Sumahendra **ibid** p. 23

3. **ibid**

that the yellow used in the above paintings was Pevdi and has acknowledged the concept of cow and mango leaves but calls it as magnesium or calcium Salt.

Dr. Sumachandra has a different opinion. (see Mahendra (p.27.) he mentions archival documents called Tojis, Jaipur-dt 1783 A. D. which mention Gaogoli was in vogue in Jaipur then.

4. Metallic colours:

In this category four major metals have been used in different forms : 1) Gold powder and gold leaf. 2) Silver powder and silver leaf called **varakh,** 3) Tin foil. **Ranga** 4) Copper powder.

Preparation of gold leaf and powder : Gold leaf known as **sone ka varakh** is applied either by pasting it on the desired surface directly or by placing it over the portion which has the solution of sugar and glue already under it.

Gold leaves are prepared by gold smiths and are available in the market. To make gold powder, the leaf is put in a **kanse ki thali** (a bronze plate) along with drops of honey and is rubbed with the palm in a circular motion. This process should be continued for some time until a muddy residue in gathered along the inner edges of the **thali.** The plate in then filled with water and kept over night. The residue collected at the bottom and edges is then washed and dried. It can be used with gum

on paintings or with little more quantity of glue and water for writing purposes.

In Jaipur the gold leaf is laid on a marble slab over glue and honey and is rubbed with four fingers. till the solution is grounded properly. This liquid is that collected in a vessel, filled with water, and kept over night. The residue is collected and mixed with appropriate quantity of ghee and used in painting.

This process of acquiring gold/silver powder is known as **Hilkari** in Jaipur area. The same treatment in recommended for silver leaf and tin.

Ranga is tin and its powder is used for writing in silver ink and also depicting water bodies in paintings.

Process of **Hilkari : Ranga** (Tin) pieces and glue is put on the anvil with few drops of water and are beaten with a hammer. Gradually the pieces are broken and eventually turn in to a powder; later, the pieces are dissolved in water for some time. The glue gets dissolved and after frequent washing, the residue that remains is the hill of Ranga (tin) which is mixed with glue and used as silver ink.

Folio from the Ms of Adi Purana A.D 1540

Illustrated manuscripts : सचित्र हस्तप्रत

A large number of Jain and Buddhist religious books with pictures are called illustrated manuscripts. In the early period (Ca. 12th century onwards,) we come across manuscripts in the form or loose leaf folios. They are on palm leaf while after ca. 1300, they are on paper.

The early Jain and Buddhist MSS had a limited space in between the text columns; sometimes two or three illustrations divided the space by columns of text. These early paintings were most of the times iconographic representations of Gods and Goddesses; in case of the Jains, the Tirthankaras or Devis occupied the central spaces. Their method of drawing and painting was simple, heiratic and narrative. The icons invariably followed the contemporary style and technique. The portion where the illustration appears is quoted with astar or some kind of white or off-white colour and was burnished from the front. The pigment got filled in to the crevasses of the palm leaf and the burnishing made the surface smooth for receiving minute brush strokes. Primary colours were used in painting and we see a predominance of red monochrome background all over. The knowledgable senior priest or the Pandit finalised the picture and indicated it through a small sketch drawn by the side of the space kept vacant for it The painter or the scribe got the idea from that key sketch to draw in detail and finish the work. In this phase the pictures are linear and there is no

attempt to show perspective. These palm leaf MSS were tied in between two wooden boards with a cord.

In case of paper, the early paper period MSS. were treated in the manner shown above, but in this case, the pictures were burnished from the front side only. The Ms. was also preserved between two painted book-covers and tied with a cord.

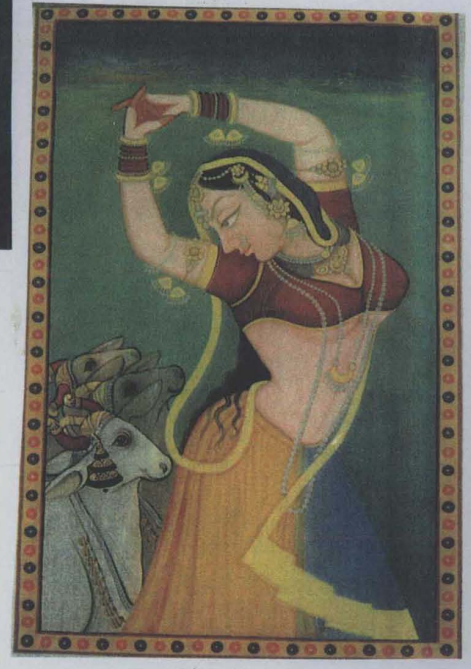
In the Sultanate period vertical format of MSS. was preferred and the illustrated books like the **Laur-Chanda**[1] **'Mirgavat'**[2] etc. had the text on one page and the picture on the opposite pate. These books were nicely bound in leather binding with golden cartouches. There after, in the Mughal period from Akbar to Shah-Jahan, we have a number of illustrated MSS which are the marvels of painting and calligraphy. The **Akbar-Nama** of the Victoria & Albert Museum, London, the **Tuti-Nama**[3] of the Cleveland Museum USA, and the **Shah-Jahan-Name** of windsor castle library, London are a few examples of this art.

In Rajasthan, there was yet another tradition, of manuscripts. According to certain popular subjects the painters prepared manuscripts or series of paintings called चित्रावली **Chitravalis.**[4] There are large number of such subjects. The

1. Karl Khandalavala and Moti Chandra **New Documents of Indian Paintings** (a reappraisal) Bombay 1969.
2. **ibid**
3. Pramod Chandra The **Tuti-Nama** of the Cleveland Museum of Art U.S.A Text, Vol LV Graz Austria 1976
4. Shridhar Andhare. **Chronology** 1987. p. 74.

Ragamala series; The **Barahmasa** series, the **Dhola-Maru** series etc. In these there in very limited text on top margin and the picture occupies the major portion of paper. Such pictures are complete paintings in all respects and are intended to be kept in **Bastas** or sometimes framed to put up on walls.

In the late 18th and early 19th centuries, the scribes as well as painters took to making small size manuscripts called **Gutka** MSS. illustrating various Jain and non Jain stories in religious books. They, at times went to ask for jobs at the doors of wealthy families, and painted **Gutka pothis** and wrote the text. In these books the text and the paintings ran side by side. The pattern of working was as narrated above; e.g., the pandit dictated the subject to the scribe or painter and he drew accordingly in his style. Invariably, the text was written earlier with the specific blank areas earmarked for the illustrations. which were added later. We see this in happening many MSS. where only drawing in available but colours have not been filled. The **Gutka** MSS. were small **Pothis** with leather building or sometimes lined with cloth as per illustration shown by the side:



Sequence of painting large pichhwai's , Nathadwara

Painter at work

Painting of large pictures on cloth : पट चित्र

Paintings other than the miniature paintings come under the little of monumental paintings as they are very large and intended to be displayed in public places. The cloth support, which is the carrier, is approximately 4x6 feet or even larger in case of Jain **Tirth patas**. Therefore, there is a different method used for painting them.

For any cloth painting, which is to be painted on cloth, the cloth (support) has to given a coat of primer, e.g. **astar,** so that the paint does not penetrate in side the cloth poars. Therefore, a paste of rice flour or of tamarin seed flour is prepared like the **Lei** (gum paste). The cloth is stuck on the plane and smooth floor and the **Lei** is applied to the cloth. When it dries up, it is burnished from above with an agate burnisher. A large burnisher which is to be operated with both hands, is used giving sufficient pressure on the cloth. This flattens the gum paste and it penetrates in to the pores of the cloth. The cloth is then ready to receive drawing and subsequent painting on it.

Painters equipment

Traditional painter at work

Method of painting :

The primed cloth depending upon the size of the picture, is either pasted on the ground which is smooth or hung from the ceiling with the help of large bamboos. The work starts from the top and is worked out going down gradually. In the case of large **Pichhwais** of Nathadwara, which are invariably 6' x 4' or 8' x 10' or even larger, the proportions of figures, landscape details and architecture are very important. The subjects of the Vaishnava **Pichhwais** are such that the composition is usually centralised. The main object of the theme is the centre and the rest of the scene is equally divided on either side. For this purpose, the painters have a unique technique of thread dusting. i.e. (soot-zadna) First the centre of the cloth is fixed by dividing it by two diagonals. The rest of the painting is done in proportion to its size. In case of smaller works only one painter can mark the measurements. In case of large cloth two persons are needed to hold the thread at one corner. The thread is smeared with black or brown powder (or rubbed over chalk stick), the thread picks up some quantity of colour. It is then lifted with left hand and its one end is put at a given point. Then it is stretched toward, another point, length wise or bredth wise. The thread is then gently plucked by the right hand like a bow string and left. The string drops down making a straight line on the cloth or paper. This method is then used where ever distance is to be measured and straight lines are to be drawn.

In this way the artist first makes the centre of the subject. Then takes out the other measurements and goes on constructing his composition as per the subject.

Once the proportions are obtained the cloth is rolled with a bamboo which is tied high up to the ceiling and the picture outline in made by unfolding smaller portions of the cloth. Thus, the entire cloth is painted gradually and finally finished in black out line. The large size Jain **Tirtha Patas** are also made in more or less the same manner.

Ch. 5. Present status of Calligraphy and Painting in India and computer aided work.

Calligraphy to-day

"In today's world of interlink, where even see mingly tenuous connection can tourn out to be significant, we explore the applications of Calligrphy in vorious tgechnologies and art forms. The ad0vent of priniting with movable type meant the develpoment of different type styles, most of which drew their inspiration from calligraphic traditions. Thus Calligraphy has influenced type design and tupographic activities throughtout the world. There are several other interconnections:

Calligrphy and Cartography:

The plotting and drawing of maps, where the lettering has to be clear but unobtrusive, well placed and easily readable, brings Calligrphy to the fore. Albrecht Duerer's woodcuts include some of the most remarkable examples of catrography. Mecator's maps reflect the finesse of his calligraphic ingenutiy. In India, the lettering of the 17th century maps of the western region makes use of informal Calligrphy while charting sea routes.

Calligraphy and musical notation:

The cadences of music and the arabesques of line have a similarity which lovers of music and Calligrphy can immediately connect. 'The dance of the pen', as Alfred Fairbank called it, makes for an imaginative language of musical notation.

Calligraphy and visual poetry:

We see this worldwide phenomenon in may and continuing - forms: the medieval **Chitrakavya** and **Akshara bandhas** of India where verses were contained within graphic shapes; the labyrinth of grid-poem which flourished in the Renaissance and the Baroque in the West; the hui-wen genre within Chinese literature; and the many modern expamples of concrete poetry in the West as well as in India, where multiplicity of scripts offers a further exciting dimension.

Calligraphy and computers:

Computer technology bids fair to revitalise printing for India's complex, non-linear scripts whose composite characters and conjuncts vary in size and form. Specially designed software will now be able to produce a variety of Calligraphic styles as tupefont designs in India scripts.

Such fonts will facilitate the publication of Indian scripts in various formats and styles.

Because of the structural differences between the Graeco-Roman and the Indian scripts, designing for Indian language is no small exercise. But a beginning has been made; it advances, with notable promise."

(R. K. Joshi)

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