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Vijay Kumar

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Editorial

The 35th Issue of "Indian Journal of Archaeology (www.ijarch.com)" has eight articles. The first one titled **"An Ethno-archaeological Investigation of the Mandana Art- A living tradition of Chambal basin"** by Dilip Kumar Kushwaha & Pooja attempts to explore the antiquity of Mandana art of Meena tribe and its connection with ancient rock art. The second one titled **"Reconstruction of Population History of Uttarakhand Using Genetic and Archeological Data"** by Vijay Kumar, Niraj Rai & Dinesh Kumar Azad reconstructs the process of peopling of Uttarakhand and explores the making of modern Indians from the perspective of genetics and archaeology. The third one titled **"Copper Hoard Weapons and Tools kept in Shahjad Rai research institute, Baraut district Baghpat Uttar Pradesh"** by Vijay Kumar & Amit Rai Jain is the catalogue of 133 copper weapons and tools collectively called copper hoard objects and connected to Ochre Colour Pottery (OCP) culture .The fourth one titled **"Geoarchaeological investigations around the Porpanai Fort using Ground Magnetic Survey"** by Dr. A. Muthamilselvan & S. Suvish aims to identify buried features, demolished wall structures and depth of those features using ground magnetic survey in and around *Porpanai* fort located in *Pudukottai* district of Tamil Nadu, India. The fifth one titled **"Catalogue of Terracotta Objects Kept in Shahjad Rai Research Institute, Baraut district Baghpat Uttar Pradesh"** by Vijay Kumar & Amit Rai Jain gives the details of 247 terracotta objects of different periods presently kept in Shahjad Rai Research Institute. The sixth one titled **"Decorated Ceilings of Osian Temples in Rajasthan"** by Amar Singh attempts a general survey and documentation of the ceilings of Osian temples. The author classifies the ceilings of Osian temples in ten types and co-relates these with textual descriptions. The seventh one titled "**Iron Metallurgy in Manipur with Reference to the Ancient Iron Smelting Sites at Kakching: An Archaeological and Empirical Approach"** by Naorem Naresh Singh & Prof. Oinam Ranjit Singh focuses on the introduction of iron use and its metallurgy in the ancient kingdom of Manipur, based on archaeological and literary sources. The eighth one titled **"A Study on Rasamancha of Bishnupur, Bankura, West Bengal, India''** by Sanghamaitra Sinha, Namgyal Tshewang Bhutia & Malavika Sinha explores the architecture of one of the terracotta temples of Bishnupur namely *Rasamancha* which is the symbol of integrity and assimilation of diversified cultural panorama of eastern India.



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An Ethno-archaeological Investigation of the Mandana Art: A living tradition of Chambal basin

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Introduction: Humans used to represent their habitation area as a canvas since pre-historic times, in which they illustrated their walls of habitat area with their philosophy of life, domestic activities, surrounding environment and their social and cultural values. Present ethnic groups similarly express their socio-cultural fabric of life through the walls and floors of their houses. They depict their religious beliefs, social values, ecology and environment of their vicinity, agricultural activities, scientific cosmic activities, and cognate relation with their animals and plants. So their house is itself an institution where their consciousness comes alive in the form of motifs on the walls, and in this way they transfer their traditional knowledge from one generation to another generation.

The study was taken with the main objective of understanding the continuity and changes of the Mandana art of the Meena tribe over the years and comparison of these symbols with the rock art of the Chambal basin. The motive and inspiration behind Rock art and indigenous art are the same. The depiction of their contemporary world is the main bridge between the continuity of the traditions of people of different times. Mandana art, which is made by the Meena community

of Rajasthan, is similar to ancient rock art tradition and through rock art of the Chambal region, we can trace the antiquity of the motifs of Mandana art. This paper gives an insight into the meaning of motifs between two different cultures of the same landscape.

Mandana art is an ancient public art i.e. folk art, which is done by the Meena tribe of Rajasthan in different forms. It is an auspicious cum seasonal art and done at each ceremony and on every changing season with different subjects and different symbols. It is done in Tonk, Sawai Madhopur, Dausa, Dungarpur, and Banswara districts of Rajasthan by the Meena community. The art is drawn on the walls, floors, granaries (*kotha-kothi*), open-hearth (*chulha*), and the skin of domestic animals. The Mandana painting are inspired from flora, fauna, and geometric designs. The painting tradition of the Meena community is an excellent blend of geometric, geomorphic, anthropomorphic, and zoomorphic designs[1]. The study area of this research is focused on three major Meena populated areas of eastern Rajasthan which are Tonk, Sawai Madhopur and, Dausa. For the study of ethnoarchaeology on rock sites, we selected major rock art sites in the Chambal region of Rajasthan and Madhya Pradesh.

Mandana art has ancient roots. Although the basic detailing of this art has been done by some scholars and researcher in previous works but further studies are still being done. In this study authors have tried to fill the gap through ethnoarchaeological work.

This research paper also highlights the artists of the painting: the women of the Meena community. The Mandana painting comes from women's consciousness. According to Madan Meena, women are the artists of the wall paintings popularly known as Mandana painting[2]. The subject of Mandana comes from their daily lives, birds, animals, farm life, festivals etc. The subject and motifs look very alive, decorative and emotional because these are made by women. Indian rock painting traditions tend to give greater weightage to male activities. Ajay Pratap who researched about the genders perspective on the interpretation of rock art, found that in proportion to male Figures the female figures are limited in rock art[3]. However, Mandana art is not only made by women but they are also the main subject in the paintings. They are depicted indulging in different kinds of groups, individual household and farm activities. This paper deals with the artists behind the wall art. The women Mandana artists are leaving this traditional art because of modernisation and the new architecture. Authors found during the survey that male artists are called to paint concrete houses for marriages and other auspicious occasions.

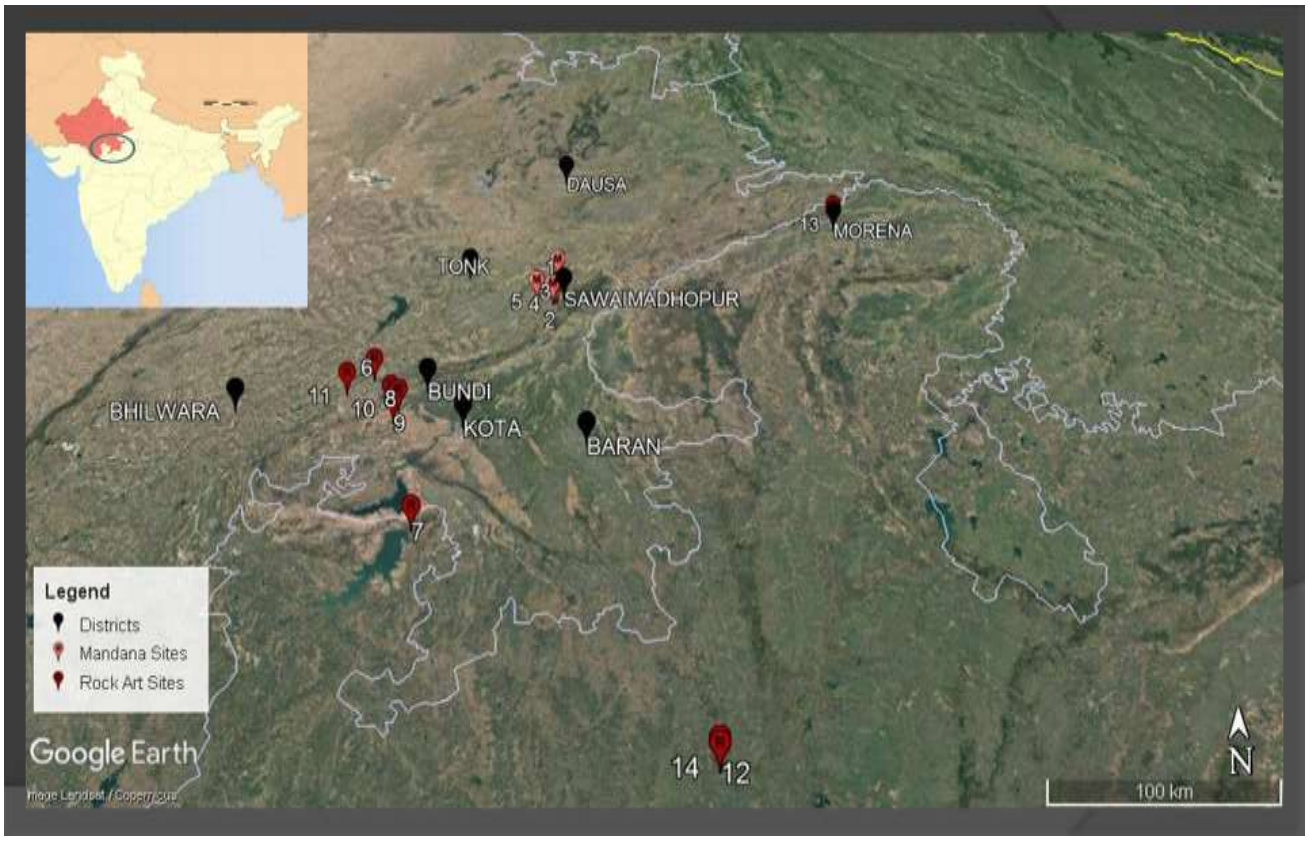


Fig. No. 01: Distributions of Mandana art and Rock art sites (Courtesy Google Earth)

S. No.	Mandana Art Sites	S. No.	Rock Art Sites
1	Banota	6	Bhakadiya
2	Borif	7	Chaturbhuj Nala
3	Kushtala	8	Dhrawa
4	Meena Dhani	9	Gararda
5	Lasadiya	10	Golpur
		11	Gopichand ke chajje
		12	KotraVihar
		13	Lakhi Chajj
		14	Shivpura

Table -1: Mandana art and Rock art sites showing in fig.1

Previous work: Several archaeologists and anthropologists have established a model to study the rock art through the mirror of ethnography data. The study of ethno-rock art started during 1870s, by Bleek and Lioyd (Ghosh, *et.* 2009)[4]. J.L. Fisher (1961)[5], a pioneer in rock art studies, proposed the idea of tribal studies for the interpretation of rock art. Wakanker and Brook (1976) have compared the tribal art and rock art of central India in their book 'Stone age Painting in India'. Dr. Sadashib Pradhan (2001) has done excellent work on ethno-rock study in Orissa in his book 'Rock art in Orissa'.

A comprehensive ethnoarchaeological work on Mandana art has not yet been done. Riza Abbas (2021), who researched the rock art of the Chambal basin, mentioned in his book 'Exploring

the rock of Chambal basin' the similarity between Mandana art and the Rock art of the Chambal region. The work on Mandana art has been done by the people of fine arts, Researchers, artists, and Photographers. The work on Mandana was first published in the Mardumshumari report of Jaipur in 1901. Madan Meena (2009), the contemporary artist and researcher who himself is from the Meena tribe, has spent more than a decade documenting this dying art. His book 'Nurturing walls: animals art by Meena women' focuses on Meena women and their cognate relation with surrounding environment. Jyoti Bhatt, a renowned artist and photographer worked in ruler areas and he captured the Mandana art in rural areas of Rajasthan from 1972 to 1989[6]. During the research, her photographs helped to identify the changes and continuity in Mandana art in village areas. V.N Saxena & Neelima Vashishtha (2000) worked on ethnographical data on Mandana art in their book 'Mandana: The Folk design of Rajasthan'.

Methodology: This research work was carried out through fieldwork in which village to village survey has been done by the researcher. For the selection of study area, the Meena populated areas of Tonk and Sawai Madhopur district in eastern Rajasthan were selected for documentation work on Mandana art. Detailed questionnaires were made to interview the Meena community. Secondary literature data on Mandana art and rock art of the Chambal basin were also collected from Books, journals, and some photographs were used from Jyoti Bhatt's collection on Mandana art from Asia Art Archives.

Historiography of Meena tribe: Meena tribe is one of the most ancient tribes in India, and also the largest tribal community in Rajasthan state. The main concentration of the Meena tribe is in the eastern belt of Rajasthan and some Meena are also found in the southern belt of Rajasthan. They are basically agricultural communities that do farming in the Aravalli hills. But originally they were a warrior clan which ruled over a large part of Rajasthan. They had conflict with the Rajput and British for their habitat area. They managed to survive in the forest by using guerrilla tactics against the Rajputs and later against the British.

According to The Cambridge history of India origin of this tribe, "the oldest stratum of pre-Dravidian blood probably belong to the savagas termed by the ancient poet Vinavar (bowman) and Meenas (fishers) of whom the former may be identical with the modern Bhil. While the later may have their descendents in Meena." The oral history preserved in the traditional folktales and folklores of this tribe affirms the kingdom of Meena (Mindesh) with its capital at Amber. They also claim to be descendants of the people of the Matsya Kingdom, which flourished in the 6th century B.C.

Rituals and customs of the Meena tribe: Meenas revere local deities and construct shrines to these lesser gods on the outskirts of their villages. They worship *Balaji, Mahadev ji* and local deities *Thakur ji, Tejaji, Shitala Mata* (the goddess of smallpox), *Pipla Mata,* and other lesser village goddesses. They pay special attention to the presiding deities of their clans. Meena tribe has

cognate relation with their surrounding environment (Fig. 2). They follow *Dharadi* tradition which means worship of various forms of nature. Their manifestation towards nature is presented by their walls of houses where they depict sacred trees which are known as their clan tree (*Dharadi* tree). They have been worshipping trees and plants for centuries as their totem trees and faunas and worship them as their part of life. Meenas have innumerable primitive traditions and one of them is *Dharadi* system. The picture of the Goddess on the seal found in the excavation of Mohenjo-Daro, from which the tree has been taken out of its belly and the various sculptures found in such millions, is an irrefutable proof that *Matradevi (Kuldevi) and Prakriti (Dhari)* were unified[7]. This is the Historical proof of the *Dharadi* system. This culture is still followed in the Meena tribe and their walls are depicted by many sacred trees like Banayan, palm, *Kadam, peepal, khejdi, Babool* etc.



Fig. No. 02: Cognate relation of Meena woman with their cattles, Banota village, Sawai Madhopur dist., Rajasthan

Analysis of Mandana art: Content, Design and structure, Motifs, Technique and Style:

The word 'Mandana' means to decorate with design. This is also known as *likhana, purvana, lipavana* in Rajasthani dialect. The decoration of walls, courtyards and other objects was included in sixty-four arts referred to by Vatsyayana in the Kamasutra. This text was written in the fourth century A.D. and among sixty-four arts, the fourth art is *alekhyan*, the ninth is *manibhumikarma*and sixth one is *tandulakusumabalivikarah* which are nothing else than Mandana[8]. The decoration and embellishment of the houses have also been referred to in Harshcharita of BanaBhatta, *Mrichchhakatikam* of Sudraka, *Raghuvamsa* of Kalidasa, and *Kadambari* of BanaBhatta.

Mandana art is folk art and public art which is produced on walls by Meena tribal women of Rajasthan. It is practised by Meena populated areas of different regions with some changes like it is practised only on the floor in Madhya Pradesh but in Rajasthan, it is made on floors and walls. It is done in Tonk, Sawai Madhopur, Dausa, Dungarpur, and Banswara districts of Rajasthan. The artist of this art is women who produce this art in the community but they draw this unique art on the wall with their individual emotions also which are conveyed in Mandana art. Mother teaches their daughters how to paint, passing on their skills and keeping art alive and the connection between mother and daughter can be seen with the same impulse in the animals around them[9] . Women are the main reason behind this art to keep it alive and emotional. The subjects and motifs seem very decorative, fashioned, alive, dynamic and joyful. Mandana is a blend of the tangible and intangible forms of art. Intangible art forms like dance, songs, rituals and beliefs are depicted on walls of the Meenas' houses in tangible forms as painting.

The women of the Meena community use Mandana art for embellishing their houses on festivals, ceremonies, seasonal occasions etc. This art is done in the painting and relief form. Relief Mandana has been done by carving on clay in the inner side of the house and painting Mandana is done with white and red colour on walls and floor outside of the house. Subjects and motifs are similar in both forms. So many types of Mandana design are found and each design and forms represent different occasions. Some Mandana motifs are used as a subsidiary and some are independent designs.

Chief Occasion for Creating Art: Content: Mandana art is done occasionally in different forms and with different subjects. The rituals and customs of the Meena community are presented by their creative art on walls. They paint and embellish their houses in different seasons of festivals, harvesting of crops, marriages etc. A Rajasthani woman cannot stand on the bare floor as it is considered a bad omen[10]. Different social occasions with seasons and their motifs are mentioned in Table-2.

Painting drawn on festivals and *Vratas*: The chief festivals like *Holi* (Springs Season) (Fig. 3), *Bada Pujani Amavasya*(Summer), *Raksha Bandhan* and *Hariyali* (Rainy season), *Diwali* (Fig. 4) and *Makar Sakranti* (Winter) are painted on walls and floors as symbolic form.

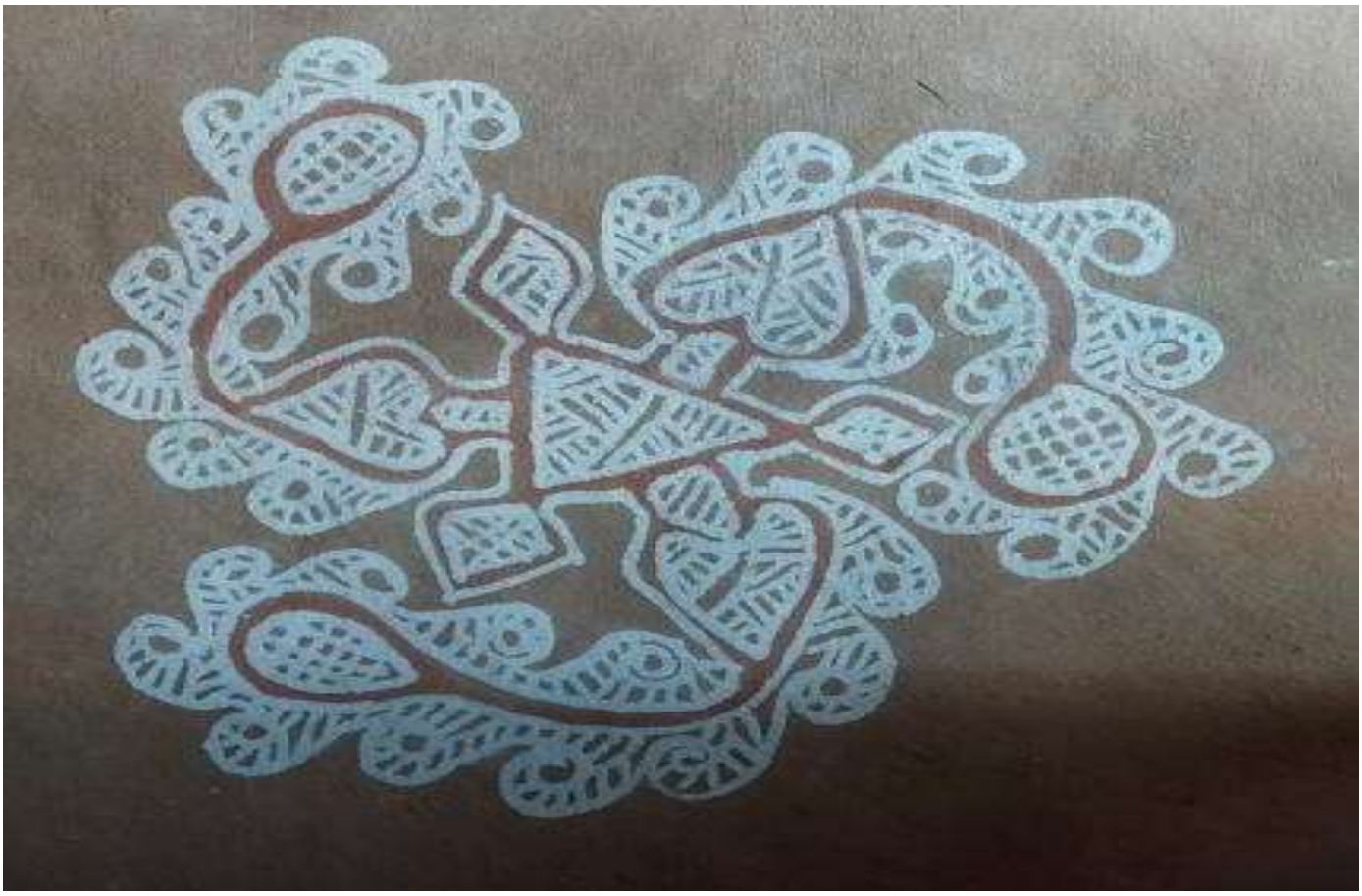


Fig. No. 03: ***Holi ka khanda*** **designs from Borif, Sawai Madhopurdist.Rajasthan**

Painting drawn on marriages: The Mandana on marriages are very auspicious for the Meena community. They embellish their houses with beautiful Mandana like they depict *lada* (groom) on horse, riders on elephants, floral motifs on walls and other sacred symbols like *paglya* and *sathya* on floors and walls.

Seasons	**Festivals or *Vratas***	**Mandana Design**	**Stylised or Symbolic motif**	**Natural motif**	**Meaning of motifs**
Springs *(vasant)*	Holi	*Holi-ka danda* or *holi ka khanda*	*Dapha,Chang, Talwar,Khanda, Guna*(musical instrument)	*Keri* (unripe mango)	*Holi ka Danda* represent *Holika* and *Prahlad*.
Summer *(jyestha)*	*Bada pujaniama vasya*		waterpots, *bijani* (fan), *bavadi* (step well)	*Bada* (banayan tree), mangoes tree with monkeys, human	Woman observe the fast and worship of Banyan tree

Monsoon *(sravan)*	*Raksha bandhan*	*Lahariya ka chowk*		*Lahariya* (ripples water), *nariyal* (coconut), human	
Winter	*Diwali*		*jail-tapaki*(dots), *ladoo*(sweets), *hida and hatari* (head decoration), *gamla, paglya*, *chaupad*,cow hoofs, *taraju-bata* (scales and weight)	*Santha* (sugarcane), *nariyal* (coconut, *bharadi* (ear of millets)	*Paglya* refers to the coming of goddess Lakshmi as footprints, winter crops are harvested during *Diwali* refers in Mandanaas *bharadi, santha* etc.
	Makar sakranti	*Sakranta ka kunda, Suraj ka chowk, Sat-diya ka-chowk*	*Swastika*	*Baingan* (brinjal), sun	*Govardhanpooja* symbol of cattle worship. The transition of sun to the tenth zodiac sign of *Makar* is celebrated *Swastika*, circular *chowks* and square *chowks* represent movement of time and sun.

Table 2: Types of Mandana paintings for different social occasion



A **B**

Fig. 4: (A) *Bijani ka paglya chowks* on *Diwali,* and (b) *goverdhan pooja* as cattle worship Borif, Sawai Madhopur dist. Rajasthan

The paintings on marriages were made by Meena women a decade ago but during the survey in villages, we found that at present time they invite male artists from outside to paint their houses in present time due to concrete houses. Meena women paint just symbolic motifs in very less area of their houses. This is a very big change in their art which we found during village to village survey and this tradition is becoming male-centric from woman-centric.



A **B** **C**

Fig. No. 04: Mandana (a, b) of marriages on concrete houses with chemical paint, Meena ki Dhani, Sawai Madhopur dist. Rajasthan and painting in white *khadiya* & (c) in traditional way (Courtesy Jyoti Bhatt)

Design, Structure and Pattern: Mandana art is a blend of different kinds of structural arrangement of elements and motifs. It is not narrative in a large sense like other tribal paintings, although it's a bunch of small narratives. During the research, symmetrical and asymmetrical patterns in Mandana's design have been found. The symmetry which is known as the mirror of design can be seen in all figurative and non-figurative Mandana designs. The depiction of animals, plants, anthropomorphic figures and geometric designs are represented in different symmetry patterns.

Reflection symmetry: All the animals, which are depicted on walls in Mandana, are represented as reflections which are also known as the line or mirror reflection (Fig.5).



A **B** **C**

Fig. No. 05: Two Peacock and Two *Baghera* (a,b) from Banota, Sawai Madhopur, and (c) painting on *chanda* of house representing different motifs in reflection symmetry (Courtesy Jyoti Bhatt)

Rotational symmetry: The Geometric design of Mandana art is known as chowks and all festivals have their special *chowks* design like circular, square and triangular *chowks*. These *chowks* follow the finite design in rotational symmetry in which all circular or rotational designs follow cn and dn finite design. The designs of type cn have n-fold rotational symmetry, but no mirror symmetry (Fig. 6a). The designs of type dn (Fig. 6b) have reflection symmetry as well as n-fold rotation symmetry[11].



A **B**

Fig. No. 06 (a): *Bijani ka paglya*: rotational symmetry with no reflection symmetry, and (b) peacock depiction in dn rotational with reflection symmetry.

Motifs and subjects: The motifs and subjects of Mandana art represent the daily life activities of the Meena people. Through the motifs, they represent their social, cultural and economic life. They depict figurative and non-figurative motifs which are mentioned in Table 3. All the motifs of Mandana art are placed in different spaces of the house according to occasions. The spatial distribution of the motifs is important in terms of their meaning and their ritualistic purpose. Mostly animals and plants are depicted on walls and geometric design as *chowks* are designed on floors. Some motifs are independently drawn and some are a subsidiary of the central design. Three kinds of motifs are found according to the purpose of their use[12].

1. The first category of the motifs is known as *bharat*or *bharavan*which means filling up the design. Motifs of *bharat* are *laddu ki bell, harade, batasa, suparika choya, tapaki ka choya, latakan* etc.
2. Second category motifs are used to expand the design but are the independent forms of some objects. The motifs are *chaukadi* (chess board), *sathiya* (*swastika*), *gau ka khur* (cow's hoof), *hatadi*(toy), *bavadi*(step well),*bijani* (fan), *kuvalya* etc.
3. Third category motifs are independent designs which are *paglya* and *swastika.*

Domestic animals	**Wild animals**	**Reptiles**	**Birds**	**Natural symbol**	**Geometric**	**Symbolic and stylised**	**Architecture**	**Vehicle**
Cow	Tiger	Snake	Peacock	Sun	Rectangular	Foot prints *(paglya)*	Stepwell *(bavadi)*	Bull lock cart *(bail gadi)*
Horse	Leopard	Lizard	Sparrow	Moon	Square	Hand Prints *(thapa)*	Door	Camel cart *(oont gadi)*
Cat	Monkey		Pigeon	Tree	Triangle	Carpet *(galicha)*	Window	Train
Camel	Wolf		Crow	Crops	Dots	Swastika *(Sathya)*		Aeroplane
Sheep	Rabbit		Parrot	River	Hexagonal	Sword *(khanda)*		
Goat	Squirrel		Grey heron	Star	Line	Fan *(bijani)*		
Deer						Borla Jhumka *(ear pendent)*		
						Sweets (ladoo)		

Table 3: Different kind of motifs found in Mandana Painting

These three categories represent geometric forms of Mandana art but Mandana art is mostly known for subjects of flora, fauna and anthropomorphic figures on walls. The subjects related to forest and environmental life are prominent features of the Mandana. Prominent motifs are

mentioned in Table 3. The walls of houses are mostly decorated with animals, birds, human figures and plants and *chowks* and other independent geometric designs used on floors. Some motifs are also depicted on independent household materials like *chulha* (hearth) and *kotha-kothi* (granary).

The prominent motif in Mandana art is known as *moradi* (peacock) which is considered a sacred and decorative figure in the Meena community (Fig. 7a). In domestic animals, horse, camel and cow are important, in which now days only horse and camels are depicted in figurative form whereas cow is only depicted in symbolic or sacred form as *gau ka khur* (Fig. 7b). During the research, it seems evident that due to urbanisation, cattle stock is kept very less in number by the women so the importance of figurative cattle depiction on walls is declining. Wild animals like *baghera* (tiger) and *nyari* (wolf) are depicted as attackers on cattles. Mandana is women-centric art although males are depicted as *sawar* (riders) on horses, elephants and camels. Men are depicted in stick, square-shaped and sometimes in natural body proportion. According to Dhapu, resident of Banota village, Sawai Madhopur, the women depicted in Mandana art are known as *gujari*. *Gujari*is depicted in a very interesting way in Mandana art wherein they are depicted in natural body proportion but their faces are shown in bird shape mostly with peacock head and this show that peacock is a very important part of their life (Fig. 8). Animals' head depiction with the human body is known as therianthrope art which is found in many rock art sites in which humans are shown with animal headdresses or masks. Animals' heads wearing human figures were found from the Mesolithic period.



A **B**

Fig. No. 07:(a) Decorative peacock depiction Banota village, Sawai Madhopur dist., Rajasthan and (b) depiction of *gau ka khur* symbolic form (Courtesy Jyoti Bhatt)



A **B**

Fig. No. 08: (a,b) ***Gujaris*** **with peacock head are depicted as playing games and carrying water pot (Courtesy Jyoti Bhatt and Meena 2009)**

Technique and style: The canvas of Mandana art is prepared with natural materials. The process of making Mandana itself an art in which a disciplinary approach is followed by all the artists of this art. Mandana is drawn conventionally with smearing cow dung and clay (*pili mitti*). In all the villages, a thin paste of cow dung/ buffalos dung mixed with clay is applied in the courtyard, floors and walls of the houses. This cow dung paste keeps the house safe and clean, which are painted white either with *khadiya*/*safeda* (Calcium carbonate) or *geru*/*laal gyar* (red ochre). The pictures are drawn with natural brushes like twigs of *khajur*, *bamboo* and *reed grass.* Some motifs are made by dipping the cotton swab in colour and pressing it gently with the thumb and the third finger.

According to Phula Devi resident of Banota village, Sawai Madhopur, they purchase red (*laal gyar*) and white (*khadiya*) colour from the Banjara community and she told us the process of Mandana painting preparation which is represented in Fig 9.



A: White *Khadiya*



B: Red Soil (*laal Gyar)*



C: *Lipana and Potana*



D: *Manda*

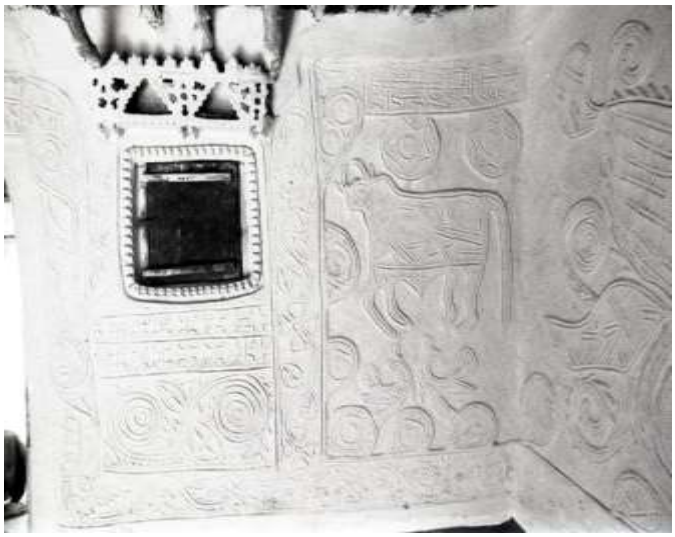
Fig. No. 09: Raw material (a,b) of Mandana and (c,d) process of painting from Banota, Sawai Madhopur dist., Rajasthan

Antiquity of Mandana art: Ethnic roots illustrated in rock art: The primitive tribe of India does not practice the art of painting on rock surfaces which has been found in other countries like Australia where aboriginal people still practice this tradition on the rock surface. In India, folk and tribal art are alive in the form of wall paintings, cloth paintings, rangoli, and in the form of plastic and metal art[13]. Many scholars have researched to find out the hidden meaning behind the art of ancient walls in different parts of India and identified some common elements in motifs and narrative folk art which are found in rock art also and have drawn parallels in themes and styles

(Ghosh 1984, Mathpal 1984, Malla 2004, Chakravarti 2009, Datta 2009, Kumar and Bhat 2008, Pradhan 2001 and Padhan 2012).

Ethnoarchaeology helped to set the path to go into the depth of Mandana art and its symbolism, in order to understand its soul through the mirror of rock art. With the help of ethnoarchaeology, we tried to find the antiquity of this art which has so many hidden meanings behind the wall. After the research, we have found the legacy of rock art has been continuing to travel into this hidden wall art. The Meena tribe of the Chambal basin is still using the same symbol and motifs, the same colours as red ochre and white lime (*khadiya* in local), the same depiction of natural life and non-figurative motif like geometric designs indicate great similarity in the tradition of rock paintings with little changes. The same kind of symbols and patterns can be seen on the wall and ceilings of the rock shelter and cave in the Chambal region. Through the research, we could be able to find the Antiquity of Mandana art from its nearby rock art sites. We tried to find the origin of this art through a questionnaire with villagers but they don't know about it. The ideological system and meaning of tribal art seems to lose among tribals. The root cause of it is the living communities do not identify themselves with these paintings[14]. The consciousness of our ancestors who produced them on the walls of rock shelters now become a tradition between tribes. Even though tribes may not know about the origins of their art, but their forms and subjects tell the stories of the antiquity of their ideas.

The antiquity of Mandana art can be traced from the Mesolithic to Historical period. This art is pictographic and petroglyphic in nature. The evidence of petroglyphs (Fig. 10) in Mandana takes the date of this art to the origin of the human art on rock surfaces which was firstly found in India at Bhimbetka in the auditorium cave dated the upper Palaeolithic. The outside area of Meena's house is decorated in pictographic form and the inside walls of the house which is the darkest area, are embellished with engraving and mirror work for illuminating the inside area. However, the evidences of petroglyphs are found very less due to concrete houses. In Table 4, the motifs are mentioned which have an analogy between both the art.



A



B



C



D

Fig. No. 10: (a),(b),(c) Petroglyphs art inside the Meena houses from Vansthali, Jaipur (Courtesy Jyoti Bhatt) and (d) engraving on outer wall of cow dung store Borif village, Sawai Madhoupr.

Mandana art	Rock Art Chambal basin	Period	Remarks
Anthropomorphic	Present, similar	Mesolithic to Historical	Stick shaped human Figures of the Mesolithic period are found in Mandana.
Therianthrope	Present	Mesolithic to Historical	Human Figures have shown wearing the headdress of animals at some rock sites and in Mandana females are also present with peacock heads.
)omestic animals	Present, similar	Chalcolithic to Historical	Animals playing with their young babies and babies inside animals as X- ray depicted in both art forms.
Wild animals	Present	Mesolithic to Historical	
Reptiles	Present	Mesolithic to Historical	
Birds	Present, similar	Mesolithic to Historical	Peacock which is known as *moradi* in Mandana art depicted in both art forms.
Musical instruments	Present	Historical	
Tree and plants	Present, similar	Historical	

Sun, moon and star	Present	Historical	
Architecture	Rarely	Late Historical	
Rituals symbols	Present, similar	Historical	Hand prints and *swastika* are found in both art forms.
Geometric and intricate	Present, similar	Mesolithic to Historical	
Vehicle	Present	Chalcolithic to Historical	Now days, modern vehicles like train, bus, and aeroplane are painted in Mandana.

Table 4: Analogy of motifs between Mandana art and Rock art of Chambal basin

Antiquity of Mandana art in the Mesolithic period: The earliest manifestation of the antiquity of Mandana motifs can resemble the earliest rock art of the Chambal region of the Mesolithic period. The depiction of this period are closer to nature and the motifs of rock art of the Mesolithic period were based on day to day life of human which is also similar to Mandana art of the Meena tribe. In the initial phase of the Mesolithic period, the bodies of animals were shown with naturalistic outlines which were filled with intricate patterns such as spiral or honeycomb patterns. This early phase of Mesolithic art is found mostly in Mandana *chowks* (Mandana circular design) on floors that are filled with intricate designs. An analogy can be seen between rock art and Mandana in (Fig. 11) wherein Mesolithic intricate design (a) from Ramtol site looks archaic form of Mandana design (b) which is known as *sathya ka jod* or *bijani ka jod* in the local dialect. The present design looks more stylistic and the internal part is filled with *bharat* motifs known as *sakarapara*. According to Phuladevi (Banota village), this design depicts in the outer area of the house (*Baramda and pol*). The earliest Human figures were shown in stick-shaped Mesolithic art which has also found in Mandana art during the research (Fig. 12)[15]. The human figures, both males and females, in rock art were depicted in red ochre with the activity of hunting and dancing whereas in Mandana, males are depicted in white colour in stick shape on a horse but females are not depicted in stick shape. The earliest depiction of the peacock (Fig. 13) which is the prominent motif of Mandana has found in Gardiya Mahadev site in Kota dist. Rajasthan.

During the research, we found that the analogy between both the art is not only seen in their style, pattern and subjects but the material of painting and application are also found common in both the art. The bichrome were used in the Mesolithic period for intricate pattern and X-ray painting. Red was the primary colour in Mesolithic art and in some places white was also used. Mandana art is also bichrome in nature in which red ochre for red colour (*laal gyar*) and calcium carbonate for white colour (*khadiya*) is used as the primary colour. The preparation of colour could be different in both art wherein colour should be thick and permanent for hard rock surfaces. According to Wakankar, red ochre minerals were grounded and powdered then heated

over the flame and used red hot[16]. In Mandana, colours are mixed with water because Mandana art is temporary in nature and women paint their walls and floors for one month or two months and on many social occasions. The colour was applied to rock art with the help of fingers, hair brushes, and fibrous twigs crushed at one end and this tradition is still followed in Mandana art. Paintings in Mandana are drawn on walls and floors with fingers, cotton swabs and natural brushes like twigs of *khajur, bamboo* and *reed grass.*



A **B**

Fig. No. 11: (a) Intricate pattern of Mesolithic period from Ramtol, Bhilwara dist. Rajasthan (Courtesy Abbas 2021: 185) and (b) Mandana of *Sathya ka jod* (Courtesy Jyoti Bhatt)



A **B**

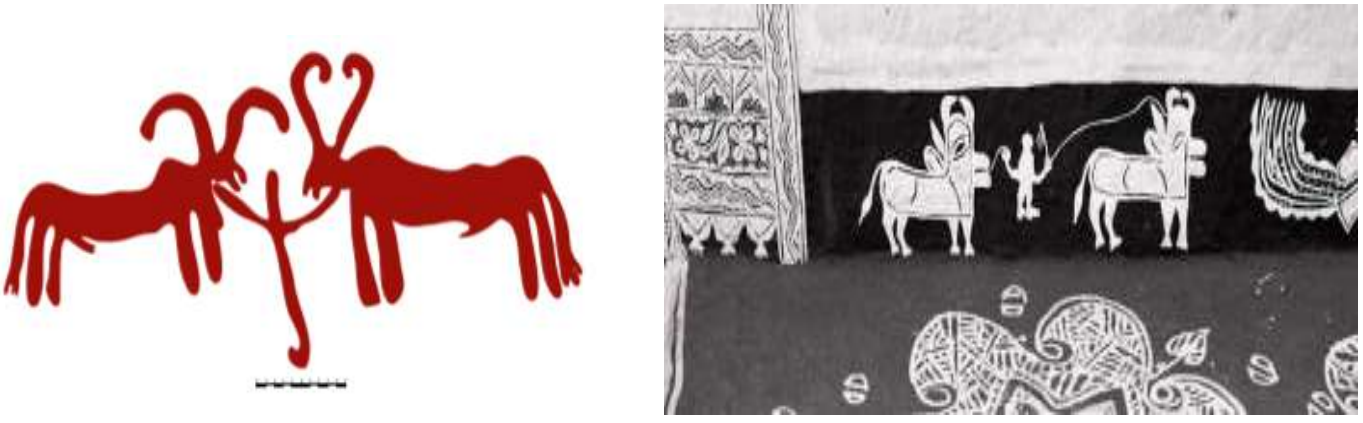
Fig. No. 12: (a) Stick shaped men in Mesolithic Period from Bhakdiya, Bundi dist. and Nalda, Bhilwara dist., Rajasthan (Courtesy Saleem 2014: 755) and (b) stick shaped men are riding on horse in Mandana art from Meena ki Dhani, Sawai Madhopur dist., Rajasthan



A B

Fig. No. 13: (a) Earliest depiction of peacock in rock art from Gardara, Kota dist., Rajasthan (Courtesy Abbas 2021: 180) and (b) depiction of peacock in Mandana art Lasadiya,Tonk dist., Rajasthan

Antiquity of Mandana art in Chalcolithic period: The Chalcolithic period is marked by full-fledged domestication, pastoralism and agricultural activities. Pastoralism and cattle herding is the most portrayed scene in rock art. Some new animals were started to depict which were found missing in Mesolithic art. In the Chalcolithic period, the variety of representations varies from zoomorphs which include herbivores such as humped cattle, deer, black buck and *Nilgai*; carnivores such as tiger, leopard and fox and birds such as crane, peacock and poultry[17]. In this period, animals are portrayed in stylistic as well as naturalistic forms and mostly depicted in flat wash. A picture of cattle fastened to rope has been found in rock art in the Chambal basin and the same depiction can be seen in Mandana art (Fig. 14). Milking of cows, nurturing scenes of animals (Fig. 15a) are common in this period as well as in Mandana art wherein cattle depicted with their calves (Fig. 15b).



A B

Fig. No. 14: (a,b) Cattle fastened to rope found in rock art from Golpur, Bundi dist.,Rajasthan (Courtesy Abbas 2021: 95) and same depiction is found in Mandana art (Courtesy Jyoti Bhatt)



A **B**

Fig. No. 15: (a) Milking of cow scene from Chatturbhujnath Nala, Madhya Pradesh (Courtesy Abbas 2021: 95) and (b) cow is feeding her calf in Mandana art (Courtesy Jyoti Bhatt)

The depictions of carnivores attacking cattle and protected by humans became common during the rock art of the Chalcolithic phase in the Chambal Basin. The theme of cattle with carnivores is found in Mandana art wherein wild animals like tigers, leopards, wolves and other wild cats are depicted as threat animals with cattle on walls. Women tell the story of their life and environment through their paintings in Mandana art. They are nurturers and protectors of their animals. Archana Meena from Banota village, Sawai Madhopur, told us about the meaning of paintings like wild and domesticated animals together on walls. She said that they paint *baghera* (tiger or leopard) and *nyari* (wolf) as attackers on their animals (Fig. 16). So this is the similarity of pastoralist and agriculturalist communities between Mandana and rock art.



A **B**

Fig. No. 16: (a) Painting of Cattle herders are protecting their cattles from carnivores in rock art from Nasaini, Madhya Pradesh (Courtesy Abbas 2021: 97) and (b) *baghera* and cattle are depicted together in Mandana art (Courtesy Jyoti Bhatt)

Antiquity of Mandana art in Historical Period: The Historical period paintings in the Chambal basin are mostly based on war and religion. Horse, camel and elephant riders equipped with defence weapons, decorative and stylistic animals and birds, and rangoli in stylised geometric patterns were mostly portrayed. In this phase, animals such as humped and long-horned bulls, goats, horses, elephants and fowl such as hens, cocks and peacocks are executed

stylistically[18]. Humans are presented in a triangular shape. The riders are shown in many scenes in the Historical period like in riding and battle scenes.

The motifs of Mandana art have similarities with the Historical art of the Chambal basin. Horse riding, manifestations of peacock in more stylised form, depiction of floral motifs and rangoli patterns of Mandana art are the prominent features of rock art in the Chambal basin in the Historical phase. Two peacocks hunting snake scenes in Mandana art are depicted in many stylised forms which have been found in rock sites at Lakhi Chajj, Morena dist., Madhya Pradesh (Fig. 17). Another painting of two pair of peacocks with *sathya jod* from rock art has some similarities with Mandana art (Fig. 18). Horse riding scenes in Mandana are very similar to rock art but riders are not depicted as warriors according to the Meena people. During the research, it has been found that horse riders are depicted mostly in marriages where *lada* (groom) is seated on a horse (Fig. 19a). According to Reshma in Kushtala village of Sawai Madhopur dist., Men are also seated as *sawar* for hunting or racing and she told us about one painting in which a man is standing between two horses and preparing them for race and two stick-shaped men are seated on the horse (Fig. 19b). A reflection symmetry scene has been found from Kotra Vihar (Fig. 20). Another horse riding scene has been found in rock art from Shivpura, Madhya Pradesh and same theme is found in Manadna art (Fig. 21).



A **B**

Fig. No. 17: (a) Two peacocks hunting a snake from rock site Lakhi Chajj, Madhya Pradesh and (b) same painting found in Mandana art from Banota, Sawai Madhopur dist., Rajasthan



A **B**

Fig. No. 18: (a) Two peacock is adjoined with *sathya* (*swastika*) from KotraVihar, Madhya Pradesh (Courtesy Abbas 2021: 180) and (b) three peacock are shown as adjoining with *sathya* in Mandana art (Courtesy Saxena, &Vashishtha 2000)



A B

Fig. No. 19: (a) Man is depicted on horse as *lada* (groom) Meena ki Dhani, Sawai Madhopur, Rajasthan and (b) Man in standing position is preparing to horses for racing and two men are seated on horses in Mandana (Courtesy Jyoti Bhatt)



A B

Fig. No. 20: (a) Two horses from rock art from KotraVihar, Madhya Pradesh (Abbas 2021: 114) and (b) Mandana art are presenting same reflection symmetry (Courtesy Jyoti Bhatt)



A B

Fig. No. 21: (a) Painting of a man who is riding on horse from rock art Shivpura, Madhya Pradesh and (Abbas 2021: 80) and (b) same theme is found in Mandana art (Courtsey Jyoti Bhatt)

The plants, trees, flowers and different kinds of rangoli floral patterns were given importance in the rock art of the Historical period. Some motifs such as *ashtadal* (full-bloomed eight-petal lotus) started to depict in this period[19] and this symbol is depicted in Mandana painting by Meena women which now looks more stylised and decorative (Fig. 22). Another *chowks*style pattern has

been found in the rock art form of this period which is now known as *bijani ka paglya* in Mandana art (Fig. 23). Some other motifs from Historical period are also found similar in Mandana art like a swastika floral motif (Fig. 24), peacock style plant (Fig. 25)[20] and peacock in *chowks* pattern (Fig. 26). The paintings of Historical period are more close to present Mandana art in the form of designs



A **B**

Fig. No. 22: (a) Eight petal lotus from KotraVihar, Madhya Pradesh (Abbas 2021: 194) and (b) same motif is found in Mandana art Borif, Sawai Madhopur dist., Rajasthan



A **B**

Fig. No. 23: (a) A intricate design in centre with leaf pattern as outer line design from rock site Gopichand ke Chajje, Bhilwara dist., Rajasthan (Abbas 2021: 180) and (b) same intricate design as *bijani ka paglya* in centre with circular *chowks* from Lasadiya, Tonk dist., Rajasthan



A B

Fig. No. 24: (a) Floral or swastika type of painting found from Dharwa, Bundi dist., Rajasthan (Courtesy Abbas 2021: 194) and (b) same motif is painted in Mandana in more stylised form (Courtesy Jyoti Bhatt)



A B

Fig. No. 25: (a) A plant with peacock decoration from Kotra Vihar, Raigarh dist., Madhya Pradesh (Courtesy Abbas 2022: 269) and (b) same motif in Mandana art (Courtesy Jyoti Bhatt)



A B

Fig. No. 26: (a) Peacock in rotational design from KotraVihar, Morena dist., Madhya Pradesh (Courtesy Abbas 2021: 194) and (b) same motif in *chowks* design in Mandana (Courtesy Jyoti Bhatt)

Conclusion: Mandana painting represents the conventional form of human life which present the primitive consciousness of rock dwellers. Mandana art represents the ecosystem of the environment and it connects them with ancient rock art dwellers who portrayed their walls with surrounding events. During the research, we found very close connectivity of this tradition with our ancestors' cultural repository. The Chambal basin provides a common cultural landscape for both the arts to nurture their legacy. Several motifs and subjects of our rock art dwellers are consistently living their life on the walls of Meena houses. The design, technique, preparation and application of colours, all these structures of painting found in rock art with some changes. Through the village surveys, we could be able to find out the changes in the legacy of Mandana art over the years and its antiquity in the rock art repository. Antiquity of Mandana art are found in rock paintings in figurative form but to find out the meaning of motifs of rock art on the basis of Mandana art is quite complicated. Meena women have given the name and meaning of motif according to their tradition. The paintings of Mesolithic period have intricate patterns and stick shaped men, which have similarities with Mandana art as well as changes also occurs like naturalistic form of human and stick shaped men both are drawn in Mandana (Fig. 19). The theme of Chalcolithic art are continuing into Mandana art as the form of cattle and wild animals relation, but simultaneously it seems declining due to less cattle production by Meena people. The main reason for this decline in cattle production is that their economy is shifting from pastoralism to service based culture. They are interested in painting decorative motifs like peacock, flower pot and *chowks* designs rather than the theme of cattle and wild animal's relation. The Historical motifs are still depicted in same form rather than Mesolithic and Chalcolithic art. Some motifs became more stylised, for example peacocks are painted in more than hundred varieties. The theme of Historical horse riders has changed in Mandana art where they depict as rider or *sawar*, but for marriages as *lada* (Fig. 19a). Meena local deities *Tejaji* is also depicted with snake on horse in their temples.

This research not only helped us to trace the antiquity of this art but the continuity and change in Mandana art were also identified. These changes and continuity are not only related to rock art but it has been found that Mandana art has come out with tremendous changes in the last three decades. We have been able to trace this change with the help of renowned photographer Jyoti Bhatt's collection on Mandana art who collected pictures of Mandana art thirty years ago in Meena populated areas in southeast Rajasthan. During that time, villages were not properly developed and concrete houses were very less so the Mandana of that time were beautifully painted by the Meena women on their mud houses. Today, this treasure seems to lose its legacy due to modernisation and concrete houses. During the survey, we found that this art has been handed down to male artists who are invited to paint the concrete houses on social occasions like marriages. These male artists paint the houses according to their own ideas and we didn't see the beautiful traditional art of this Meena tribe in present modern houses, which is a sign of the

decline of traditional phases of this art, which come on walls from the consciousness of Meena women.

The legacy of the rock art tradition in the Chambal region has been kept through the Mandana art by the Meena women in their traditional way over the years. The indigenous knowledge of the Meena tribe about their surrounding environment, flora and fauna is very similar to our ancestors. If this art disappears, then we might lose the way that connects us with the ideas of our ancestors. So for our future generations, this art should be conserved by the indigenous people and vast documentation should be done by researchers for future studies because it can go extinct in the next ten to twenty years. Through the research, tribal women of Meena societies should be inspired for establishing their own small industries in which they can create Mandana on other objects like pottery, textiles, miniature paintings etc. It will generate not only income for them but also they can preserve their Mandana art on other objects. Thus more research studies are required on this hidden treasure to understand our ancestor's heritage.

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Reconstruction of Population History of Uttarakhand Using Genetic and Archeological Data

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Introduction:

Reasons for selecting Uttarakhand for reconstruction of population history: *Uttarakhand* has been a melting pot of the populations of Gangetic plains, Tibetan plateau and Nepal. The population of this area is the mixture of people from all these areas. As we shall see later on in this article that different communities show combinations of the male DNA (Y-DNA) and female DNA (mitochondrial DNA) from different parts mainly of South Asia and a very small proportion comes from central Asia, Siberia, Eastern Europe, Middle east, South East and Africa. The geography of Uttarakhand is mountainous and the settlements are separated by steep hills and deep valleys. This fact makes the intermingling of the peoples of different human settlements a little difficult. This has given the peculiar characteristics to the population of this area. The hilly parts of Uttarakhand are inhabited mainly by three communities i.e. *Khas, Shilpkar* and *Bhotiya. Khasas* are divided into two branches *Brahmin* and *Rajput*. Terai is inhabited by *Tharus*, *Boksas* and people from plains. Some of the *Brahmins* and *Rajputs* of present-day state of Uttarakhand, have migrated from different parts of India. The western part of Garhwal is inhabited by *Rajis* and *Jaunsaris*. In earlier times polyandry was predominant among *Jaunsaris* although at present this practice has almost disappeared. The term *Jaunsari* does not indicate

a single caste. It denotes all the communities living in *Jaunsar* area of *Garhwal*. They practiced fraternal polyandry which is similar to the tradition of the marriage of *Draupadi* to five *Pandavas* mentioned in *Mahabharata*.

The people belonging to Ochre Color Pottery (OCP) culture of North India made weapons, implements and anthropomorphic figures. Some of these weapons have been found in *Kumaon*. A notable find was that of cast anthropomorphic figures from *Bankot* District *Pithoragarh*. It indicates that the copper was being imported from *Kumaon* and *Garhwal* to Northern area of India in addition to the copper mines of Rajasthan.

The *Shilpkars* of Uttarakhand who constitute about 9% population of present-day Uttarakhand state have a different combinations of Y-DNAs. They have bigger percentage of Y-DNA H which is maximum in Central Indian *Gond* tribe and is dispersed all over South Asia. In contrast to this *Brahmins* and *Rajputs* have small percentage of this DNAs whereas they have large percentage of Y-DNAs, R1a1-M17 and R2a- M124 which are typically found in Northern India in large percentages. *Shilpkars* appears to be the ethnic descendants of ancient copper and iron workers.

These facts combined together indicate that the ancient and modern population movement can be worked out if we examine the distribution of copper ore find spots, archaeology and archaeometallurgy of Northern India, Himalayan and Trans Himalayan, DNA of modern population of Uttarakhand and literary traditions of India.

Copper Ore find Spots, OCP Culture and Copper Hoards related to OCP Culture: The map showing find spots of copper ore over Northern, Western and Eastern India, Pakistan and Nepal indicate that copper from copper ore was extracted from different mines of Uttarakhand, Himachal Pradesh, Kashmir, Rajasthan, Madhya Pradesh and Nepal. In Himalayan zone, the density of the find spots is maximum in Uttarakhand. Another high-density area is the Aravalli hills in Rajasthan.

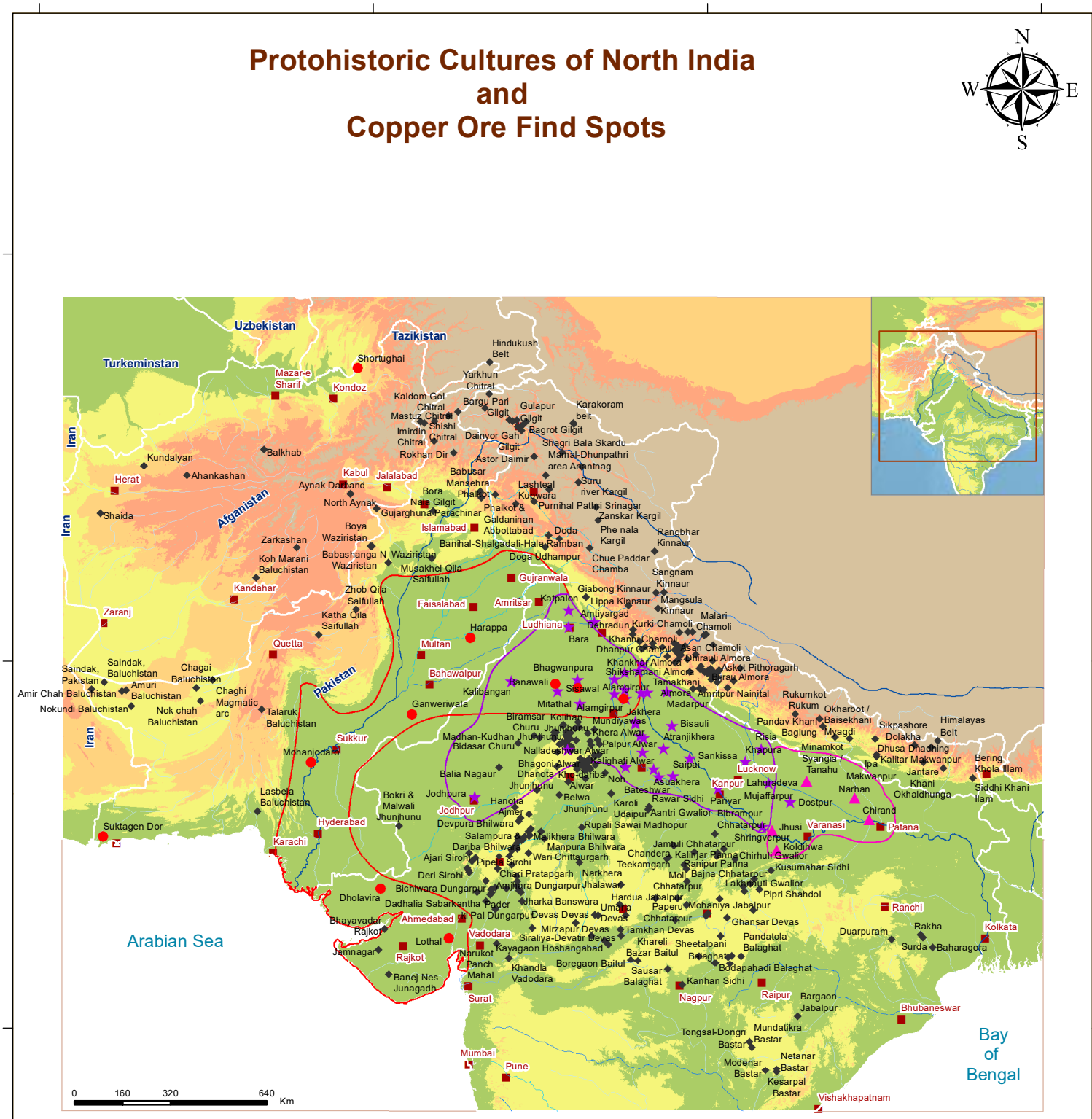


Fig. No. 01: Copper ore find spots of South-Asia

The OCP sites are sandwiched between these two sources of copper. Surprisingly this area has yielded maximum number of copper hoards typically related to OCP culture. The reason must have been the lesser distance from copper mines which facilitated the trade between the Gangetic plains and these areas. The northern part of Rajasthan has large number of OCP sites. This fact indicates that the mines of this area were being worked by OCP people. The area adjacent to Nepal copper mines has not yielded OCP copper hoards and is occupied by Corded Ware culture. It appears that Nepal copper mines were not being exploited because the copper hoard weapons are not found east of Lucknow, although many OCP sites have been reported by the author in *Bahraich, Gonda, Sravasti, Sultanpur* and *Ambedkar Nagar*. The western and north-eastern periphery of Mature Harappan area had very few copper mines. These are confined to *Baluchistan, Khyber Pakhtoon Khwa* province, *Punjab (Pakistan), Jammu & Kashmir* and *Pak Occupied Kashmir*. This explains the lower numbers of copper weapons and implements recovered from *Harappan* sites. Harappans had very little supply of copper. In contrast to this, it appears that OCP people-controlled copper mines situated in Uttarakhand, *Rajasthan, Himanchal* and South Haryana. This explains the presence of 150 – 250 copper weapons and implements weighing around more than 200 kilograms at almost every important site. The possession of such formidable arms and a militarized society must have formed the bulwark against expansion of Harappan Culture beyond *Yamuna* and expansion of people belonging to corded ware culture from the east[1]. The profession of copper-smiths must have been a prestigious one that time. These facts taken together point to interaction between the people of the Gangetic plains and the people of Uttarakhand around 3000 B.C.

History of Copper Metallurgy in Kumaon & Garhwal: The copper hoard artefacts are associated with OCP culture and are dateable from 2500 B.C. – 1900 B.C. The oldest instance of copper smelting in Uttarakhand comes from *Bankot* in *Pithoragarh* where half a dozen copper ingots shaped like anthropomorphic figures, weighing 2.5 – 3.5 kg, were found kept on a rock[2]. These contained 98 % copper, 1.22 % iron and minor impurities of Iron[3]. The anthropomorphic figures were made only during Ocher Color Pottery (OCP) period, therefore the *Bankot* anthropomorphic figures are of that time and the copper-smiths must have existed at that time. The discovery of anthropomorphic figure ingots clearly indicates that, copper hoards were being manufactured near copper working mines of Uttarakhand. The manufactured implements, weapons and figures were exported to the Gangetic plains. These findings clearly indicate that anthropomorphic figure shaped copper ingots were also exported from this area.

Coppersmiths of Uttarakhand: At present copper workers of Uttarakhand area are *Tamatas*, a sub-branch of *Shilpkar* caste. They are artisans of Kumaon and Garhwal. They are iron workers, weavers & leather workers also. A brief survey of social status of copper smiths of Gangetic plains will help us in

looking at the process of the formation of caste. The northern plains have copper workers called *Thatheras*. They claim to be descendants of *Haiahayas* of *Narmada* valley. The *Thatheras* of *Rajasthan* make the same claim. There exists a caste of *Thatheras* in *Punjab & Haryana* also. *Thatheras* are similar to *Vaishya's* in these area. Iron workers are a different caste in north India. They call themselves *Lohar*. The weaves & leather workers go by the name of *Kori & Chamar* and are recognized as different castes unlike *Shilpkars* of Uttarakhand. The iron workers of *Rajasthan* are identified as *Kanjars* and can be seen as nomadic *Lohars* moving around in their bullock-carts accompanied by their families. The artisans of *Himanchal Pradesh* form a distinct caste called *Koltas*. The *Nepali* copper workers call themselves *Newaris* or *Shakyas*. They are a trading caste. It appears that the caste of copper workers has different social status in different parts of the country. The Himalayan area being a difficult terrain has populations entrenched from ancient times. People from different areas have migrated from different parts of India and joined the original population. It appears that copper working started during Chalcolithic period around 2500 BC. The *Shilpkars* who have a fairly distinct genetic makeup, appear to be the ethnic survivors of ancient coppersmiths who made copper hoard weapons and exported these to the gangetic plains[4]. The genetic study of *Tamatas / Shilpkars* of Uttarakhand who form approximately 9% of the population of Uttarakhand, will be interesting from the point of view of peopling of Uttarakhand and from this, we can infer many things about the population history of other parts of India.

Comparison between the copper mining technology in Uttarakhand and Rajasthan:

(A) Tradition of copper mining and smelting in Uttarakhand in 19th century: In 1881, Atkinson noticed copper mines in *Rai-Agar pargana Gangoli* Kumaon, *Sera* mines *Patti barbisi pargana Sera* Kumaon, *Gaul* mines *Patti Kharhi* and *Sor-Gurang*, *Dhanpur* mines in Garhwal, *Dhobari* mines near *Dhanpur*, *Agar-Sera* mines *Patti Lobha* Kumaon, *Pokhari* mines, *Nota* mines, *Thala* mines, *Danda* mines, *Chaumatiya* mines, *Gaja Chowk*, *Kuber Chowk*, *Bhartwal Puan*, *Taal-Pungala* mines, *Kharua* mines (all near *Pokhari*) in Kumaon[5].

Atkinson, in 1881, describes the smelting of copper at *Sera* mines district *Dehradun* Uttarakhand as follows. The ore was pounded and moistened with water and received an admixture of five parts in six of limestone or flux. The charge, consisting of about 6 pound (2.72 kilogram) of unmixed ore, takes about half an hour to melt and is placed from time to time in handfuls on the furnace, and covered with oak charcoal which is occasionally moistened with water. When the fire falls in after the last supply of ore, the charge is ready to be taken out. The door of the furnace is then taken away and the remains of the fire being raked out, there appears at the bottom a melted mass which, after being stirred about a minute or two to allow the heavier particles to settle down, is sprinkled with water to harden the surface. Three or four of these charges being taken away, the melted copper is found at the bottom in a small mass weighing about 77.69 grams, for which twelve pounds of charcoal had been used. Thus,

from every 100 parts of ore about 2 1/18th the parts of the copper are procured, having consumed 200 parts of charcoal or, in other words, 62.14 kilogram of charcoal was required for the production of a little over two pounds of pure copper, which sold at about one rupee a pound at that time[6].

Before 1790 & 1804 A.D. respectively, the copper mines were yielding the revenue to Kumaon *&* Garhwal kings[7].

(B) Tradition of copper Mining & Smelting in Rajasthan in 19th century: The melting and smelting technology of *Singhana* area of *Rajasthan* as described by Ball in 1850 is as follows. The pounding or crushing was affected on a stone anvil with a hammer weighing 7.46 kilogram; when completely reduced to powder the ore was made up into balls with cow dung and roasted. The blast furnaces were prepared in the following manner. A quantity of common sand was spread on the floor of a circular hut, in the center of which a depression, 30 to 38 centimeters in diameter and 5 or 7 centimeters deep, was made; in this a layer of fine sand and another of ashes were laid to prevent the metal from adhering to the bottom of the receiver; two clay nozzles or twyers were then placed on opposite sides of this hollow and a third between them, leaving the fourth side vacant for the slag to escape. The nozzles were then connected by moist clay and a circular rim of mud, a few inches in height, was raised, on which three annular vessels of fire-clay were placed to form the body of the furnace; each of these was 38 centimeters in external diameter, 25 centimeters high, and 7 centimeters thick. They were used repeatedly, but the lower part of the furnace had to be reconstructed for every charge. The bellows were simply goat- skins connected with the nozzles and were worked by the families of the smelters. After a preliminary firing, to dry the mud, the furnace was charged with charcoal, roasted ore, and iron slag, the latter being employed as a flux.

In a day of nine- or ten-hours' duration, 112 Kilogram of charcoal, 93 kg of the roasted ore, and 74 kg of the iron slag were consumed. The slag was drawn off and the smelted copper which had accumulated at the bottom of the furnace was removed on the following day. It was then re-melted and refined in an open furnace under a strong blast from bellows, and cast into small bars or ingots, which were subsequently removed to the Mint and cut up and fashioned into coins. The ore was said to yield only from to 2 ½ to 7 ½ percent of metal[8].

(C) Present day tradition of copper mining and smelting in Uttarakhand*:* At present, the practice of copper making in Uttarakhand appears to be very similar to ancient method of extracting copper. According to *Saklani,* The Tamatas of Uttarakhand specialize in copper mining, smelting and making different copper utensils. *Saklani et.al.* studied this method. They have described the present-day practice of copper smelting in detail. Their observations are as follows: They found that metal workers extracted ores from *Shrikot-khan,* an old working mine situated 4km east of modern Srinagar. The implements used by *Tamatas* in digging ore are pick-axe (*Gainthi*), wedge / gad/ hoe (*Kudal*), crowbar (*sapauce*), gad / hoe / wedge (base) and shovel. Only two or three people were dig the mine

during the daytime. The deeper mines were dark, so they used torches made of pine wood. They collected 45-50 kilograms of ores sufficient for 3-4 days' work[9]. The ore was removed with the help of chisels and mattocks. The ore was then hammered into small pieces. Ladies of the household picked out the impurities. Then it was washed in running water and ore pieces were picked and were collected in baskets. The clean ore was taken to the houses. The wet ore was first dried outside the houses.

One meter long and six cm wide furnace called *Aphara*, was made of mud and cow-dung. Ore and fuel were loaded through the mouth of the furnace which remained open. A burnt clay pipe called *Nava* / *Nabha*, was fitted on the back of the wall of the furnace. The opening of this was attached to below called *Kawala*, which was made of animal dressed skin. It was generally 1.2 meters long and 60 cm wide. It was operated by two persons who raised and pushed down the log attached to the bellow. The furnace was divided into two parts with the help of a mesh wire. The fuel was kept on the upper part of the mesh while the lower part was used for collecting ash[10].

The ore was taken in pulverized form or was mixed with cow-dung to make balls. This was sometimes put on the charcoal or sometimes the ore was put inside a spouted basin called *Haneli* / *Musaulla*. The spouted basin was locally made by using mud, quartzite stone and grass of *Babhila or Babhya* (*Exisphorum cososum*). The impurities of the ore were removed either by mixing the ore with borax or using the grass *Babhila* or *Babhya* (*Exisphorum cososum*). To prevent molten copper from sticking to the basin, a layer of ash was spread over it. Then the molten metal spread over the surface of ash. This molten metal was gradually converted into sheet which is called *Thelka*. The impurities were removed by cold forging. *Tamatas* made utensils from these sheets using implements namely hammer (*hathauda*), chisel (*lyani*), pincer (*sundasi*), wooden stand (*khadiya*), *Thelka* etc.[11].

Anita & *Nautiyal* have indicated that in older times, the local coppersmiths were using a technology which yielded flat copper slang[12].

The *Tamatas* make the following types of copper utensils:

(i) *Gagar* (water container)
(ii) *Bantha* (water container)
(iii) *Taula* (large cooking vessel)
(iv) *Bhaddu* (small cooking vessel)
(v) *Geda* (large cooking vessel)
(vi) *Patila* (small cooking vessel)
(vii) Traditional grain measuring pot (*patha*) etc.[13].

The brief survey of the traditional copper mining technology in Uttarakhand and Rajasthan indicates that these are almost similar. Based on this similarity, we can surmise that this technology was exported from the Rajasthan area.

Review of the archaeology of copper, iron and other finds from Uttarakhand: We have already

mentioned that anthropomorphic figures found at *Bankot* are dateable to 2500 B.C. to 2000 B.C. The earliest date obtained for Iron from Central and Eastern Ganga plains is 1800 B.C.[14]. It can be presumed that Iron smelting technology spread to whole of North India within a short period. PGW (starting from 14th century B.C.) is associated with Iron Age in Northern India. PGW has been reported from many sites of Uttarakhand like *Thapli* district *Tehri*[15], *Purola* district *Uttar-Kashi*[16], *Sanana & Baseri* from district *Almora*[17]. The ancient copper workers of Uttarakhand must have started smelting iron as soon as it was discovered in Northern India. At present the coppersmith of Uttarakhand are smelting iron also.

Schist burials of *Lippa* have given date of 1420 ± 170 B.C.[18].

The burials of *Malari*[19] are dateable to 1000 B.C.[20]. The pottery of *Malari* is similar to that of Trans-Himalayan area[21]. The whole area bordering Tibetan Plateau is inhabited by *Bhotias*[22].

Uleni, an Iron smelting site has given C-14 date of 2770±90 B.P.[23].

Ranihat has yielded evidence of smelting of Iron and fabrication of tools which is dateable to about 5th century B.C.[24].

Chuvthag burials are dateable from 3rd century B.C. – 2nd century A.D.[25].

The Tibetan proto-historic pottery from *Chu-vthang & Quta* is similar to the pottery found on the southern side of the Tibetan border of *Kanam (Himachal Pradesh), Malari (*Uttarakhand*)* and *Mustang (Nepal)*. The two traditions share common typological features like large funnel shaped splayed out rims, coarse fabric, spouts, latches, handled potteries, chord impressed and incised designs on the surface[26].

Excavations at Supna and Ufalda have yielded large number of copper and antiquities dateable to 3rd-4th century A.D.[27].

The copper plate grant of *Paurava* dynasty dateable to 6th century A.D., *Pandukeshar* copper plate dated 853 A.D., *Raghunath* temple copper plate dateable to 8th-10th century A.D., copper plate grants issued by king of *katyuris*, *Lalitasura* dateable to 9th-10th century A.D., *Padmadeva Tamrapatra* dateable to 10th century A.D., *Panwar* dynasty copper plate dateable to 16th-17th century A.D., it indicate that copper was being mined and smelted locally on which these grants were engraved[28].

Schist burials from *Sanana & Baseri*[29] have yielded schist burials dated to 1st-2nd century B.C. Many such burials have been found from Kumaon as well as Garhwal.

This survey indicates that there was interaction between the people of Uttarakhand with those of Gangetic plains and Tibetan plateau. The technologies must have diffused quickly from one area to other although material culture of Uttarakhand was unique. It combined the elements from Tibetan plateau and Gangetic plains and developed its own distinct material culture from ancient times to early historical period.

Movement of Tribes from the Tibetan plateau is indicated by ceramic traditions: The burials

of the Tibetan border area show a ceramic tradition which is akin to Trans-Himalayan potteries of *Chu-vthang* (3rd century B.C. – 2nd century A.D.), *Quta* and *Chugong*. It is different from the one obtained from *Kharub, Tibet*. This in turn has similarity with Ban Chigang and Non Nok, the corded pottery and the large funnel shaped pottery of Thailand. It appears that people from the Tibetan plateau could penetrate only margins of higher Himalayas. This region has yielded cave burials & schist burials like *Lippa & Kanam* in *Himanchal Pradesh, Malari* in Uttarakhand and *Mustang* in *Nepal*[30]. The pottery found in burials has generic similarity to the sites of *Chu-vthang & Quta* but it is not similar to the pottery found from *Kharub* province *Chamdo*. The later pottery of *Mustang* shows double pots which is also found in *Kharub*, this indicates that the *Kharub* tradition influenced the *Mustang* tradition in later period.



1. Vase from Mane Gogma, 2. Vase from Malari, Uttarakhand & 3. Vase from Chu-vthang

Fig no. 2: Spouted vases from Himalachal Pradesh, Uttarakhand and Tibet[31]

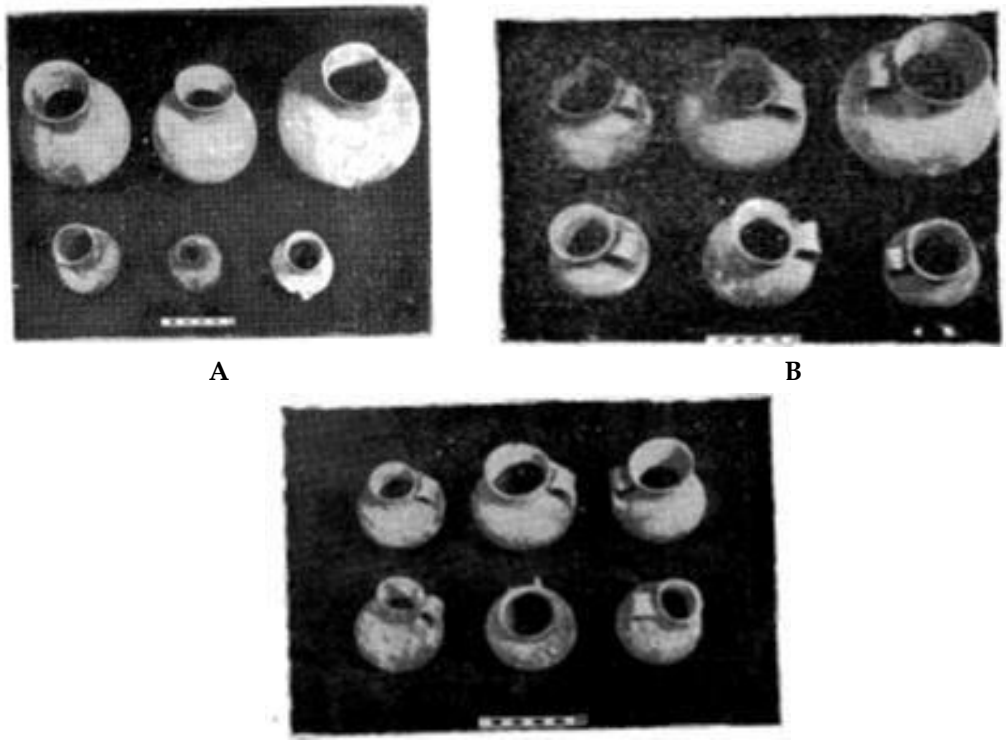


Fig No. 03: Handle and other types of vases from burials of Mustang, Nepal. (A) Globular pots and small jars. (B) Globular pots with handle. (C) Small globular pots with handle[32]



A **B**

Fig No. 4: Potteries found from Gurugyam and Kanam. (A)Spouted pottery jar (Gurugyam 2013M1:1) and High-stemmed pottery cup (Gurugyam 2013M2:4) & (B) Pottery from Kanam[33]

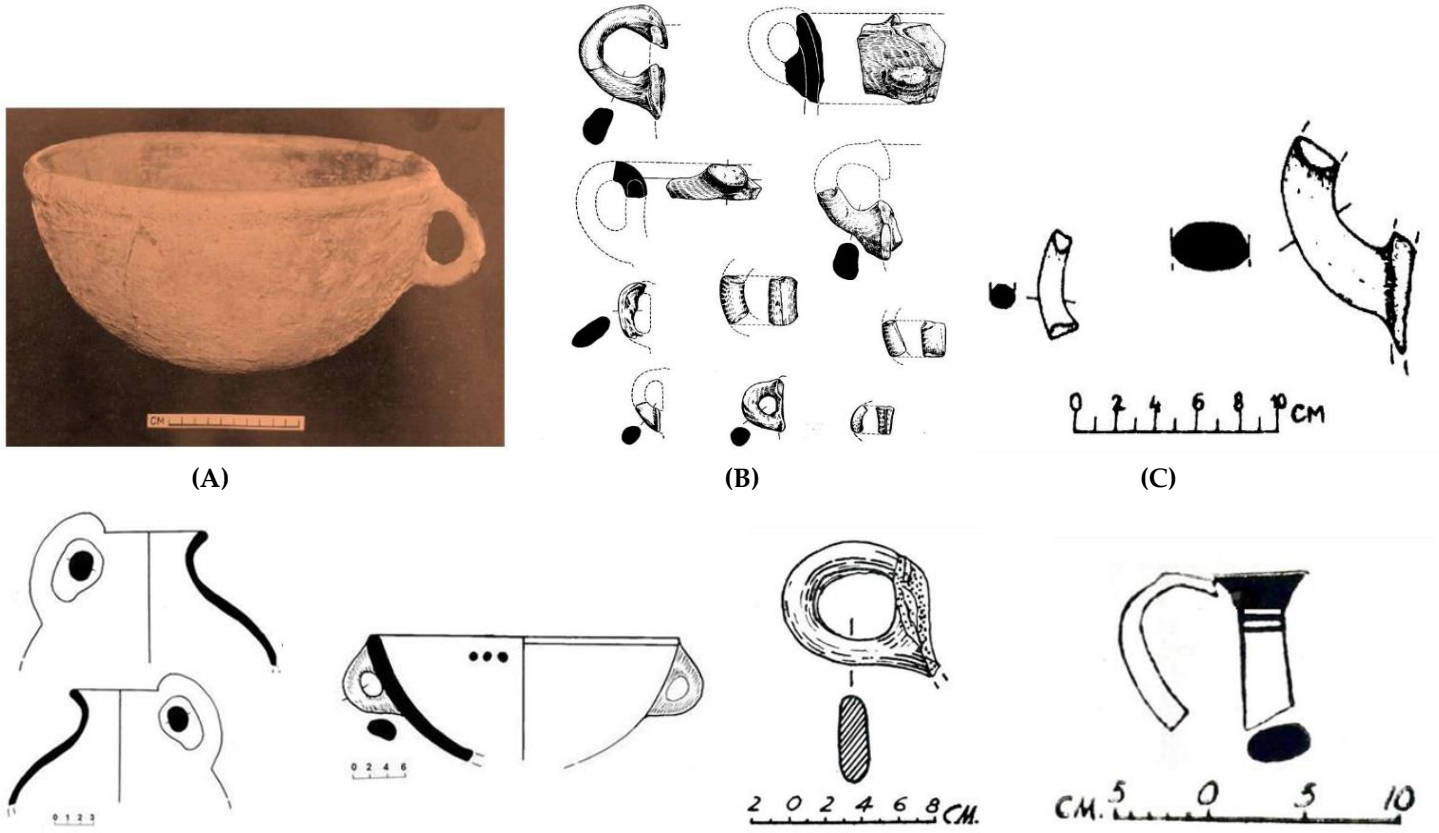


Fig No. 05: Potteries found from *Chugong, Tibet*



Fig No. 06: Potteries found from *Kharub, Tibet*

The significance of handles & spouts in the potteries of Gangetic Plains: The *Tibetan* pottery across the length and breadth of *Tibet* shows spouted and handled vases. These two features are shared by potteries of the Gangetic plains which signifies the phase of diffusion of ideas from the Tibetan side. The borrowing of handles from Tibetan pottery tradition by OCP culture would have taken place between 2500 – 2000 B.C. as attested by the handles found from *Ganeshwar, Siswal Haryana, Bahadurabad, Lal Qila, Atranjikhera, Chandaukha, Hathras, Saipai* and *Sitapur*. This borrowing may be result of cultural influence or migration of the Trans-Himalayan / Himalayan tribes.



(A) (B) (C) (D) (E) (F) (G)

Fig No. 07: (A) [34], (B) [35], (C) [36], (D) [37], (E) [38], (F) [39], (G) [40]



A B

Fig No. 08: Handles from OCP sites. (A) Aligarh Hathras handle *Aimipur Grant Ramkot Sitapur* (B) Aligarh Hathras handle Ganeshwar

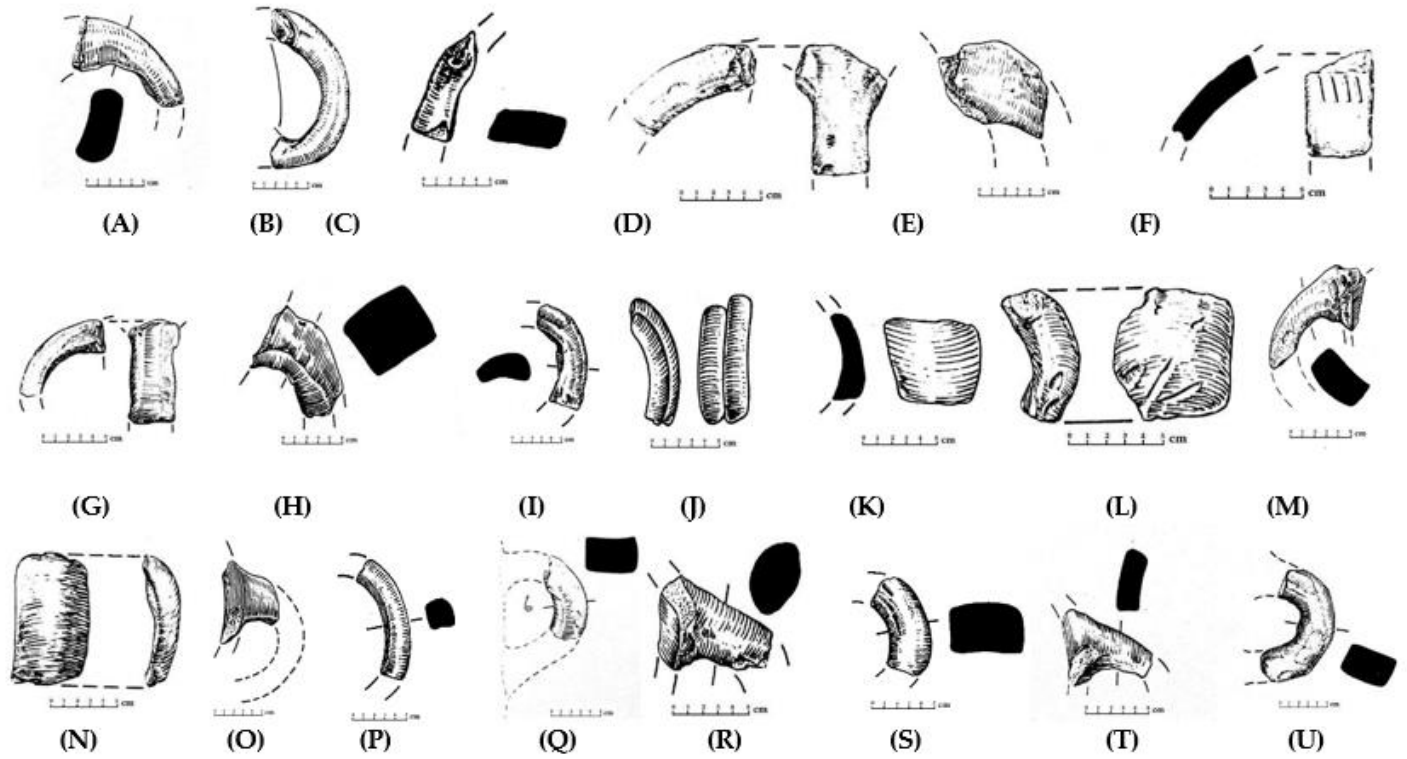


Fig No. 09: Handles from different OCP sites: (A) Handle village Atrauli[41], (B) Handle village Bhamori Bujurg[42], (C) Handle village Chhalesar[43], (D) Handle village Dabha[44], (E) Handle village Dadon Bujurg[45], (F) Handle village Jahrauli[46], (G) Handle village Jahrauli[47], (H) Handle village Khera Narayan Singh[48], (I) Handle village Mirgadhi[49], (J) Handle village Pachwari[50], (K) Handle village Salpur[51], (L) Handle village Sarva Nagla Bujurg[52], (M)Handle village Sijawalpur[53], , (N) Handle village Sukhrawali[54], , (O) Handle village Karaia Hathras[55], (P) Handle village Moharia Hathras[56], (Q) Handle village Rohai Hathras[57], (R) Handle village Satpia Hathras[58], (S) Handle village Tajpur Haveli Hathras[59], (T) Handle village Tarfara Hathras[60], (U) Handle village Thulai Hathras[61]

Spouts: The corded ware tradition of eastern India shows the borrowing of only spouts as a feature of pottery design. The spouted potteries of Chirand Bihar, Waina, Bhunadih and Pakka-kot district Balia U.P. display a different feature as compared to Tibetan pottery. These pots are mostly flat based basins of straight, tapering, convex and concave sides. A few vessels with spherical bodies are also found. Surprisingly the pottery of high Himalayas is not being copied as such, only a few features are being borrowed from there. This clearly suggests exchange of ideas with Trans-Himalayan tradition coming down to *Ganga* valley. The pottery from Waina with this feature was found in the early layers of phase 1 A which was at that time was dated around 1600 B.C. but the material is similar to early phase of *Senuwar*, therefore this date needs to be revised to 2200 B.C.[62]. At *Pakka-kot,* the excavators have reported the spouted vessels from all three phases (Period I, II & III). Period I of *Pakka-kot* is dateable to 2200 B.C., because the antiquities are comparable to early phase of *Senuwar* district *Rohtas Bihar*. Period III was coeval to NBPW period. It appears that spout was introduced between 2500 B.C. – 2000 B.C. The inspiration for this design probably came from Tibetan plateau.

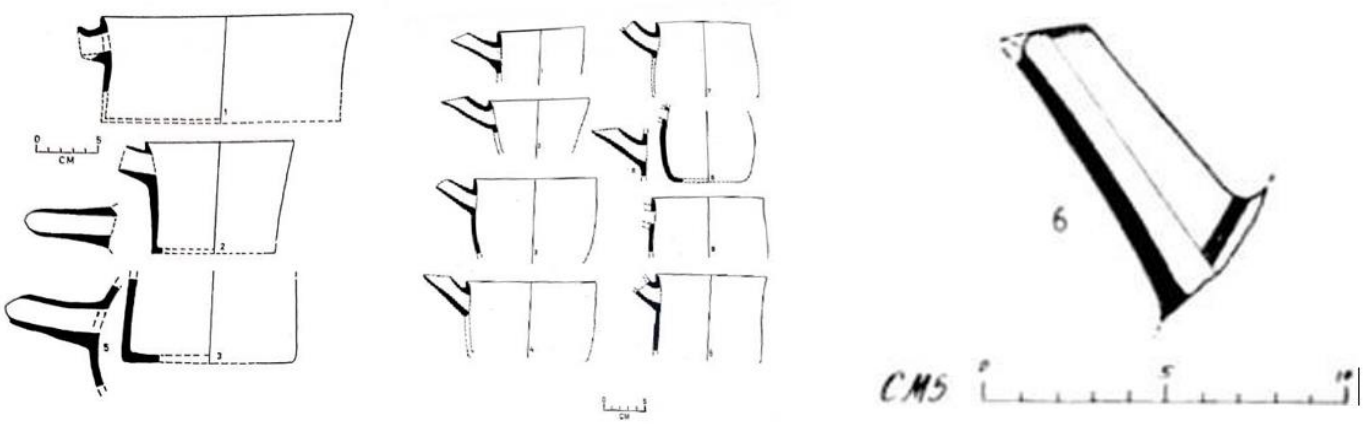


Fig No. 10: Spouted vases from Chiranad[63]

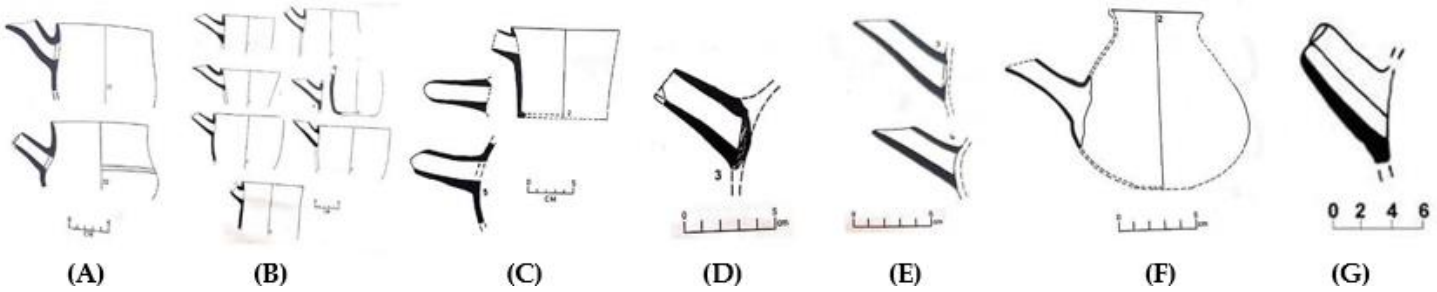


Fig No. 11: (A) Spouted vase from Waina Balia[64], (B) Spouted vase from Bhunadih[65], (C) Spouted vase from Bhunadih[66], (D) Spouted vase from Pakka-kot[67], (E) Spouted vase from Pakka-kot[68], (F) Spouted vase from Pakka-kot[69], (G) Koldihwa spout[70]

Corded design on the pottery of Eastern India: The three important Chalcolithic pottery traditions of Indo-Gangetic plains are Mature Harappan (Indus Plains), OCP (North & Western India) and Corded Ware (Eastern area) cultures. The corded designs are found on the Neolithic pottery of *Lahuradewa*. Such corded designs are found on some Himalayan potteries starting from Ladakh to North- East. This corded designs is also found in South-East Asian cultures. The presence of common designs in such vast area testifies the interaction between the people of these areas.

Uttarakhand the melting pot of the people of Himalayan area, Trans-Himalayan area and Indo-Gangetic Plains: The *Bhotia* tribe living in upper-Himalayan tract are the remains of southward movement of ancient Tibetan people. It appears that they are not found as distinct caste in middle and lower Himalayas. There can be only one reason behind this. This Himalayan area was already inhabited by some people. When the Tibetan tribes came to these areas, they were absorbing in the local population whereas at the *Tibetan* border, they survived as a distinct ethnic group[71]. *Khasia* is a generic name which probably represents some ancient tribe which inhabited *Himalayas* from *Kashmir* to *Nepal* in proto historic period and its name was later on co-opted as a generic name by all tribes of

Uttarakhand who joined *Rajputs & Brahmins* umbrella castes. Uttarakhand has approximately 9% population of *Shilpkars*.

Population with North Indian and Central Indian DNA adopts Trans-Himalayan Polyandry:

Draupadi marrying five *Pandava* brothers is a clear example of polyandry. It was being practiced in ancient times. *Drupada* was initially not comfortable with this idea but later on reconciled with this marriage. The *Kunti* asking his five sons to distribute *Draupadi* among themselves thinking that they have brought something as alms has been imagined by the author who was living in non-polyandrous society. *Yuddhistir's* apology is different. He cites old example of polyandry and says that the prospect of polyandry appears to be good and his conscience is in support of this act, therefore he accepted it. The narrative appears to be a piece of creative writing. The polyandry must have been normal with *Kurus* whose ancestors migrated from the *Himalayas* / Trans-Himalayan areas[72].

Some of the tribes like *Jaunsaris, Bhotias* of Uttarakhand and *Tibetans* practiced polyandry earlier but this practice has almost disappeared with the formation of the nuclear families and the spread of education. *Jaunsaris* are not an ethnic group. It is a broad label for the group of different castes like *Khas Brahmins, Khas Rajputs, Sonars, Koltas, Chamars, Lohars* etc, living in the South-Western part of Garhwal in Uttarakhand. There exists a caste hierarchy among them but it appears that all of them practiced polyandry in earlier times. In 1957, D. N. Majumdar studied polyandry among *Jaunsaris* and he found that all the castes irrespective of their social status practice polyandry. The types of Marriages have been studied in detail by

D. N. Majumdar[73]. The result of his study shows that 44.4 % *Khas Rajputs,* 100 % *Khas Brahmins,* 41.7 % *Badhai,* 44.4% *Bajgi, and* 31.6 % *Koltas* practice Polygyanandry / Polyandry. It appears that in the ancient period, the whole population practiced this form of marriage and they appear to be following the tradition of *Pandavas* whose ancestors came from *Uttarkuru*. This practice is not prevalent at present because of education, formation of nuclear families and increased employment opportunities.

Caste	Polygyanandrous	Polyandrous	Polygynous	Monogamous	Total
Rajput	40 %	4.4 %	28.9 %	26.7 %	100 %
Brahmin	50 %	50 %	-	-	100 %
Badhai	25 %	16.7 %	16.7 %	41.6 %	100 %
Sunar	-	-	-	100 %	100 %
Bajgi	33.3 %	11.1 %	33.3 %	22.2 %	100 %
Kolta	21.1 %	10.5 %	21.1 %	47.8 %	100 %
Total	32.6 %	9 %	24.7 %	33.7 %	100 %

Table No. 01: Forms of Marriage among various Castes in village Balia district Chakrata (December 1957)

This has considerably reduced among Tibetans now and is practiced only in remote villages[74]. The same is the case with *Bhotias* of Uttarakhand. Fraternal Polyandry was practiced in Laddakh, Lahaul Spiti and many parts of Himanchal Pradesh[75]. The table from *Bashahar State* Gazetteer given by Parmar shows the state of Polyandry in Himachal Pradesh at the time of the study by Y.S. Parmar and is produced below:

Caste	Number of women having				Total
	2 Husbands	*3 Husbands*	*4 Husbands*	*5 Husbands*	
Brahman	96	7	-	-	103
Koli	176	48	16	7	247
Jad (Buddhist Kanet)	7	-	2	2	11
Kanet	521	173	68	42	804
Lohar	29	1	-	-	30
Rajput	13	-	-	-	13
Tarkhan	23	9	-	-	32
Total	865	237	86	51	1240

Table No. 02: Giving Number of Husbands of women of different Castes

According to this, all castes practiced polyandry on different scales. Out of a total of 1,240 women who have more than one husband, as many as 865 have two husbands, 237 three husbands, 86 four husbands, and 51 five husbands. According to this table, women mostly had two husbands, though they might have three or more husbands. The survival of polyandry in the Himalayas and adjoining plains in present times:

The continuation of polyandry from the age of the Mahabharata to present times proves that hill tribes had their distinct social tradition from the proto-historic period to the present times. This social tradition was widespread in Tibet and the Trans-Himalayan area of India. In fact, some of the castes of Haryana and Western UP still practice some sort of informal polyandry and it appears that this social tradition has come down to the plains because of the migration of people and diffusion of this social custom from the Himalayan/Tibetan area.

Literary evidence of the migration of population as a result of military conquest and the formation of a new tribe: According to *Buddhist* literature, *Uttar Kuru* was a city and its king was *Kuber* / *Vessavana*[76], i.e. *Vaishravana Kuber,* the son of *Vishrava* of *Puranic* traditions. It is also said that *Yakkhas* are inhabitants of *Uttarkuru* and every *Chakkavati* kings (Universal Monarch) has a queen from *Uttarkuru*. *Mandhata* son of *Yuvanashva* (also called *Trasddasyu*)[77] called a *Bodhisattva* conquered *Uttarkuru* and shared throne with *Indra*[78] but later on he realized the futility of worldly gains (Image # 1, 2, 3). When he went to heaven he was accompanied by the people of Uttarkuru to heaven returned when he came to earth from heaven all the people who went with him to heaven came back to India

and they were settled in Kurukshetra area (*Majjhim Nikay*). This event is the subject of sculptures of *Sunga* and *Satvahan* periods. This narrative points to an event of people migrating in masses from Himalayas to Gangetic plains during the reign of Mandhata probably in early third millennium BC.



A **B**

Fig No. 12: (A) Sharing of the throne of heaven between King *Mandhata* and *Indra* – *British Museum, London. (B) Mandhata Trampling Nagas sculpture kept in* The Metropolitan Museum of Art, New York

According to *Aitreya Brahmana, Uttarkuru* was located north of *Himalayas*[79]. It was also called land of Gods in the same text[80]. According to *Mahabharata,* the ancestors of *Kauravas & Pandavas* came from *Uttarkuru*[81] and settled in *Kurushetra, Kuru Jangal & Hastinapur.* People of *Uttarkuru* are called their kins[82]. *Arjun* visited *Uttarkuru* and he was informed by the guards that he can't see anything in *Uttarkuru* and no war could be waged there. This statement was probably made because of scanty population and hilly terrain of the area[83]. *Mahabharata* identifies northern *Kuru* as a tribe[84]. The women of *Uttarkuru* enjoyed sexual liberty[85]. Mythical account of *Uttarkuru* is given in Mahabharata[86]. Here is the hyperbolic description of *Uttarkuru* given in *Mahabharata.* On the northern side of Meru existed the sacred land of *Northern Kurus*, which was the residence of *Siddhas*. The trees were laden with sweet fruits, and were always covered with fruits and flowers. All the flowers (there) were fragrant, and the fruits were of excellent taste. Some of the trees yielded fruits according to the wish of the person. Some of the trees were called *milk-yielding*. These trees always yielded milk and the six different kinds of food having taste of *Amrita.* Those trees also yielded cloths and ornaments. The land abounded with

fine golden sands. This region possessed ruby, diamond, *lapis lazuli* and other semi-precious stones. All the seasons of the land were agreeable and there is no mud anywhere. The tanks were full of delicious water. The men born there came down from the world of the gods. All were of pure birth and were extremely handsome. They were born as twins and the women resembled *Apsaras*. They drank milk of trees. The twins of opposite sex grow at the same speed. Both possessed equal beauty, both possessed similar virtues, and were equally dressed, both grew up in love like *chakava* bird (*Ruddy Shelduck*) which is considered to be monogamous. The people of that country were free from illness and were always cheerful. They lived for ten thousand and ten hundred years[87]. Literary evidence and inscription mentioning Uttarkuru: A *Gupta* Inscription of Udaigiri Cave dated 425-26 mentions *Uttarkuru* as a geographical region[88]. *Rajatarangini* mentions that *Lalitaditya* fought against people of *Uttarkuru*.

Diffusion of funerary rituals across vast areas over the time scale of 10-12K years - Last rites associated with *Uttar kuru in Mahabharata*: The *Mahabharata* mentions the last rites of Uttarkuru in which birds called *Bharunda*, furnished with sharp beaks and possessed of great strength, took dead bodies up and threw these into mountain caves[89]. This refers to one type of sky burial is practiced by Tibets, Laddakhis and high land tribes of Nepal. It appears that some sort of sky burial was being practiced in whole Central Asia from Turkey to Sechuan in China. The earliest form of sky burial at Neolithic Catal Huyuk which are dateable from 8th millennium to 5th millennium BCE, is as follows. First the dead body was kept in open space. When the flesh was eaten away by vultures and crows, skeleton was collected and placed in flexed position below the floor of the house. Later on this practice took different forms in different regions. This change over time is clearly visible in tower of silence of Achemenids, sky burials and cave burials of Buddhist Laddakhis, Tibetans, Nepalese and Sichuanese.

Cliff burial of Nepal: There is a tradition of burying the dead bodies in a caves made in the side of a cliff. This consist of digging the cave in the side of the hill, placing the dead body and funerary furniture with it inside the cave. This is similar to one of the practices of burial described in Mahabharata as we have already noticed. This type of burial is practiced in Ladakh, Tibet and Nepal.



Fig No. 13: Cliff burials Samdzong, Upper Mustang, Nepal

Hanging coffin burials of China and South-East Asia: A slight variation in the practice of burials dug in the cave of hills can be seen in the hanging coffin burial on the vertical faces of the cliffs ascribed to ancient Bo people in South-East and East Asia. This type of last rite was practiced in Fujian, Hubei, Jiangxi, Sichuan, Guangxi and Yunnan Provinces of China, parts of Philippines and Indonesia. Some tribes in these countries still practice cliff burials. This practice is modification of burial described in the Mahabharata. It appears that the practice of hanging the coffin from cliffs is inspired from the last rites of Tibetan area described in the *Mahabharata*. The example of such burial in Philippines is shown in fig. 14. It shows that chairs, bamboo poles, cross, corrugated sheets are also hung with the coffins. The names of the diseased has also been written on some of the coffins. These items are probably to be used by the diseased in the afterlife. This is slightly modified form of the original cliff burial.



Fig No. 14: Hanging coffins at *Sagada*, Mountain Province in Philippines.

Examination of Y-haplogroup of Uttarakhand population: The percentage of different Y-DNA in *Brahmin, Kshatriya, Shah, Goswami, Arya* and *Tamata* caste is shown in the following table (01). *Shah* and *Goswami* are considered to be *Rajputs. Arya* and *Tamatas* are among schedule castes. South Asian major Y-haplogroups are F-M89, H1-M69, H1a1-M82, H1b-apt, R1a1a-M17 and R2a-M124, O2a1-M95, O3a2c-M134. The other Y-Haplogroups are identified from the place of their origin in the table.

	Y-DNA of India					Y-DNA of Bactria: L-M11, L1a1-M27	Y-DNA of central Asia: C-M130	Y-DNA of Caucasus: G-M201	Y-DNA of Middle East: J2-M172,J2a-M410	Y-DNA of Uralic: N_M231	Y-DNA Siberia: P-M45,Q-P36.2	Y-DNA Semitic:T1a-M70
	F-M89	H1-M69, H1a1-M82,H1b-apt(South India)	R1a1a-M17,r2a-m124(North India)	Y-DNA Mundari : O2a1-M95	Y-DNA of Tibet Burmese: O3a2c-M134							
Brahmin	1.2%	13.2%	56.6%	-	1.2%	3.6%	2.4%	-	18.1%	-	3.6%	-
Kshatriya	2.5%	12.7%	53.2%	7.6%	1.3%	-	1.3%	-	12.7%	3.8%	1.3%	2.5%
Shah	-	22.9%	45.7%	-	-	-	2.9%	-	17.1%	-	11.4%	-
Goswami	-	45.7%	13%	-	4.3%	-	2.2%	-	28.3%	4.3%	-	-
Arya	-	21.8%	52.1%	-	4.3%	-	-	2.2%	6.5%	-	10.9%	2.2%
Tamata	-	41.2%	11.7%	-	2.9%	-	5.9%	-	11.8%	-	23.5%	2.9%

Table No. 3: Table showing Y-haplogroups of different castes of Kumaon

Analysis of the distribution of Y-haplogroups found in these castes leads to the following conclusions:

All the Castes are formed mainly from a mixture of South Asian Y-haplogroups: All the castes from *Brahmin* to schedule castes are formed from the major South-Asian Y-haplogroups namely F, H1, H1a1, R1a1a and R2a. For example the total percentage of these Y-haplogroups among *Brahmins* is 71 %, *Kshatriyas* is 68.4 %, *Shahs* is 68.6 %, *Goswamis* is 58.7 %, *Arya* is 73.9 % and *Tamatas* is 52.9 %. The south & central Indian Y-DNA H1 and H1b and north-Indian Y-DNA, R1a1 and R2a have mixed in different proportions and therefore the slight difference in the morphological features of different castes. It appears that different social groups and tribes maintained a sort of endogamy even in the earliest times, different tribes joined together to make an extended tribe. The Present day social status is not connected to particularly exclusive Y-haplogroups.

Social Mobility in Castes: *Shah* and *Goswamis* who are categorized as *Rajputs* in Uttarakhand have a varying mixture of H1 & H1a1 (South / Central Indian Y-DNA) and R1a1a & R2a (North Indian Y-DNA). *Goswamis* who were *Shaivaite,* house-holders, present all over northern India, are generally priests of old *Shiva* temples in the Gangetic plain. They were armed military bands professing the *Shaivaites* faith and played a very important part in the politics of northern India during the *Mughal* period. When they migrated to Uttarakhand, they joined the umbrella caste of *Rajputs* although in the plains, they come under OBC (other backward caste) category. Genetically they are similar to *Shilpkars* but have a different social status. Similarly, *Shah* have 28.5 % *Siberian* & Middle-Eastern Y-haplogroup but they are regarded as *Rajputs,* different from *Khasia Rajputs*. Y-haplogroup O2a1 is a *Mundari.* It is noticeable that this haplogroup is not found in any other caste of Uttarakhand, it means that a social-group having this haplogroup moved from eastern India to Uttarakhand and was easily assimilated among *Rajputs*. The *Tibeto-Burmese* haplogroup is found among all castes except among the *Shahs*. The Bactrian Y-haplogroup is found among *Brahmins* only. It is not found in any other caste. It appears that the people bearing these haplogroups came from western India later on and became *Brahmins*. This haplogroup is not found in North India. It originated in ancient times in Bactria.

Making of a new ethnic group by migration from Iran as a result of political changes: The examination of the genetic structure of *Parsis* gives insight into the time and place of the origin of this haplogroup. The lay *Parsis* of western India have 54.9 % Y-haplogroup 'J', 2.5 % Y-haplogroup 'L' and 23.8% Y-haplogroup 'P', whereas the priest class of *Parsis* have 4.2 % Y-haplogroup 'J' and 54.9 % Y- haplogroup 'L' and 31% Y-haplogroup 'P'. Historically, Zoroastrian religion originated in Bactria, therefore it is natural that the priestly class carries the more Y-haplogroup 'L' but the ordinary *Parsis* have very less percentage of this haplogroup. The Achaemenian rulers who consolidated the Persian Empire were Bactrians so the massive expansion of this Y-haplogroup towards *Iran* must have taken place in the early 1st millennium B.C. The absence of this Y-haplogroup in most of the castes of northern

& eastern India and its absence in *Khasia Rajputs* of Uttarakhand, indicates that this haplogroup was not present when originally *Khasias* and their precursors settled in Uttarakhand[90]. The evidence of the movement of ancestors of *Tamatas* in early 3rd millennium B.C. from probably *Rajasthan* combined with the fact that Y-haplogroup 'L' is absent from non-*Brahmin* tribes castes (of Uttarakhand) points towards later expansion of Y-haplogroup 'L' into Western India, Deccan and South India. Central Asian Y-haplogroup C-M130 is present in all castes except *Aryas*. The Y-haplogroup G-M201 which has origin in Caucasus is present only in *Aryas,* this indicates that *Aryas* are recent migrants from plains. It also indicates that the migration from Caucasus took place in much later period. At present, Y-haplogroup 'G' is mainly found in *Muslims* (*Shia* / *Sunni*), *Brahuis (Pakistan), Kalasha (Pakistan), Pashtuns (Pakistan), Gujarat Brahmins* and *Maharashtra Brahmins*. The Y-haplogroup 'J2a – M410' which originated in Middle-East is found in all caste of Uttarakhand except *Shah* who have 'J2-M172', which indicates that 'J2a – M410' came to India before 3000 B.C. It was there in *Rajasthan* from where *Tamatas* migrated. It appears that there was a massive movement of people bearing 'J2a – M410' before 3000 B.C. to western part of North-India, Central India, Deccan and South-India. It is not found in *Chamars* of North-India.

Semitic population adopts Indo-Iranian culture: When we examine the history of Persia, we see the Persian following the Zoroastrian religion in the 6th century BC during the reign of the Achaemenids. This religion is similar to the Indo-Aryan religion and the Avestan language, the language of their scriptures is also similar to Indo-Aryan languages. The present day Parsis have Semitic and Central Asian Y-haplogroups. As we have seen above it appears that a nation bearing Semitic Y-DNA adopted Indo-Aryan religion and language. Let us examine the beginning of this process. BMAC developed after the fall of mature Harappan culture. The DNA of BMAC people around 2000BC presented a very interesting picture. The people belonging to this culture had 11.5% J*, 3.8% J1, 26.9% J2, 3.8% T, 3.8% E Semitic Y-haplogroups (50%) , 7.7% G Caucasian Y-haplogroups, 7.7% L, 11.5% R2, 7.7% R* , 3.8% H1 Indian/ North-Western Indian Y-haplogroup(31%), 3.8% P, 3.8% Q Central Asian Y- DNA(7.7%), 3.8% R1b Western European Y-haplogroup (Vagheesh M. Narasimham et al. The formation of human population in south and central Asia, 2019, Science Volume 365, issue 6457). This distribution clearly shows that ancient Central Asians had 50% Semitic DNA, 30% Indian DNA, 7.7% Caucasian DNA, 7.7% Central Asian DNA and 3.8% Western European DNA. BMAC people used ephedra (*Some/haum*) twigs in their religious rituals and last rites. They worshiped the Indian zebu. This point towards some early form of Zoroastrian religion resembling Indo-Aryan early Proto-Vedic religion. Within two centuries we find Kassites ruling in Mesopotamia from 1500 BC to 1155 BC and Mitanni ruling from Zagros to the Levant. Kassite names reveal mix of local religion and Indian religion.

The names of their kings have the names of Indian deities like Indash, Maruttash, Bugash, and Shurias. The name of a deity Burias a Greek deity of Northern winds also appears as part of their

names. It appears that around second millennium BC the Kassites were familiar with Indian as well as Greek deities. Similarly the Mittanis who ruled from 1550 BC to 1260 BC, were worshiping Indian gods like Indra, Varuna, Mitra and Nasatya written in early proto- prakrit, using horse training manual which contains proto-prakrit words. A large number of ruling aristocrats of Near East bore Indian names. This phenomenon can be attributed to moving out of Indianised Central Asian tribes living in the BMAC area. It appears that different groups of tribes were worshiping different sets of Indian gods. The early Proto-Vedic religion had a different form than the present one. The presence of Hittites who were speaking a centum language resembling modern day Germanic Languages and worshiping gods which were not related to Indian gods indicates that the satem- centum divide had taken place much before 2000 BC. This 30% frequency distribution of Indian Y-DNAs must have been present in Central Asia during the early and Mature Harappan period. We find a trading post of Mature Harappans (2500 – 2000 BC) in Shortughai in Darqad district of Northern Afghanistan on the bank of the River Oxus near lapis lazuli mines.

The caste hierarchy is not reflected in genetic structure**:** The Kumaoni *Brahmins,* at the top of the social hierarchy have 56 % 'R1a1a' and 'R2a' Y-haplogroup, 13.2 % 'H1a1' and 'H1b' Y-haplogroup and 1.2 % 'F' Y-haplogroup. In addition to this, they have 18.1 % 'J2a' (Middle Eastern) Y-haplogroup, 3.6 % of 'P & Q' (Siberian) Y-haplogroups, 3.6 % 'L' and 'L1a1' (Bactrian) Y-haplogroups, 1.2 % O3a2c (Tibeto-Burmese) Y-haplogroup and 2.4 % 'C' (Central Asian) Y-haplogroup. To compare their genetic makeup from the point of view of male DNA, we take up the constitution of *Chamars* (who are at the bottom of the social hierarchy and are found almost all over India) of North India. They have 44.4 % Y-haplogroup 'H', 38.9 % Y-haplogroup 'R1a', 11.8 % Y-haplogroup 'R2' and 5.6 % Y- haplogroup 'C'. It indicates that this caste received almost equal contributions from different clades of Y- haplogroups 'R' & 'H'. They never mixed with people having the Semitic Y-haplogroup 'J2a'[91]. It should be noticed that J2a is found in large percentage among *Brahmins* of Maharashtra, Western MP and Gujarat.

Greater Diversity in Y-DNA of Priestly caste as compared to Schedule castes: The comparison of the three tables below shows that the Kumaon *Brahmin, Uttar Pradesh Brahmin* and *Uttar Pradesh Chamar* have almost same percentage of North-Indian Y-haplogroups. The only difference among the *Brahmins* and *Chamars* is that of higher percentage of South-Indian Y-haplogroup 'H' which is around 44 % among *Chamars*. The *Uttar Pradesh* and Kumaon*i Brahmins* have respectively 16.13 % and 13.2 % South/ Central Indian Y-haplogroup 'H'. Central Asian Y-haplogroup 'C' is found in all the three. It appears that all these three groups received it in ancient times. The percentage of Bactrian Y-haplogroup 'L, L1a1', and Siberian Y-haplogroup 'Q' is almost same in Kumaon*i Brahmins* and *Uttar Pradesh Brahmins.* Surprisingly Kumaon*i Brahmins* have 18.1% J2a-M410 which they must have received because of the migration of some of the sub-caste e.g. Pants, Joshis etc. from Western part of central India where this group is found in large percentage among *Brahmins* as compared to North Indian

Brahmins.

The extra Tibeto-Burmese Y-haplogroup 'O3a2c – M134' is found only in Kumaoni *Brahmins*. This appears to be the result of a steady flow of this Y-haplogroup from the Tibeto-Burmese population.

	Y-DNA of India:			Y-DNA Mundari: O2a1-M95	Y-DNA of Tibeto Burmese: O3a2c-M134	Y-DNA of Bactria: L-M11, L1a1-M27	Y-DNA of Central Asia: C-M130	Y-DNA of Caucasus: G-M201	Y-DNA of Middle East: J2-M172, J2a-M410	Y-DNA Uralic: N-M231	Y-DNA Siberia: P-M45, Q-P36.2	Y-DNA Semitic: T1a-M70
	F-M89	H1-M69, H1a1-M82, H1b-apt (South-India)	R1a1a-M17, R2a-M124 (North-India)									
Brahmin	1.2%	13.2 %	56.6 %	-	1.2 %	3.6 %	2.4 %	-	18.1 %	-	3.6 %	-

Table No. 04: Table showing Y-haplogroups of *Kumaoni Brahmin*

	Y-DNA of India:			Y-DNA Mundari: O2a1-M95	Y-DNA of Tibeto Burmese: O3a2c-M134	Y-DNA of Bactria: L	Y-DNA of Central Asia: C	Y-DNA of Caucasus: G-M201	Y-DNA of Middle East: J	Y-DNA Uralic: N-M231	Y-DNA Siberia: Q	Y-DNA Semitic: T1a-M70
	F-M89	H (South-India)	R1a, R2 (North-India)									
Uttar Pradesh Brahmin	-	16.13 %	70.97 %	-	-	3.21 %	5.6 %	-	3.23 %	-	6.46 %	-

Table No. 05: Table showing Y-haplogroups of *Uttar Pradesh Brahmin*[92]

	Y-DNA of India:			Y-DNA Mundari: O2a1-M95	Y-DNA of Tibeto Burmese: O3a2c-M134	Y-DNA of Bactria: L-M11, L1a1-M27	Y-DNA of Central Asia: C	Y-DNA of Caucasus: G-M201	Y-DNA of Middle East: J2-M172, J2a-M410	Y-DNA Uralic: N-M231	Y-DNA Siberia: P-M45, Q-P36.2	Y-DNA Semitic: T1a-M70
	F-M89	H (South-India)	R1a, R2 (North-India)									
Chamar	-	44.4 %	50.7 %	-	-	-	5.6 %	-	-	-	-	-

Table No. 06: Table showing Y-haplogroups of *Chamar*[93]

This comparison clearly shows more diversity among Brahmins i.e. more flow of Y-haplogroup from other ethnic groups who entered India from time to time. It also underlines least flow of outside genes into *Chamars*.

The caste/ethnic groups in Gangetic plains have formed very late whereas the hill tribes maintained their ethnic identities till early medival period: The analysis above shows that the Brahmins and Rajputs of Uttarakhand maintained their distinct tribal identity as Khasa till early medieval period. Shilpkars also remained as distinct tribal/professional group and there was lesser intermingled with Khasas and more intermingled with Trans- Himalayan tribes namely Khasas. In contrast to this the original ethnic groups having R1a1 and R2 has adopted the identity of all castes from Brahmins to Chamars in almost the same proportion.

In some regions of South Asia people with different Y-DNA tend to combine and adopt a tribal identity: The tribes of North Pakistan adopted the umbrella caste name Pathan a distinct ethnic

group which form 73% of the total population of Khyber Pakhtunkhwa provinces of Pakistan. Similarly Jat (Muslim and Hindu) form a prominent majority of 20-35% in Indian province of Punjab and Pakistani Province of Punjab. Similarly Marathas form 30% of the total population of Maharashtra. Whereas in Uttar Pradesh, Bihar, Rajasthan and Madhya Pradesh no caste forms more than 15% of the total population of the state. The Khas Rajputs and Brahmins form above 50% population of Uttarakhand. This indicates that in some parts of the country different ethnic groups easily combine and adopt a tribal umbrella identity where the spirit of equality prevailed.

Changing the tribal identity to Varna Identity: We have seen that the areas which were dominated by tribes tend to be more egalitarian as we have seen above in the case of *Pathans, Marathas, Jats* and *Khasas*. The case of Khas tribe of Uttarakhand is peculiar. They evolved as a district tribe and later on divided into two *Varnas* mainly Brahmins and Rajputs. They Maintained distinct identity different from *Shilpkars* and were practicing agriculture and animal husbandry by and large. Somehow they didn't want to take up different arts and crafts. They freely admitted the new comers as *brahmins* and Rajputs during late medieval period as we have seen in the case of Goswamis, Shahs, Pants, Joshis etc.

A *Rajput* sub-caste emerges from a Tribal ethnic group and this breakaway group from tribe adopts a new social identity and becomes exogamous: In contrast to this, *Gonds* of Central India have 62.5 % Y- haplogroup 'H', 18.75 % Y-haplogroup 'R1a', 6.25% Y-haplogroup 'K', 6.25 % Y-haplogroup 'O' and 6.25 % Y-haplogroup 'Q'[94]. The distribution of Y- haplogroups in *Rajgond* caste which emerged as *Rajputs* from among *Gond* tribe and freely intermarried with other *Rajputs* has Y-haplogroups from diverse origins. Surprisingly they have Y-haplogroup 'H2' 39.6 % and Y-haplogroup 'H1' 12.5 % and very small percentage of Y-haplogroup 'R2', i.e. 6.2 %. The presence of 31.2% Y-haplogroup 'J2' indicates that a large number of people bearing Y-haplogroup 'J2' joined *Rajgond* caste.

	Y-DNA of India:			Y-DNA Mundari: O	Y-DNA of Tibeto Burmese: O3a2c-M134	Y-DNA of Bactria: L	Y-DNA of Central Asia: C	Y-DNA of Caucasus: G-M201	Y-DNA of Middle East: J	Y-DNA Uralic: N-M231	Y-DNA Siberia: Q	Y-DNA Semitic: T1a-M70	K
	F-M89	H (South-India)	R1a (North-India)										
Gond	-	62.5 %	18.75 %	6.25 %	-	-	-	-	-	-	6.25 %	-	6.25 %

Table No. 07: Table showing Y-haplogroups of *Gond*[95]

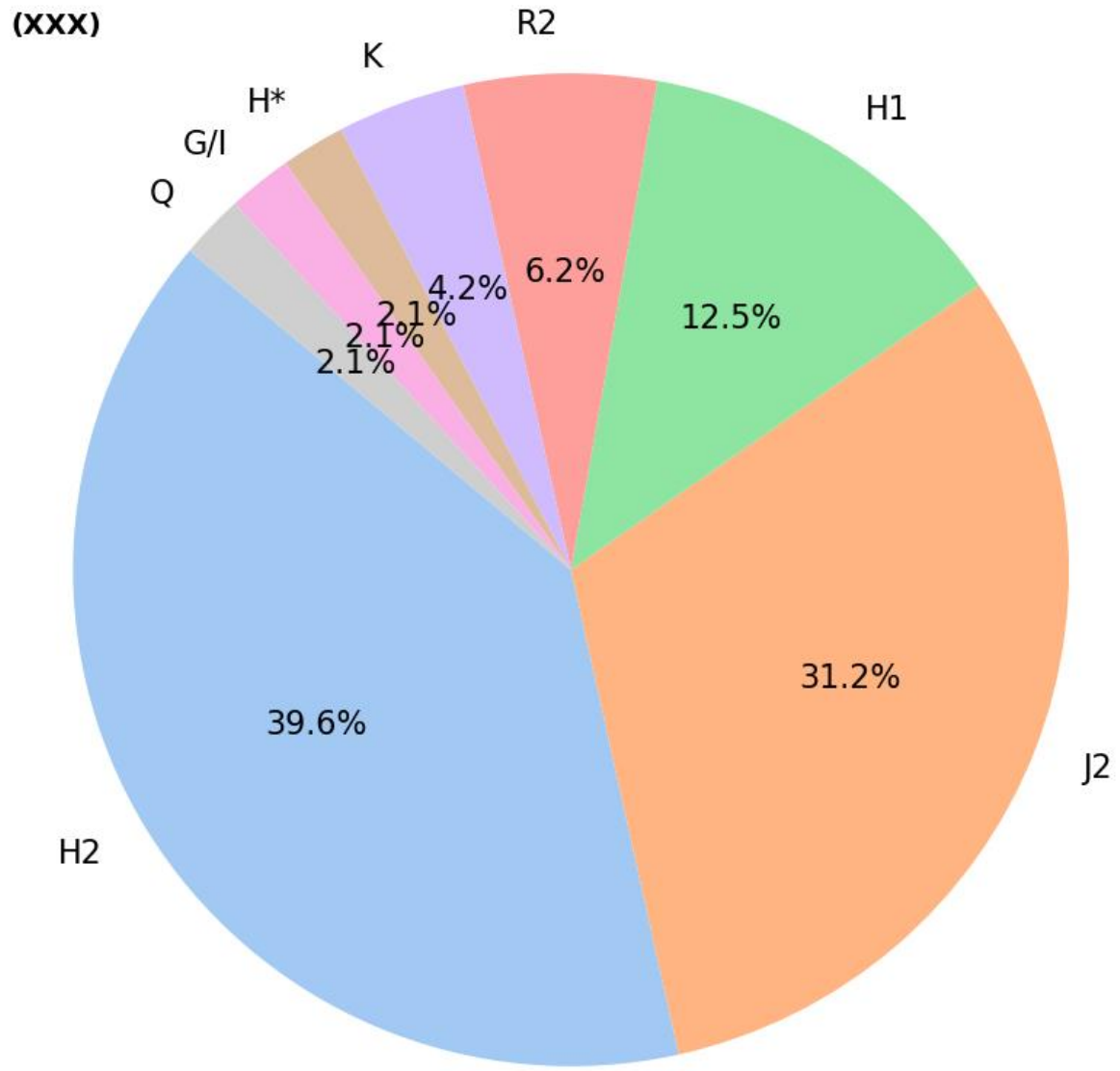


Fig. No. 15: Pie Chart of Y- haplogroups of *Rajgonds a sub-caste of Rajputs* caste

	Y-DNA of India :			Y-DNA Mundari : O2a1-M95	Y-DNA of Tibeto Burmese : O3a2c-M134	Y-DNA of Bacteria: L	Y-DNA of Central Asia : C	YDNA of Caucasus: G-M201	Y-DNA of Middle East: J	Y-DNA Uralic: N-M231	y-DNA Siberia: Q	Y-DNA Semitic T1a-M70	Y-DNA Central Asia/North West India: K
	F-M89	H-(South-India)	R2-(North India)										
Rajgond	-	52.1%	6.2%	-	-	-	-	2.1%	31.2%	-	2.1%		4.2%

Table No. 08: Table showing Y-haplogroups of *Rajgond*

Assimilation of foreigners into Indian tribes shows that they don't necessarily join the

dominant castes only: *Bhils* of *Gujarat* show a large percentage of this haplogroup ('H' 27.27 %, 'J' 18.18 %, 'L' 18.18 %, 'R1a' 9%, 'R2' 18.18 % and 'C' 9.09 %). These two examples indicate that the movement of 'J2' took place in the ancient period. *Gujarati Brahmins* have almost the same percentage of Y-DNA 'J' that is about 15.63%. It is very near the percentage of Y-DNA 'J' in *Bhils*. It appears that the tribes with this Semitic DNA came from Eastern-Iran/Central Asia and from there they came to India and joined Bhils and Brahmins in equal percentage[%]. *Kshatriyas* and *Goswamis* have Y-haplogroup 'N – M231' but this is absent from other castes in the table. It indicates that only these castes received this Y-haplogroup from people who migrated from *Uralic* zone / North-western Asia. The Y-haplogroups 'P and Q' are present in all castes. This must have resulted from the flow of male DNA from the Tibetan side. The Semitic Y-haplogroup 'T1a – M70' is present among *Kshatriyas, Aryas* and *Tamatas*. It seems that this haplogroup came to Western India before 3000 B.C. from where it was picked up by *Tamatas* and the ancestors of *Goswamis*. *Kshatriyas* must have picked it up from people of Northern India. It appears that the foreign elements can be adjusted in different castes. These castes may not necessarily be the dominant caste at present.

Y-haplogroup Diversity in the Genetic Makeup of all castes/tribes/ ethnic groups of South Asia: Seeing the table of Y-haplogroup distribution in different castes, we conclude that all the castes have great diversity. Every caste from *Brahmin* to *Tamata* has Y-haplogroup contributions from different ethnic groups. The difference in the morphological features is because of the difference in the proportion of Y-haplogroup constituents.

Examination of mitochondrial DNA (mtDNA) of Kumaon population: Social mobility from the point of view of mitochondrial DNA. The table no. 7 of the mitochondrial DNA (mtDNA) of different castes of the Kumaon region shows that *Brahmin, Kshatriya, Goswami, Arya & Tamata* show Indian mtDNA in large percentage.

	MtDNA of India: M, M18, M3, M30, M30d, M30d1, M33a, M33a3, M34, M35, M35b, M36, M39, M39b, M3c1, M4, M46, M4a, M4c, M5, M5a, M6, M65, M6b, M7e, M9, M9a1b, M9d, R, R30, R31a, R5, R6, R8b, U2, U2a, U2b, U2c, U2e	MtDNA of Central & North-East Asia: A4, A4c, B4a4, C, C4a3, D4, D4g2, D4q, D5a2	MtDNA of South-East Asia: F, F1, F1ac, F1d, F2	MtDNA of Central Asia / Tibet: Z7, G1b, G2a, G3a	MtDNA of West Asia / North Africa / Southern & Eastern Europe: HV, I	MtDNA Afro-Asiatic: T1, T2	MtDNA of Eastern Europe: U1	MtDNA of West Asia: U7, W
Brahmin	62.4 %	4.8 %	1.2 %	6 %	1.2 %	16.9 %	1.2 %	6 %
Kshatriya	53.47 %	20.3 %	14.4 %	5.1 %	1.3 %	1.3 %	-	2.5 %
Shah	31.5 %	39.9 %	11.5 %	8.6 %	2.9 %	-	-	5.7 %
Goswami	58.5 %	17.3 %	2.2 %	17.4 %	-	-	-	4.4 %
Arya	78.3 %	8.7 %	-	2.2 %	2.2 %	-	-	8.7 %
Tamata	71 %	20.5 %	-	2.9 %	-	-	-	-

Table No. 09: Table showing Mitochondrial-DNA (Mt-DNA) of different castes of *Kumaon*

All Castes are mainly constituted by India-specific mtDNA: There is a constant presence of South-Asian mtDNA in all the castes. The percentage varies from 78.3 % among *Aryas* to 53.47 % among *Kshatriyas*. *Shahs* have the lowest percentage of Indian mtDNA because they have migrated recently from Nepal and joined the ranks of *Rajput* being a ruling ethnic group, probably during the hegemony of *Gorakhas* in Uttarakhand.

Same Caste people have contribution of Mitochondrial-DNA (mtDNA) from distant regional ethnic groups: *Shah* who have status of *Kshatriya* have 31 % of Indian mtDNA, 39 % of mtDNA from Central & North-East Asia, 11.5 % mtDNA from South-East Asia and 8.6 % mtDNA from Central Asia & Tibet. It indicates that they are formed from Indian & *Tibeto-Burmese* mtDNA, North-Indian and Central Asian population and they joined the umbrella caste of *Kshatriyas* during the medieval period. *Goswamis* have 58.5 % Indian, 17.3 % North-East Asian and 17.4 % from Central-Asian mtDNA. They came to hills during the *Mughal* period and joined *Kshatriyas* but they are different from local *Khasia Rajputs*. *Arya* has the maximum percentage of Indian mtDNA, 78.3 % & very small percentage, 8.7 % of Central & North-East Asian and 8.7 % West-Asian mtDNA. They are also late comers and belong to Schedule Caste community. *Brahmin* show 62.4% Indian mtDNA and 16.9 % Afro-Asiatic mtDNA. This might have taken place during the early historical period. *Kshatriyas* have 53.47 % Indian mtDNA, 20 % Central & North-East Asian and 14.4 % South-East Asian mtDNA. It indicates that *Khasia Rajputs* were joined by Central Asians & South-East Asian tribes. These facts again underline great social mobility unlike the traditional model of caste formation.

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Diversity in the mtDNA of different Castes: The analysis of the distribution of mtDNA in the different castes of Uttarakhand clearly indicates that *Brahmin* caste has received mtDNA from diverse sources, probably this caste was formed by coming together of priestly classes of different tribes. Similarly *Kshatriyas* formed by coming together of different ruling groups. The recent example of the integration of *Shah* and *Goswami* caste demonstrates this mechanism. *Aryas* were the Schedule caste who adopted this title after becoming *Arya Samajis*. *Tamata*, the old caste of craftsman who moved to Uttarakhand in early 3rd millennium B.C. specialized in mining & smelting of copper and making of tools, weapons & utensils from the metal, also took up the trades of ironsmiths, weavers, leather-workers and musicians in later times.

Emergence of Caste through different Social Processes: The *Shahs, Goswamis* and *Kshatriyas* have 17.3 –39.9% contribution from Central & North-East Asia. It appears to be because of intermarriage among these sub-castes of *Kshatriyas*. *Tamatas* also have large percentage of this mtDNA, probably because of intermarriages with *Bhotias*, a population related to *Tibetan* area. *Brahmins* have very little (4.8 %) inflow from this group. *Kshatriyas* and *Shah* (a sub-caste of *Rajput*) have 14.4 – 11.5 % mtDNA contribution from South-East Asia. *Tamatas* and *Aryas* have no mtDNA contribution from this area. *Goswamis* who migrated from the border of Northern & Central India have 2.2 % mtDNA from South-East Asia. *Goswamis* have the highest mtDNA from Central Asia and Tibet (Z7, G1b, G2a and G3). The second highest percentage found among *Shahs*. The other castes namely *Brahmins, Kshatriyas, Aryas* and *Tamatas* have little contribution from this area. Surprisingly the contribution of mtDNA of west Asia, North Africa and South-Eastern Europe is 0 % in *Goswamis* and *Tamatas*. In other caste, it is found in less percentage. It indicates that this mtDNA was not present in place of origin of *Tamatas* and *Goswamis*, when these ethnic groups were forming. *Tamatas* formed around early 3rd millennium and *Goswamis* have taken the shape of a distinct ethnic group around 1000 A.D. Afro-Asiatic mtDNA is maximum in *Brahmins.* It is about 16.9 %. It is very little in *Kshatriyas* who must have received this by intermarriage with an ethnic group carrying this mtDNA. Eastern-European DNA is found only in *Brahmins* and is very little about 1.2 %. This indicates that some people belonging to this ethnic group became *Brahmins* during historical period. mtDNA of west Asia is found in all the caste except *Tamatas*. It is maximum in *Aryas* who are categorized as Scheduled Caste. It appears that this mtDNA came to

India in recent times.

Inflow of mtDNA from different Ethnic groups during different times: The study of mitochondrial DNA and Y-haplogroups of Uttarakhand ethnic groups clearly shows that these formed by joining together of mostly local people and sometimes people coming from different parts of South Asia. Some caste shows large contribution from Tibet and South-East Asia like *Shahs* and *Goswamis*. *Brahmins* have 16.8 % contributions from west, central and north-east Asia. Afro-Asiatic contribution appears to have come long after 3000 B.C. because this DNA is not found at all in *Aryas, Shah, Goswamis* and *Tamatas*. Only 1.3 % Afro- Asiatic mtDNA is present in *Kshatriyas*. It must have resulted from intermarriages with people carrying this mtDNA.

Making of the tribe of Bhotia from Tibetan stock:

Looking from the prospective of mitochondrial DNA: An interesting case of trans-Himalayan tribe of Bhotia will be examined here from the point of view of mitochondrial DNA. When we see the table for the two groups, it is very clear that the Bhotias have developed from Tibetan population because of founder effect some Y-haplogroups have increased and some have decreased. mtDNA haplogroup B and W have disappeared from Bhotia population. This example clearly shows that when a population moves to a new area and evolves locally for a long time its constituent may increase or decreased because of genetic selection and genetic bottle neck.

	Mt DNA: M9ala1b, M9a1b1 U: U2a, U5b2a1b	Mt DNA: A, A11, A11a; C4a1, D4a4, D4e5,d4j1a D4jla1, D4, D4b2	Mt DNA F1, F1d	Mt DNA: G2a, Z3a1, Z4	Mt DNA: Hv2a	Mt DNA : T2	Mt DNA: R31b	Mt DNA : N1b
Bhotia	8.33	35%	5%	21.68%	1.67%	1.67%	1.67%	23%

Table No. 10: Table showing Mt-DNA of *Bhotia*

	M: M9a, M8, M70, M13, M5, M10, M62, M11a, M61, M7, M25, M20, M49, M12 U:	A, D	F:	G:	H	TJ	R:	N: N10, N9a1, N11	Y	B	W
Tibetans	42.01 %	31.16 %	11.44 %	8.22 %	0.26 %	0.72%	0.52%	1.1 %	0.2%	3.76 %	0.05 %

Table No. 10: Table showing Mt-DNA of *Tibetans*[98]

All the caste show long standing genetic evolution: Prospective of mitochondrial DNA: After examining the mitochondrial DNA of different caste we can safely say that all the caste has great

diversity and no caste is formed from a single original tribe. It is in total contrast with traditional theories of *varna* and *jati* (caste). No caste is exception to this. It is interesting to note that the mitochondrial haplogroups from far off places in India and outside also have contributed to the making of Indians but the contribution from outside the South Asia is very little.

Conclusions: The examination of the different aspects of population history of Uttarakhand leads to the following conclusions. There is genetic diversity in all caste of Uttarakhand irrespective of their social status. The classical concept of *Varnashankar* is a myth from the point of view of the Y-haplogroups of the population of Uttarakhand. North-Indian Y-DNA R1a1 and R2 was entrenched in Uttarakhand long before 3000 BC. The Central and South Indian Y-DNA namely H1a1, H1b was also present before this time. After this between 3000 BC and 2500 BC a new group of people having Y-haplogroup H1a1 and H1b moved to Uttarakhand with copper mining & smelting technology from North Rajasthan. They were part of the expansion of OCP culture which used copper hoard weapons and tools. Their culture was different from Early Harrapans and Mature Harrapans. The present day Uttarakhand population is formed mainly by mixture of South Asian Y-haplogroups. There has been social mobility throughout the prehistoric period and it continues even today as the example of Shahs and Goswamis indicates. They have become Rajputs during recent times. The caste hierarchy is not reflected in genetic structure of the population. The emergence of Rajgond Rajputs from the tribe of Gonds is a recent phenomenon and shows a great social mobility in all times in all the regions of India. In the ancient period movement from Central Asia took place before 3000 BC and the new population merged in equal proportions in all castes from Brahmins to Bhils in Rajasthan, Gujarat, Maharashtra and Madhya Pradesh. The foreign elements don't necessarily join the dominant caste. The late foreign migrants like Parsis exist as a distinct ethnic group. The examination of their Y-haplogroups indicate that their priestly class migrated from Bactria because Zoroastrian originated in North East Afghanistan. This fact also indicates that Y-haplogroup L pushed into Western India after 2000 BC but it could not penetrate into Northern and Eastern India although some populations bearing this Y-haplogroup are found far-flung area of the country. The Persians who speak Indo-Iranian language basically have Semitic Y DNA but in past professed religion related to Vedic religion. The archelogy and literature clearly indicates that there has been movement of population from across the Himalayas from Tibet and Central Asia. The Tibetan social tradition of polyandry spread to Himachal Pradesh and Uttarakhand and people bearing north Indian Y-DNA adopted it. As this is evident from the examples of five Pandavas, the heroes of epic Mahabharata, marrying Draupadi the princess of Panchal.

When we examine the mitochondrial DNA of the population of Uttarakhand we reach the following conclusions. All castes are constituted mainly by India specific mtDNA. There is great diversity of mitochondrial DNA in all caste. The mitochondrial DNA contributions come from different

regions of South-Asia. Brahmins have mtDNA contribution from Africa, Middle East and Eastern Europe in very small percentage. It is minimum in Tamatas but the Aryas the scheduled caste from Northern India have maximum mtDNA from West Asia. All the castes show long standing genetic evolution and no caste has evolved from single tribe.

It can be concluded that all the caste have great diversity. They are mainly formed by contributions within South Asia. Very little contribution comes from outside the country. The social status is not connected to the genetics of a caste. There is social mobility noticeable in the society. The people who have come from outside India did not necessarily get higher social status. Generally such movement has resulted in uniform distribution of the new comers in all the castes. It appears that before 1000AD there existed *shrenis* or groups of people having the same profession. These *shrenis* were joined by different tribal and ethnic groups. Brahmin was the broad term for any type of religious functionary. Initially there was tribal and ethnic group endogamy but when later on *shrenis* formed and people from all the ranks joined *shrenis* and became various endogamous castes. The difference in morphology arose because of endogamy, genetic bottleneck, assumption of new social identity and social mobility. The myth of Aryan invasion is not reflected in archeology, genetics and literary tradition.

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Copper Hoard Weapons and Tools kept in Shahjad Rai research institute, Baraut district Baghpat Uttar Pradesh

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Introduction: This is the catalogue of total 133 copper hoard objects kept in Shahjad Rai Research Institute, Baraut district Baghpat Uttar Pradesh. It consists of 82 flat axes, 14 shouldered axes, 01 lugged shouldered axe, 04 flat celts, 04 bar celts, 08 *khantis*, 08 chisels, 03 barbed harpoons, 01 harpoon, 04 swords, 02 antennae swords, 01 elongated piece of copper and 01 thick peg / bent nail. The copper axes of *Sitapur & Lakhimpur* area have rounded edges unlike square edges of flat celts and shouldered axes.

The catalogue of copper hoard objects kept in Shahjad Rai Research Institute, Baraut district Baghpat Uttar Pradesh is as follows:



Obverse



Fig. No. 01: Reverse

Accessesion No.	-	STP - 1
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.422 kilogram
Size (LxWxT)	-	2.1x10x1 cm
Description	-	It is a flat axe (fig. 01) with rounded corners.



Obverse



Fig. No. 02: Reverse

Accessesion No.	-	STP -2
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.461 kilogram
Size (LxWxT)	-	22.1x10x1cm
Description	-	It is a flat axe (fig. 02) with rounded corners.



Obverse



Fig. No. 03: Reverse

Accessesion No.	-	STP - 3
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.456 kilogram
Size (LxWxT)	-	22x10x1.4 cm
Description	-	It is a flat axe (fig. 03) with rounded corners.



Obverse



Fig. No. 04: Reverse

Accessesion No.	-	STP - 4
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.788 kilogram
Size (LxWxT)	-	19.5x9x0.8 cm
Description	-	It is a flat axe (fig. 04) with rounded corners.



Obverse



Fig. No. 05: Reverse

Accessesion No.	-	STP - 5
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.427 kilogram
Size (LxWxT)	-	22x9.9x1 cm
Description	-	It is a flat axe (fig. 05) with rounded corners.



Obverse



Fig. No. 06: Reverse

Accessesion No.	-	STP – 6
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.473 kilogram
Size (LxWxT)	-	20.9x9x0.9 cm
Description	-	It is a flat axe (fig. 06) with rounded corners.



Obverse



Fig. No. 07: Reverse

Accessesion No.	-	STP – 7
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.378 kilogram
Size (LxWxT)	-	23.6x9.9x0.9 cm
Description	-	It is a flat axe (fig. 07) with rounded corners.



Obverse



Fig. No. 08: Reverse

Accessesion No.	-	STP – 8
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.510 kilogram
Size (LxWxT)	-	21.9x9.8x0.9 cm
Description	-	It is a flat axe (fig. 08) with rounded corners.



Obverse



Fig. No. 09: Reverse

Accessesion No.	-	STP – 9
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.482 kilogram
Size (LxWxT)	-	21.7x9.7x1 cm
Description	-	It is a flat axe (fig. 09) with rounded corners.



Obverse



Fig. No. 10: Reverse

Accessesion No.	-	STP – 10
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.359 kilogram
Size (LxWxT)	-	22x9.8x0.9 cm
Description	-	It is a flat axe (fig. 10) with rounded corners.



Obverse



Fig. No. 11: Reverse



Fig. No. 12: Tree in a railing

Accessesion No.	-	STP – 11
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.381 kilogram
Size (LxWxT)	-	21.1x9.9x1 cm
Description	-	It is a flat axe (fig. 11 & 12) with rounded corners with a tree in a railing.



Obverse



Fig. No. 13: Reverse

Accessesion No.	-	STP – 12
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.444 kilogram
Size (LxWxT)	-	22.5x10.2x1 cm
Description	-	It is a flat axe (fig. 13) with rounded corners.



Obverse



Fig. No. 14: Reverse

Accessesion No.	-	STP – 13
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.315 kilogram
Size (LxWxT)	-	21x9.4x0.9 cm
Description	-	It is a flat axe (fig. 14) with rounded corners.



Obverse



Fig. No. 15: Reverse

Accessesion No.	-	STP – 14
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.469 kilogram
Size (LxWxT)	-	22.8x9.9x0.9 cm
Description	-	It is a flat axe (fig. 15) with rounded corners.



Obverse



Fig. No. 16: Reverse

Accessesion No.	-	STP – 15
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.433 kilogram
Size (LxWxT)	-	21.8x9.7x0.9 cm
Description	-	It is a flat axe (fig. 16) with rounded corners.



Obverse



Fig. No. 17: Reverse

Accessesion No.	-	STP – 16
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.500 kilogram
Size (LxWxT)	-	22.1x9.7x1 cm
Description	-	It is a flat axe (fig. 17) with rounded corners.



Obverse



Fig. No. 18: Reverse

Accessesion No.	-	STP – 17
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.560 kilogram
Size (LxWxT)	-	21.8x9.5x1.1 cm
Description	-	It is a flat axe (fig. 18) with rounded corners.



Obverse



Fig. No. 19: Reverse

Accessesion No.	-	STP – 18
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.473 kilogram
Size (LxWxT)	-	22.1x9.6x0.9 cm
Description	-	It is a flat axe (fig. 18) with rounded corners.



Obverse



Fig. No. 20: Reverse

Accessesion No.	-	STP – 19
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.509 kilogram
Size (LxWxT)	-	21.8x9.5x0.9 cm
Description	-	It is a flat axe (fig. 19) with rounded corners.



Obverse



Fig. No. 21: Reverse

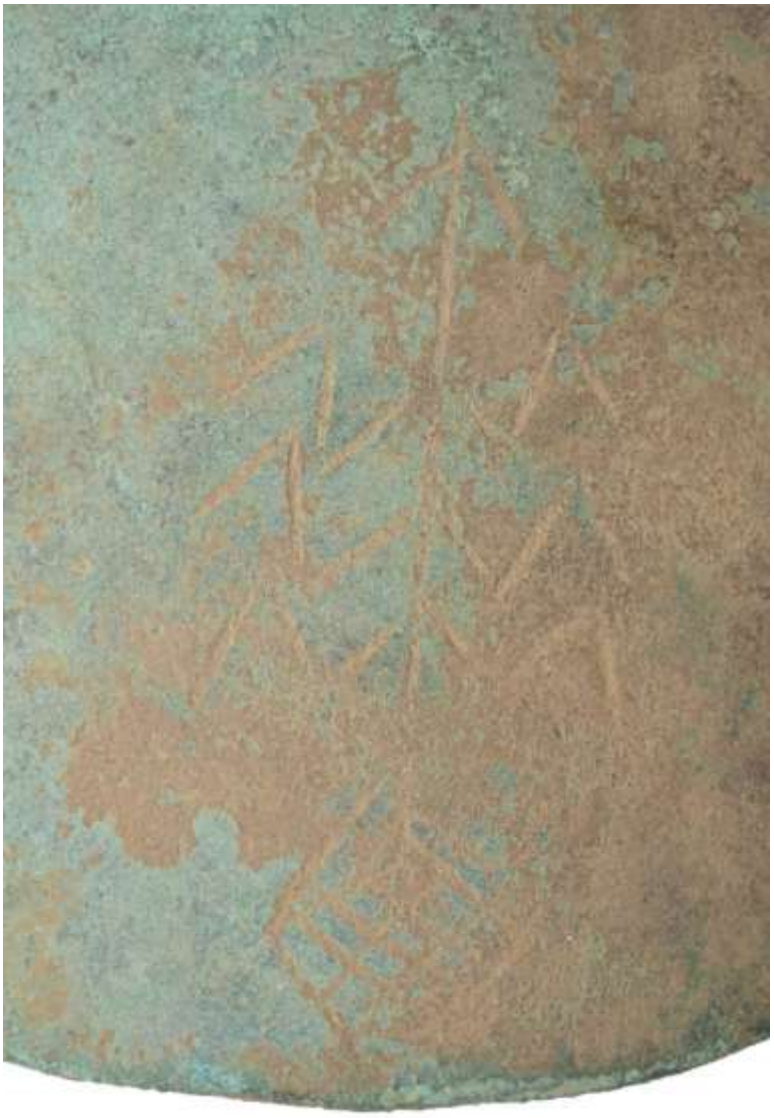


Fig. No. 22: Tree in a railing

Accessesion No.	-	STP – 20
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.337 kilogram
Size (LxWxT)	-	21x9.6x0.8 cm
Description	-	It is a flat axe (fig. 21 & 22) with rounded corners with a tree in a railing.



Obverse



Fig. No. 23: Reverse

Accessesion No.	-	STP – 21
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.197 kilogram
Size (LxWxT)	-	19x10x0.9 cm
Description	-	It is a flat axe (fig. 23) with rounded corners.



Obverse



Fig. No. 24: Reverse

Accessesion No.	-	STP – 22
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.517 kilogram
Size (LxWxT)	-	22.5x9.8x0.9 cm
Description	-	It is a flat axe (fig. 24) with rounded corners.



Obverse



Fig. No. 25: Reverse

Accessesion No.	-	STP – 23
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.961 kilogram
Size (LxWxT)	-	18.2x10x.05 cm
Description	-	It is a flat axe (fig. 25) with rounded corners.



Obverse



Fig. No. 26: Reverse

Accessesion No.	-	STP – 24
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.073 kilogram
Size (LxWxT)	-	16.4x9.7x0.4 cm
Description	-	It is a flat axe (fig. 26).



Obverse



Fig. No. 27: Reverse

Accessesion No.	-	STP - 25
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.965 kilogram
Size (LxWxT)	-	19.3x10x0.8 mcm
Description	-	It is a flat axe (fig. 27).



Obverse



Fig. No. 28: Reverse

Accessesion No.	-	STP – 26
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.713 kilogram
Size (LxWxT)	-	17.1x9.8x0.6 cm
Description	-	It is a flat axe (fig. 28).



Obverse



Fig. No. 29: Reverse

Accessesion No.	-	STP – 27
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.504 kilogram
Size (LxWxT)	-	22.4x11x0.7 cm
Description	-	It is a flat axe (fig. 29) with rounded corners.



Obverse



Fig. No. 30: Reverse



Fig. No. 31: Round Impressions

Accessesion No.	-	STP – 28
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.508 kilogram
Size (LxWxT)	-	21.7x9.7x0.7 cm
Description	-	It is a flat axe (fig. 30 & 31) with rounded impressions five in number.



Obverse



Fig. No. 32: Reverse

Accessesion No.	-	STP – 29
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.215 kilogram
Size (LxWxT)	-	2.13x9.4x1 cm
Description	-	It is a flat axe (fig. 32) with rounded corners.



Obverse



Fig. No. 33: Reverse

Accessesion No.	-	STP – 30
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.202 kilogram
Size (LxWxT)	-	1.9x9.8x0.7 cm
Description	-	It is a flat axe (fig. 33).



Obverse



Fig. No. 34: Reverse

Accessesion No.	-	STP – 31
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.082 kilogram
Size (LxWxT)	-	21x10x0.6 cm
Description	-	It is a flat axe (fig. 34).



Obverse



Fig. No. 35: Reverse

Accessesion No.	-	STP – 32
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.044 kilogram
Size (LxWxT)	-	19.3x9.8x0.6 cm
Description	-	It is a flat axe (fig. 35).



Obverse



Fig. No. 36: Reverse

Accessesion No.	-	STP – 33
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.121 kilogram
Size (LxWxT)	-	20x19.8x0.4 cm
Description	-	It is a flat axe (fig. 36).



Obverse



Fig. No. 37: Reverse

Accessesion No.	-	STP – 34
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.650 kilogram
Size (LxWxT)	-	16x9.7x0.7 cm
Description	-	It is a flat axe (fig. 37).



Obverse



Fig. No. 38: Reverse

Accessesion No.	-	STP – 35
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.092 kilogram
Size (LxWxT)	-	19.5x9.6x0.6 cm
Description	-	It is a flat axe (fig. 38).



Obverse



Fig. No. 39: Reverse

Accessesion No.	-	STP – 36
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.471 kilogram
Size (LxWxT)	-	22x9.9x1 cm
Description	-	It is a flat axe (fig. 39) with rounded corners.



Obverse



Fig. No. 40: Reverse

Accessesion No.	-	STP – 37
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.451 kilogram
Size (LxWxT)	-	22x9.7x0.8 cm
Description	-	It is a flat axe (fig. 40) with rounded corners.



Obverse

Fig. No. 41: Reverse

Accessesion No.	-	STP – 38
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.480 kilogram
Size (LxWxT)	-	22.9x10.1x0.9 cm
Description	-	It is a flat axe (fig. 41) with rounded corners.



Obverse



Fig. No. 42: Reverse

Accessesion No.	-	STP – 39
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.421 kilogram
Size (LxWxT)	-	21.3x9.4x1.1cm
Description	-	It is a flat axe (fig. 42) with rounded corners.



Obverse



Fig. No. 43: Reverse

Accessesion No.	-	STP – 40
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.319 kilogram
Size (LxWxT)	-	19.8x10.1x0.5 cm
Description	-	It is a flat axe (fig. 43) with rounded corners.



Obverse



Fig. No. 44: Reverse

Accessesion No.	-	STP – 41
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.780 kilogram
Size (LxWxT)	-	8.2x9.7x0.4 cm
Description	-	It is a flat axe (fig. 44) with rounded corners.



Obverse



Fig. No. 45: Reverse

Accessesion No.	-	STP – 42
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.446 kilogram
Size (LxWxT)	-	21.3x10x0.9 cm
Description	-	It is a flat axe (fig. 45) with rounded corners.



Obverse



Fig. No. 46: Reverse

Accessesion No.	-	STP – 43
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.204 kilogram
Size (LxWxT)	-	18.9x9.9x0.4 cm
Description	-	It is a flat axe (fig. 46).



Obverse



Fig. No. 47: Round Corners & tree in a railing



Fig. No. 48: Reverse

Accessesion No.	-	STP – 44
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.415 kilogram
Size (LxWxT)	-	21.9x9.4x0.9 cm
Description	-	It is a flat axe (fig. 47 & 48) with rounded corners and a tree in a railing.



Obverse



Fig. No. 49: Reverse

Accessesion No.	-	STP – 45
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.403 kilogram
Size (LxWxT)	-	21x9.2x1 cm
Description	-	It is a flat axe (fig. 49) with round corners.



Obverse



Fig. No. 50: Reverse

Accessesion No.	-	STP – 46
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.745 kilogram
Size (LxWxT)	-	19.3x8.1x0.6 cm
Description	-	It is a flat axe (fig. 50) with round corners.



Obverse



Fig. No. 51: Reverse

Accessesion No.	-	STP – 47
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.521 kilogram
Size (LxWxT)	-	21.9x9.2x1.1 cm
Description	-	It is a flat axe (fig. 51) with round corners.



Obverse



Fig. No. 52: Reverse

Accessesion No.	-	STP – 48
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.955 kilogram
Size (LxWxT)	-	8.2x10x0.6 cm
Description	-	It is a flat axe (fig. 52).



Obverse



Fig. No. 53: Reverse

Accessesion No.	-	STP – 49
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.830 kilogram
Size (LxWxT)	-	17.9x9.8x0.4 cm
Description	-	It is a flat axe (fig. 53).



Obverse



Fig. No. 54: Reverse

Accessesion No.	-	STP – 50
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.131 kilogram
Size (LxWxT)	-	18.4x10.1x0.7 cm
Description	-	It is a flat axe (fig. 54).



Obverse

Fig. No. 55: Reverse

Accessesion No.	-	STP – 51
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.411 kilogram
Size (LxWxT)	-	21.3x10x0.7 cm
Description	-	It is a flat axe (fig. 55) with round corners.



Obverse



Fig. No. 56: Reverse

Accessesion No.	-	STP – 52
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.014 kilogram
Size (LxWxT)	-	20x11.5x0.5 cm
Description	-	It is a flat axe (fig. 56).



Obverse



Fig. No. 57: Reverse

Accessesion No.	-	STP – 53
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.687 kilogram
Size (LxWxT)	-	20x12x0.3 cm
Description	-	It is a flat axe (fig. 57).



Obverse



Fig. No. 58: Reverse

Accessesion No.	-	STP – 54
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.840 kilogram
Size (LxWxT)	-	19x10.3x0.5 cm
Description	-	It is a flat axe (fig. 58).



Obverse



Fig. No. 59: Reverse

Accessesion No.	-	STP – 55
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.844 kilogram
Size (LxWxT)	-	20.1x11x0.3 cm
Description	-	It is a flat axe (fig. 59).



Obverse



Fig. No. 60: Reverse

Accessesion No.	-	STP – 56
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.560 kilogram
Size (LxWxT)	-	19.2x11.3x0.9 cm
Description	-	It is a flat axe (fig. 60).



Obverse



Fig. No. 61: Kettle-drum symbol



Fig. No. 62: Reverse

Accessesion No.	-	STP – 57
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.804 kilogram
Size (LxWxT)	-	22.1x9.2x1.1 cm
Description	-	It is a flat axe (fig. 61 & 62) engraved with kettle-drum symbol.



Obverse



Fig. No. 63: Reverse

Accessesion No.	-	STP – 58
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.783 kilogram
Size (LxWxT)	-	19.2x10.4x0.4 cm
Description	-	It is a flat axe (fig. 63).



Obverse



Fig. No. 64: Reverse

Accessesion No.	-	STP – 59
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.885 kilogram
Size (LxWxT)	-	18.5x11.1x0.5 cm
Description	-	It is a flat axe (fig. 64).



Obverse



Fig. No. 65: Reverse

Accessesion No.	-	STP – 60
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.710 kilogram
Size (LxWxT)	-	19x11.8x0.4 cm
Description	-	It is a flat axe (fig. 65).



Obverse



Fig. No. 66: Reverse

Accessesion No.	-	STP – 61
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.780 kilogram
Size (LxWxT)	-	19.7x10.6x0.4 cm
Description	-	It is a flat axe (fig. 66).



Obverse



Fig. No. 67: Reverse

Accessesion No.	-	STP – 62
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.859 kilogram
Size (LxWxT)	-	19.2x11.5x0.5 cm
Description	-	It is a flat axe (fig. 67).



Obverse



Fig. No. 68: Reverse

Accessesion No.	-	STP – 63
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.917 kilogram
Size (LxWxT)	-	17.1x13.5x0.6 cm
Description	-	It is a shouldered axe (fig. 68).



Obverse



Fig. No. 69: Reverse

Accessesion No.	-	STP – 64
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.580 kilogram
Size (LxWxT)	-	12.5x13.2x0.3 cm
Description	-	It is a shouldered axe (fig. 69).



Obverse



Fig. No. 70: Reverse

Accessesion No.	-	STP – 65
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.887 kilogram
Size (LxWxT)	-	16.7x13.1x0.7 cm
Description	-	It is a shouldered axe (fig. 70).



Obverse



Fig. No. 71: Reverse

Accessesion No.	-	STP – 66
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.860 kilogram
Size (LxWxT)	-	16.5x10.6x0.2 cm
Description	-	It is a flat axe (fig. 71) with round corners.



Obverse



Fig. No. 72: Reverse

Accessesion No.	-	STP – 67
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.958 kilogram
Size (LxWxT)	-	16x12.3x0.8 cm
Description	-	It is a shouldered axe (fig. 72).



Obverse



Fig. No. 73: Reverse

Accessesion No.	-	STP – 68
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.749 kilogram
Size (LxWxT)	-	17.6x10x0.1 cm
Description	-	It is a flat axe (fig. 73).



Obverse



Fig. No. 74: Reverse

Accessesion No.	-	STP – 69
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.216 kilogram
Size (LxWxT)	-	19.8x11.5x0.7 cm
Description	-	It is a flat axe (fig. 74) with round corners.



Obverse



Fig. No. 75: Reverse

Accessesion No.	-	STP – 70
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.642 kilogram
Size (LxWxT)	-	17.2x11.6x0.6 cm
Description	-	It is a flat axe (fig. 75) with round corners.



Obverse



Fig. No. 76: Reverse

Accessesion No.	-	STP – 71
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.222 kilogram
Size (LxWxT)	-	15x11.4x0.1 cm
Description	-	It is a lugged shouldered axe (fig. 76).



Obverse



Fig. No. 77: Reverse

Accessesion No.	-	STP – 72
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.023 kilogram
Size (LxWxT)	-	21x10x0.6 cm
Description	-	It is a flat axe (fig. 77).



Obverse



Fig. No. 78: Reverse

Accessesion No.	-	STP – 73
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.154 kilogram
Size (LxWxT)	-	22.5x8.5x0.8 cm
Description	-	It is a flat axe (fig. 78) with rounded corners.



Obverse



Fig. No. 79: Reverse

Accessesion No.	-	STP – 74
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.259 kilogram
Size (LxWxT)	-	23.4x9x0.5 cm
Description	-	It is a flat axe (fig. 79) with round corners.



Obverse



Fig. No. 80: Reverse

Accessesion No.	-	STP – 75
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.323 kilogram
Size (LxWxT)	-	23x9x0.6 cm
Description	-	It is a flat axe (fig. 80) with round corners.



Obverse

Fig. No. 81: Reverse

Accessesion No.	-	STP – 76
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.799 kilogram
Size (LxWxT)	-	21.3x8.1x0.3 cm
Description	-	It is a flat axe (fig. 81) with round corners.



Obverse



Fig. No. 82: Reverse

Accessesion No.	-	STP – 77
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.242 kilogram
Size (LxWxT)	-	23.9x11.2x0.6 cm
Description	-	It is a flat axe (fig. 82) with round corners.



Obverse



Fig. No. 83: Reverse

Accessesion No.	-	STP – 78
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.854 kilogram
Size (LxWxT)	-	16x8.3x0.5 cm
Description	-	It is a flat axe (fig. 83) with round corners.



Obverse



Fig. No. 84: Reverse

Accessesion No.	-	STP – 79
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.955 kilogram
Size (LxWxT)	-	18.2x9.2x0.7 cm
Description	-	It is a flat axe (fig. 84) with round corners.



Obverse



Fig. No. 85: Reverse

Accessesion No.	-	STP – 80
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.036 kilogram
Size (LxWxT)	-	22.2x9.5x0.6 cm
Description	-	It is a flat axe (fig. 85) with round corners.



Obverse



Fig. No. 86: Reverse

Accessesion No.	-	STP – 81
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.408 kilogram
Size (LxWxT)	-	10.3x6.1x0.6 cm
Description	-	It is a flat axe (fig. 86) with round corners.



Obverse



Fig. No. 87: Reverse

Accessesion No.	-	STP – 82
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.640 kilogram
Size (LxWxT)	-	11.9x10.2x0.5 cm
Description	-	It is a shouldered axe (fig. 87).



Obverse



Fig. No. 88: Reverse

Accessesion No.	-	STP – 83
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.568 kilogram
Size (LxWxT)	-	12.4x9x0.6 cm
Description	-	It is a lugged shouldered axe (fig. 88).



Obverse



Fig. No. 89: Reverse

Accessesion No.	-	STP – 84
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.791 kilogram
Size (LxWxT)	-	12.5x10.2x0.5 cm
Description	-	It is a shouldered axe (fig. 89).



Obverse



Fig. No. 90: Reverse

Accessesion No.	-	STP – 85
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.757 kilogram
Size (LxWxT)	-	15.5x11.3x0.3 cm
Description	-	It is a flat celt (fig. 90) with round corners.



Obverse



Fig. No. 91: Reverse

Accessesion No.	-	STP – 86
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.821 kilogram
Size (LxWxT)	-	15.5x11x0.4 cm
Description	-	It is a flat celt (fig. 91) with round corners.

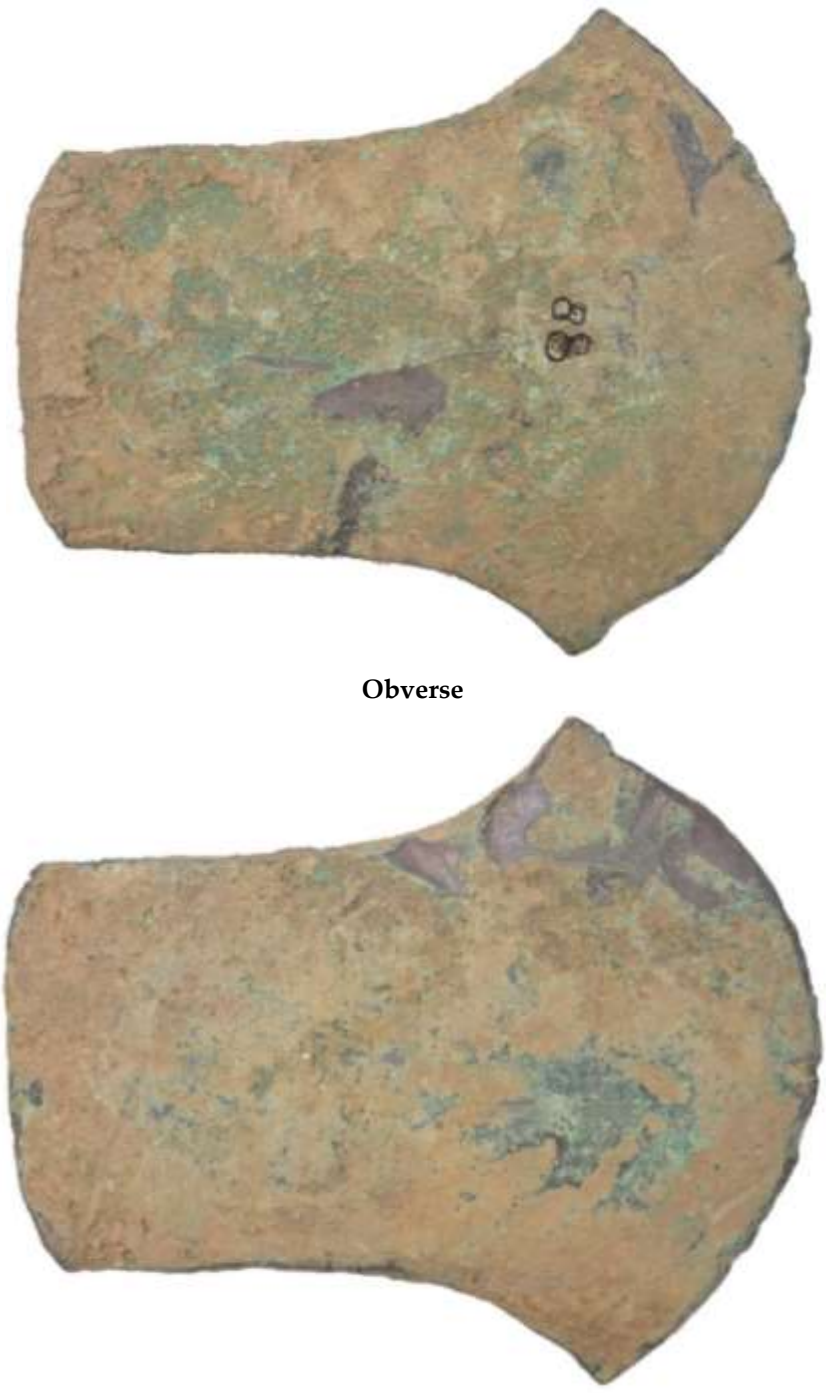


Obverse



Fig. No. 92: Reverse

Accessesion No.	-	STP – 87
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.475 kilogram
Size (LxWxT)	-	13.5x9.9x0.1 cm
Description	-	It is a flat celt (fig. 92) with round corners.



Obverse

Fig. No. 93: Reverse

Accessesion No.	-	STP – 88
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.806 kilogram
Size (LxWxT)	-	13.7x11.5x0.9 cm
Description	-	It is a shouldered axe (fig. 93).



Obverse



Fig. No. 94: Reverse

Accessesion No.	-	STP – 89
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.754 kilogram
Size (LxWxT)	-	13.2x19.6x0.6 cm
Description	-	It is a shouldered axe (fig. 94).



Obverse



Fig. No. 95: Reverse

Accessesion No.	-	STP – 90
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.760 kilogram
Size (LxWxT)	-	21x13.2x1 cm
Description	-	It is a shouldered axe (fig. 95).



Obverse



Fig. No. 96: Reverse

Accessesion No.	-	STP – 91
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.451 kilogram
Size (LxWxT)	-	19x12x0.5 cm
Description	-	It is a flat axe (fig. 96) with round corners.



Obverse



Fig. No. 97: Reverse

Accessesion No.	-	STP – 92
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.297 kilogram
Size (LxWxT)	-	20x14x0.4 cm
Description	-	It is a shouldered axe (fig. 97).



Obverse

Reverse

Fig. No. 98: Reverse

Accessesion No.	-	STP – 93
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.312 kilogram
Size (LxWxT)	-	20.1x14x0.5 cm
Description	-	It is a shouldered axe (fig. 98).



Obverse



Fig. No. 99: Reverse

Accessesion No.	-	STP – 94
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.616 kilogram
Size (LxWxT)	-	13.5x9.5x0.5 cm
Description	-	It is a shouldered axe (fig. 99).



Obverse



Fig. No. 100: Reverse

Accessesion No.	-	STP – 95
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.159 kilogram
Size (LxWxT)	-	10x7.6x0.1 cm
Description	-	It is a lugged shouldered axe (fig. 100).



Obverse

Fig. No. 101: Reverse

Accessesion No.	-	STP – 96
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.226 kilogram
Size (LxWxT)	-	17x4.4x0.1 cm
Description	-	It is a *khanti* (fig. 101).



Obverse



Fig. No. 102: Reverse

Accessesion No.	-	STP – 97
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.185 kilogram
Size (LxWxT)	-	13.5x3x0.5 cm
Description	-	It is a chisel (fig. 102).



Obverse



Fig. No. 103: Reverse

Accessesion No.	-	STP – 98
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.058 kilogram
Size (LxWxT)	-	9.6x4x0.1 cm
Description	-	It is a *khanti* (fig. 103).



Obverse

Fig. No. 104: Reverse

Accessesion No.	-	STP – 99
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.194 kilogram
Size (LxWxT)	-	17.1x11x0.4 cm
Description	-	It is a chisel (fig. 104).

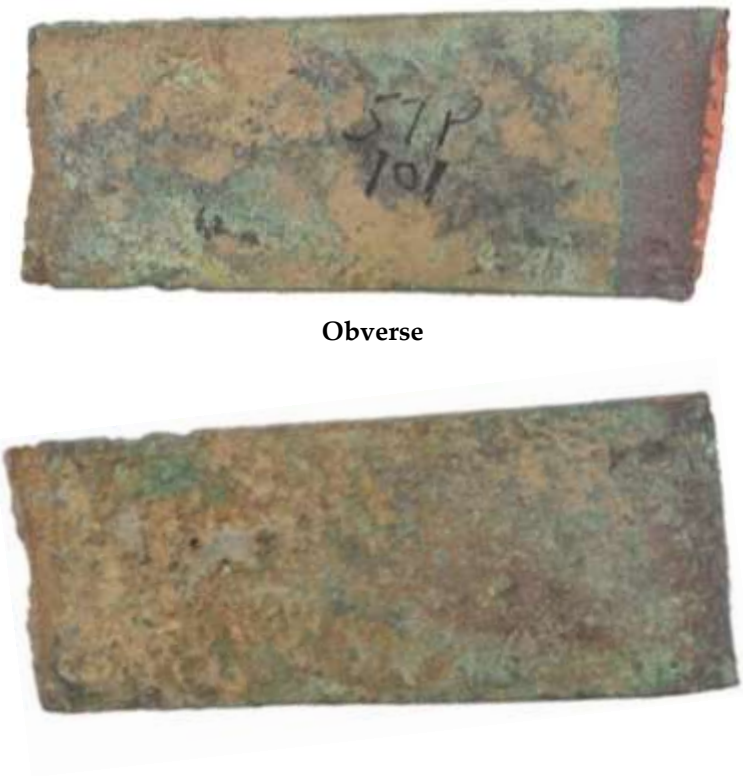


Obverse

Reverse

Fig. No. 105:

Accessesion No.	-	STP – 100
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.086 kilogram
Size (LxWxT)	-	13.1x5x0.1 cm
Description	-	It is a *khanti* (fig. 105).



Obverse

Fig. No. 106 Reverse

Accessesion No.	-	STP – 101
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.043 kilogram
Size (LxWxT)	-	2.9x3.2x0.2 cm
Description	-	It is pieces of *khanti* (fig. 106).



Obverse

Fig. No. 107: Reverse

Accessesion No.	-	STP – 102
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.063 kilogram
Size (LxWxT)	-	15.2x1.5x0.3 cm
Description	-	It is a chisel (fig. 107).



Obverse



Fig. No. 108: Reverse

Accessesion No.	-	STP – 103
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	1.564 kilogram
Size (LxWxT)	-	18.2x12.5x0.5 cm
Description	-	It is a flat axe (fig. 108).



Obverse



Fig. No. 109: Reverse

Accessesion No.	-	STP – 104
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.099 kilogram
Size (LxWxT)	-	8x4.9x0.2 cm
Description	-	It is a flat axe (fig. 109).



Obverse



Fig. No. 110: Reverse

Accessesion No.	-	STP – 105
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.044 kilogram
Size (LxWxT)	-	8.5x3.5x0.1 cm
Description	-	It is a flat axe (fig. 110).



Obverse



Fig. No. 111: Reverse

Accessesion No.	-	STP – 106
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.111 kilogram
Size (LxWxT)	-	9.7x5.3x0.1 cm
Description	-	It is a flat axe (fig. 111) with rounded corners.



Obverse



Fig. No. 112: Reverse

Accessesion No.	-	STP – 107
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.096 kilogram
Size (LxWxT)	-	9.5x3.1x0.3 cm
Description	-	It is a *khanti* (fig. 112).



Obverse



Fig. No. 113: Reverse

Accessesion No.	-	STP – 108
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.097 kilogram
Size (LxWxT)	-	10.4x4.2x0.1 cm
Description	-	It is a *khanti* (fig. 113).



Obverse



Fig. No. 114: Reverse

Accessesion No.	-	STP – 109
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.182 kilogram
Size (LxWxT)	-	12x4.2x0.2 cm
Description	-	It is a *khanti* (fig. 114).



Obverse

Fig. No. 115: Reverse

Accessesion No.	-	STP – 110
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.036 kilogram
Size (LxWxT)	-	10.5x4.2x0.1 cm
Description	-	It is an elongated shaped piece of copper (fig. 115).



Obverse



Fig. No. 116: Reverse

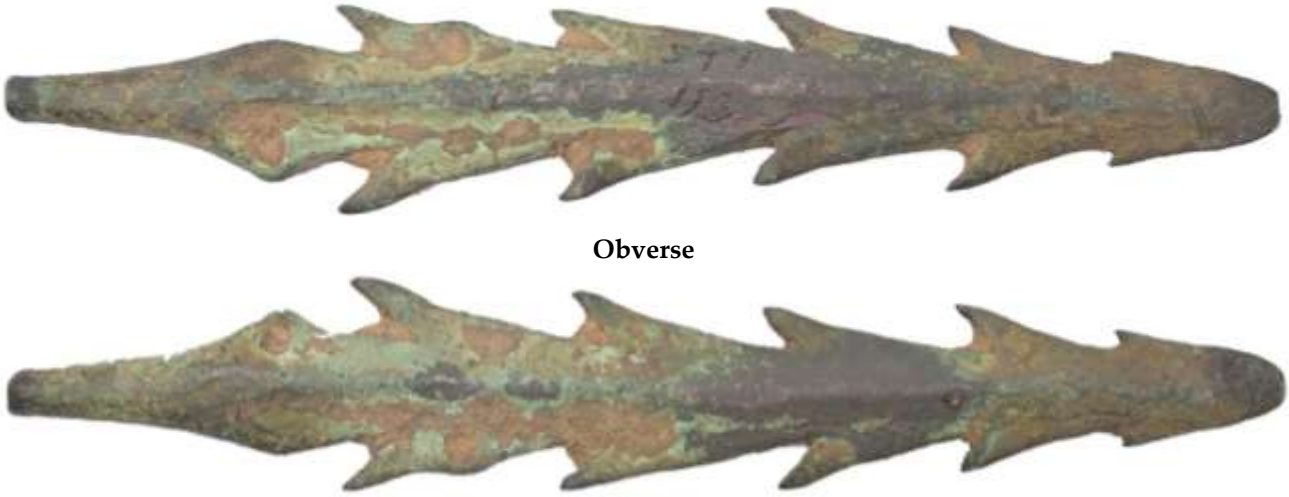
Accessesion No.	-	STP – 111
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.124 kilogram
Size (LxWxT)	-	8.5x4.3x0.3 cm
Description	-	It is a flat axe (fig. 116).



Obverse

Fig. No. 117: Reverse

Accessesion No.	-	STP – 112
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.178 kilogram
Size (LxWxT)	-	15.1x3.9x0.2 cm
Description	-	It is a bar celt (fig. 117).



Obverse

Fig. No. 118: Reverse

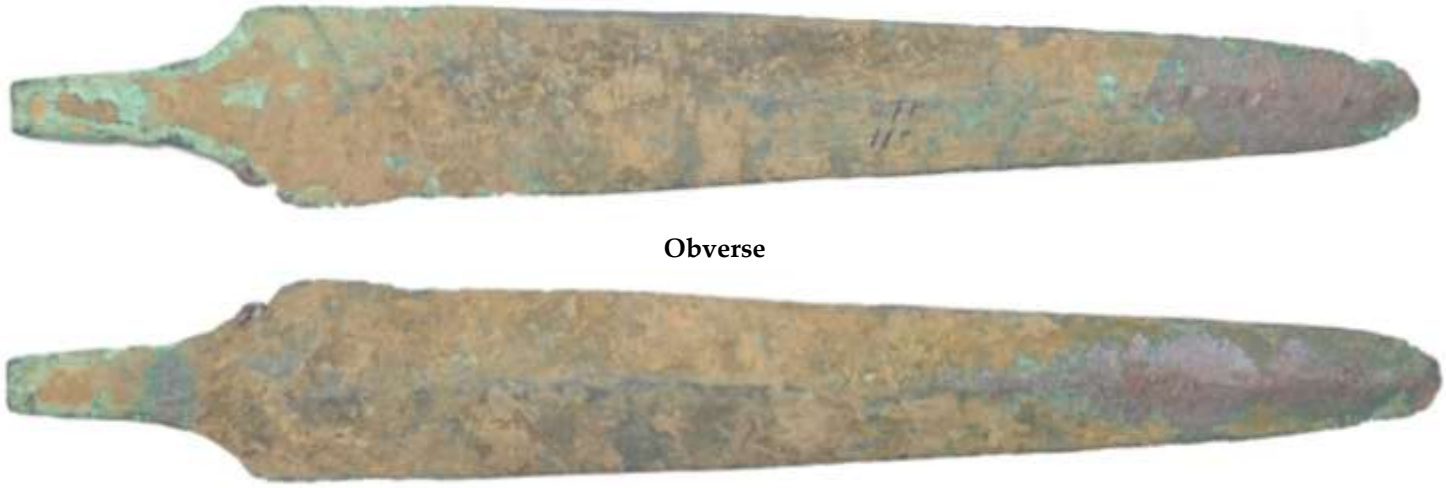
Accessesion No.	-	STP – 113
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.339 kilogram
Size (LxWxT)	-	23.1x2.5x1.4 cm
Description	-	It is a barbed harpoon (fig. 118).



Obverse

Fig. No. 119: Reverse

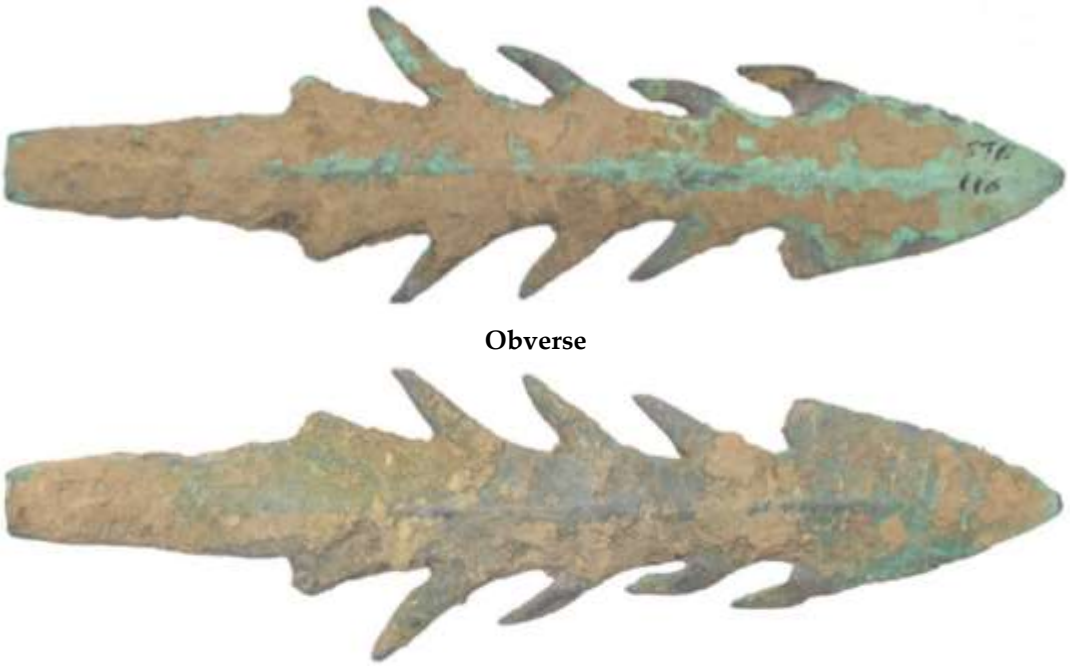
Accessesion No.	-	STP – 114
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.279 kilogram
Size (LxWxT)	-	25x4x0.9 cm
Description	-	It is a barbed harpoon (fig. 119).



Obverse

Fig. No. 120: Reverse

Accessesion No.	-	STP – 115
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.772 kilogram
Size (LxWxT)	-	38.5x5.5x0.1 cm
Description	-	It is a sword (fig. 120).



Obverse

Fig. No. 121: Reverse

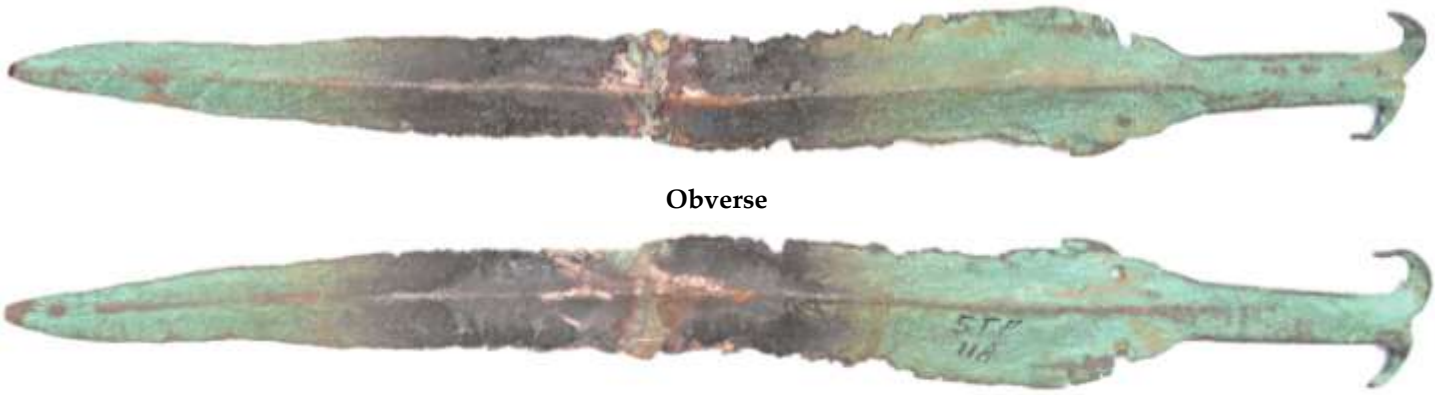
Accessesion No.	-	STP – 116
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.325 kilogram
Size (LxWxT)	-	24x6.8x0.3 cm
Description	-	It is a harpoon (fig. 121).



Obverse

Fig. No. 122: Reverse

Accessesion No.	-	STP – 117
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.431 kilogram
Size (LxWxT)	-	36x6x0.1 cm
Description	-	It is a piece of a sword (fig. 122).



Obverse

Fig. No. 123: Reverse

Accessesion No.	-	STP – 118
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.403 kilogram
Size (LxWxT)	-	45.2x5x0.1 cm
Description	-	It is an antennae sword (fig. 123).



Obverse

Fig. No. 124: Reverse

Accessesion No.	-	STP – 119
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.850 kilogram
Size (LxWxT)	-	34x4.3x0.7 cm
Description	-	It is a bar celt (fig. 124).



Obverse



Fig. No. 125: Reverse

Accessesion No.	-	STP – 120
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.526 kilogram
Size (LxWxT)	-	25.1x5.6x0.3 cm
Description	-	It is a *khanti* (fig. 125).



Obverse



Fig. No. 126: Reverse

Accessesion No.	-	STP – 121
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.135 kilogram
Size (LxWxT)	-	14.1x2.1x0.4 cm
Description	-	It is a hilt of an antennae sword (fig. 126).



Obverse



Fig. No. 127: Reverse

Accessesion No.	-	STP – 122
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.684 kilogram
Size (LxWxT)	-	26x7x1.7 cm
Description	-	It is a barbed harpoon (fig. 127).

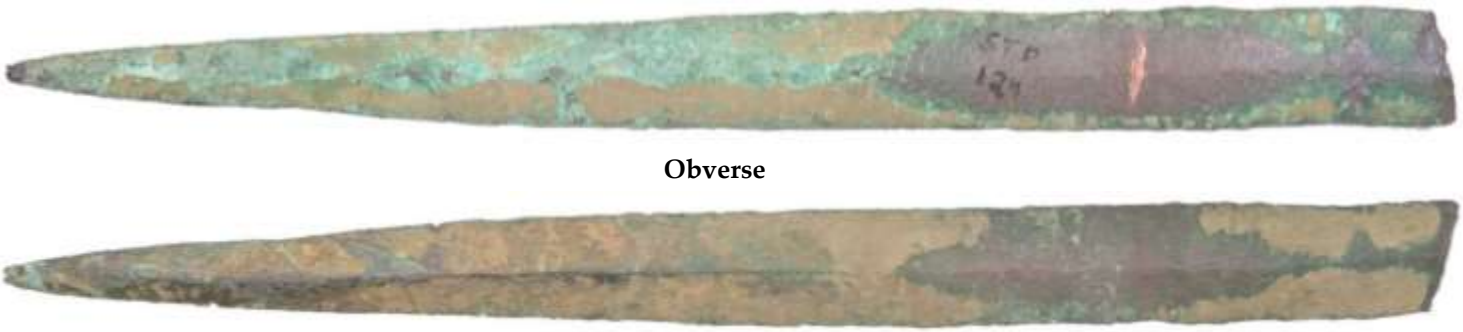


Obverse

Reverse

Fig. No. 128:

Accessesion No. - STP – 123
Provenance - *Sitapur* district *Sitapur U.P.*
Weight - 0.456 kilogram
Size (LxWxT) - 30x5x0.1 cm
Description - It is a broken sword (fig. 128).

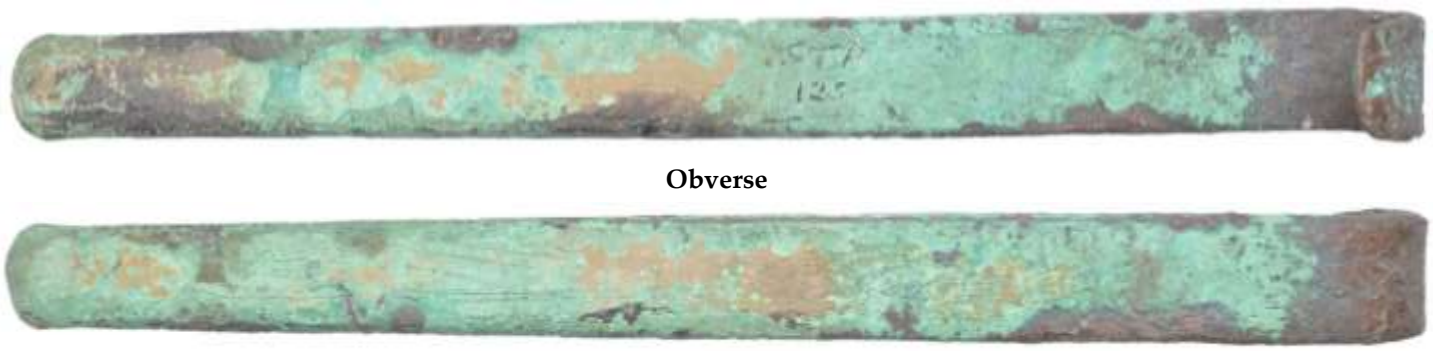


Obverse

Reverse

Fig. No. 129:

Accessesion No. - STP – 124
Provenance - *Sitapur* district *Sitapur U.P.*
Weight - 0.364 kilogram
Size (LxWxT) - 39.9x4x0.1 m
Description - It is a broken sword (fig. 129).



Obverse

Fig. No. 130: Reverse

Accessesion No.	-	STP – 125
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.754 kilogram
Size (LxWxT)	-	32.3x3x0.1 cm
Description	-	It is a bar celt (fig. 130).



Obverse

Fig. No. 131: Reverse

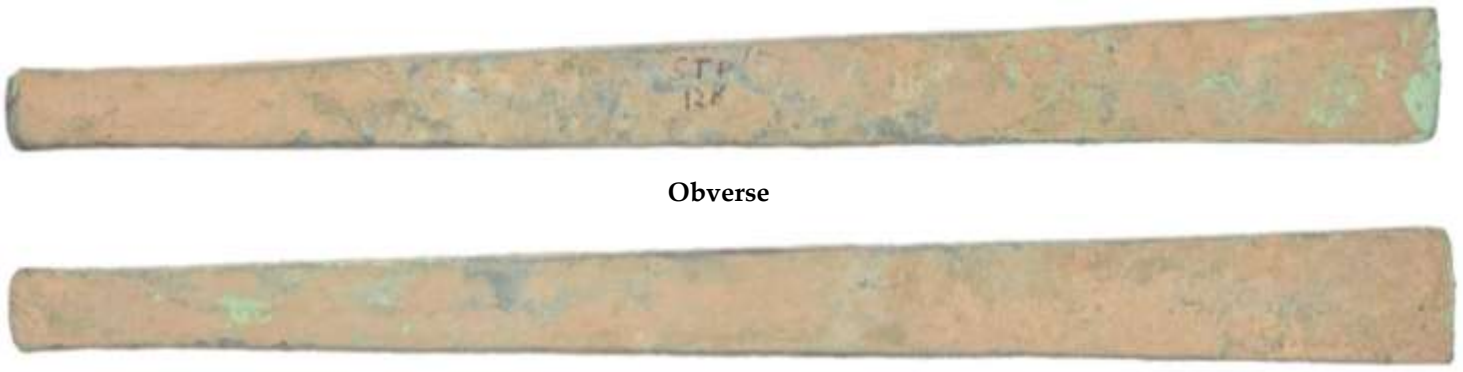
Accessesion No.	-	STP – 126
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.832 kilogram
Size (LxWxT)	-	34x3x1.1 cm
Description	-	It is a bar celt (fig. 131).



Obverse

Fig. No. 132: Reverse

Accessesion No.	-	STP – 127
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.323 kilogram
Size (LxWxT)	-	24.9x6x0.2 cm
Description	-	It is a flat celt (fig. 132).



Obverse

Fig. No. 133: Reverse

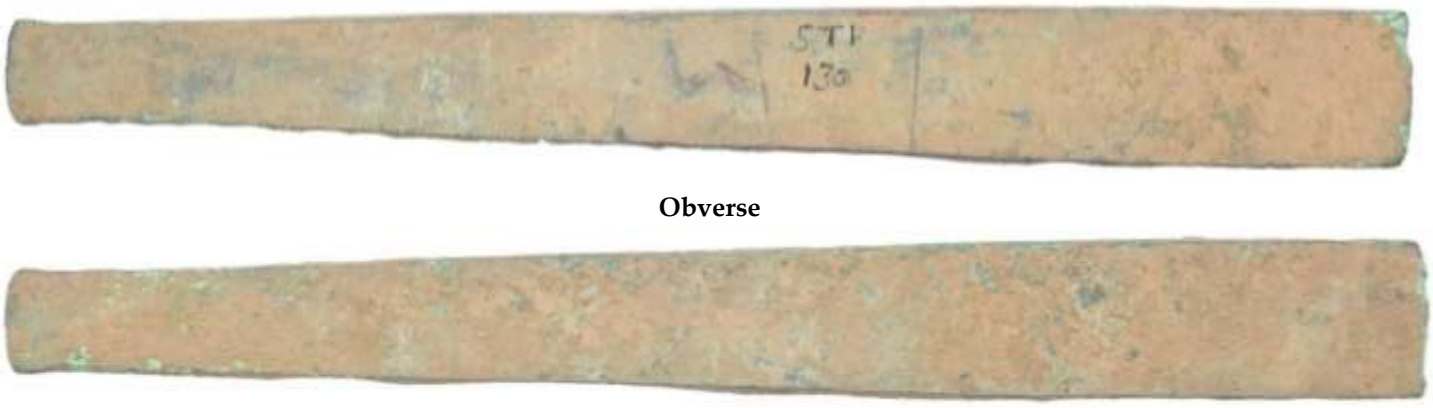
Accessesion No.	-	STP – 128
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.565 kilogram
Size (LxWxT)	-	34.2x3.1x0.8 cm
Description	-	It is a chisel (fig. 133).



Obverse

Fig. No. 134: Reverse

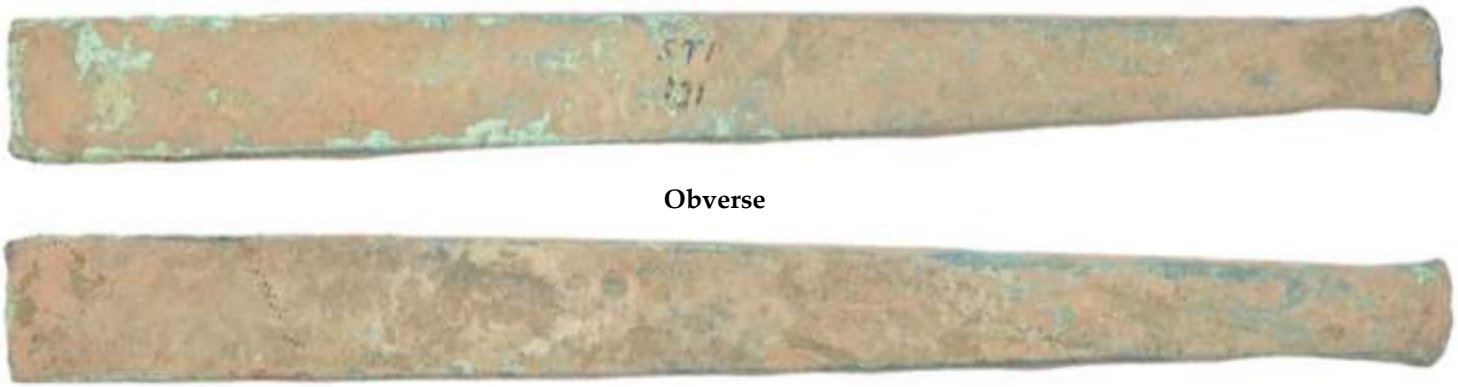
Accessesion No.	-	STP – 129
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.604 kilogram
Size (LxWxT)	-	34.3x3x0.9 cm
Description	-	It is a chisel (fig. 134).



Obverse

Fig. No. 135: Reverse

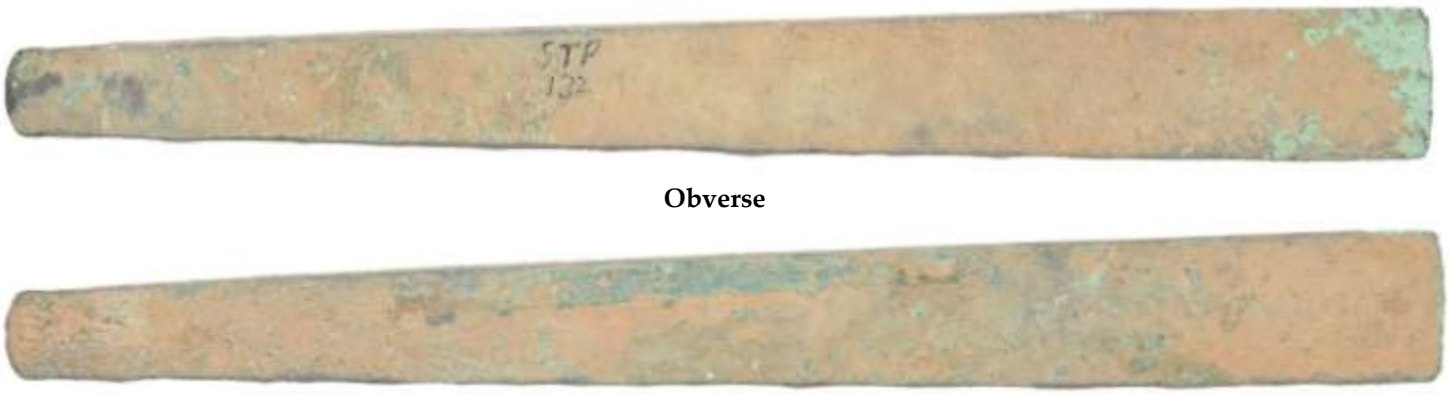
Accessesion No.	-	STP – 130
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.533 kilogram
Size (LxWxT)	-	28.2x3x0.7 cm
Description	-	It is a chisel (fig. 135).



Obverse

Fig. No. 136: Reverse

Accessesion No.	-	STP – 131
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.650 kilogram
Size (LxWxT)	-	32x3.7x0.7 cm
Description	-	It is a chisel (fig. 136).



Obverse

Fig. No. 137: Reverse

Accessesion No.	-	STP – 132
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.530 kilogram
Size (LxWxT)	-	26.5x3.5x0.5 cm
Description	-	It is a chisel (fig. 137).



Obverse

Reverse

Fig. No. 138:

Accessesion No.	-	STP – 133
Provenance	-	*Sitapur* district *Sitapur U.P.*
Weight	-	0.477 kilogram
Size (LxWxT)	-	11.6x11 cm
Description	-	It is a thick peg (fig. 138) like bent nail.

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Geoarchaeological investigations around the Porpanai Fort using Ground Magnetic Survey

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Introduction: Geo-archaeology describes the application of the geosciences to solve research problems in archaeology. The interaction between the sciences of geology and archaeology has a long and honorable history where geology and archaeology developed in parallel. In archaeology, almost all its basic data recovered by excavation and every archaeological problem starts as a problem in geo-archaeology'.

Many archaeological structures, features, and artifacts can be detected with a magnetometer because the iron that they contain has been changed to a very magnetic form by some cultural process. In the field archaeology, some objects are easily detectable because they have been moved from their natural location by humans; this movement can result in an artificial concentration or depletion of magnetic materials: Examples include igneous stones (magnetic) that form the foundation of a building, or non-magnetic stones, such as limestone, in the foundation of a building where the soil is rather magnetic. A ditch that was dug into non-magnetic subsoil, later to be refilled with magnetic topsoil, is another example.

Magnetic survey is usually used in archaeological prospecting to detect features such as buried walls, pottery, bricks, fire pits, buried pathways, tombs, and numerous archaeological objects. These features are detected because they are more magnetic than the host materials. In magnetic field survey, measurement of the total magnetic field (TMF) is widely used; however, the magnetic

gradient is more effective in archaeological prospection. In such challenging cases, the role of geophysical surveys over a small area could be decisive to fill the knowledge gap and explore the buried targets at different depths with sufficient resolution. In addition, information about the location, depth, and dimensions of buried archaeological remains may be determined by means of geophysical investigation, which is carried out easily and quickly on the surface without disturbing or damaging the buried archaeological structures.

Porpanai fort is a well-known archaeological site in Tamil Nadu, India (Fig. 1). The site was assumed to be an industrialized area for making war weapons. In this archaeological site, archaeologists have made an excavation in a very small area. During the investigations, they found evidences of ancient human prehistorical times. Hence, Porpanai fort has been chosen as a study area to manifest the shallow subsurface features and wall structure of the demolished fort over the entire fort regions using ground magnetic surveying.

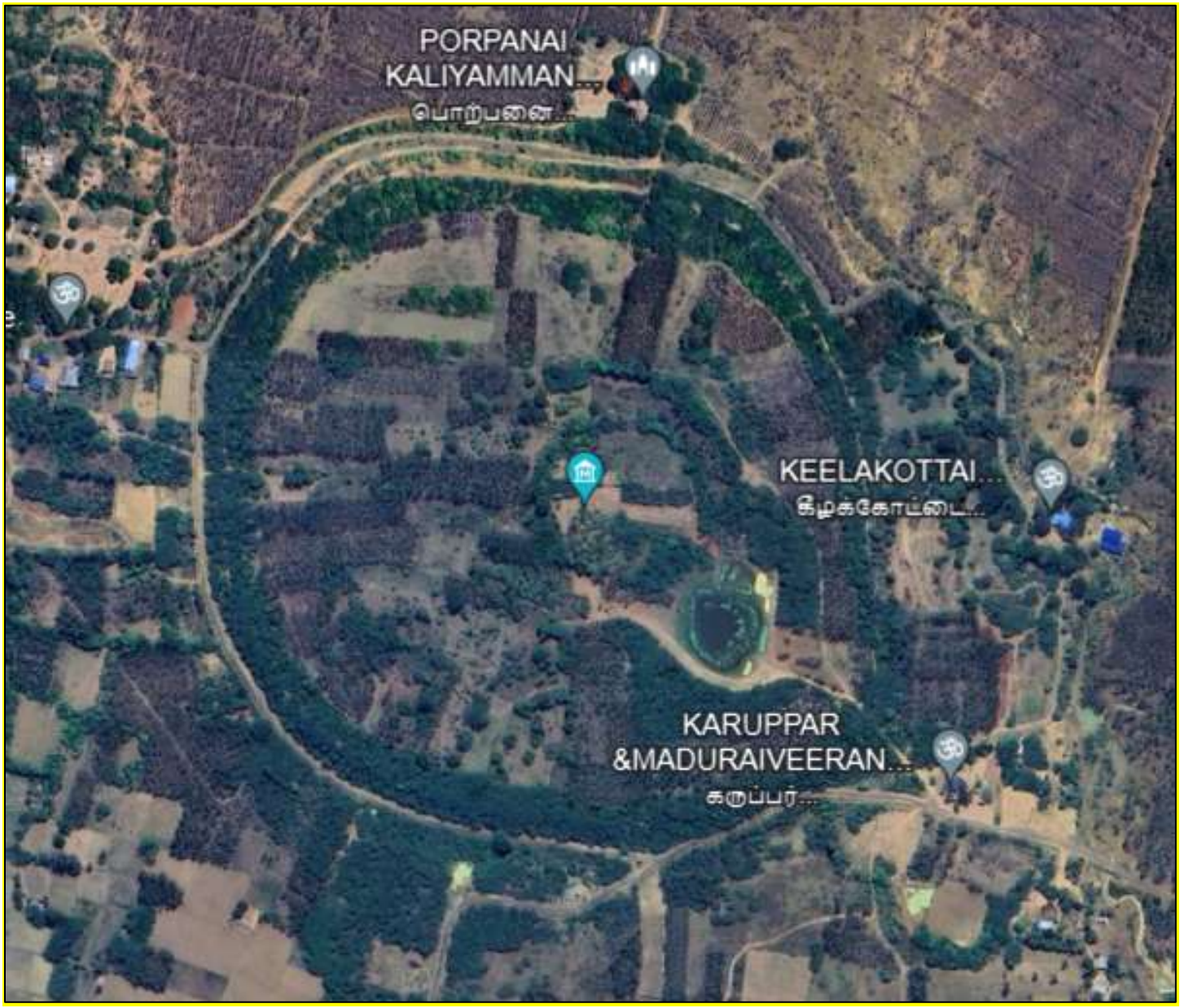


Fig. No. 01: Satellite Imagery of the Porpanaikottai

Geology of the Study area: Geologically the study area comprises Archean to Quaternary period. The entire area can be divided into hard and sedimentary rock regions where the hard rocks are found on the western side and sedimentary formation noticed towards the eastern side. The various types of hard rocks found in Pudukkottai districts are Charnockites, Hornblende Gneiss, Biotite Gneiss, Granite and Quartzite. Quartzite deposits are found in small quantity in some parts of Annavasal, and Thirumayam and Porpannaikottai Blocks. In the Blocks of Kulathur, Thirumayamand parts of Pudukkottai crystalline rocks were noticed. The sedimentary deposits found in this region consist of shaly sandstone, sand,clay and gravels. The sedimentary deposits formed during the Tertiary period consist of laterite, arenaceous and argillaceous sandstone clay. These deposits are found in the Blocks of Arantangi, Gandarvakottai, Alangudi and

Thiruvarankulam. Cretaceous deposits consisting of clay, limestone, sand stone and clayey sand stone are found in some parts of Gandarvakottai, Thirumayam and Pudukkottai. Unconsolidated coastal alluvial deposits consisting of sand gravel and silt are found along the river bed. Silt and clay deposits of Quaternary period are found in the blocks of Avudaiyarkoil and Manalmelkudi. Sand deposits with beach ridges and dunes are identified near the coastal boundary of Pudukkottai District

Near the survey area, ferruginous sandstone occupies all over the tracts of the Porpanai Fort and the development of Laterite was also noticed. The sandstone recorded in this area are belongs to Tertiary epoch. Laterites are economically most important for iron ore deposits similar to bauxite for aluminum ore. Laterites are very strong, hardened varieties and are sometimes cut into blocks and used as brick stones for building houses. This could have been used as wall rock for foundation of *Porpanai kottai.*

Methodology: The main process involve in this study is the collection of magnetic data, pre-processing and preparation of various magnetic maps for interpretation. In the present work, proton precession magnetometer was employed to check the likelihood of the presence of archaeological ruins at different depths and characterize the in situ archaeological stratigraphy to produce a more detailed settlement reconstruction. The survey was carried out in N-S direction over an area of 2.85 sq.km. Totally, 507 magnetic data were collected along 13 profile lines with a sampling interval of 20m and profile interval of 50m. To direct the future excavations in the areas indicated by magnetic surveys, the precise locations of geophysical measurements were recorded using Garmin GPS device. Diurnal corrections were applied for the magnetic data collected using base station data obtained every one hour and it was interpolated to the field timing using Geosoft software. After removing the diurnal variation from the field data, the magnetic data were gridded, contoured and various magnetic maps were prepared. All these maps were produced on WGS84 ellipsoidal datum with Geographic lat - long projection. Interpretations were made from these maps and identified buried structures, wall boundary and few archeological ruins in the study area and this information is used to map the suitable sites for detailed exploration by archeological survey.

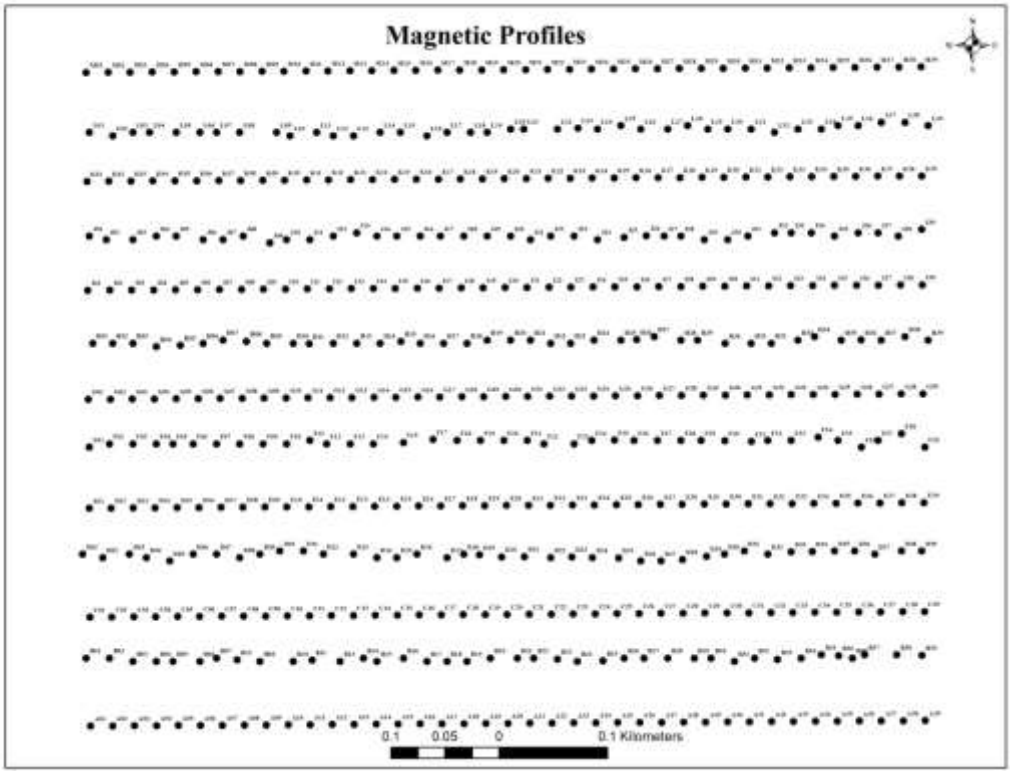


Fig. No. 02: Magnetic profiles

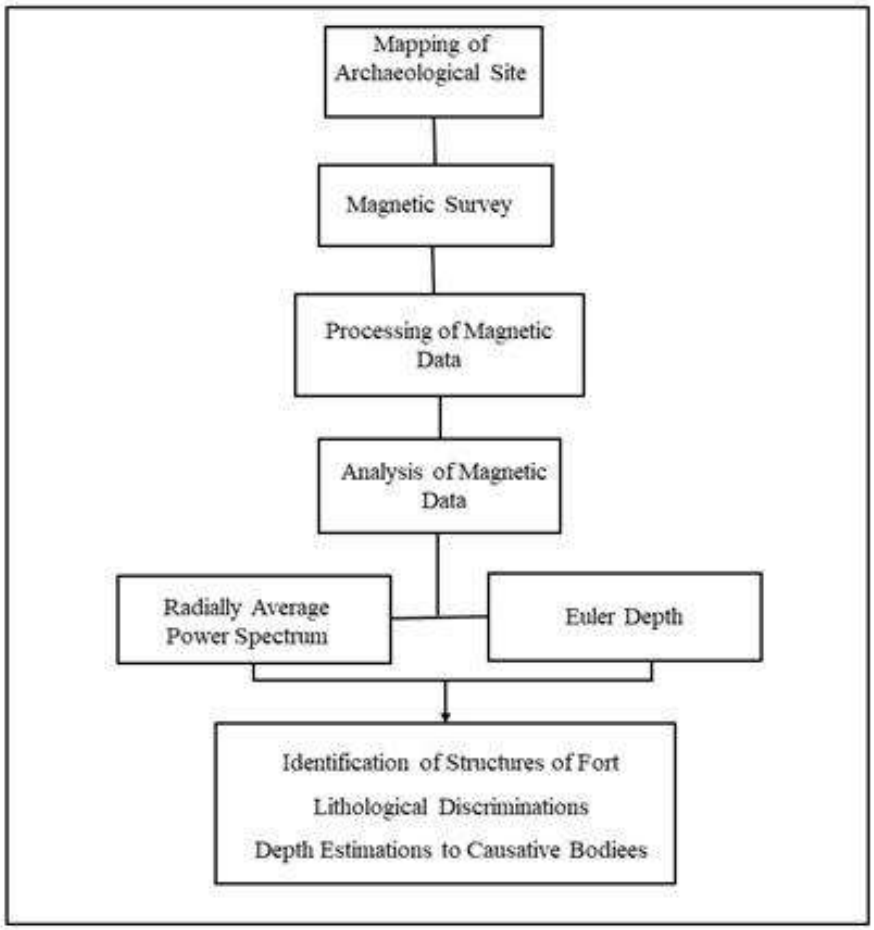


Fig. No. 03: Methodology Flowchart

Results and Discussion

Analytical Signal: The analytical signal (AS) amplitude was calculated from the total magnetic intensity of the study area. It reduces magnetic data to anomalies whose maxima mark the edges of magnetized bodies and whose shape can be used to determine the depth of these edges. AS map is independent of the direction of magnetization of the source. Since amplitude of the anomalies combines all vector components of the field into a simple constant, Interpreter can consider that the analytic signal is as a map of magnetization in the ground. Keeping this in the mind, one can map strong anomalies which exist where the magnetization vector intersects magnetic contrasts, even if we were not aware of the source of the contrasts from the signal amplitude alone. The analytic signal amplitude over the study area ranges from 0.994 nT/m to 10.951 nT/m and partially highlighted the wall structures of the fort with moderate anomalies. Circular to semicircular shape anomalies have maximum amplitudes found throughout the maps. However, few large positive magnetic zone were located to eastern, western and southern part of the map. The low anomalies may be due to the presence of sediments and sedimentary rocks. Apart from these anomalies, many isolated magnetic high anomalies have been noticed which are also very important for archeological investigations. Analytical signal map were further used for the preparation of Regional anomaly, Residual anomaly and Band-pass filter map.

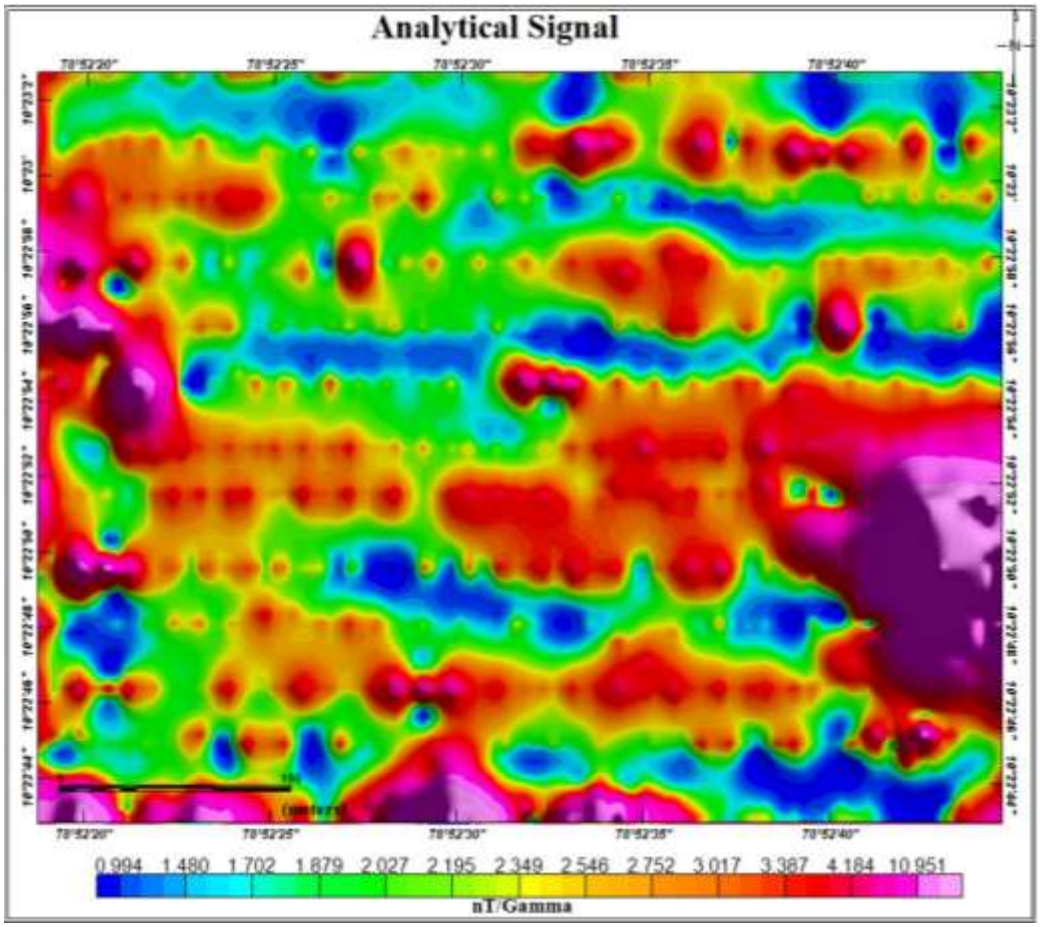


Fig. No. 04: Analytical Signal Map

***Regional and Residual Anomaly*:** Regional anomaly map were generated using low pass filter under Geosoft Oasis Montaj. It is used to delineate information about the deep causative bodies located in the subsurface of study area. It indicates that the depth perception for those causative bodies are deep when compared to the other magnetic intensity noticed in the study area indicating that they are very significant in understanding the depth of the buried structures. Regional anomaly map of the Porpani region indicates very significant circular anomaly in the eastern and southern part of the map. This area needs detailed archeological exploration and this feature may be the parts of fort which is buried in depth.

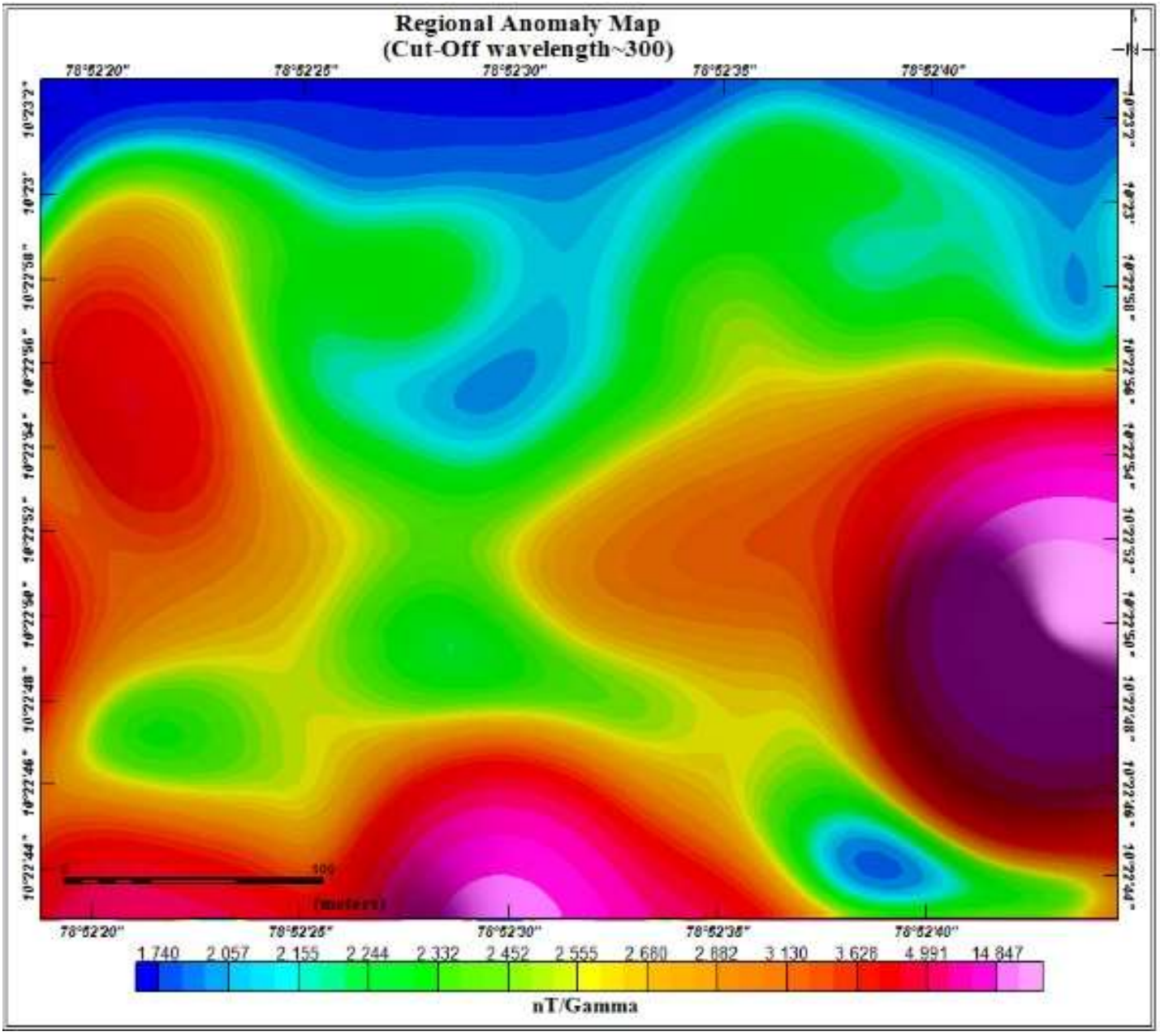


Fig. No. 05: Regional Anomaly Map

Residual anomaly also brought out significant information about buried structures which is spatially coinciding with the regional anomaly found in that region. In this map, the individual causative bodies were separated and shallow features are clearly highlighted. Circular residual anomaly surrounded by some kind of ring structure is clearly noticed in the eastern as well as southern anomalies. These two structures show cumulative effect in the regional anomaly. Ring structure around the positive circular anomaly clearly indicates about that some part of the fort is buried in shallow depth.

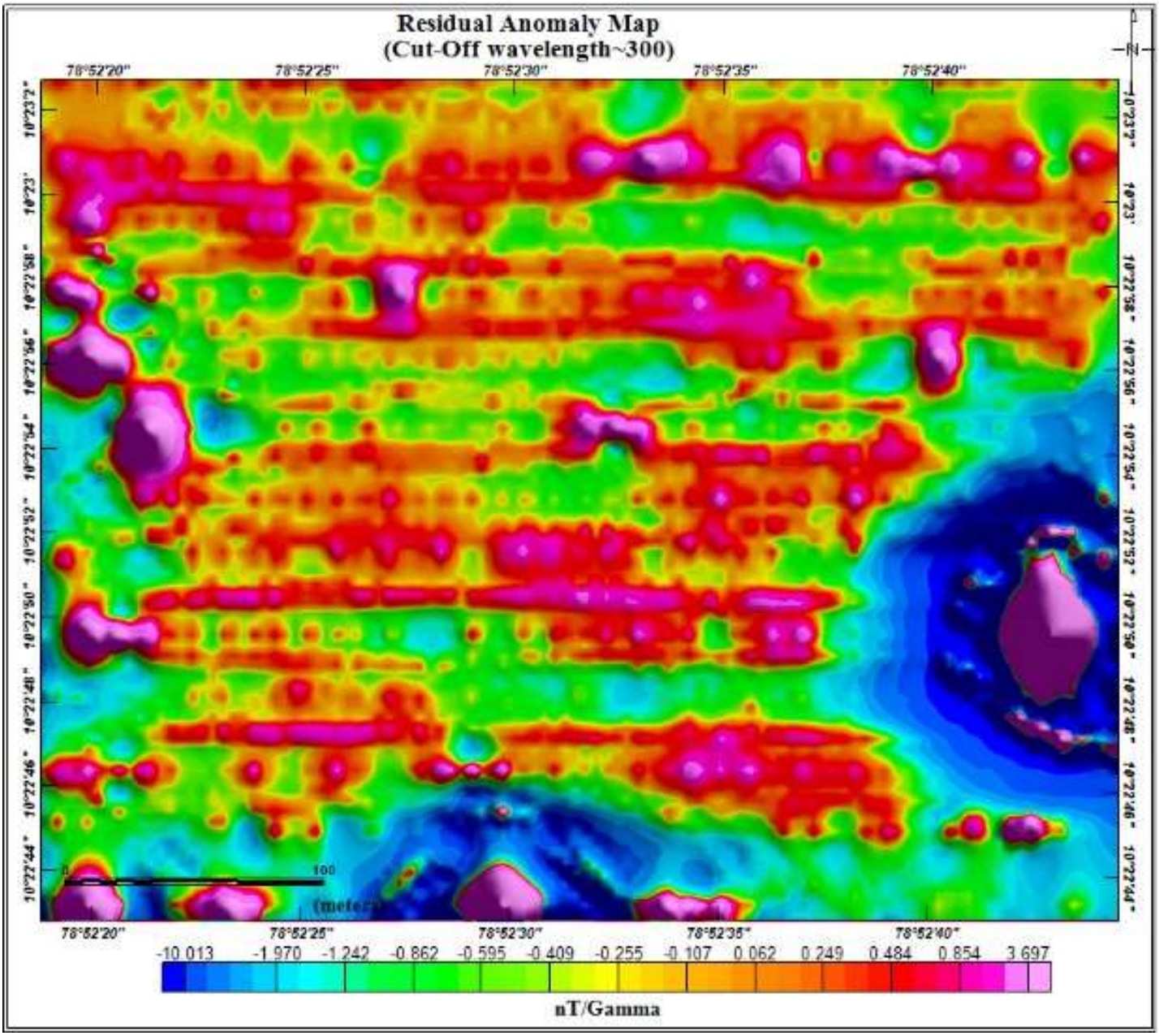


Fig. No. 06: Residual Anomaly Map

The bandpass filter map was produced by applying FFT in Oasis Montaj. The bandpass is by removing the band of signals of wave numbers between 800 and 300m. This band represents the deep

seated bodies in the area. Therefore, the signals at the right on the filter are the deeper causative bodies. The structures were highlighted in this band pass filter map. The circular anomalies noticed in the regional and residual anomaly are further highlighted in this method. Ring structures observed in the residual map have been further enhanced using this band pass technique.

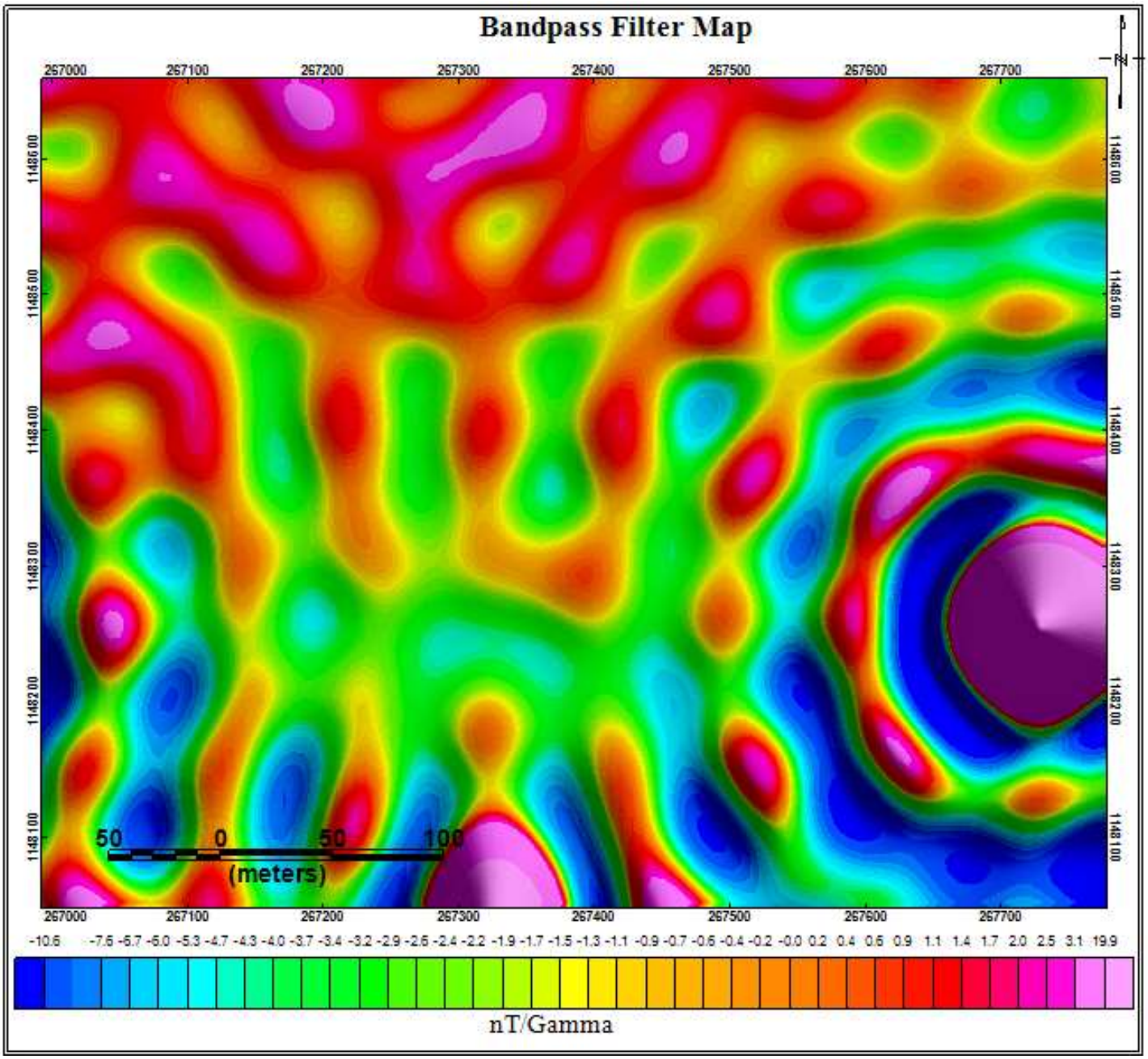


Fig. No. 07: Bandpass Filter Map

Radially Averaged Power Spectrum: Radially averaged power spectrum is used to detect the depths of the shallow and deep sources, basement complex, and subsurface geological structures. Many authors have explained the spectral analysis technique. Depth of the causative body has been determined by calculating slope and then the slope has been used to estimate the depth using the

formula [h=s/4 π]. This technique has been applied to Analytical signal data to calculate the energy spectrum under Geosoft environment. The resulting diagrams of the radially averaged power spectrum indicated the average depth level to the shallow depths and deep segments vary from 10 to 30m respectively. The profile shows only three slopes from which the above depth has been estimated.

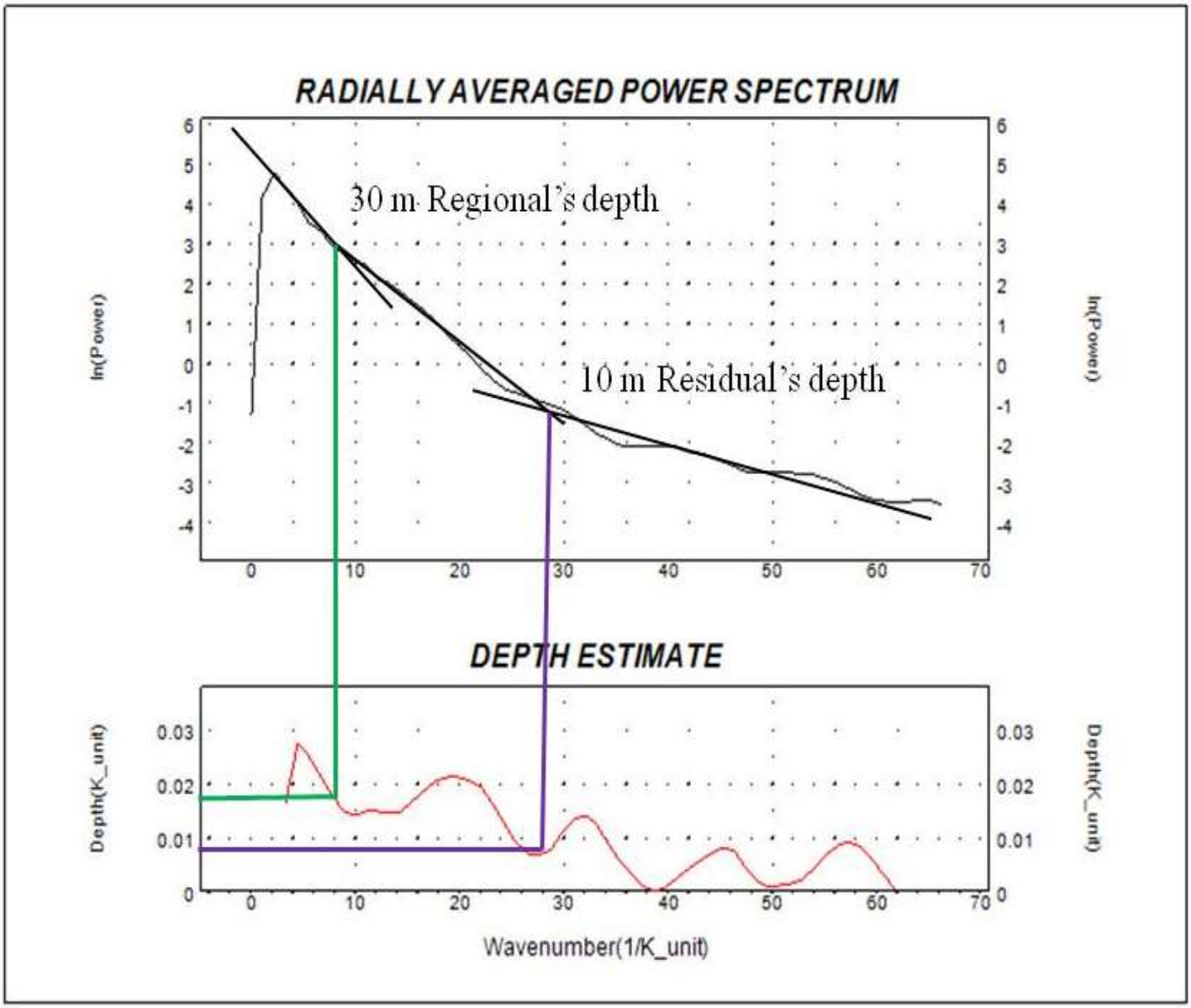


Fig. No. 08: Radially Average Power Spectrum Map

Euler's Deconvolution Method: This is another method used in the Geosoft program for depth estimation, which is based on Euler's homogeneity equation. Euler's homogeneity equation relates the magnetic field and its gradient components to the location of the source. According to Reid and Thompson, the degree of homogeneity N has been interpreted as a structural index (SI). It is a measure of the rate of change of a magnetic field with distance. Proposed models like contacts are

demarcated by the structural index N=0, the magnetic field of a narrow 2-D dyke has a structural index N=1, while a vertical pipe or horizontal cylinder has N=2 and the magnetic sphere has N=3. In the present study, the structural indexes that applied to Analytical signal map are 0, 1, 2, and 3 to select the best solution. Depth estimation based on the SI indicates that structural index 2 and 3 shows better solutions than the structural index 0 and 1. Map produced using SI 3 shows circular features at many places particularly in the eastern side which has spatial correlation with the anomalies noticed from regional and residual magnetic anomaly. Depths ranges are noticed in this area are varied from <10m to >30m.

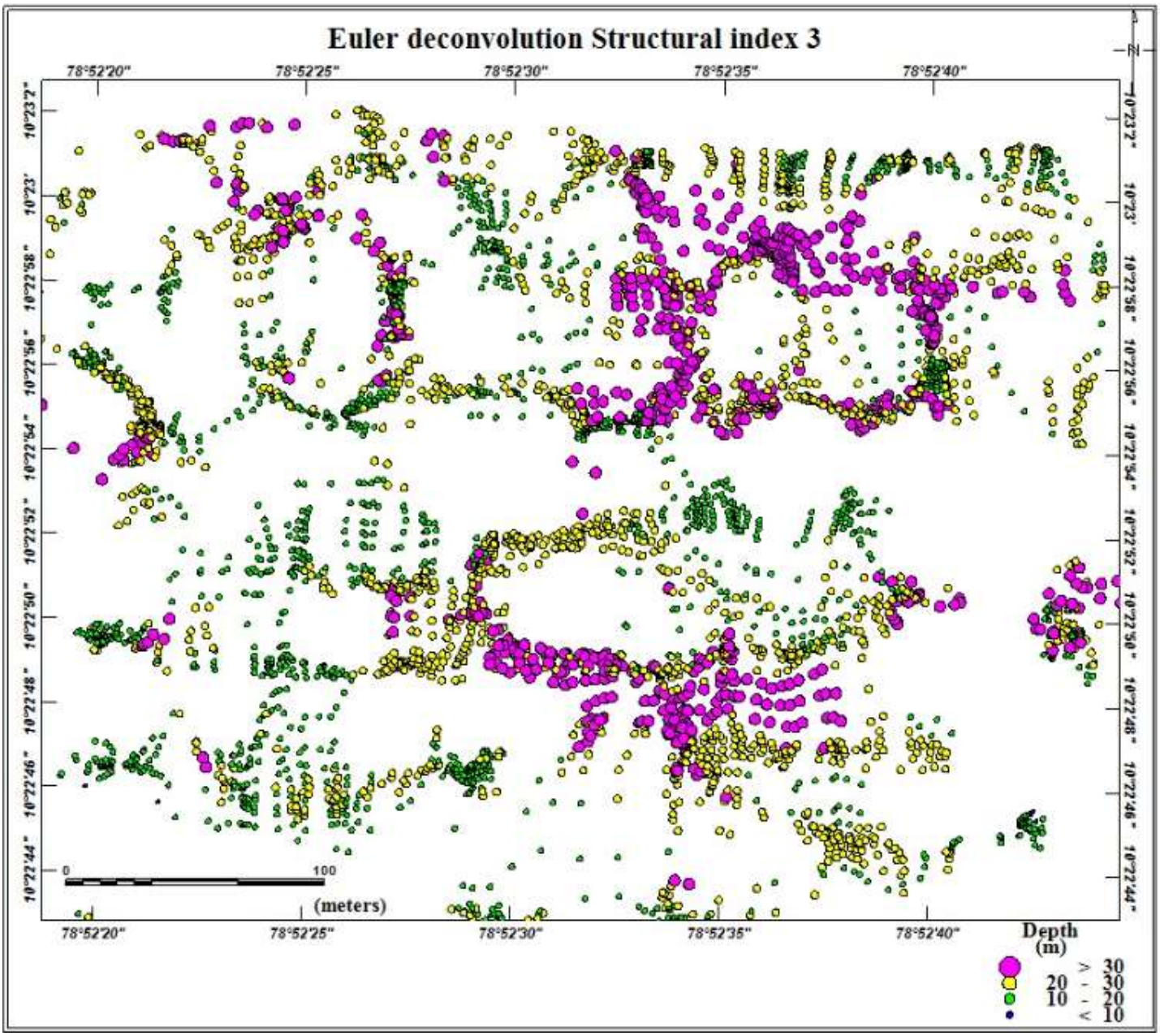


Fig. No. 09: Euler's Deconvolution Map

Proposed Zones for Detailed Excavation: The perspective zones were proposed based on the indication of subsurface structures from the regional, residual, bandpass filter and Euler maps. Prominent structures were noticed in 4 different locations which are highlighted in the figure no. Areal extent of the proposed region is tabulated below for necessary action. The zones were suggested to the Geophysicist and archaeologist for future detailed excavations either by close spacing of magnetic survey or GPR method.

Zone	Location	Areal Extent	Approximate Depth
1	Zone 1	200x125m	30m
2	Zone 2	20x35m	10-20m
3	Zone 3	70x70m	20-30m
4	Zone 4	40x110m	20-30m

Conclusion: Ground magnetic survey carried out around Porpanaikottai significantly brought to light sub surface structures features of the archaeological ruins. Magnetic maps such as analytical signal, regional and residual maps indicated the presence of shallow and deep causative bodies at the eastern and southern part of the surveyed area. Circular anomaly with ring structures noticed in those anomalies provides strong evidence about hidden archaeological structures. These anomalies were further having solid spatial correlation with all other derivative maps and also with the depth clusters noticed from Euler map. Depth ranges of all these causative sources vary from <8 to >18m estimated through power spectrum method. Euler deconvolution method also estimated the depth

range between 10 and 30m. Present study highlighted occurrence of causative body in the subsurface. Based on that, two zones were proposed for detailed archaeological excavation.

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Catalogue of Terracotta Objects Kept in Shahjad Rai Research Institute, Baraut district Baghpat Uttar Pradesh

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Chief Editor
Indian Journal of Archaeology

&

Amit Rai Jain
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Shahjad Rai Research Institute,
Baraut, Baghpat U.P.

Introduction: The antiquities of *Mauryan* period present a great variety. Some of the antiquities of this period are made by reduced firing technique which imparted grey colour to the antiquities. The Northern Black Polished (NBP) pottery was made using this technique and had grey core and burnished black slip with metallic lustre. When the potters made objects for everyday use like toys, votive offerings decorative items they did not use burnished slip. The elephant shaped grey coloured toy cart and votive grey coloured mother goddess are typical examples of this technique. The Elephant has been decorated by stamped and incised designs (fig. 01), and the mother goddess (fig. 02) is decorated by incised design on the girdle made using applique design.



Fig No 01: TC *Mauryan* Elephant



Fig No. 02: TC *Mauryan* Mother Goddess

It appears that enlarge number of toys were made during Mauryan period. These were made in the shape of elephant, bull, horse and ram. One such horse shaped toy cart of red colour has been shown below (fig. 03) .It still has holes in the legs to fix the wheels. Another type of terracotta made during Mauryan period in large numbers is realistically made human figures. The faces were made using Moulds and different limbs and clothes were attached separately. One example of such figures is the head shown below (fig. 04).



Fig No. 03: TC horse shaped plaque



Fig No. 04: TC Head

A large numbers of plaques made from moulds are found from sites belonging to *Sunga* period. These plaques are characterised by finely carved details of clothes and ornaments and different parts of human. These plaques are always of small sizes. We find mostly the plaques of the mother goddesses. Some of the plaques show scenes of daily social life.



Fig No. 05
TC human figure carrying bucket



Fig. No. 06
TC plaque showing female bust



Fig No. 07
TC plaque showing female bust

Another variety of *Sunga* plaques doesn't show fine details. The ornaments headgears and clothes are executed in bold strokes looking like applique design. One such example is shown below.



Fig No. 08: TC plaque showing female bust

The *Kushan* terracotta are generally crude the eyebrows are made by incising the rig of eyebrow. The eyelids are made by punching holes in the eye balls. The nostrils are similarly punched. The lips are crudely made. The head are made separately and are generally inserted in the wheel turned cylindrical body. The insertion is effected by making a peg like projection at the base of the head. The legs and hands are separately added to the image. The toys of *Kushan* period have incised decorations.



Fig No. 09: TC human head



Fig No. 10: TC toy tortoise

Another variety of *Kushan* terracotta shows plaques carved in low relief. One such example is that of broken plaque showing horse headed *Yakshi* in standing posture and looking towards right (fig no.). Another variety is that of stamp bearing *triranta symbol.* These antiquities don't have the finely executed details of *Sunga* plaque. The 3d images are very crude and may go from the size of 4-5 inches to 2-3 feet.



Fig No. 11: TC plaque showing horse headed *Yakshi*



Fig No. 12: TC medallion with *Yatna* symbol

The terracotta of Gupta period are hand modelled and large in size. These are realistically made. The hair are carved in great details and fall down generally in cascading coils. The eyes are finely made with proper eyelids. The lips are thick with the ends of the lips terminating into a hole. The nose is shapely.



Fig No. 13: TC human head



Fig No. 14: TC human head

Some *Gupta* terracottas are made from moulds. It appears that mould made terracotta were either used for home decoration or was offered at different local shrines. The terracotta of this period are mould made. One such example is that of *Varah* (fig. 16). The worship of *Varah Avatar* of *Vishnu* was started in this period. Before *Gupta* period his images were not made and worshipped.



Fig No. 15: TC female bust



Fig No. 16: TC *Varah*

After *Gupta* period the terracotta images were replaced by stone images. Only some crude terracotta toys were made during early and late medieval period in northern India. The brick temples continued to be made during medieval period. The bricks were carved and then fired before being used as facing of the temple. The carved terracotta bricks bear only geometrical and floral designs but no image was made in north India. After the Islamic rule was established in India the terracotta temples disappeared only to resurface in 17th and 18th century in Bengal. The Bengal terracotta panels used for decorating temples walls and were crudely made. These wear no similarity to beautiful and *Gupta* and *Sunga* terracotta. The catalogue of terracotta images is as follows:

The *Mauryan* Terracotta: There are 49 terracotta images belonging to this period and their catalogue is as follows:



Fig. No. 17: TC elephant (*Mauryan*)

Accession No.	-	AHCH – 62
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	3.4x2.3cm
Description	-	It is a grey Terracotta elephant.



Fig. No. 18: TC elephant (*Mauryan*)

Accession No.	-	AHCH – 46
Provenance	-	*Ahichchhatra*, District *Bareilly, Uttar Pradesh*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	4.3x3.3cm
Description	-	It is a terracotta Elephant.



Fig. No. 19: TC elephant (*Mauryan*)

Description - It is same as Fig no. 18



Fig. No. 20: TC Bull (*Mauryan*)

Provenance	-	*Ahichchhatra*, District *Bareilly, Uttar Pradesh*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	6x3.2cm
Description	-	It is a terracotta Bull.



Fig. No. 21: TC Bull (*Mauryan*)

Description - It is other side of Terracotta Fig no. 20.



Fig. No. 22: TC Bull (*Mauryan*)

Accession No.	-	AHCH - 7
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	8.5x3.0cm
Description	-	It is a terracotta Bull.



Fig. No. 23: TC Bull (*Mauryan*)

Description - It is other side of Fig no. 22



Fig. No. 24: TC Horse (*Mauryan*)

Period	-	*Mauryan*
Material	-	Terracotta
Description	-	It is a horse head stamped with dots and *chakra* devices and applique design



Fig. No. 25: TC Horse (*Mauryan*)

Description - It is side view of Fig no. 107



Fig. No. 26: TC ram (*Mauryan*)

Accession No.	-	SUGH – 209
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	5.2x3.5cm
Description	-	It is a terracotta ram.



Fig. No. 27: TC ram (*Mauryan*)

Description - It is other side of Fig no. 114.



Fig. No. 28: TC Horse (*Mauryan*)

Accession No.	-	AHCH – 3
Provenance	-	*Ahichchhatra*, District *Bareilly, Uttar Pradesh*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	10.5x5cm
Description	-	It is a terracotta horse.



Fig. No. 29: TC Horse (*Mauryan*)

Description - It is other side of Fig no. 117.



Fig. No. 30: TC animal, (*Mauryan*)

Accession No.	-	SUGH - 221
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	7.2x2.1cm
Description	-	It is a very long necked animal looking more like dinosaur.



Fig. No. 31: Miniature pot, (*Mauryan*)

Period - *Mauryan*
Material - Terracotta
Description - It is a Miniature pot.



Fig. No. 32: Miniature pot, (*Mauryan*)

Description - It is side view of the miniature pot.



Fig. No. 33: TC Elephant, (*Mauryan*)

Accession No.	-	SUGH – 192
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	4.3x3 cm.
Description	-	It is terracotta elephant



Fig. No. 34 TC Elephant (*Mauryan*)

Description - It is other side of the elephant.



Fig. No. 35: TC Human Head (*Mauryan*)

Accession No.	-	AHCH – 23
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	6x3cm
Description	-	It is terracotta Human head.



Fig. No. 36: TC Human Head (*Mauryan*)

Description - It is side view of human head shown in fig no. 35.



Fig. No. 37: TC Human Head (*Mauryan*)

Description - It is a broken Terracotta piece



Fig. No. 38: TC Disc (*Mauryan*)

Accession No.	-	SNKS - 20
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	3.2x3.1cm
Description	-	It is terracotta Disc decorated with incised designs around the Periphery.



Fig. No. 39: TC bull (*Mauryan*)

Period - *Mauryan*

Material - Terracotta

Description - It is a terracotta Bull.



Fig. No. 40: TC bull (*Mauryan*)

Material - Terracotta

Description - It is other side of the Fig no. 39



Fig. No. 41: TC Elephant (*Mauryan*)

Period	-	*Mauryan*
Material	-	Terracotta
Description	-	It is terracotta elephant.



Fig. No. 42: TC elephant (*Mauryan*)

Material - Terracotta

Description - It is reverse side of Fig no. 41.



Fig. No. 43: TC elephant (*Mauryan*)

Accession No.	-	SUGH – 174
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	12.5x.6.5cm
Description	-	It is broken Terracotta Elephant.



Fig. No. 44: TC ram shaped toy cart (*Mauryan*)

Accession No.	-	SUGH – 175
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	10x5 cm
Description	-	It is a ram shaped Terracotta Toy cart.



Fig. No. 45: TC ram shaped toy cart (*Mauryan*)

Description - It is ram shaped Terracotta Toy cart



Fig. No. 46: TC female bust (*Mauryan*)

Period - *Mauryan*

Material - Terracotta

Description - It is terracotta Female bust.



Fig. No. 47: TC toy cart (*Mauryan*)

Period - *Mauryan*

Description - It is an animal shaped terracotta toy cart.



Fig. No. 48: TC horse shaped toy cart (*Mauryan*)

Period - *Mauryan*

Material - Terracotta

Description - It is a terracotta Horse shaped toy cart.



Fig. No. 49: TC horse shaped toy cart (*Mauryan*)

Period - *Mauryan*

Description - It is terracotta decorated Horse shaped toy cart seen from the other side



Fig. No. 50: TC female figure (*Mauryan*)

Period - *Mauryan*

Material - Terracotta

Description - It is a terracotta female figure.



Fig. No. 51: Standing Female figure, *Mauryan*

Accession No.	-	SUGH – 135
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	10.1x5cm
Description	-	It is a standing Female figure.



Fig. No. 52: TC Horse, *Mauryan*

Period	-	*Mauryan*
Material	-	Terracotta
Description	-	It is a terracotta Horse.



Fig. No. 53: Turbaned male head, *Mauryan*

Accession No.	-	SUGH - 55
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	6x5cm
Description	-	It is a turbaned male head.



Fig. No. 54: Turbaned male head seen from the side

Description - Turbaned male head seen from the side.



Fig. No. 55: Human head seen from the front, *Mauryan*

Period - *Mauryan*

Material - Terracotta

Description - Human head wearing a cap seen from the front.



Fig. No. 56: Female bust, *Mauryan*

Period	-	*Mauryan*
Material	-	Terracotta
Description	-	It is the figure of a female bust.



Fig. No. 57: TC Human Head, *Mauryan*

Accession No.	-	SUGH – 9
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	4.5x3.5cm
Description	-	It is a terracotta Human Head.



Fig. No. 58: Human head, *Mauryan*

Accession No.	-	SUGH – 172
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	2.1x2cm
Description	-	It is a human head.



Fig. No. 59: Anthropomorphic, *Mauryan*

Accession No.	-	SUGH – 152
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	6.8x4cm
Description	-	It is an anthropomorphic female bust.



Fig. No. 60: Human head, *Mauryan*

Period	-	*Mauryan*
Material	-	Terracotta
Description	-	It is a human head.



Fig. No. 61: Anthropomorphic figure

Accession No.	-	SUGH - 22
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Description	-	It is an anthropomorphic figure.



Fig. No. 62: TC Human head, *Mauryan*

Accession No.	-	SUGH – 162
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	4.3x2.3cm
Description	-	It is terracotta Human head.



Fig. No. 63: Human head seen from the side

Description - It is a human head seen from the side.



Fig. No. 64: TC female head, *Mauryan*

Accession No.	-	SUGH – 150
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	4x3.5cm
Description	-	It is terracotta female head.



Fig. No. 65: TC male head, *Mauryan*

Accession No.	-	SUGH – 148
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	5.3x5.1cm
Description	-	It is terracotta male head.



Fig. No. 66: Anthropomorphic mother goddess, *Mauryan*

Accession No.	-	SUGH – 120
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	12.8x6.8
Description	-	It is an anthropomorphic mother goddess.



Fig. No. 67: TC Human head, *Mauryan*

Accession No.	-	SUGH – 40
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	3.5x1.8cm
Description	-	It is a terracotta Human head.



Fig. No. 68: TC Human head seen from the side

Description - It is terracotta Human head seen from the side.



Fig. No. 69: Anthropomorphic mother goddess, *Mauryan*

Accession No.	-	SUGH – 137
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	8.8x4.1cm
Description	-	It is a terracotta anthropomorphic mother goddess.



Fig. No. 70: Human head, *Mauryan*

Accession No.	-	SUGH – 3
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	5.7x3.5cm
Description	-	It is a terracotta Human head.



Fig. No. 71: Human head seen from the side

Description - It is terracotta Human head seen from the side.



Fig. No. 72: Human Head, *Mauryan*

Accession No.	-	SUGH – 8
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	5.2x3cm
Description	-	It is a terracotta Human Head with hair twisted in the shape of a coil and hanging on the right side.



Fig. No. 73: Human head

Description - It is a terracotta head seen from the side.



Fig. No. 74: Anthropomorphic mother goddess, *Mauryan*

Accession No.	-	SUGH – 125
Provenance	-	*Sugh*, District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	13.3x5cm
Description	-	It is a broken terracotta anthropomorphic mother goddess.



Fig. No. 75: Broken human head, *Mauryan*

Accession No.	-	SUGH – 42
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	7x3.3cm
Description	-	It is terracotta Broken human head.



Fig. No. 76: Human Head wearing a conical cap and a triangular decoration on the cap, *Mauryan*

Accession No.	-	SUGH – 17
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	8x5cm
Description	-	It is a terracotta Human Head wearing a conical cap and a triangular decoration on the cap.



Fig. No. 77: Head seen from the side

Description - It is a terracotta head seen from the side.



Fig. No. 78: Female bust, *Mauryan*

Period	-	*Mauryan*
Material	-	Terracotta
Description	-	It is a terracotta Female bust.



Fig. No. 79: Female head, *Mauryan*

Accession No.	-	SUGH – 9
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	4.5x3.5cm
Description	-	It is a terracotta Female head.



Fig. No. 80: Female head, *Mauryan*

Description - It is a terracotta Female head.



Fig. No. 81: TC male head wear a cap, *Mauryan*

Accession No.	-	SUGH – 43
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	5.7x3cm
Description	-	It is a terracotta male head wearing a cap.



Fig. No. 82: Male head wearing a cap, *Mauryan*

Accession No.	-	SUGH – 14
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	5.2x2.6cm
Description	-	It is a male head wearing a cap.



Fig. No. 83: Male head, *Mauryan*

Accession No.	-	SUGH – 10
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	3.5x3.2cm
Description	-	It is a male head.



Fig. No. 84: Male head

Accession No.	-	SUGH – 99
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	4.3x1.5cm
Description	-	A male head wearing a conical cap.



Fig. No. 85: Male head

Description - This is the reverse side of the above figure.



Fig. No. 86: Male head, *Mauryan*

Accession No.	-	SUGH – 18
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	5x3.5cm
Description	-	It is the figure of a male head wearing a large turban.



Fig. No. 87: Turban head seen from the side

Description - This is the reverse side of the fig. no. 86.



Fig. No. 88: Female head, *Mauryan*

Accession No.	-	SUGH – 5
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	6.3x4cm
Description	-	It is a Female head.



Fig. No. 89: Female head

Description - This is the reverse side of the fig. no. 88.



Fig. No. 90: TC plaque showing upper portion of a female in standing posture, *Mauryan*

Accession No.	-	SUGH – 62
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	6x5cm
Description	-	It is a terracotta plaque showing upper portion of a female in standing posture



Fig. No. 91: TC human head, *Mauryan*

Accession No.	-	SUGH – 45
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	3.2x1.8cm
Description	-	It is a terracotta human head.



Fig. No. 92: TC human head, *Mauryan*

Accession No.	-	SUGH – 30
Provenance	-	*Sugh*, District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	3x2.5cm
Description	-	It is a terracotta human head.



Fig. No. 93: TC Human head, *Mauryan*

Description - This is the reverse side of the above fig. no. 92.



Fig. No. 94: Upper portion of female, *Mauryan*

Accession No.	-	SUGH – 65
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	6.5x5.5cm
Description	-	It is a terracotta plaque showing upper portion of female in standing posture



Fig. No. 95: TC male head, *Mauryan*

Accession No.	-	SUGH – 49
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	3.8x2.2cm
Description	-	It is terracotta male head.



Fig. No. 96: Male head

Description - This is side view of the male head.



Fig. No. 97: TC human head wearing a cap, *Mauryan*

Accession No.	-	SUGH – 98
Provenance	-	*Sugh*, District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	3.5x1.7cm
Description	-	It is terracotta human head wearing a cap



Fig. No. 98: Human head

Description - This is side view of human head



Fig. No. 99: TC human head, *Mauryan*

Accession No.	-	SUGH – 63
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	4.5x5.0cm
Description	-	It is terracotta human head.



Fig. No. 100: Side view of human head

Description - This is side view of human head.



Fig. No. 101: Side view of human head

Description - This is side view of human head.



Fig. No. 102: Human head, *Mauryan*

Accession No.	-	SUGH – 61
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	3.9x2.6cm
Description	-	It is a human head wearing a hat.



Fig. No. 103: TC human head, *Mauryan*

Accession No.	-	SUGH – 20
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	3.3x3cm
Description	-	It is a terracotta human head.



Fig. No. 104: TC male head, *Mauryan*

Period	-	*Mauryan*
Material	-	Terracotta
Description	-	It is a terracotta male head.



Fig. No. 105: TC Male head, *Mauryan*

Period - *Mauryan*

Material - Terracotta

Description - It is a terracotta Male head.



Fig. No. 106: Male head

Description - This is side view of male head.



Fig. No. 107: TC human head, *Mauryan*

Accession No.	-	SUGH – 22
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	4.5x3.5cm
Description	-	It is a terracotta human head.



Fig. No. 108: Human head

Description - This is side view of the human head.



Fig. No. 109: TC Male figure, *Mauryan*

Accession No.	-	SUGH – 53
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	6.5x5.4cm
Description	-	It is a broken terracotta Male figure with left hand raised.



Fig. No. 110: TC male head, *Mauryan*

Accession No.	-	SUGH – 109
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	4x3.2cm
Description	-	It is terracotta head of a male.



Fig. No. 111: TC male head, *Mauryan*

Accession No.	-	SUGH – 107
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta
Size	-	4x2cm
Description	-	It is a terracotta male head wearing a conical cap.



Fig. No. 112: Male head

Description - This is side view of male head wearing a conical cap



Fig. No. 113: TC male head, *Mauryan*

Accession No.	-	SUGH – 27
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Mauryan*
Material	-	Terracotta.
Size	-	6.5x5cm
Description	-	It is terracotta male head.

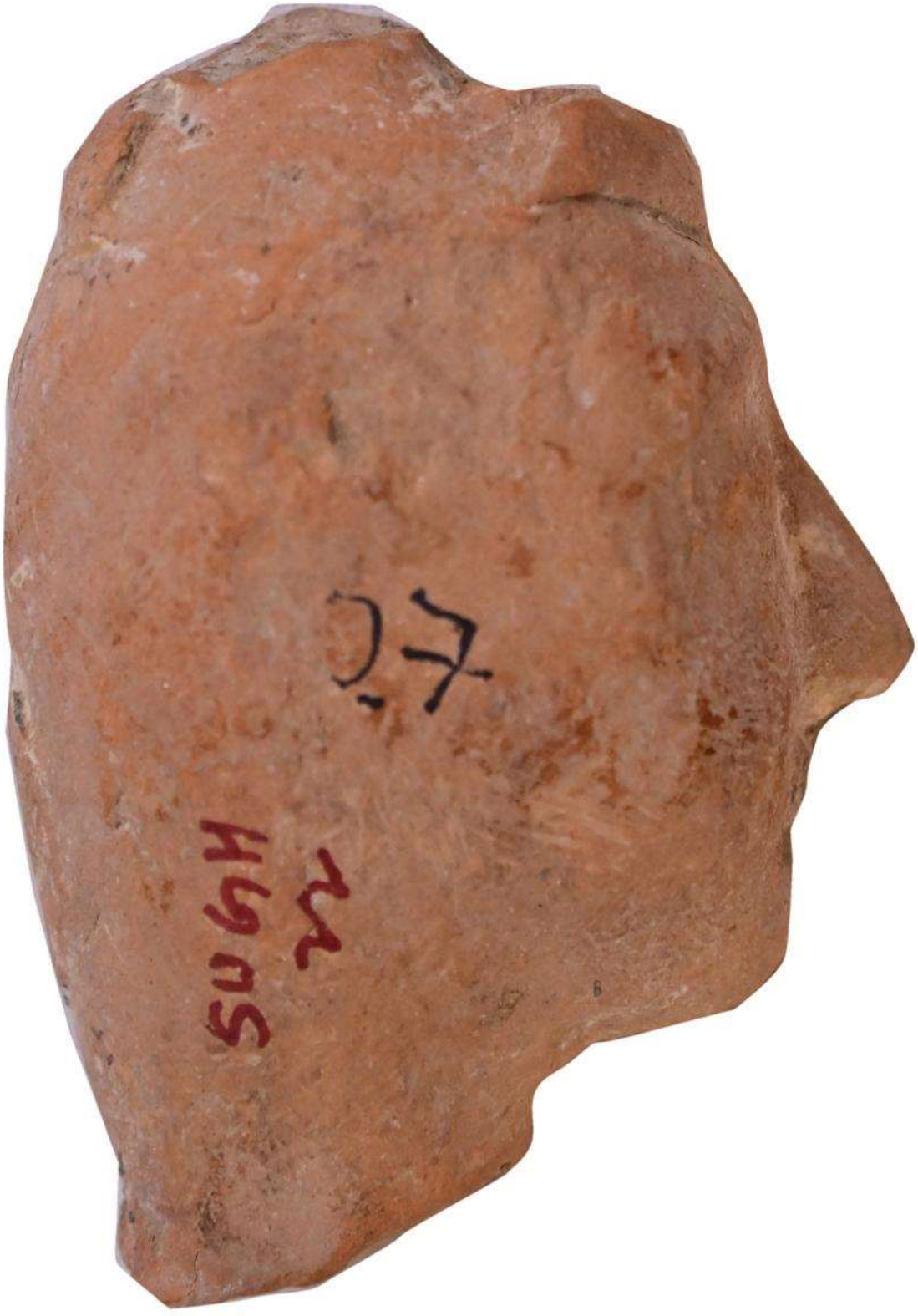


Fig. No. 114: TC male head, *Mauryan*

Description - This is head seen from side.

The *Sunga* Terracotta: There are 80 terracotta belonging to this period and their catalogue is as follows:



Fig. No. 115: Upper portion of a female, *Sunga*

Period - *Sunga*
Material - Terracotta
Description - It is terracotta plaque showing the upper portion of a female in standing posture



Fig. No. 116: Female bust, *Sunga*

Accessesion No.	-	SUGH – 88
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	5x6cm
Description	**-**	It is a female bust



Fig. No. 117: Male head, *Sunga*

Accessesion No.	-	AHCH - 77
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	4x3cm
Description	-	It is a male head.



Fig. No. 118: Broken TC piece, *Sunga*

Accessesion No.	-	AHCH - 42
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	6.8x4.5cm
Description	-	It is a broken piece of plaque showing the head gear of goddess. It shows various weapons inserted in her headgear.



Fig. No. 119: Broken TC piece, *Sunga*

Accessesion No.	-	AHCH – 47
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	4x5cm
Description	-	It is a broken Terracotta plaque showing a couple.



Fig. No. 120: TC plaque, *Sunga*

Accessesion No.	-	SUGH - 236
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	2.7x5.5cm
Description	-	It is a terracotta plaque showing the middle portion of a female.



Fig. No. 121: Human figure, *Sunga*

Accessesion No.	-	AHCH - 13
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	6.3x3cm
Description	-	It is a terracotta plaque showing a human figure.



Fig. No. 122: TC Stamp, *Sunga*

Accessesion No.	-	AHCH – 2
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	8.5x8.5cm
Description	-	It is a terracotta Stamp.



Fig. No. 123: Male bust, *Sunga*

Accessesion No.	-	SUGH - 212
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	10x7.1cm
Description	-	It is a male bust with large year ornaments and *jatabhar*.



Fig. No. 124: Human head, *Sunga*

Accessesion No.	-	AHCH – 16
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	5x4.5cm
Description	-	It is a human head.



Fig. No. 125: TC Human figure, *Sunga*

Accessesion No.	-	SUGH - 231
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	7.7x4.5cm
Description	-	A man shown carrying a bucket and a fan on his left shoulder.



Fig. No. 126: TC mould showing female in standing posture, *Sunga*

Accessesion No.	-	AHCH – 36
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	8.8x7.7cm
Description	-	It is a terracotta mould showing female in standing posture.



Fig. No. 127: Decorated TC piece, *Sunga*

Accessesion No.	-	SUGH – 206
Provenance	-	*Sugh*, District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	4.6x3.2cm
Description	**-**	It is a terracotta piece decorated with beaded string frills and octagonal and circular shapes.



Fig. No. 128: TC plaque showing a man carrying a bucket, *Sunga*

Accessesion No.	-	SUGH – 233
Provenance	-	*Sugh*, District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	5.5x4.5cm
Description	**-**	A man shown carrying a bucket and a fan on his left shoulder.



Fig. No. 129: TC piece, *Sunga*

Accessesion No.	-	SUGH – 235
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	4.6x6.5cm
Description	**-**	It is terracotta Piece elaborately decorated with floral, rope and *vedika* motifs.



Fig. No. 130: TC Plaque showing Upper portion of a man, *Sunga*

Accessesion No.	-	AHCH - 35
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	7x4.6cm
Description	-	It is an upper portion of a man in standing posture.



Fig. No. 131: TC Wheel, *Sunga*

Accessesion No.	-	SUGH – 177
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	12.3x12.3 cm
Description	-	It is a terracotta wheel.



Fig. No. 132: Terracotta wheel, *Sunga*

Accessesion No.	-	SUGH – 178
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	8.8x8.4cm
Description	**-**	It is a broken Terracotta Wheel.



Fig. No. 133: TC Wheel, *Sunga*

Accessesion No.	-	SUGH – 176
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	11.5x10.5
Description	**-**	It is a terracotta Wheel.



Fig. No. 134: TC Plaque, *Sunga*

Period - *Sunga*

Material - Terracotta

Description - It is a broken terracotta plaque showing feet of a lady in standing posture.



Fig. No. 135: Figure of a couple, *Sunga*

Period - *Sunga*

Material - Terracotta

Description - It is a plaque showing a couple in standing posture.



Fig. No. 136: TC Female head, *Sunga*

Accessesion No.	-	SUGH – 159
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	3.7x3.6cm
Description	**-**	It is a female head.



Fig. No. 137: TC Toy chariot, *Sunga*

Accessesion No.	-	SUGH - 196
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	7x6.8cm
Description	-	It is a terracotta Toy chariot seen from the top.



Fig. No. 138: TC Toy seen from the side, *Sunga*

Period - *Sunga*

Material - Terracotta

Description **-** It is a terracotta Toy seen from the side.



Fig. No. 139: TC Female head, *Sunga*

Accessesion No.	-	SUGH -145
Provenance	-	*Sugh*, District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	4.4x4.8cm
Description	**-**	It is a terracotta Female head.



Fig. No. 140: Upper portion of a plaque showing a couple, *Sunga*

Accessesion No.	-	SUGH – 104
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	3.8x4cm
Description	**-**	It is an upper portion of a plaque showing a couple.



Fig. No. 141: Upper portion of a man, *Sunga*

Accessesion No.	-	SUGH – 141
Provenance	-	*Sugh*, District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	6x7.4cm
Description	-	It is an upper portion of the Terracotta plaque showing a man in standing posture.



Fig. No. 142: Broken TC plaque, *Sunga*

Accessesion No.	-	SUGH – 114
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	10.6x6.8cm
Description	**-**	It is a broken Terracotta plaque showing a female in standing Posture.



Fig. No. 143: Plaque showing mother goddess, *Sunga*

Accessesion No.	-	SUGH – 124
Provenance	-	*Sugh*, District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	7.5x10.3cm
Description	**-**	It is a plaque showing mother goddess. Different miniature weapons are inserted in her headgear.



Fig. No. 144: Lower portion of female, *Sunga*

Accessesion No. - SUGH -2
Provenance - *Sugh,* District *Yamuna Nagar, Haryana*
Period - *Sunga*
Material - Terracotta
Size - 9x4.5cm
Description - It is a broken terracotta plaque showing the lower portion of a female in standing posture.



Fig. No. 145: Man in standing posture, *Sunga*

Accessesion No.	-	SUGH – 118
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	7.9x5.9cm
Description	**-**	It is a terracotta man in standing posture accompanied by Attendants.



Fig. No. 146: Female in standing posture, *Sunga*

Accessesion No.	-	SUGH – 86
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	8.8x3.4cm
Description	-	It is a terracotta plaque showing a female in standing posture.



Fig. No. 147: Lower portion of a female, Sunga

Period - *Sunga*

Material - Terracotta

Description - It is a terracotta Broken plaque showing the lower portion of a female in standing posture.



Fig. No. 148: Lower portion of a female, *Sunga*

Accessesion No.	-	SUGH – 1
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	8.5x4.8cm
Description	**-**	It is a terracotta plaque showing lower portion of a female in standing posture.



Fig. No. 149: Head of mother goddess, *Sunga*

Accessesion No.	-	SUGH – 101
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	4x6cm
Description	**-**	It is a terracotta plaque showing head of mother goddess.



Fig. No. 150: Head of Mother goddess, *Sunga*

Accessesion No.	-	SUGH – 122
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	10.5x11.4cm
Description	-	It is a terracotta Broken plaque showing the middle portion of serpent god. His human body in the front and his snake body is shown in the back.



Fig. No. 151: Torso of man, *Sunga*

Accessesion No.	-	SUGH – 116
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	6.7x8.1cm
Description	**-**	It is a terracotta torso of man holding a bird and flower in his left and right hands respectively.



Fig. No. 152: Plaque showing a naked male and a deer, *Sunga*

Accessesion No.	-	SUGH – 132
Provenance	-	*Sugh*, District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	7.8x6cm
Description	-	It is a terracotta plaque showing a naked male in standing posture. A deer (?) is standing on the right side.



Fig. No. 153: Middle portion of a female, *Sunga*

Accessesion No.	-	SUGH – 123
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	8x7.8cm
Description	**-**	It is a terracotta Middle portion of a female in standing posture.



Fig. No. 154: Plaque showing legs of a human, *Sunga*

Accessesion No.	-	SUGH – 130
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	10x8cm
Description	**-**	It is terracotta Plaque showing legs of a human figure in standing Posture.



Fig. No. 155: Male in standing posture, *Sunga*

Accessesion No.	-	SUGH – 127
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	9.2x5.8cm
Description	**-**	It is a terracotta Plaque showing a male in standing posture.



Fig. No. 156: TC Human head, *Sunga*

Accessesion No.	-	SUGH - 77
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	5x4.5cm
Description	**-**	It is a terracotta Human head.



Fig. No. 157: Torso of a female, *Sunga*

Accessesion No.	-	SUGH – 76
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	5x5cm
Description	**-**	It is a terracotta torso of a female in standing posture.



Fig. No. 158: Bust of a female, *Sunga*

Accessesion No.	-	SUGH – 89
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	7x6.5cm
Description	**-**	It is a terracotta plaque showing the bust of a female.



Fig. No. 159: Bust of a male, *Sunga*

Accessesion No.	-	SUGH – 75
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	8x4.5cm
Description	**-**	It is a terracotta Broken Plaque showing bust of a male in standing Posture.



Fig. No. 160: Lower portion of a female, *Sunga*

Accessesion No.	-	SUGH – 91
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	9.2x8cm
Description	**-**	It is a terracotta plaque showing the lower portion of a female accompanied by a child.



Fig. No. 161: Torso of a female, *Sunga*

Accessesion No.	-	SUGH - 16
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	6.2x5.5cm
Description	-	It is a terracotta plaque showing the upper portion of the torso of a female in standing posture.



Fig. No. 162: Torso of a female, *Sunga*

Accessesion No.	-	SUGH – 85
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	7.3x3.6cm
Description	**-**	It is a plaque showing the torso of a female.



Fig. No. 163: Female bust, *Sunga*

Accessesion No.	-	SUGH – 76
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	5x5cm
Description	**-**	It is a terracotta female bust.



Fig. No. 164: Female bust, *Sunga*

Accessesion No.	-	SUGH – 89
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	7x6.5cm
Description	**-**	It is a broken female bust.



Fig. No. 165: Male bust, *Sunga*

Accessesion No.	-	SUGH – 75
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	8x4.5cm
Description	**-**	It is broken terracotta male bust.



Fig. No. 166: Female bust, *Sunga*

Accessesion No.	-	SUGH – 81
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	6.5x6.3cm
Description	**-**	It is a broken terracotta female bust.



Fig. No. 167: Female in standing posture, *Sunga*

Accessesion No.	-	SUGH – 84
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	7.5x2.5cm
Description	-	It is a terracotta plaque showing a female in standing posture.



Fig. No. 168: TC Mother Goddess, *Sunga*

Accessesion No.	-	SUGH – 95
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	7.1x5.5cm
Description	-	It is a terracotta plaque showing head of mother goddess. Different weapons are inserted in her headgear.



Fig. No. 169: Female bust, *Sunga*

Accessesion No.	-	SUGH – 82
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	6.5x5.3cm
Description	**-**	It is a broken terracotta female bust.



Fig. No. 170: Lower portion of female, *Sunga*

Accessesion No.	-	SUGH – 93
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	9x5.1cm
Description	-	It is a broken terracotta piece showing lower portion of female.



Fig. No. 171: Upper portion of a female, *Sunga*

Accessesion No.	-	SUGH – 79
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	5.7x6cm
Description	**-**	It is a terracotta plaque showing upper portion of a female in standing posture.



Fig. No. 172: Lower portion of a female, *Sunga*

Accessesion No.	-	SUGH – 129
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	10.2x7.5cm
Description	**-**	It is a plaque showing lower portion of a female in standing posture.



Fig. No. 173: Female bust, *Sunga*

Accessesion No.	-	SUGH – 48
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	4.6x4.9cm
Description	**-**	It is a terracotta plaque showing female bust.



Fig. No. 174: Upper portion of female, *Sunga*

Accessesion No.	-	SUGH – 37
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	5.2x4.2cm
Description	**-**	It is a terracotta plaque showing upper portion of female in standing posture.



Fig. No. 175: Upper portion of female, *Sunga*

Accessesion No.	-	SUGH – 23
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	5.3x3.8cm
Description	**-**	It is a terracotta plaque showing upper portion of female in standing posture.



Fig. No. 176: Upper portion of female, *Sunga*

Accessesion No.	-	SUGH – 26
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	4.7x3.8cm
Description	**-**	It is a terracotta plaque showing upper portion of female in standing posture.



Fig. No. 177: Female bust, *Sunga*

Accessesion No.	-	SUGH – 96
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	4.5x3.3cm
Description	**-**	It is a female bust.



Fig. No. 178: Head of a lady, *Sunga*

Period - *Sunga*

Material - Terracotta

Description - It is a broken plaque showing the head of a lady.



Fig. No. 179: TC human head, *Sunga*

Accessesion No.	-	SUGH – 64
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	7x5cm
Description	**-**	It is a terracotta human head wearing a tall *Kireet* crown.



Fig. No. 180: TC human head, *Sunga*

Accessesion No.	-	SUGH – 21
Provenance	-	*Sugh*, District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	3.9x3.4cm
Description	-	It is a terracotta human head.



Fig. No. 181: Female head, *Sunga*

Accessesion No.	-	SUGH – 57
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	3.7x5cm
Description	**-**	It is a terracotta female head.



Fig. No. 182: Female bust, *Sunga*

Accessesion No.	-	SUGH – 74
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	5x2.8cm
Description	**-**	It is a terracotta female bust.



Fig. No. 183: TC plaque showing two female figures, *Sunga*

Accessesion No.	-	SUGH – 73
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	3.5x4.8cm
Description	**-**	It is a terracotta plaque showing two female figures. The larger one is squatting on the floor and the smaller one is dancing.



Fig. No. 184: Tc human head, *Sunga*

Accessesion No.	-	SUGH – 33
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	4.5x3.7cm
Description	**-**	It is terracotta human head.



Fig. No. 185: Lady in standing posture, *Sunga*

Accessesion No.	-	SUGH – 67
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	7x7.5cm
Description	-	It is terracotta plaque showing a lady in standing posture.



Fig. No. 186: Lady in standing posture, *Sunga*

Period - *Sunga*

Material - Terracotta

Description - It is a terracotta plaque showing a lady in standing posture.



Fig. No. 187: Lady in standing posture, *Sunga*

Accessesion No.	-	SUGH – 71
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	6.5x3.3cm
Description	**-**	It is a terracotta plaque showing a lady in standing posture.



Fig. No. 188: Lower portion of a female, *Sunga*

Accessesion No. - SUGH – 102
Provenance - *Sugh,* District *Yamuna Nagar, Haryana*
Period - *Sunga*
Material - Terracotta
Size - 6.4x5cm
Description - It is a terracotta plaque showing lower portion of a female in standing posture. She is holding a conical object in her right hand and a thick staff in her left hand.



Fig. No. 189: TC male head, *Sunga*

Accessesion No.	-	SUGH – 32
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	3.8x2.7cm
Description	**-**	It is a terracotta male head.



Fig. No. 190: Upper part of a female, *Sunga*

Accessesion No.	-	SUGH – 70
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	5.3x5cm
Description	**-**	It is a terracotta plaque showing upper part of a female in standing posture



Fig. No. 191: Upper portion of a female, *Sunga*

Accessesion No.	-	SUGH – 69
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	4x4cm
Description	**-**	It is a terracotta plaque showing a upper portion of a female.



Fig. No. 192: Upper portion of a female, *Sunga*

Period - *Sunga*

Material - Terracotta

Description - It is a terracotta plaque showing the upper portion of a female in standing posture.



Fig. No. 193: Middle portion of a couple, *Sunga*

Accessesion No.	-	SUGH – 92
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	7.8x5.8cm
Description	-	It is the middle portion of a plaque showing a couple in standing posture.



Fig. No. 194: Bust of a female, *Sunga*

Period - *Sunga*

Material - Terracotta

Description - It is a terracotta plaque showing the bust of a female.



Fig. No. 195: Bust of a female, *Sunga*

Accessesion No.	-	SUGH – 94
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta
Size	-	5.2x4.5cm
Description	-	It is a grey coloured Terracotta plaque showing the bust of a female.



Fig. No. 196: Female head, *Sunga*

Accessesion No.	-	SUGH – 134
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Sunga*
Material	-	Terracotta
Size	-	5.4x6.1cm
Description	**-**	It is a plaque showing head of a female.



Fig. No. 197: Female bust, *Sunga*

Accessesion No.	-	SUGH – 90
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta.
Size	-	6.8cmx4.2cm
Description	-	It is a broken Terracotta plaque showing female bust.



Fig. No. 198: Male torso, *Sunga*

Accessesion No.	-	SUGH -83
Provenance	-	*Sugh*, District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta.
Size	-	6x3.5cm
Description	**-**	It is a male torso with large head dress and *graiveyaka*.



Fig. No. 199: Bust of a female, *Sunga*

Accessesion No.	-	SUGH – 34
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta.
Size	-	5.5x4.4cm
Description	**-**	It is a broken Terracotta plaque showing the bust of a female.



Fig. No. 200: Head of mother goddess, *Sunga*

Accessesion No.	-	SUGH – 72
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta.
Size	-	7.5x5.8cm
Description	**-**	It is a broken Terracotta plaque showing the head of mother goddess.



Fig. No. 201: Lower portion of a female, *Sunga*

Accessesion No.	-	SUGH - 128
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta.
Size	-	10.3x6.8cm
Description	**-**	It is a broken Terracotta piece showing lower portion of female.



Fig. No. 202: Female figure, *Sunga*

Accessesion No.	-	SUGH - 87
Provenance	-	*Sugh*, District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta.
Size	-	8x4.5cm
Description	**-**	It is a terracotta plaque showing a female figure.



Fig. No. 203: Female bust, *Sunga*

Accessesion No.	-	SUGH - 81
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Sunga*
Material	-	Terracotta.
Size	-	6.5x6.3cm
Description	-	It is a broken terracotta plaque showing a female bust.

The *Kushan* Terracotta: There are 37 terracotta belonging to this period and their catalogue is as follows:



Fig. No. 204: TC tablet, *Kushan*

Accession No.	-	AHCH – 61
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	4x3cm
Description	-	It is a terracotta tablet carved with *Triratna* symbol.



Fig. No. 205: TC disc, *Kushan*

Accession No.	-	AHCH – 78
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	4.2x4.2cm
Description	-	It is a terracotta disc carved with *Triratna* symbol.



Fig. No. 206: Human head, Kushan

Accession No.	-	AHCH – 60
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	3.3x2.1
Description	-	It is a human head.



Fig. No. 207: Human head, *Kushan*

Description - It is the side view of the head.



Fig. No. 208: TC Human figure, *Kushan*

Accession No.	-	AHCH – 51
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	5x3.5cm
Description	-	It is a terracotta broken human figure.



Fig. No. 209: TC disc, *Kushan*

Accession No.	-	AHCH – 63
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	4x4.2cm
Description	-	It is a terracotta Disc decorated with incised lines crescent and whorl.



Fig. No. 210: TC Disc, *Kushan*

Description - It is obverse of Fig no. 209.



Fig. No. 211: TC human head, *Kushan*

Accession No.	-	AHCH - 52
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	4x3cm
Description	-	It is terracotta human head.



Fig. No. 212: TC human head, *Kushan*

Description - It is side view of Fig no. 211.



Fig. No. 213: TC female head, *Kushan*

Accession No.	-	AHCH – 50
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	5.8x4.2cm
Description	-	It is a female head with a large turban on the right side.



Fig. No. 214: TC female head, *Kushan*

Description - It is side view of Fig no. 213.



Fig. No. 215: TC human head, *Kushan*

Accession No.	-	AHCH – 54
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	6x3.8cm
Description	-	It is a terracotta human head



Fig. No. 216: TC human head, *Kushan*

Accession No.	-	AHCH – 84
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	1.5x1.5cm
Description	-	It is a broken human head.



Fig. No. 217: TC broken peace of *Hariti, Kushan*

Accession No.	-	AHCH – 27
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	6.8x3cm
Description	-	It is a broken piece of *Hariti*.



Fig. No. 218: TC plaque, *Kushan*

Accession No.	-	AHCH - 29
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	6x5cm
Description	-	It is terracotta plaque showing horse headed *Yakshini*.



Fig. No. 219: TC stamp, *Kushan*

Accession No.	-	AHCH - 33
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	3x3.5cm
Description	-	It is terracotta stamp seen from the stamping side.



Fig. No. 220: TC turtle, *Kushan*

Accession No. - SUGH – 217
Provenance - *Sugh,* District *Yamuna Nagar, Haryana*
Period - *Kushan*
Material - Terracotta
Description - It is a terracotta turtle.



Fig. No. 221: Side view of TC turtle

Description - It is a terracotta turtle seen from the side.



Fig. No. 222: TC human figure, *Kushan*

Accession No.	-	AHCH - 34
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	7x6cm
Description	-	It is a terracotta human figure carrying a basket.



Fig. No. 223: TC piece showing Human head, *Kushan*

Accession No.	-	AHCH – 38
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	6.3x4.2cm
Description	-	It is a terracotta piece showing Human head looking from an eye shaped opening.



Fig. No. 224: TC stamp, *Kushan*

Period	-	*Kushan*
Material	-	Terracotta
Description	-	It is a *triratna* Stamp.



Fig. No. 225: TC stamp, *Kushan*

Description - It is other side of the fig. no. 224 showing three concentric circles.



Fig. No. 226: TC unidentified animal, *Kushan*

Period - *Kushan*

Material - Terracotta

Description - It is terracotta unidentifiable animal.



Fig. No. 227: TC bird, *Kushan*

Period	-	*Kushan*
Material	-	Terracotta
Description	-	It is a terracotta bird.



Fig. No. 228: TC bird, *Kushan*

Period	-	*Kushan*
Material	-	Terracotta
Description	-	It is side view of terracotta bird.



Fig. No. 229: TC human head, *Kushan*

Accession No.	-	AHCH – 24
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	7x5.5cm
Description	-	It is a terracotta human head.



Fig. No. 230: TC human head, *Kushan*

Description - It is the side view of human head.



Fig. No. 231: TC bird, *Kushan*

Accession No.	-	SUGH - 193
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	3.8x3.2cm
Description	-	It is a terracotta bird looking from the top.



Fig. No. 232: TC bird, *Kushan*

Description	-	It is a terracotta bird looking from side.



Fig. No. 234: TC bird, *Kushan*

Accession No.	-	SUGH – 201
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	7.1x3.3 cm
Description	-	It is a terracotta bird.



Fig. No. 235: TC bird, *Kushan*

Accession No.	-	SUGH - 193
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	3.8x3.2cm
Description	-	It is a terracotta bird.



Fig. No. 236: TC bird, *Kushan*

Description	-	It is a terracotta bird seen from the side.



Fig. No. 237: TC Disc, *Kushan*

Accession No.	-	SUGH – 190
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	4.2x4.2cm
Description	-	It is a terracotta disc.



Fig. No. 238: Anthropomorphic female figure, *Kushan*

Period	-	*Kushan*
Material	-	Terracotta
Description	-	It is an anthropomorphic female figure.



Fig. No. 239: TC female head, *Kushan*

Period - *Kushan*
Material - Terracotta
Description - It is a female Head



Fig. No. 240: Human Head, *Kushan*

Accession No.	-	SUGH - 144
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	5.1x3.8
Description	-	It is a human head.



Fig. No. 241: Female Figure in standing Posture, *Kushan*

Accession No.	-	SUGH – 136
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	10x6.4cm
Description	-	It is a female figure in standing posture.



Fig. No. 242: Grotesque Human head, *Kushan*

Accession No.	-	SUGH – 105
Provenance	-	*Sugh*, District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	3.6x3cm
Description	-	It is a grotesque Human head.



Fig. No. 243: Female bust, *Kushan*

Accession No.	-	SUGH – 146
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	6x4.5cm
Description	-	It is a female bust.



Fig. No. 244: Female bust

Description - It is female bust seen from the side.



Fig. No. 245: Female head, *Kushan*

Accession No.	-	SUGH – 28
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	3.9x3.6cm
Description	-	It is a female head.



Fig. No. 246: Bust of the *Hariti*, *Kushan*

Accession No.	-	SUGH – 160
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	5.7x6.1cm
Description	-	It is bust of the *Hariti* holding a child.



Fig. No. 247: TC Human head, *Kushan*

Accession No.	-	SUGH – 142
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	3.8x4.8cm
Description	-	It is a terracotta human head.



Fig. No. 248: Anthropomorphic figure, Kushan

Accession No.	-	SUGH – 163
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	4.3x5cm
Description	-	It is an anthropomorphic figure.



Fig. No. 249: TC Female in standing posture, *Kushan*

Accession No.	-	SUGH _ 117
Provenance	-	*Sugh,* District *Yamuna Nagar , Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	9.8x8.4cm
Description	-	It is terracotta Female in standing posture. She is holding her hair.



Fig. No. 250: Bird head, *Kushan*

Accession No.	-	SUGH – 12
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	7x4.5cm
Description	-	It is a terracotta bird head.



Fig. No. 251: TC Human head, *Kushan*

Accession No.	-	SUGH – 143
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	5.2x5cm
Description	-	It is a terracotta human head



Fig. No. 252: TC Human Head, *Mauryan*

Accession No.	-	SUGH – 171
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	3.5x2.2cm
Description	-	It is terracotta human head



Fig. No. 253: Female bust, Kushan

Accession No.	-	SUGH – 151
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	7.8x5.6cm
Description	-	It is a terracotta female bust



Fig. No. 254: TC Human Head, Kushan

Accession No.	-	SUGH – 6
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	3.2x3.4cm
Description	-	It is a terracotta human Head



Fig. No. 255: TC human head, *Kushan*

Accession No.	-	SUGH – 110
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta
Size	-	2x1.8cm
Description	-	It is a terracotta human head



Fig. No. 256: TC male head, *Kushan*

Accession No.	-	SUGH – 46
Provenance	-	*Sugh*, District *Yamuna Nagar, Haryana*
Period	-	*Kushan*
Material	-	Terracotta.
Size	-	2.8x1.7cm
Description	-	It is a terracotta male head.

The *Gupta* Terracotta: There are 51 terracotta belonging to this period and their catalogue is as follows:



Fig. No. 257: TC bull, *Gupta*

Accession No.	-	AHCH – 76
Provenance	-	*Ahichchhatra* District *Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	3.5x1.7cm
Description	-	It is the image of a bull in sitting posture.



Fig. No. 258: TC Tablet, *Gupta*

Accession No.	-	AHCH – 70
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh.*
Period	-	*Gupta.*
Material	-	*Terracotta*
Size	-	3.8x3 cm
Description	-	It is a terracotta tablet carved with unidentifiable motif.



Fig. No. 259: TC Tablet, *Gupta*

Description - It is reverse side of Fig no. 258.



Fig. No. 260: Male head, *Gupta*

Accession No.	-	AHCH – 83
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	2x1cm
Description	-	It is a male head.



Fig. No. 261: TC Male head, *Gupta*

Accession No.	-	SUGH – 52
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Gupta*
Material	-	Terracotta
Size	-	3.2x3.6cm
Description	**-**	It is a terracotta male head.



Fig. No. 262: Female bust, *Gupta*

Accession No.	-	AHCH – 56
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	3.5x4.2cm
Description	-	It is headless female bust.



Fig. No. 263: Upper portion of a male deity, *Gupta*

Accession No.	-	AHCH – 43
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	9.2x5.3cm
Description	-	It is a broken piece of Terracotta plaque showing the upper portion of a male deity in standing posture holding flowers in both hands. Human head of his attendant is visible in front.



Fig. No. 264: TC Human head, *Gupta*

Accession No.	-	SUGH – 107
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	4x2cm
Description	-	It is a terracotta human head.



Fig. No. 265: Human head

Description - It is side view of Fig no. 264.



Fig. No. 266: Human head

Description - It is also the side view of Fig no. 48.



Fig. No. 267: TC Human head, *Gupta*

Accession No.	-	AHCH – 44
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	4.5x3.5cm
Description	-	It is a terracotta human head.



Fig. No. 268: Human head

Description - It is side view of Fig no. 267.



Fig. No. 269: Human head

Description - it is side view of Fig no. 267.



Fig. No. 270: TC Bird, *Gupta*

Accession No.	-	AHCH – 57
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	5x2.5cm
Description	-	It is a terracotta Bird.



Fig. No. 271: TC bird

Description - It is other side of the Bird shown in Fig no. 270.



Fig. No. 272: TC Elephant, *Gupta*

Accession No.	-	AHCH – 62
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	3.4x2.3cm
Description	-	It is terracotta elephant.



Fig. No. 273: Human head, *Gupta*

Accession No.	-	AHCH – 59
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	3.5x3.2cm
Description	-	It is a human head.



Fig. No. 274: TC conch shell, *Gupta*

Accession No.	-	AHCH – 45
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	4.5x3.3cm
Description	-	It is terracotta conch shell.



Fig. No. 275: TC Boar, *Gupta*

Accession No.	-	AHCH - 10
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	5.3x2.3cm
Description	-	It is terracotta boar.



Fig. No. 276: TC Boar

Description - It is other side of Fig no. 275.



Fig. No. 277: Human bust, *Gupta*

Accession No.	-	AHCH - 11
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	5x11.2cm
Description	-	It is a plaque showing human bust having curly hairs.



Fig. No. 278: Broken TC Elephant, *Gupta*

Accession No.	-	AHCH - 8
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	6x3.1cm
Description	-	It is a broken terracotta elephant.



Fig. No. 279: TC female head, *Gupta*

Accession No.	-	AHCH – 28
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	6x5.5cm
Description	-	It is a terracotta female head.



Fig. No. 280: Female head

Description - Side view of Fig no. 279.



Fig. No. 281: TC Elephant, *Gupta*

Provenance	-	*Sankissa,* District *Farrukhabad, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	4.2x3.5
Description	-	It is the figure of a terracotta Elephant.



Fig. No. 282: TC elephant

Description - It is the other side of fig. no. 281.



Fig. No. 283: TC human head, *Gupta*

Accession No.	-	AHCH - 9
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	5.1x4.7cm
Description	-	It is a terracotta Human Head.



Fig. No. 284: TC figure of *Ganesh, Gupta*

Period - *Gupta*

Material - Terracotta

Description - It is terracotta mould of *Ganesh*.



Fig. No. 285: Bust of *Naigmeshi*, *Gupta*

Period - *Gupta*

Material - Terracotta

Description - It is terracotta bust of *Naigmeshi*.



Fig. No. 286: TC Human head, *Gupta*

Accession No.	-	AHCH – 18
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	6.3x5cm
Description	-	It is a terracotta Human Head.



Fig. No. 288: Bust of *Naigameshi, Gupta*

Accession No.	-	AHCH - 26
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	7.2x5.2cm
Description	**-**	It is the bust of *Naigameshi*.



Fig. No. 289: Broken TC elephant, *Gupta*

Accession No.	-	AHCH - 23
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Description	-	It is a broken terracotta Elephant.



Fig. No. 290: TC human head, *Gupta*

Accession No.	-	AHCH – 39
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	4.5x4cm
Description	-	It is a terracotta human head.



Fig. No. 291: TC figure of mother and child, *Gupta*

Accession No.	-	AHCH - 41
Provenance	-	*Ahichchhatra , District Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	7.5x4cm
Description	-	It is terracotta figuring of a mother with child squatting on the ground.



Fig. No. 292: TC man in standing posture, *Gupta*

Accession No.	-	SUGH – 118
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Gupta*
Material	-	Terracotta
Size	-	7.9x5.9cm
Description	**-**	It is terracotta plaque showing a man in standing posture.



Fig. No. 293: TC pot

Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Gupta*
Material	-	Terracotta
Size	-	5.3x3.7 cm
Description	**-**	It is terracotta miniature pot.



Fig. No. 294: Head of a bird, *Gupta*

Period - *Gupta*

Material - Terracotta

Description **-** It is the head of a terracotta bird.



Fig. No. 295: TC bird, *Gupta*

Description - It is other side of the fig. no. 294.



Fig. No. 296: Broken human face, *Gupta*

Accession No.	-	SUGH – 224
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	3.2x2.7cm
Description	-	It is a broken human face.



Fig. No. 297: Human Head, *Gupta*

Period	**-**	*Gupta*
Material	-	Terracotta
Description	**-**	It is a grotesque Human Head.



Fig. No. 298: Terracotta Plaque showing a female bust, *Gupta*

Period	**-**	*Gupta*
Material	-	Terracotta
Description	-	It is a terracotta Plaque showing a female bust



Fig. No. 299: Bust of a man, *Gupta*

Period - *Gupta*

Material - Terracotta

Description - It is bust of a man wearing ornaments.



Fig. No. 300: Terracotta Porcupine, *Gupta*

Accession No.	-	SUGH – 205
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	4.5x2.5cm
Description	**-**	It is a terracotta porcupine looking from the top.



Fig. No. 301: TC porcupine, *Gupta*

Description - It is side view of the terracotta porcupine.



Fig. No. 302: TC Bull, *Gupta*

Accession No.	-	SUGH – 216
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	4.2x1.7cm
Description	-	It is a bull in sitting posture.



Fig. No. 303: Terracotta Human head, *Gupta*

Accession No.	-	AHCH – 37
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	6x4.7cm
Description	-	It is a terracotta human head.



Fig. No. 304: TC human head, *Gupta*

Description - It is side view of the human head.



Fig. No. 305: Female Head, *Gupta*

Accession No.	-	AHCH – 25
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	5x3.8 cm
Description	-	It is a piece of terracotta plaque showing female head.



Fig. No. 306: Terracotta Boar, *Gupta*

Period - *Gupta*

Material - Terracotta

Description - It is a broken terracotta boar.



Fig. No. 307: TC boar, *Gupta*

Description - It is terracotta boar seen from the other side.



Fig. No. 308: Head of a Boy, *Gupta*

Accession No.	-	SUGH – 181
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	8.3x5.5cm
Description	-	It is head of a boy.



Fig. No. 309: Boy head, *Gupta*

Description: - It is side view of the head shown in Fig no. 308.



Fig. No. 310, TC Human Head, *Gupta*

Accession No.	-	SUGH – 134
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	5.4x6.1cm
Description	-	It is terracotta plaque showing a human head.



Fig. No. 311, Mother with child, *Gupta*

Accession No.	-	SUGH – 140
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	6.2x5.5cm
Description	-	It is mother with child.



Fig. No. 312: Male with a dwarf, *Gupta*

Period **-** *Gupta*
Material - Terracotta
Description **-** It is a male standing with a dwarf.



Fig. No. 313: Male figure, *Gupta*

Accession No.	-	Sugh – 139
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	8x5.8cm
Description	**-**	It is a male in standing posture with his left hand held *akimbo*.



Fig. No. 314: Female Head, *Gupta*

Accession No.	-	SUGH - 154
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Gupta*
Material	-	Terracotta
Size	-	4.3x5.5cm
Description	**-**	It is female head.



Fig. No. 314: Human Head, *Gupta*

Accession No.	-	SUGH - 147
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Gupta*
Material	-	Terracotta
Size	-	7.1x3.6
Description	**-**	It is terracotta human head.



Fig. No. 315: Human head, *Gupta*

Period - *Gupta*
Material - Terracotta
Description - It is a human head.



Fig. No. 316: Human Head, *Gupta*

Accession No.	-	SUGH – 24
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Gupta*
Material	-	Terracotta
Size	-	3.4x3.4cm
Description	**-**	It is a terracotta human head.



Fig. No. 317: Human head, *Gupta*

Accession No.	-	SUGH – 3
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Gupta*
Material	-	Terracotta
Size	-	5.7x3.5cm
Description	**-**	It is a terracotta human head.



Fig. No. 318: Human head

Description - It is a terracotta human head seen from the side.



Fig. No. 319: Headless torso of a male, *Gupta*

Accession No.	-	SUGH – 121
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	10x8cm
Description	-	It is terracotta headless torso of a male holding his left hand akimbo and right hand in *abhaya mudra*.



Fig. No. 320: Male torso, *Gupta*

Accession No.	-	SUGH – 112
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	15.2x11.4cm
Description	-	It is a terracotta male torso.



Fig. No. 321: Human head, *Gupta*

Accession No.	-	SUGH – 38
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Gupta*
Material	-	Terracotta
Size	-	6.2x4cm
Description	**-**	It is a terracotta human head.



Fig. No. 322: TC head of a monkey, *Gupta*

Accession No.	-	SUGH – 13
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	3.7x3cm
Description	-	It is a terracotta head of a monkey seen from the side.



Fig. No. 323: TC head of a monkey

Material - Terracotta

Description - It is a terracotta head of a monkey seen from the front.



Fig. No. 324: TC Male head, *Gupta*

Period - *Gupta*

Material - Terracotta

Description - It is a terracotta male head.



Fig. No. 325: TC male head, *Gupta*

Accession No.	-	SUGH – 29
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Gupta*
Material	-	Terracotta
Size	-	4.8x3.5cm
Description	**-**	It is terracotta male head.



Fig. No. 326: Male head, *Gupta*

Description - It is a terracotta male head seen from the side.



Fig. No. 327: Human head, *Gupta*

Accession No.	-	SUGH – 39
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Gupta*
Material	-	Terracotta
Size	-	3.9x3.6cm
Description	**-**	It is a human head.



Fig. No. 328: Female bust, *Gupta*

Accession No.	-	SUGH – 47
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	5.2x4.2cm
Description	-	It is female bust.



Fig. No. 329: Image of *Ganesh, Gupta*

Accession No.	-	AHCH -12
Period	**-**	*Gupta*
Material	-	Terracotta
Size	-	7.3x4.1cm
Description	**-**	It is an image of two handed *Ganesh* seated on a pedestal.



Fig. No. 330: TC male head, *Gupta*

Accession No.	-	SUGH 78
Provenance	-	*Sugh*, District *Yamuna Nagar, Haryana*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	6x4.8cm
Description	-	It is terracotta male head.



Fig. No. 331: TC male head, *Gupta*

Period - *Gupta*

Material - Terracotta

Description - It is a terracotta male head.



Fig. No. 332: TC female head, *Gupta*

Accession No.	-	SUGH – 56
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	4.9x4.5cm
Description	-	It is a terracotta female head.



Fig. No. 333: TC Human Head, *Gupta*

Accession No.	-	SUGH - 44
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Gupta*
Material	-	Terracotta.
Size	-	2.6x1.9cm
Description	**-**	It is a terracotta human head.



Fig. No. 334: Torso of a male, *Gupta*

Accession No.	-	SUGH – 58
Provenance	-	*Sugh*, District *Yamuna Nagar, Haryana*
Period	-	*Gupta*
Material	-	Terracotta.
Size	-	7x7cm
Description	-	It is a broken TC plaque showing the torso of a male.



Fig. No. 335: Turbaned human head, *Gupta*

Accession No.	-	SUGH – 80
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Gupta*
Material	-	Terracotta
Size	-	4.6x3cm
Description	-	It is a turbaned human head.



Fig. No. 336: TC Boar, *Gupta*

Accession No.	-	SUGH – 188
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	**-**	*Gupta*
Material	-	Terracotta
Size	-	5.8x2.7cm
Description	**-**	It is terracotta Boar.



Fig. No. 337: TC elephant, *Gupta*

Period - *Gupta*

Material - Terracotta

Description - It is a terracotta elephant.



Fig. No. 338: TC elephant, *Gupta*

Description - It is a terracotta elephant.

The *Medieval* Terracotta: There are 01 terracotta belonging to this period and their catalogue is as follows:



Fig. No. 339: Miniature *shivalingas,* Medieval

Accessesion No.	-	AHCH - 71
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	**-**	Medieval
Material	-	Stone
Size	-	3x3.5cm
Description	-	It is a nine stone *shivalingas*.



Fig. No. 340: Side view of *shivalingas*, Medieval

Description - It is the side view of Fig. no. 339.

The *Modern* Terracotta: There are 03 terracotta belonging to this period and their catalogue is as follows:



Fig. No. 341: Crowned human head, Modern

Accessesion No.	-	SUGh -111
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	Modern
Material	-	Terracotta
Size	-	6.3x4.2cm
Description	**-**	It is a crowned human head.



Fig. No. 342: TC head of *Hanuman*, Modern

Accessesion No.	-	SUGH – 7
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Period	-	*Modern*
Material	-	Terracotta
Size	-	5.7x4cm
Description	-	It is a terracotta head of *Hanuman*.



Fig. No. 343: TC animal, Modern

Accessesion No.	-	AHCH - 73
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Period	-	Modern
Material	-	Terracotta
Size	-	2.6x1.5cm
Description	-	It is a terracotta animal

Miscellaneous Terracottas: There are 26 terracotta belonging to this period and their catalogue is as follows:



Fig. No. 344: TC object

Accessesion No.	-	AHCH - 49
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Material	-	Terracotta
Size	-	3.5x2.8cm
Description	-	It is a terracotta object.



Fig. No. 345: TC tablet

Accessesion No.	-	AHCH - 66
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Material	-	Terracotta
Size	-	2.8x2.7cm
Description	-	It is a terracotta tablet carved with three parallel lines.



Fig. No. 346: Hemispherical object

Accessesion No.	-	AHCH – 79
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Material	-	Terracotta
Size	-	2.1x3cm
Description	-	It is a fluted hemispherical object with a depression on the lower side.



Fig. No. 347: TC games

Accessesion No.	-	AHCH – 65
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Material	-	Terracotta
Size	-	2.8x2.5cm
Description	-	It is a terracotta game decorated with dots.



Fig. No. 348: Grooved ball

Accessesion No.	-	AHCH – 68
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Material	-	Terracotta
Size	-	2.5x2.5cm
Description	-	It is a grooved ball

-



Fig. No. 349: TC *Chakra*

Accessesion No.	-	AHCH – 82
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Material	-	Terracotta
Size	-	1.5x1.5cm
Description	-	It is a terracotta *chakra*.



Fig. No. 350: TC chariot

Accessesion No.	-	AHCH - 40
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Material	-	Terracotta
Size	-	8.1x6cm
Description	-	It is a terracotta Chariot.



Fig. No. 351: Ink pot lid

Accessesion No.	-	AHCH - 1
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Material	-	Terracotta
Size	-	9.5x9.5cm
Description	-	It is an ink pot lid.

.



Fig. No. 352: TC ball

Accessesion No.	-	SUGH - 224
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Material	-	Terracotta
Size	-	3.2x3.2cm
Description	-	It is a t.c. ball with two circular incision dividing it in eight parts.



Fig. No. 353: Skin rubber

Accessesion No.	-	AHCH - 15
Provenance	-	*Ahichchhatra,* District *Bareilly, Uttar Pradesh*
Material	-	Terracotta
Size	-	10x6 cm
Description	-	It is a skin rubber.

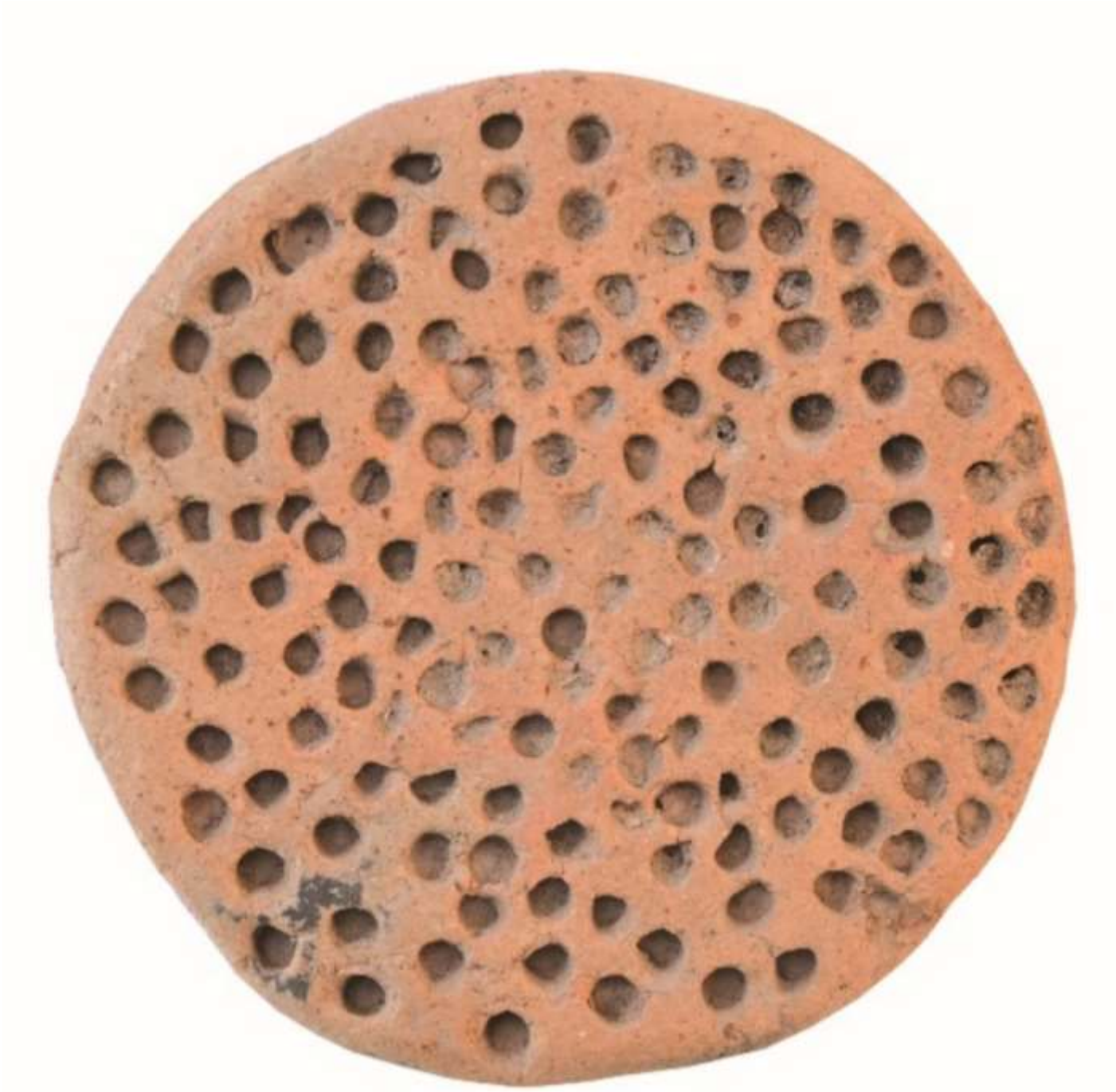


Fig. No. 354: TC Disc

Accessesion No.	-	AHCH – 31
Provenance	-	*Ahichchhatra, District Bareilly, Uttar Pradesh*
Material	-	Terracotta
Size	-	5.8x5.8cm
Description	-	It is a disc decorated with perforations.



Fig. No. 355: TC piece

Accessesion No.	-	SUGH – 198
Provenance	-	*Sugh, District Yamuna Nagar, Haryana*
Material	-	Terracotta
Description	-	It is a taurine shaped terracotta piece.



Fig. No. 366: TC ring

Accessesion No.	-	SUGH - 194
Provenance	-	*Sugh, District Yamuna Nagar, Haryana*
Material	-	Terracotta.
Size	-	5x4.9cm.
Description	**-**	It is a terracotta ring seen from the top.



Fig. No. 367: TC Ring

Accessesion No.	-	SUGH - 199
Provenance	-	*Sugh, District Yamuna Nagar, Haryana*
Material	-	Terracotta
Size	-	3.3x3.3cm.
Description	**-**	It is a terracotta ring seen from the side.



Fig. No. 368: Tc piece

Accessesion No.	-	SUGH – 225
Provenance	-	*Sugh, District Yamuna Nagar, Haryana*
Material	-	Terracotta
Size	-	3.5x3.5cm
Description	**-**	It is a terracotta piece.



Fig. No. 369: Cylindrical bead

Accessesion No.	-	SUGH – 226
Provenance	-	*Sugh, District Yamuna Nagar, Haryana*
Material	-	Terracotta
Size	-	5.3x2cm
Description	**-**	It is a cylindrical bead.



Fig. No. 370: TC disc

Accessesion No.	-	SNKS - 20
Material	-	Terracotta
Size	-	3.2x3.1cm
Description	-	It is a terracotta disc decorated with incised designs around the periphery.



Fig. No. 371: TC Chariot

Accessesion No.	-	SUGH - 185
Provenance	-	*Sugh, District Yamuna Nagar, Haryana*
Material	-	Terracotta
Size	-	9.5x10cm
Description	**-**	It is a chariot seen from the above.



Fig. No. 372: TC disc

Accessesion No.	-	SUGH – 189
Provenance	-	*Sugh, District Yamuna Nagar, Haryana*
Material	-	Terracotta
Size	-	5.2x5.3 cm
Description	**-**	It is a terracotta disc.



Fig. No. 373: TC ring

Accessesion No.	-	SUGH – 194
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Material	-	Terracotta
Size	-	5x4.9 cm
Description	**-**	It is terracotta ring.



Fig. No. 374: TC wheel

Accessesion No.	-	SUGH – 191
Provenance	-	*Sugh, District Yamuna Nagar, Haryana*
Material	-	Terracotta
Size	-	5x5cm
Description	**-**	It is a terracotta wheel.



Fig. No. 375: Human Figure

Accessesion No.	-	SUGH - 4
Provenance	-	*Sugh, District Yamuna Nagar, Haryana*
Material	-	Terracotta
Size	-	4.5x2.5cm
Description	**-**	It is a terracotta human figure seated on ground with folded hands.



Fig. No. 376: Circular TC object

Accessesion No.	-	AHCH – 67
Material	-	Terracotta
Size	-	2.4x2cm
Description	**-**	It is a circular terracotta object decorated with concentric incised circular grooves.



Fig. No. 377: Circular Terracotta

Description - It is a circular terracotta object decorated with concentric incised circular grooves.



Fig. No. 378: TC object

Material - Terracotta

Description - It is a terracotta object.



Fig. No. 379: TC Male Bust

Accessesion No.	-	SUGH – 19
Provenance	-	*Sugh, District Yamuna Nagar, Haryana*
Material	-	Terracotta
Size	-	6x4cm
Description	**-**	It is a terracotta bust of a male with his hands held akimbo.



Fig. No. 380: TC disc

Accessesion No.	-	AHCH – 20
Material	-	Terracotta
Size	-	4.7x4.7cm
Description	**-**	It is a terracotta disc decorated with flower and circle motif. The periphery of the disc wears short incised strokes.



Fig. No. 381: Other side of TC disc

Description - It is the other Side of terracotta disc of Fig no. 380.



Fig. No. 382: TC male bust

Accessesion No.	-	SUGH – 36
Provenance	-	*Sugh,* District *Yamuna Nagar, Haryana*
Material	-	Terracotta.
Size	-	6.6x3cm
Description	**-**	It is a broken terracotta male bust.

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Decorated Ceilings of Osian Temples in Rajasthan

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Osian in district Jodhpur (Rajasthan) has a group of temples belonging to 8th - 9th centuries and eleventh century. These are located in three main groups known as Brahmanical group, Sachiyamata group and Jain temple complex or Mahavira temple. The temples of 8th - 9th centuries or Pratihara period evolved in a homogeneous style representing one and the same characteristic features of all the temples, which are built about the same time and are closely related to other Pratihara temples of Central India and Gujarat. Most of the temples have usually a square *garbhagriha* attached with *antarala* and a *mukha-mandapa* or *rangamandapa*,They are generally *pancharatha* on plan and elevated on a high *jagati*. The *vedibandha* depicts *khura, kumbha, kalasa and kapota* mouldings surmounted by *jangha* and curvilinear *shikhara* of *Ngara-latina* style. The *jangha* is normally embellished with sculptured niches showing *udgamas* on the top and the *shikhara* is divided into five or seven storeys separated by the *bhumi-amalakas* on the *karnas*, while the central *bhadras* of the *shikhara* are carved with bold *chandrashala-jala*. The doorways of the temples usually have three or five *sakhas* decorated with scrolls, *patra, pushpa mithuna* and *nagapasa*. The images of river goddesses Ganga and Yamuna with attendants are also seen depicted on the *pedya,* the lower part of the door-jambs. The early temples in their *antarala* and *mukha-mandapa* are adorned with *samatala* (flat) *vitanas* decorated with full bloomed lotus medallions in the centre and some of them are ornamented with bands of *nagapasa* and *vidyadharas,* while later temples are embellished with *sama-kshipta* or *kshipta vitanas* decorative with *padma, gajatalu, kola* and other designs and motifs.

They are decorated to beautify and to make the temples more attractive. On the other hands fineness of these ceilings reflects the best creative faculty of the human mind and artists. The ceilings of Osian temples have not so far been studied with full details. The objective of this paper is to make a general survey and documentation of the temple ceilings of Osian and also to trace the origin and development of the decorative symbols along with their characteristic features and artistic importance. While describing the salient features and the constituent elements of the ceilings with their minute details, the nomenclature of each decorative motif is provided by using technical terms mentioned in the canonical texts. The types of the *vitanas* are also classified by co-relating them according to given in the texts and on the basis of their forms, shapes and

embellishment. The growth and extension of the decorative motifs is marked by comparing the ceilings of other temples by giving some selected illustrations.

The Osian temples have numerous varieties of ceilings from the earliest and primitive to very mature stages in decoration. Some of these are mutilated or damaged, a few are restored and renovated and many of these are intact, beautifully carved, good looking and well preserved illuminating their gracefulness.

The first variety of ceilings in Osian temples is a square *samatala vitana* decorated with full bloomed lotus in the center. Aparajitaprichchha calls it '*Padmashila*', literal meaning lotus shaped (*padmakara padmashila pratishtha chaturthika*, Aparajit. 147, 3). The *mukha-chatuski* and the *mandapa* of the Hari-Hara temple No. 2, the *Mukha-mandapa* of the Hari-Hara temple No. 3 and the Shiva temple (between temples Nos. 3 and 4), the *Antarala* of the Vishnu temple No. 1 (Temple No. 4), and the *Valanaka* (entrance porch) ceiling of Mahavira temple, all belonging to late eighth century and the *Antarala* of the Vishnu temple No. 2 (Temple No. 11) of mid ninth century have square flat ceilings (*vargakara samatala vitana*) beautifully carved with full bloomed lotuses in the centre. The Vishnu temple No. 2 (Temple No. 11) shows more advancement in ornamentation, where lotus is depicted within a stencilled circle and intricate design on the sides similar to Hari-Hara temple No. 2. Some of them also have corners filled with *kirtimukhas* and profusely engraved stencilled designs on the borders. Exceptionally the Hari-Hara temple No. 2 has figures of *vidyadharas* replacing *kirttimukhas* on each corner of the square.

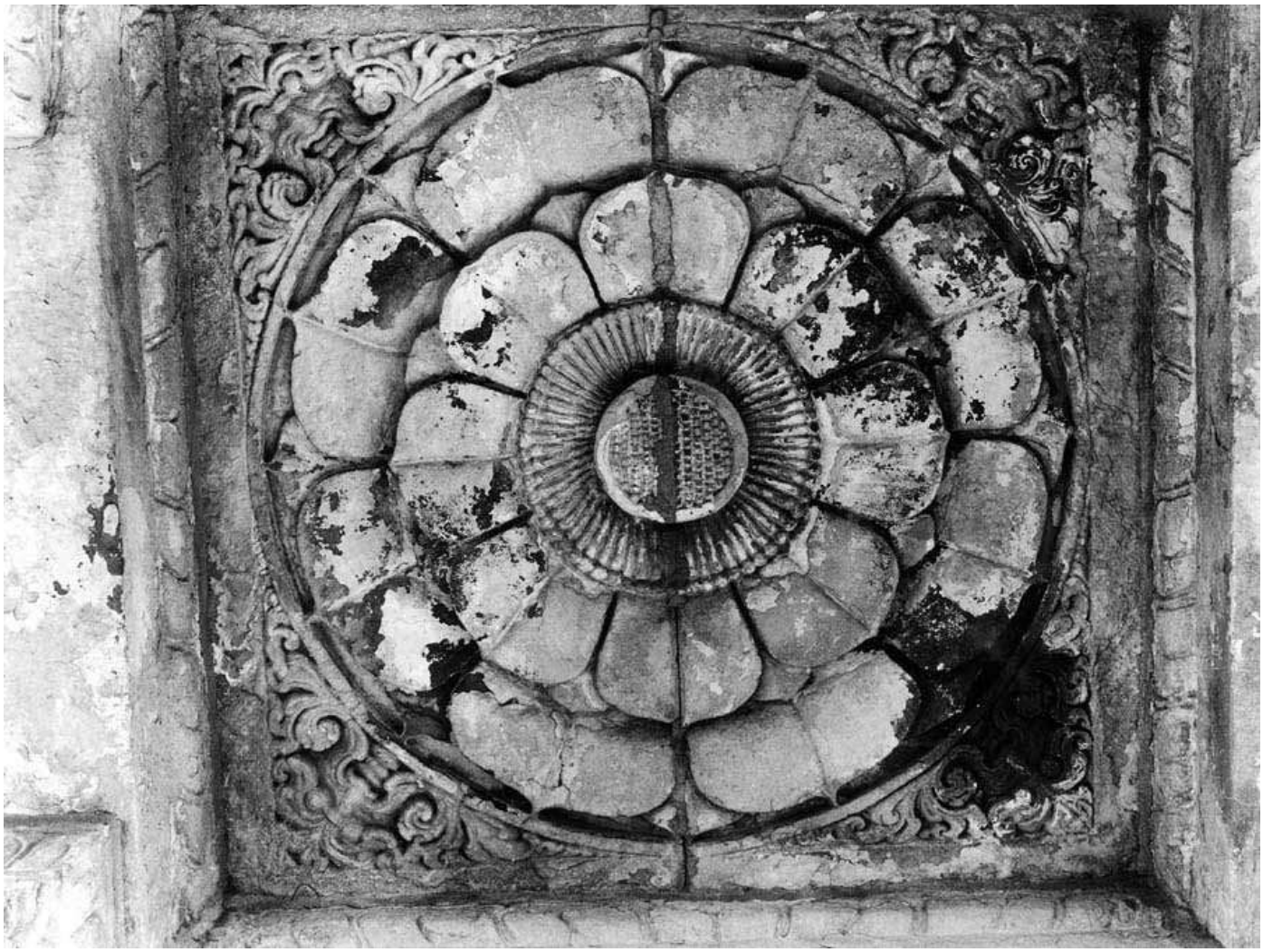


Fig. No. 01: Mukha-chatuski ceiling, Hari-Hara temple No. 2, c. 8th cent.

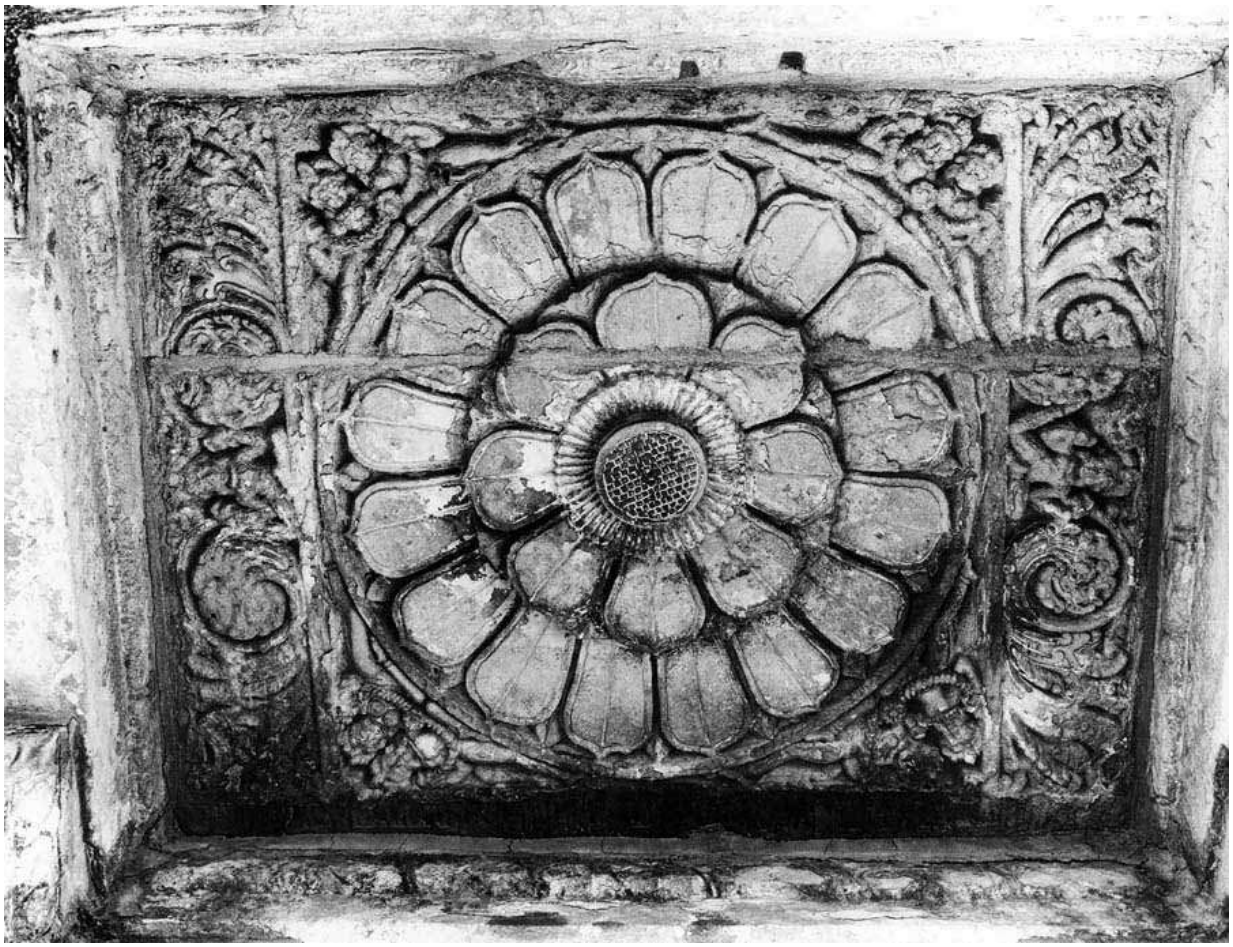


Fig. No. 02: Hari-Hara temple No. 2, r*anga-mandapa* ceiling, c. 8th cent.

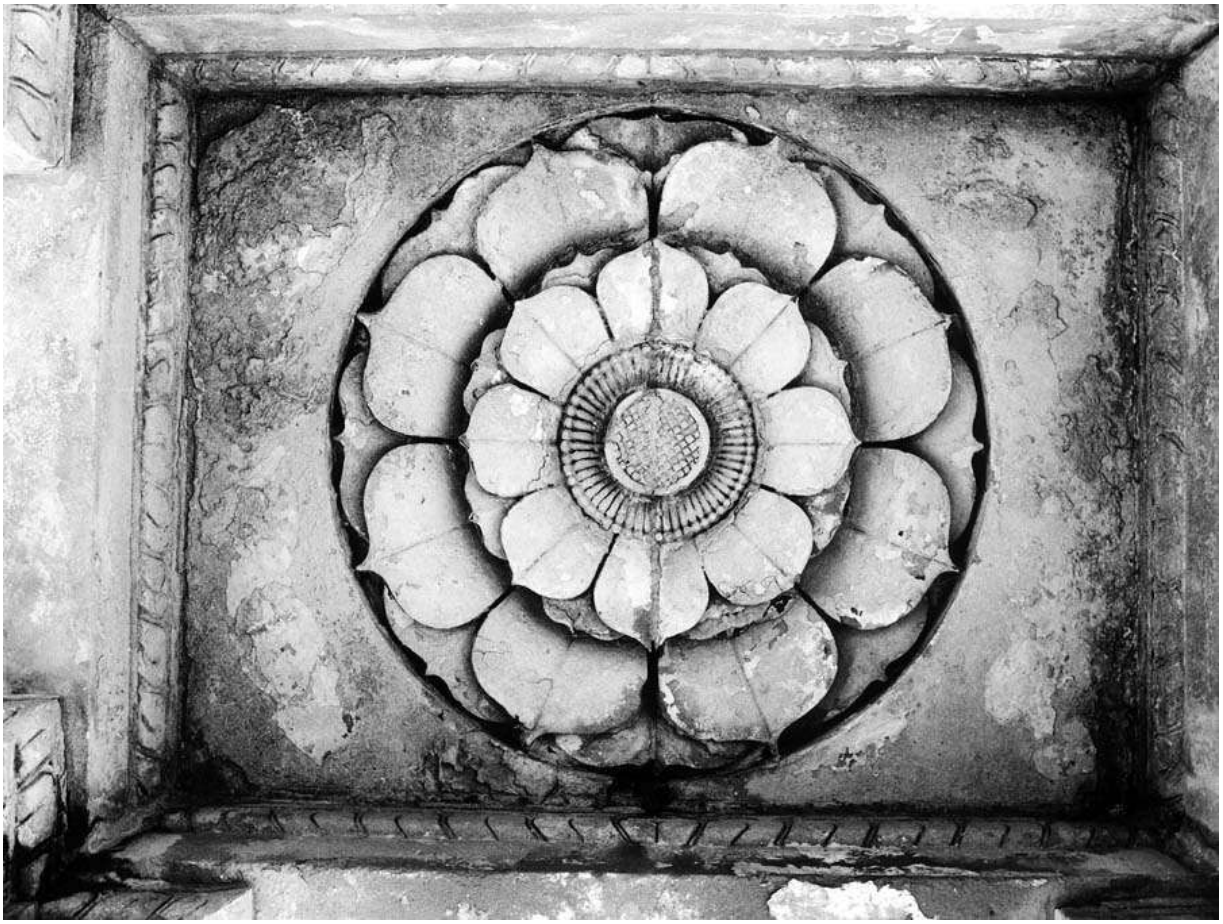


Fig. No. 03: Hari-Hara temple No. 3, *mukha-mandapa* ceiling, c. 8th cent.

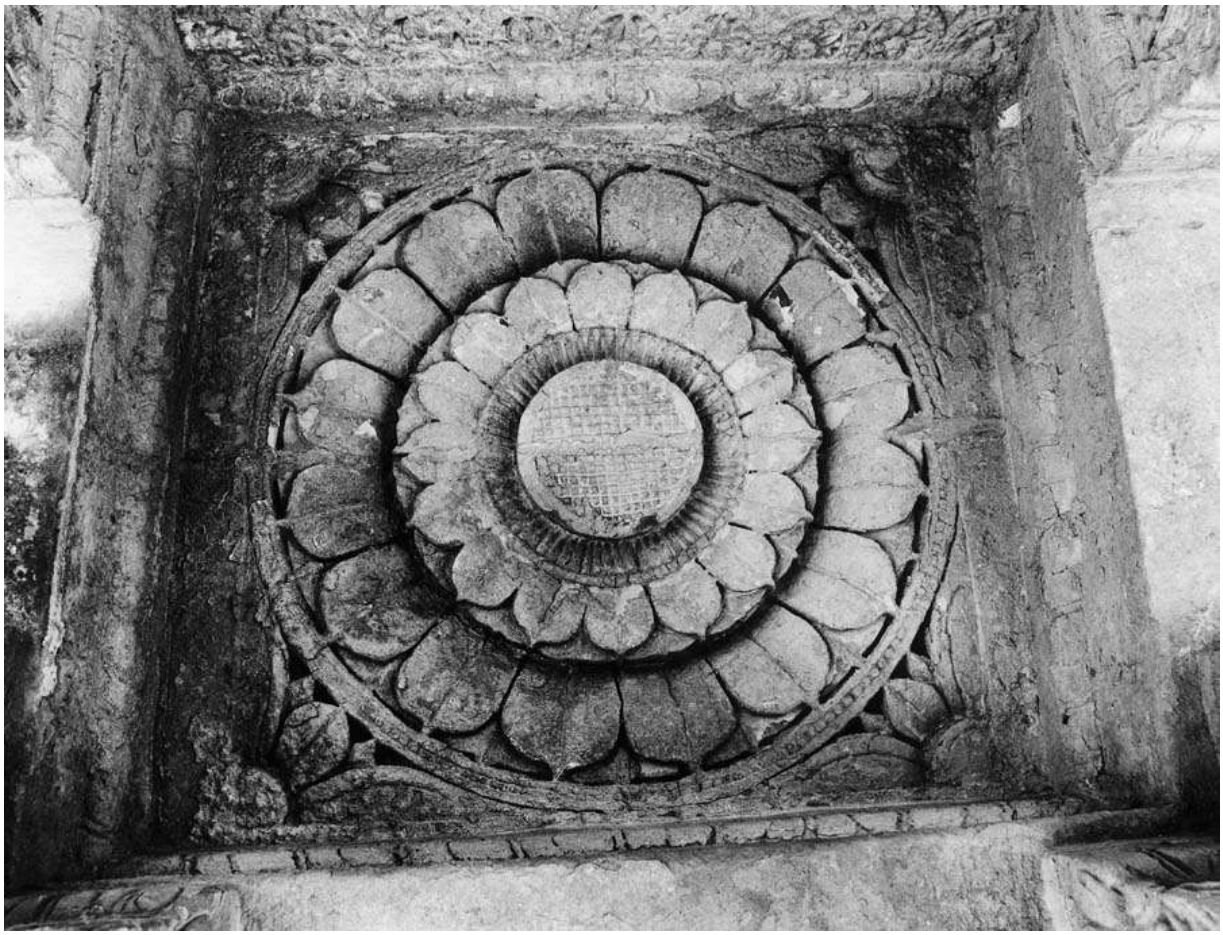


Fig. No. 04: Vishnu temple 1 (Temple 4), *antarala* ceilimg, c. 8th cent.

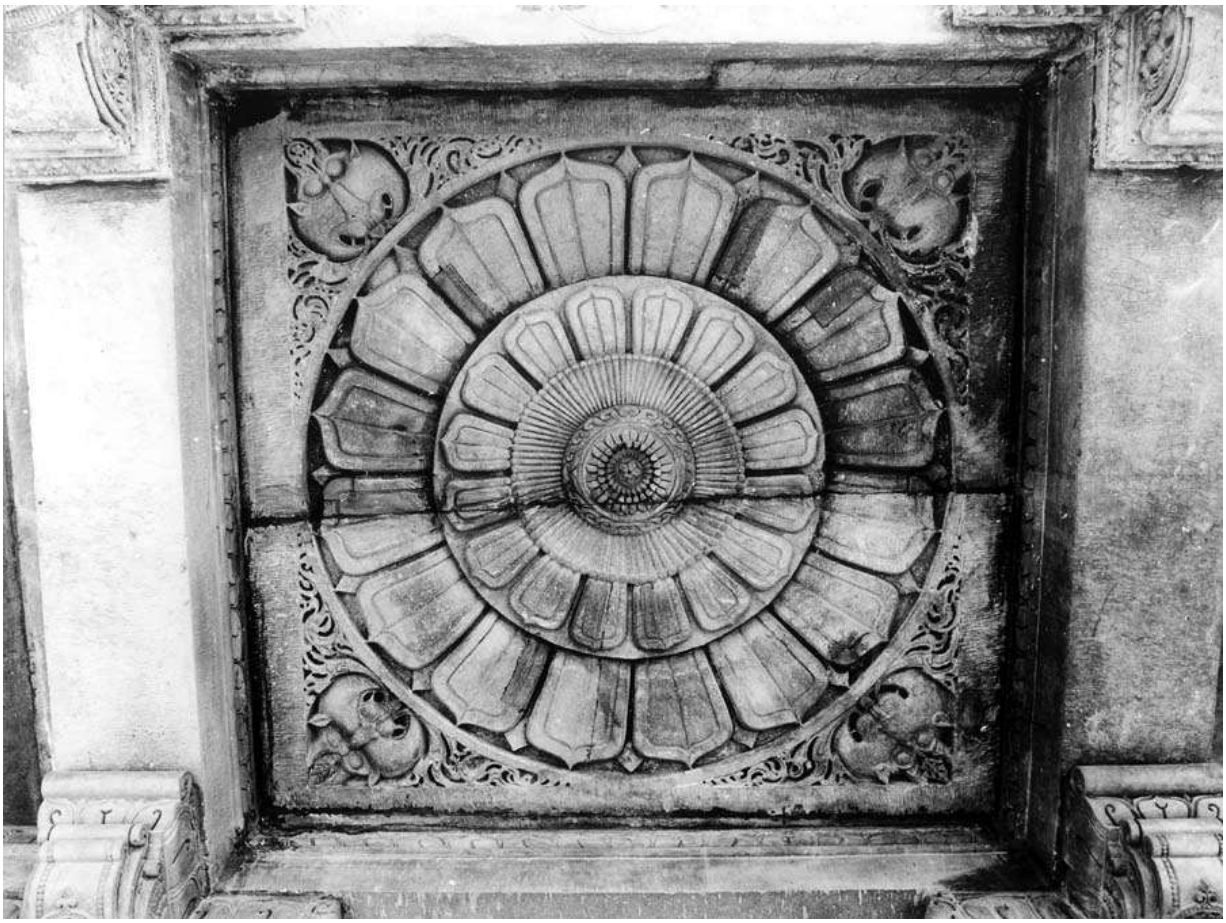


Fig. No. 05: Mahavira temple, *Valanaka* (entrance porch) ceiling, late 8th cent.

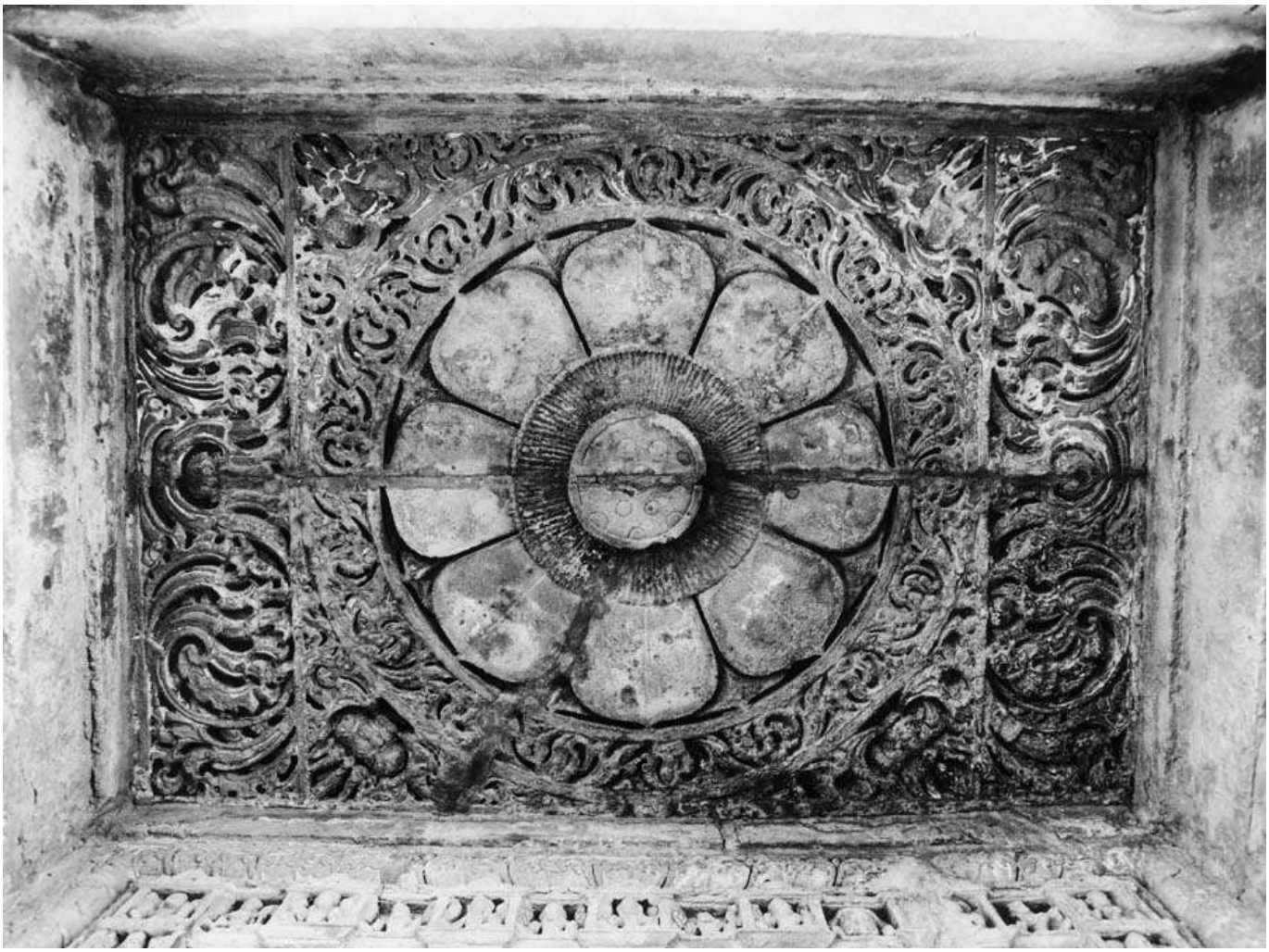


Fig. No. 06: Vishnu temple 2 (temple 11), *antarala* ceiling, mid. 9th cent.

Theses ceilings can be compared with the early ceiling of the Gupta temples and also with the ceilings of the Central India and Gujarat temples built in the same period. There is no measure difference in the lotus design. The ceilings of the Shiva temple (c. 8th cent. A. D.), at Indore, district Guna, Madhya Pradesh; the Chaturbhuja temple (875 A.D.) at Gwalior Fort, M.P. and the Sun temple at Mankhera (9th cent. A.D.), district Tikamagarha, M.P. in Central India are carved in the same pattern depicting full blossomed lotus in the centre and *kirttimukhas* on the corners of the square. Similarly the *garbgagriha* and *mukha-mandapa* of the early temples at Roda, district Sabarkantha in Gujarat are also covered with a square *samatala vitana* embellished with a full bloomed lotus decorated with two circles of lotus petals in the same archaic form as in the temples of Gupta period and early medieval Pratihara temples of Central India. Though their lotus petals are well proportioned, they are heavy and bold in carving. Apart from this, inner two circles of the medallion are presented in the shape of *padmakeshara*, the stamens of the lotus, perhaps the earliest is seen in Central India. They are bulky in shape and bear archaic character without a stamenal tube.

The ceilings of the 9th and 10th centuries temples show some advancement and betterment in beautification of the *padmashilas*, as their whorl of the lotus is formed by two or more than two

circles of overlapping petals in the centre and the corners of the square are filled with elaborately carved *kirttimukhas,* while the borders are embellished with lotus petals and richly decorated scrolls. In the Chaturbhuja temple at Gwalior Fort the corners of the square are filled with intricately carved *kirttimukhas.* The borders are decorated with lotus petals and scrolls. The floriated tailed peacocks, scrolls and *kirttimukhas* are nicely depicted in the Shiva temple at Indore. The *mukhamandapa* ceiling of *bhadra-rathika*, Jarai Math temple (late 9th cent.), Jhansi, U.P. and the ceilings of Varaha temple at Khajuraho, M.P., belonging to the early 10th century (c. 900-925 A.D.) are also represented with *samatala vitana* decorated with *padmasilas.* Here, these *padmashilas* show advancement in the ornamentation of the lotus petals and their decoration is superior to those found in the earlier temples of Osian, Gujarat and Central India.



Fig. No. 07: Mukha-mandapa ceiling, Chaturbhuja temple (875 A.D.) at Gwalior Fort

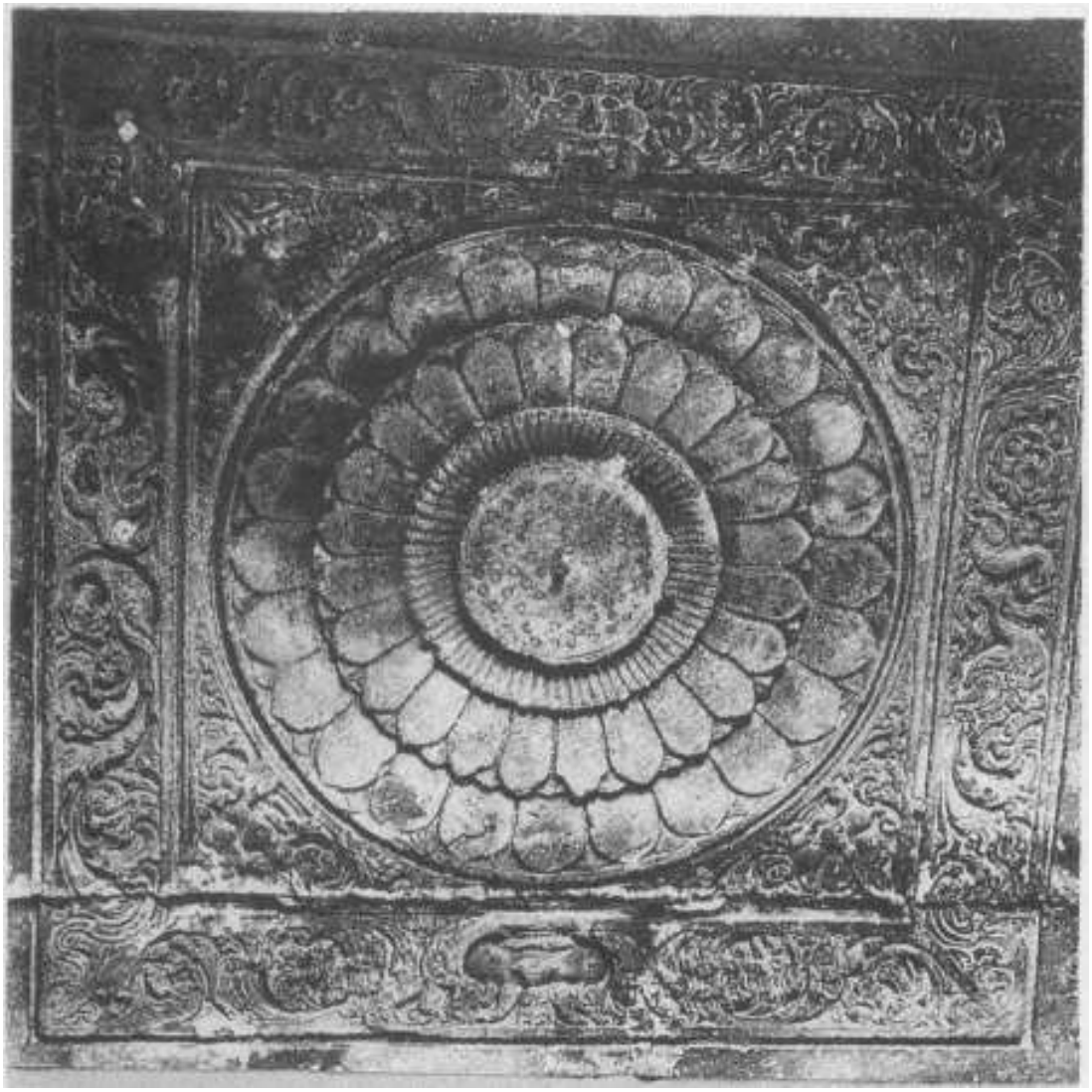


Fig. No. 08: Garbhagriha ceiling, Shiva temple, Indore, Guna, c. 8th cent. A.D.

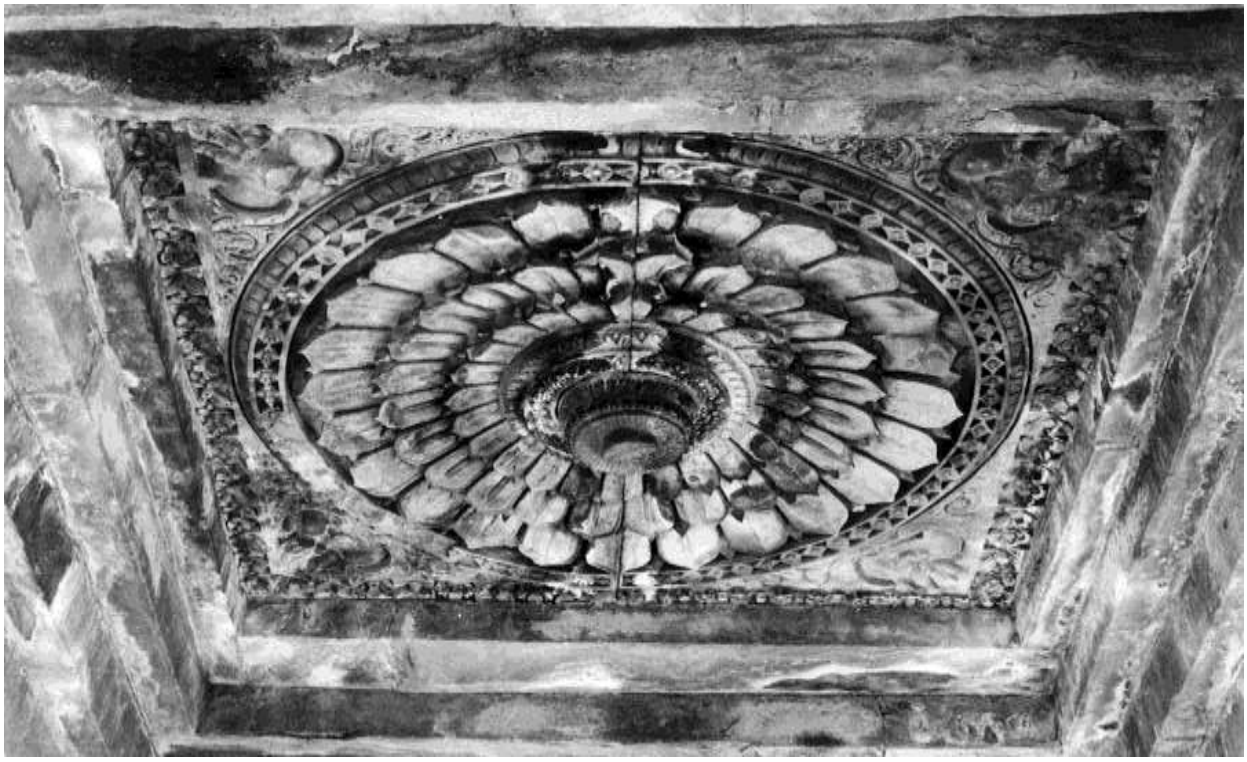


Fig. No. 09: A flat square ceilings in the *garbhagriha* of the Varaha temple, early 10th cent.

The second variety of flat ceilings is found in the *garbhgrha* of the Surya temple 3 (Temple 7) datable to late eighth century. A square intersecting another square is embellished with full bloomed lotus showing *padmakeshara* in the centre and border of the square are carved with *danturika* design. The similar form is also repeated in the *mukhamandapa vitana* of the Shiva temple (c. 8th century), located between temple No. 3 and 4. The type is perhaps earliest in North India. Later on this class of ceiling became popular and frequently found in the temples of Khajuraho and some other places in Central India, Rajasthan and Gujarat from 9th century onwards, where a set of two, three or five squares diagonally arranged in diminishing order, decorated with a full bloomed lotus in the centre are found.

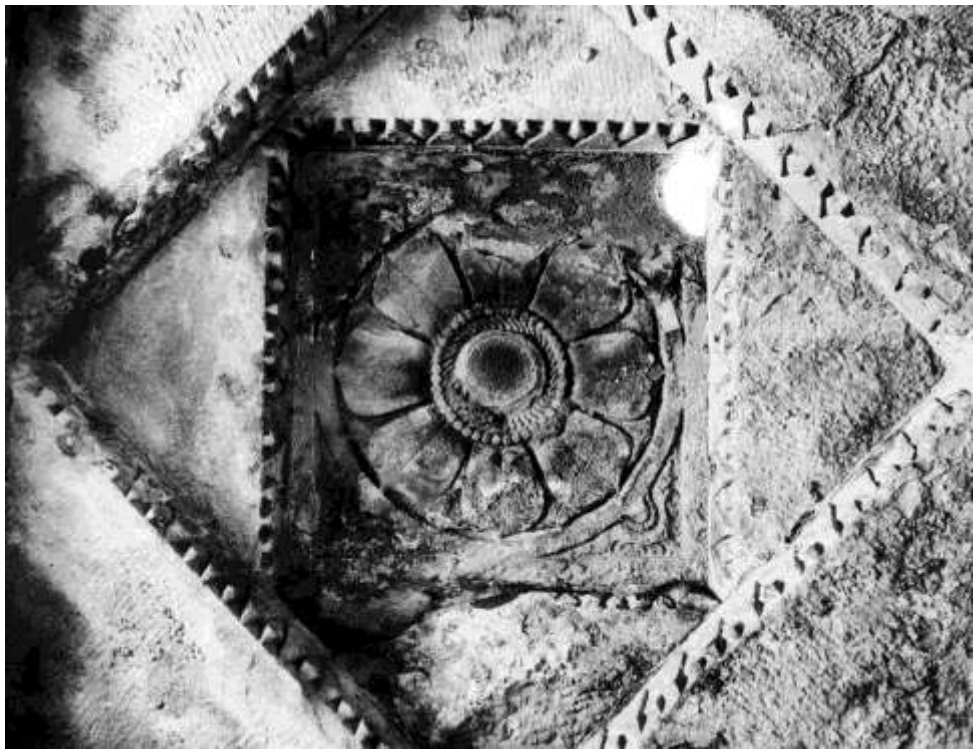


Fig. No. 10: A *samatala garbhagriha vitana*, Surya temple No. 3, Osian



Fig. No. 11: A *samatala garbhagriha vitana*, Surya temple No. 3, Osian

The ceilings of Brahma temple, one of the earliest at Khajuraho (900-925 A.D.), is represented by a square intersected by another square and decorated with full bloomed lotus is in the center.

The third type of *samatala vitana* in Osian temples is a square flat ceiling depicted in the *antarala* of the Surya temple No. 1 (c. 750 CE) situated on the Sachiyamata hill. It has a flying Garuna in the centre of a square and decoration of *nagapasa* design and *vidyadharas* on the sides. The *nagas* are shown with folded hands and the *vidyadhas* are playing with musical instruments.

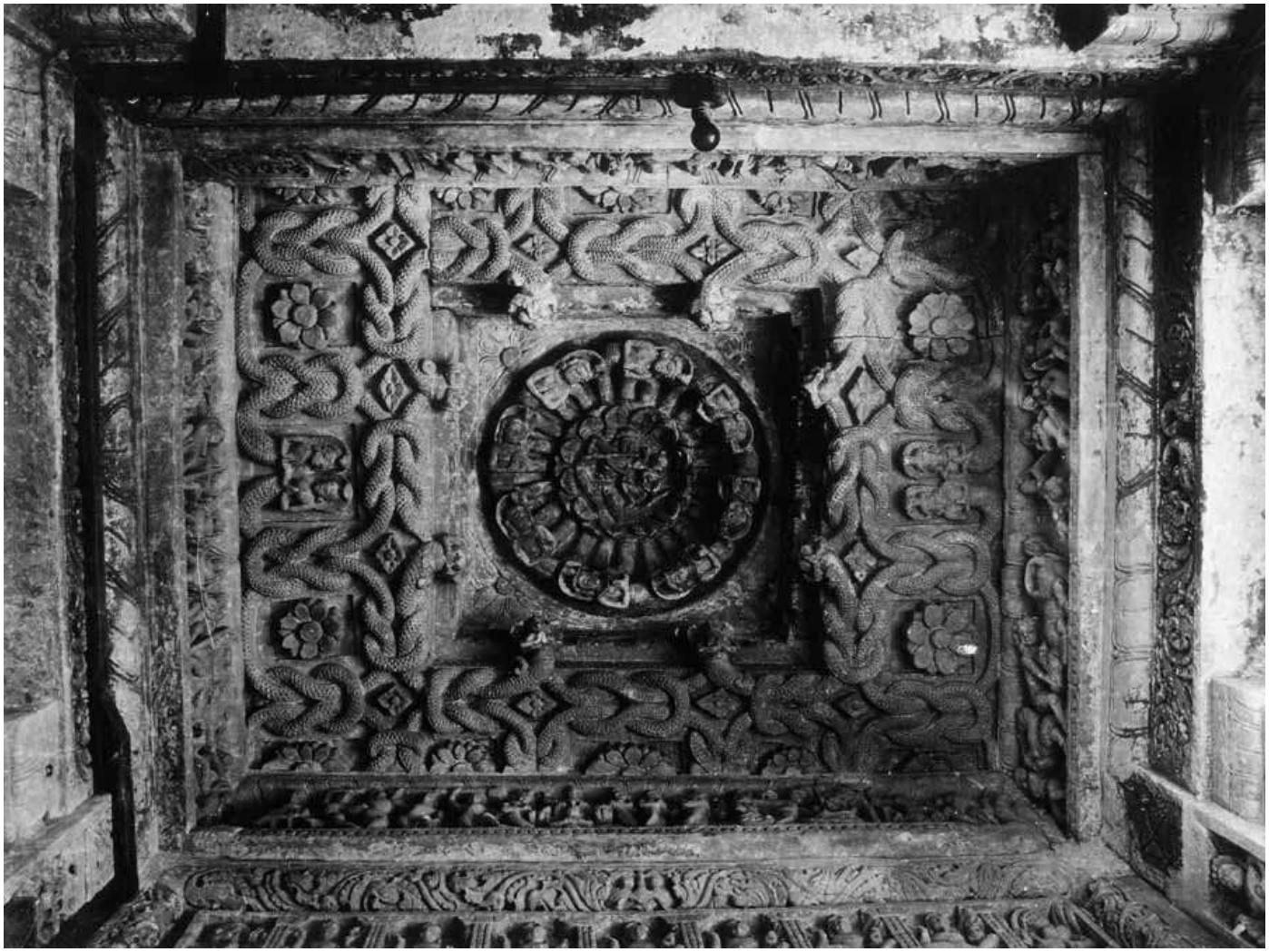


Fig. No. 12: A square *samatala vitana, antarala,* Surya temple No. 1 (c. 750 CE)

Another example is a rectangular *samatala* ceiling of the *antarala* of the Harihara temple 1 (late 8th century), which is embellished with a flying figure of Garuna holding tail-ends of the *nagas* in his hands in the centre of a medallion formed by intertwined serpents within a square frame, whose corners are filled with g*rasamukhas*. On both the sides of the frames the *nagapasa* design is beautifully carved. The *nagas* are paying veneration to Garuna with folded hands.



Fig. No. 13: A rectangular *samatala* vitana, *antarala,* Harihara temple 1 (late 8th cent.)

Another *antarala* ceiling of the Surya temple 2 (Temple 6) dated early ninth century CE also has similar *nagapasa* design and Garuda in the centre of a medallion. These decorations are exceptionally experimented for the first time in the early temples of Osian.

The forth variety of *vitana* is represented in theih Harara temple No. 3 (c. 8th century) where the ceiling of the *antarala* is interestingly carved with two circles of simple *gajatalu* like courses marked by the ribs carrying *gagaraka* at the terminal points and has a lotus flower in the center. The ribs are depicted like a serpent body.

Lotus Now the constituents of the fully developed ceilings began to evolve from *padmapatra to gajatalus, kolas, karnadardarikas, padmashilas, lumas* and *padmakeshara* etc. These components were evolved by the modifications and ramifications of the lotus petals, earlier decorated in the archaic form of *padmashila* with (lotus medallions). The *gajatalu* or *hastitalu* is a modified lotus petal carrying beautiful carved *gagaraka* at the terminal points of the ribs. The *kola* is composed by a series of *gajatalus,* numbering 3, 5, 7 or 9 ribs topped by *champaka* buds.The *karnadardarika* is designed like stencilled lotus petal . The *luma* is conceived as lotus flower, it is composed of small *kola* courses arranged in two or three circles. The term **'***padamshila'* literally means a 'lotus stone' or 'a stone decorated with lotus'. According to Aparajitaprccha it should be of lotus shaped (*padmakara*).The *padmakeshara* is the stamens of the lotus flower in *padmashila* depicted at the centre

of the lotus petals. In mature ceilings, it is shown as a stamen tube hanging from the centre of the *lumas* and *padmashilas*.

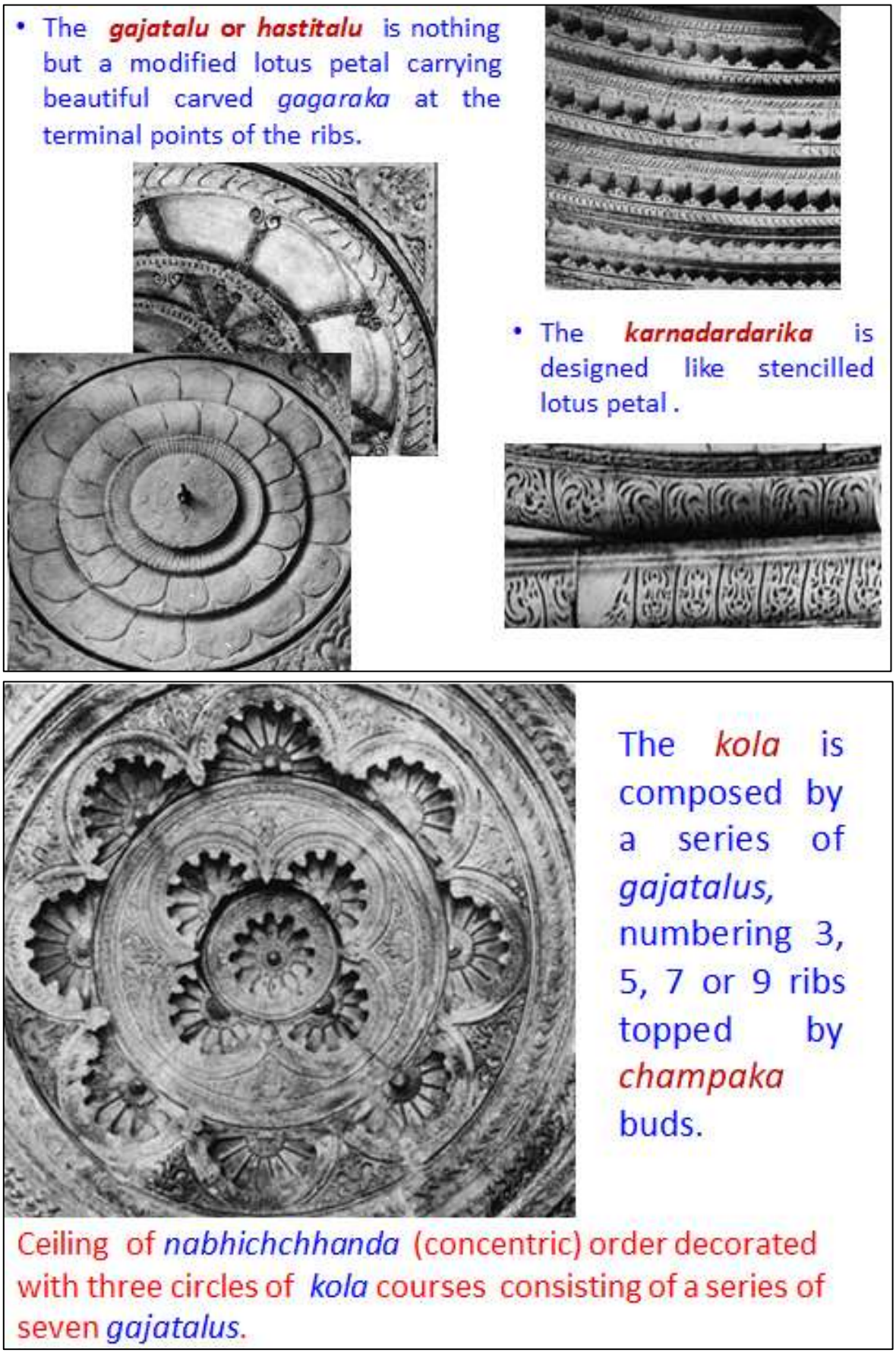


Fig. No. 14: Ceiling of Nabhichhanda

The other decorative parts of a ceiling are *valika, rupakantha, pushpaka and mukula.* The *valika* is a circular moulding which separates two courses (*starantara*). It is usually provided between *karnadardarikas, gajatalus* or kola courses in the form of a *chippika* decorated petals or diamonds or with some other floral leaves.

The *rupakantha* usually consists of seated and niched images of gods and goddesses. Generally a band of minor deities like *apsaras, gandharvas, vidyadharas* brackets (dancers and musicians), *yakshis, Jinas, vidyadevis* etc. either standing or seated in the *rathikas*, are shown in the large ceilings after the *karnadardarikas.* The *vidyadharas* are normally depicted with four hands, two upper supporting the ceiling and two lower hands playing with musical instruments.

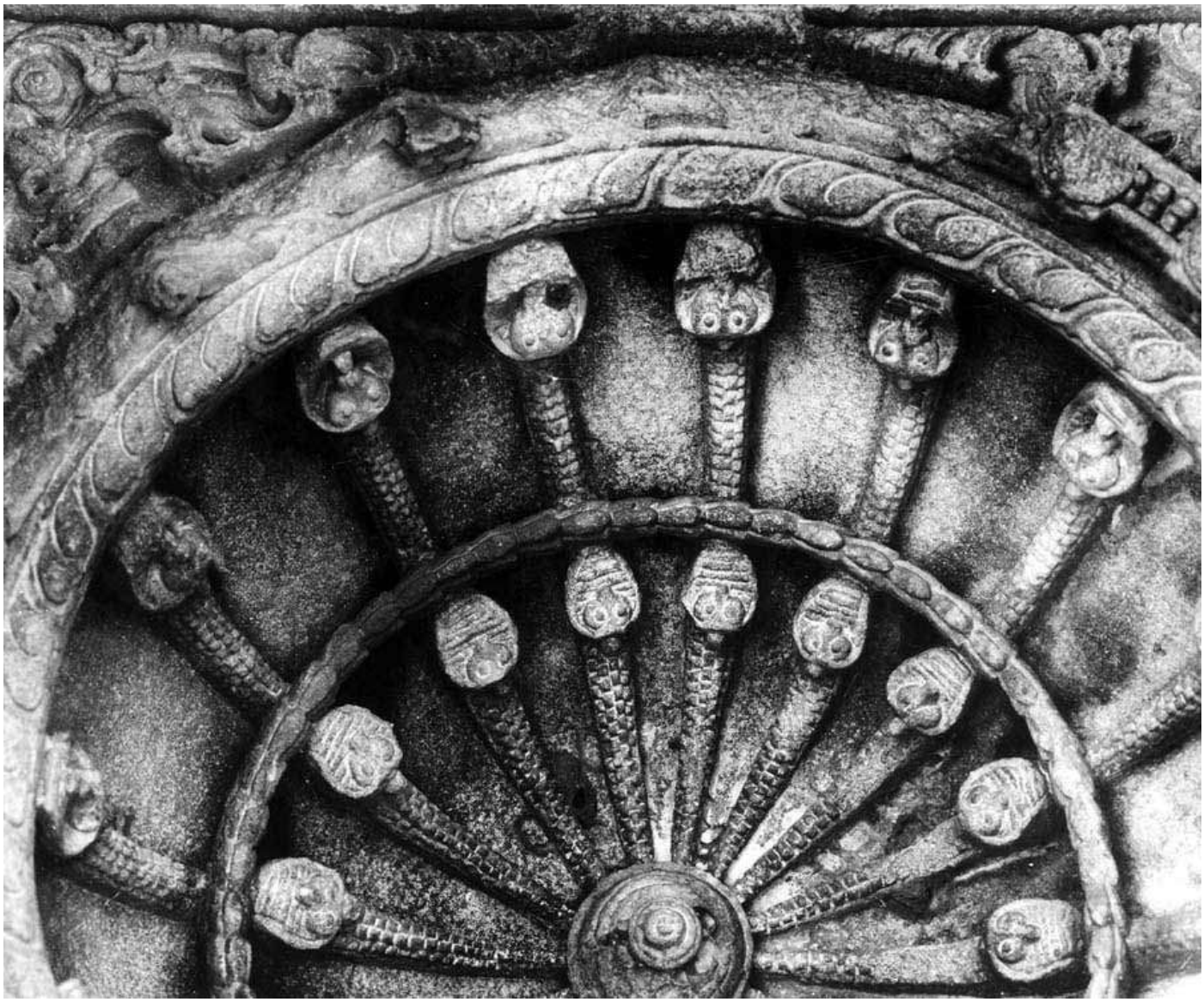


Fig. No. 15: An *antarala* ceiling, Harihara temple No. 3 (c. 8th cent.)

Another *rangamandapa* ceiling of the same temple Harara temple No. 3 is decorated with a series of *gajatalus* radiating from a common center forming two circles of a big *kola* bounded by a *chipika* carved with lotus petals. The *gajatalus* are heavy and bold showing primitive features. Both the ceilings are the earliest surviving example of the *gajatalus* forming a *kola* in Rajasthan**.**

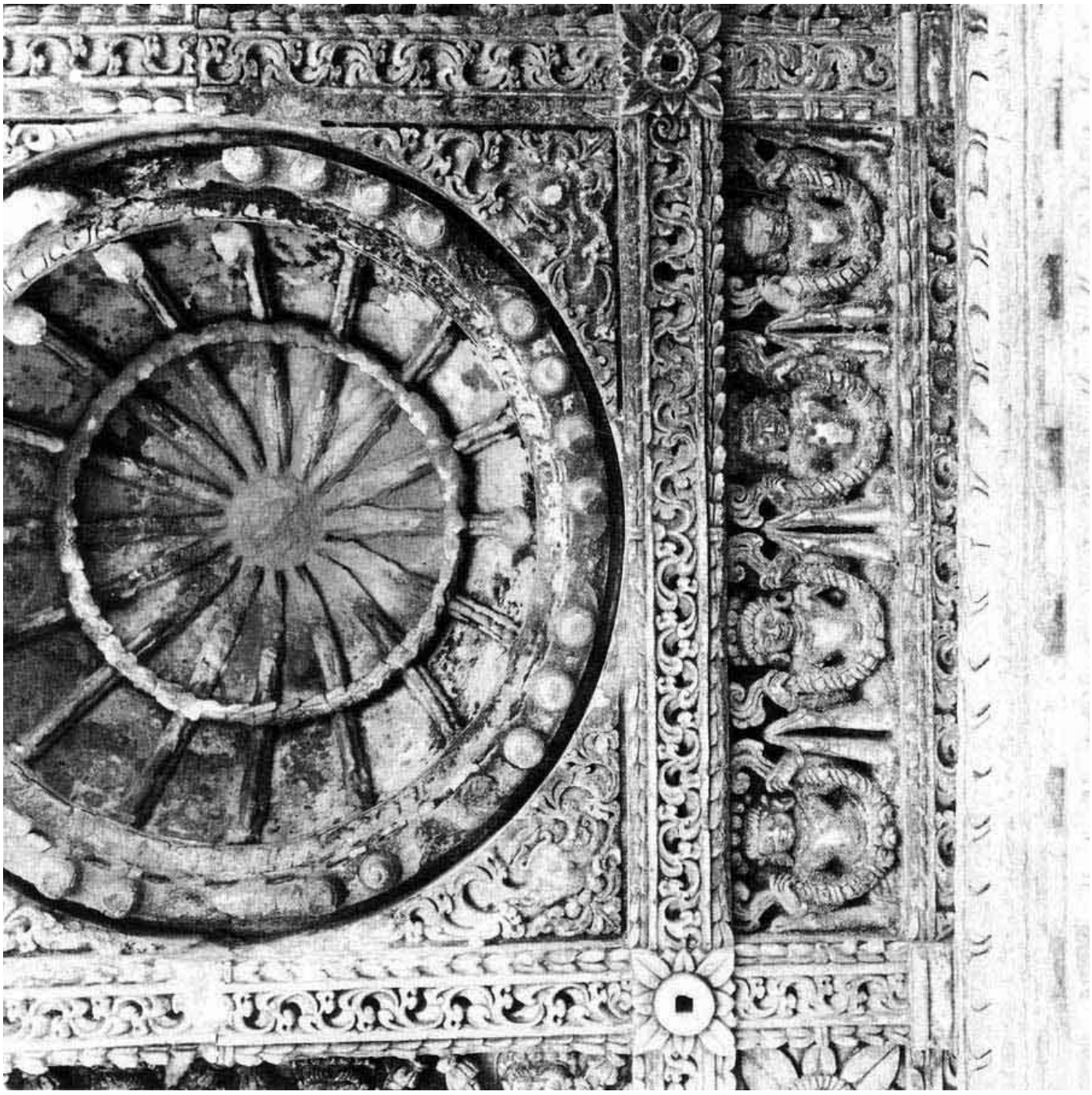


Fig. No. 16: A *rangamandapa vitana,* Harihara temple No. 3 (c. 8th cent.)

The fifth type ceiling depicted in the Osian temples is a rectangular *vitana* carved with *gajatalus*. The examples of this type of ceiling showing *gajatalus* are the *mandapa vitana* of the Harihara temple 2 (c. 8th century), the *antarala* ceiling of a south west *devakulika* of the Harihara temple 1 (late 8th century), and the *antarala* ceiling of the Mahavira temple (c. 9th century) which are rectangular in plan and have ornamentation of oblong *gajatalu* courses of archaic type. These are carved heavy and bold showing their primitive character. The decoration of nicely carved floriated peacocks on the upper and lower sides shows the skill of the artists.

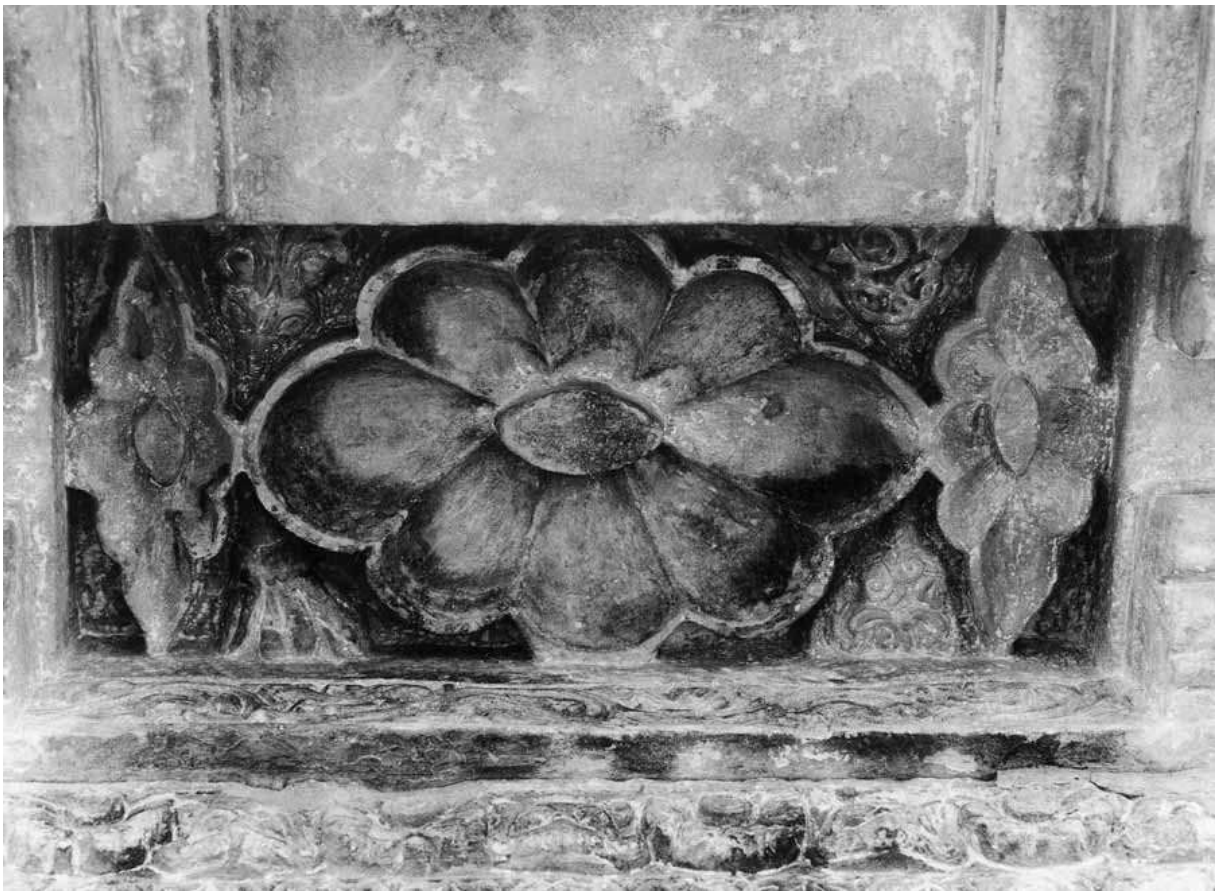


Fig. No. 17: An *antarala* ceiling, south-west *devakulika,* Harihara temple No.1 (late 8th cent.)



Fig. No. 18: A *mandapa vitana,* Harihara temple No. 2 (c. 8th century)

It seems that decorative motifs *gajatalu, kola* and *karnadardarika* appeared in the temples of Central India, Rajasthan and Gujarat during the 8th and 9th centuries simultaneously, which gradually evolved from the lotus petals of the *padmashila vitana* decorated in the early temple.

The *gajatalus* were evolved from the lotus petals and the *kolas* were composed by combining a series of 3. 5, 7 or more *gajatalus* within a semi-circular cell radiating from a centre, separated by ribs decorated with *gagarakas* on the top and the *karnadardarikas* are like lotus petals carved with stencilled design.

In Central India the Maladevi temple (9th cent. A.D.) at Gyaraspur, district Vidisha M.P and the Jarai Math temple (late 9th century) Barwa Sagar, district Jhansi in Uttar Pradesh have rectangular and square ceilings of *sama-ksipta* variety decorated with lotus petals, *danturika* and *gajatalu* motifs, a new feature. Here *gajatalus* are depicted in the form of a simple *kola* without depth showing its primitive character.

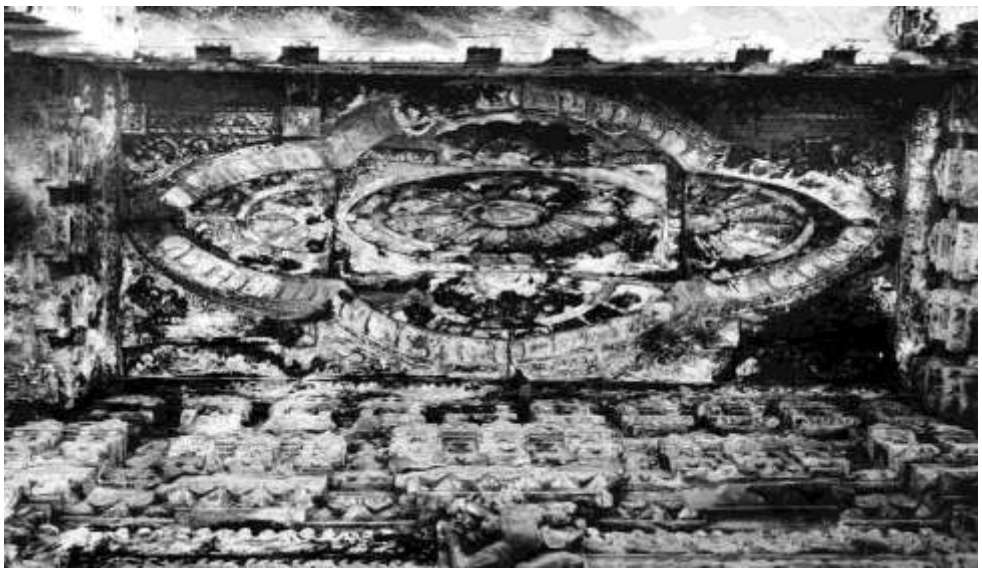


Fig. No. 19: A *sama-ksipta vitana*, Maladevi temple, Gyaraspur Vidisa, late c. 9th Cent.



Fig. No. 20: A square *garbhagrha* ceiling , Jarai Math temple (late 9th cent.), Barwa Sagar, Jhansi, U.P.

A *sama-kshipta vitana* illustrated in the *mukhamandapa* of Temple III and IV at Roda (c.775 A.D.) in district Sabarkantha of Gujarat is ornamented with two series of rudimentary *kola* courses with a *padmakeshara* prominently projected in the centre. These ceilings are the earliest surviving examples of *kolas* in Gujarat showing co-radial regression, a primitive characteristic of this period. The *samatala* portion of the ceiling is ornamented with the human figures in the boxes and sides are decorated with scrolls. The ribs of the kolas are topped by the *champaka* buds.

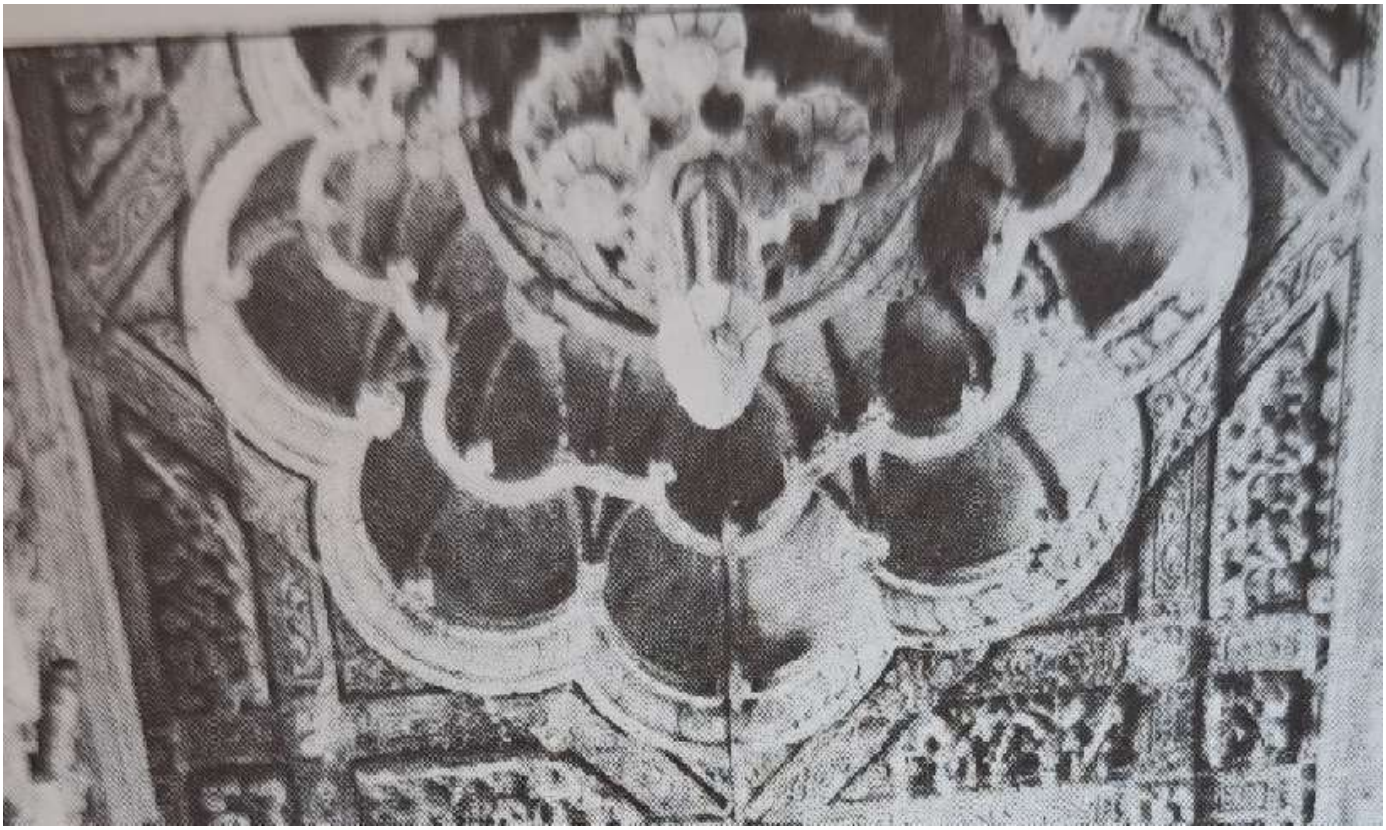


Fig. No. 21: A *sama-kshipta vitana, mukhamandapa,* Temple III at Roda (c.775 A.D.), Sabarkantha, Gujarat

The sixth type of ceiling 'the *kshipta vitana* of *nabhicchanda* order' has Mahavira temple at Osian. The class is mentioned in the Aparajitaprichchha (2, 25; 50, 18; 189, 6). The '*kshipta*' is derived from the word '*kship*' meaning 'throw'. Thus, the term '*kshipta*' literally meaning 'thrown' indicates for the ceiling whose component courses are projected inside. The *nabhichchhanda* variety are formed in concentric order by decorative elements *gajatalus* and *kolas* and showing *kshipt* feature of ceiling.

The seventh variety of ceilings is the *kshipta vitana* of *nabhicchanda* order illustrated in the *mandapa* of the Mahavira temple (c. 8th cent.) at Osian. It is probably one of the earliest ceilings from Rajasthan representing *kolas,* eight in number comprising a series of *gajatalus* of 5 ribs each and a semicircular big *kola* above, bounded by *chipikas* carved with floral design. The space between the *kolas* is filled with a pair of birds and the corners of the square are adorned with *kirttimukhas*. A row rathikas with human figures is also depicted. The ceiling is remarkable for its advancement in composition and articulation.

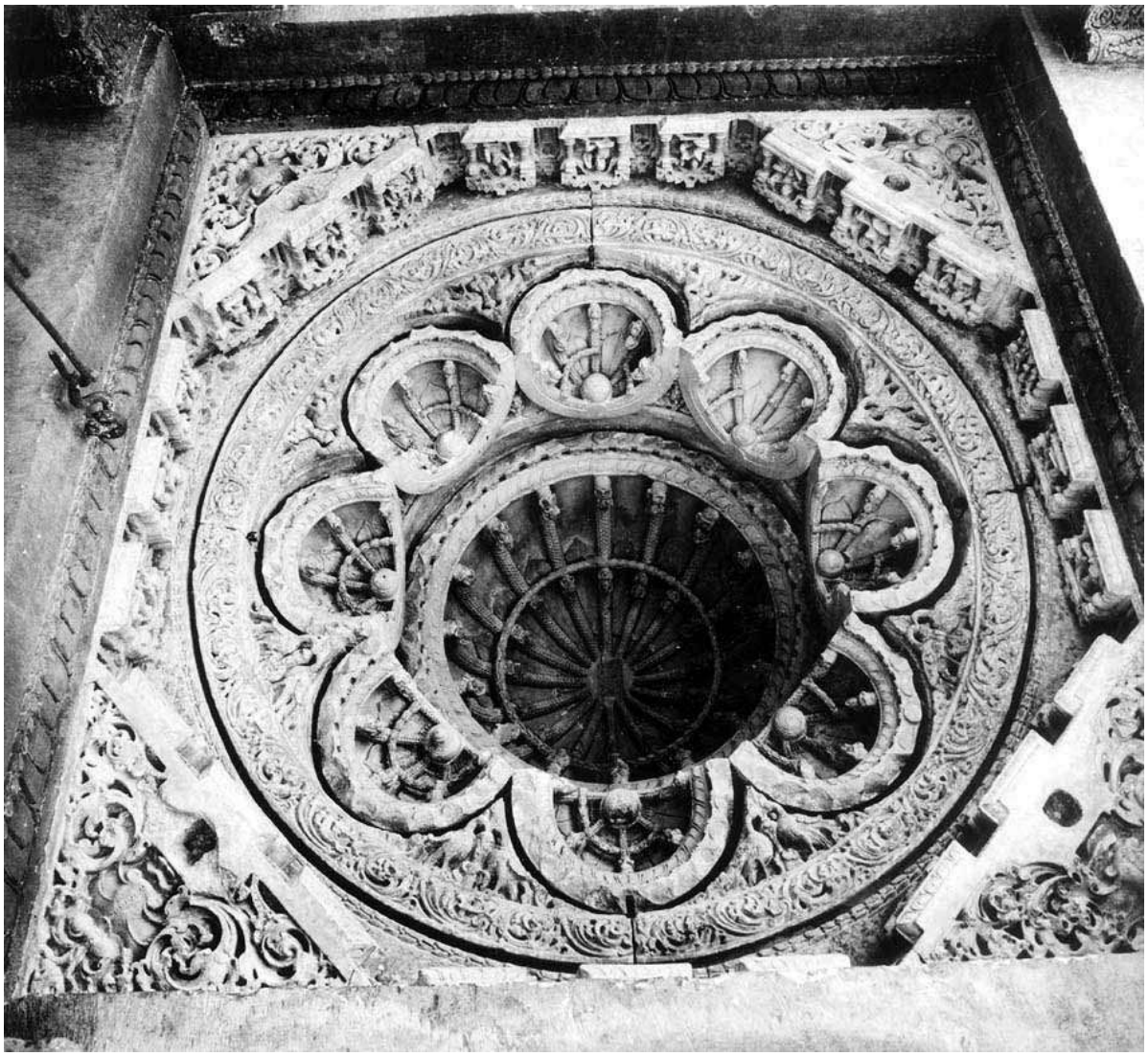


Fig. No. 22: A *kshipta vitana* of *nabhicchanda* order, *mandapa,* Mahavira temple, Osian.

The ceilings decorated in the *mukha-chatuski, gudhamandapa* and *antarala* of the Maladevi temple (9th cent. A.D.), at Gyaraspur, district Vidisha representing rectangular ceilings of *sama-ksipta* variety decorated with lotus petals, *danturika* and *gajatalu* motifs, a new feature in Central India.

Here *gajatalus* are depicted in the form of a simple *kola* without depth showing its primitive character.

Another temple the Jarai Math temple of late 9th century at Barwa Sagar, district Jhansi, Uttar Pradesh also has some more developed ceilings where the square and rectangular *vitanas* of *sama-ksipta* variety decorated with lotus petals, *danturika*, *kola* and *gajatalu* courses in the *garbhagriha* and *antarala* of the temple. Here the *gajatalus* and the *kolas* are depicted simple without depth showing its primitive character.

The Matangeshvara temple (early 9th cent.) at Khajuraho has a large circular ceiling in the sanctum comprised of a plain *dardarika*, six courses of *gajatalus* and six shell-like courses of *kolas* with a *padmakeshara* in the centre showing rudimentary features.

The Muni Bawa temple near than is depicted with the earliest decoration of simple and bold *gajatalus* in Gujarat.

A gradual evolution and advancement is seen in the forms, shapes and designs of ceilings which also shows perfection in the medieval temples. After the ninth century the temples mainly of Gujarat, Rajasthan and Madhya Pradesh are adorned with *samatala, ksipta, utksipta* and *misraka* varieties as classified and described in Samaranganasutradhara (54, 28); Aparajitaprccha (189, 4) and Prasadamandana (7, 34).These are ornamented with lotus-petals (*padmashilas*), *kirttimukhas, gajatalus , kolas, karnadardarikas, valikas, campaka*-buds, lotus flowers, beaded garlands scrolls, geometrical and floral designs and frequently showing *lumas, apsaras, gandharvas*, dancers and musicians, with prominent *padmakeshara* (staminal tube) hanging from the centre, and show an uncommon skill of the craftsmen of that period.

The eighth type is represented by a *mukhamandapa* ceiling of North *devakulika* on the west (2) of the Mahavira temple, a latter addition of early 11th century CE, shows further development depicting a square *sama-kshipta vitana* (combination of *samatala* and *kshipta vitanas*) of *nabhichchhanda* order decorated with boldly carved *gajatalus* and square-cut *kolas*. The ceiling consists of a circle of *gajatalus* and a set of four *kolas* projecting a *padmakeshara* separated by plain *valika*. The square frame of the ceiling is carved with stencilled design on the strips, while on the each corner of the square a *kirttimukha* is illustrated. The formation of the *gajatalus* and *kolas* is still primitive (not semi-circular, which is a later evolution), though they are beautifully carved.



Fig. No. 23: A *mukhamandapa sama-kshipta vitana,* North *devakulika* on the west (2) of the Mahavira temple, 11th century CE

Another *mukhamandapa* ceiling of Southern *devakulika* on the west (4) of the Mahavira temple is also a latter addition of c. early 11th century. It is almost similar to above mentioned *vitana* in composition and design. a square *sama-kshipta vitana* of *nabhichchhanda* order, and have same features, except a slight variation in the decoration of side strips, which are elaborately carved with *kirttimukhas and danturikas*.



Fig. No. 24: A *mukhamandapa sama-kshipta vitana,* Southern *devakulika* on the west (4) of the Mahavira temple, 11th century CE

The ninth category of ceiling is a circular *kshipta vitana* of *nabhichchhanda* order. The specimen of this form is a *mandapa* ceiling of western *devakulika* on the north of the Sachiyamata temple (c. 11th century CE). It is a fully developed circular *kshipta vitana* of *nabhichchhanda* class consisting of a series of *karnadardarikas* decorated with stencilled design, a row of *gajatalu* courses with *gagaraka* on the top of ribs and two circles of *kolas,* each separated by ornamented *valikas*. The ceiling also has eight *vidyadhara* brackets and *padmashila* with *padmakeshara* and a small pendent in the centre.



Fig. No. 25: A circular *kshipta vitana* of *nabhichchhanda* order in the *mandapa* of western *devakulika* on the north of the Sachiyamata temple (c. 11th century)

The tenth form of ceiling at Osian is a circular *ksipta vitana* of *nabhicchanda* order decorated with boldly carved designs of *gajatalu* and *kola* courses (cusps and floral cusps). The ceiling is represented in the *valanaka* of Mahavira temple which was added later on in the late 11th century CE. It is slightly different form previous one and shows some more developed features. The octagonal frame of the ceiling is supported by ornamented architraves based on pillars. The outer three rings of thin mouldings are decorated with diamonds and other designs, after that a circle of *padmapatras* (lotus petals) in a row and *chippika* are depicted above *rupakantha.* The *lumbikas* are shown below between the eight *naika*s (dancing girls) brackets, a new feature in Osian temples. Then three courses of *gajatalus* and five courses of *kolas* in diminishing order, separated from each other by the *valikas* are concentric to the centre. This *kshipta* type ceiling forms the *karotaka* of the *valanaka* (entrance porch) of the temple.

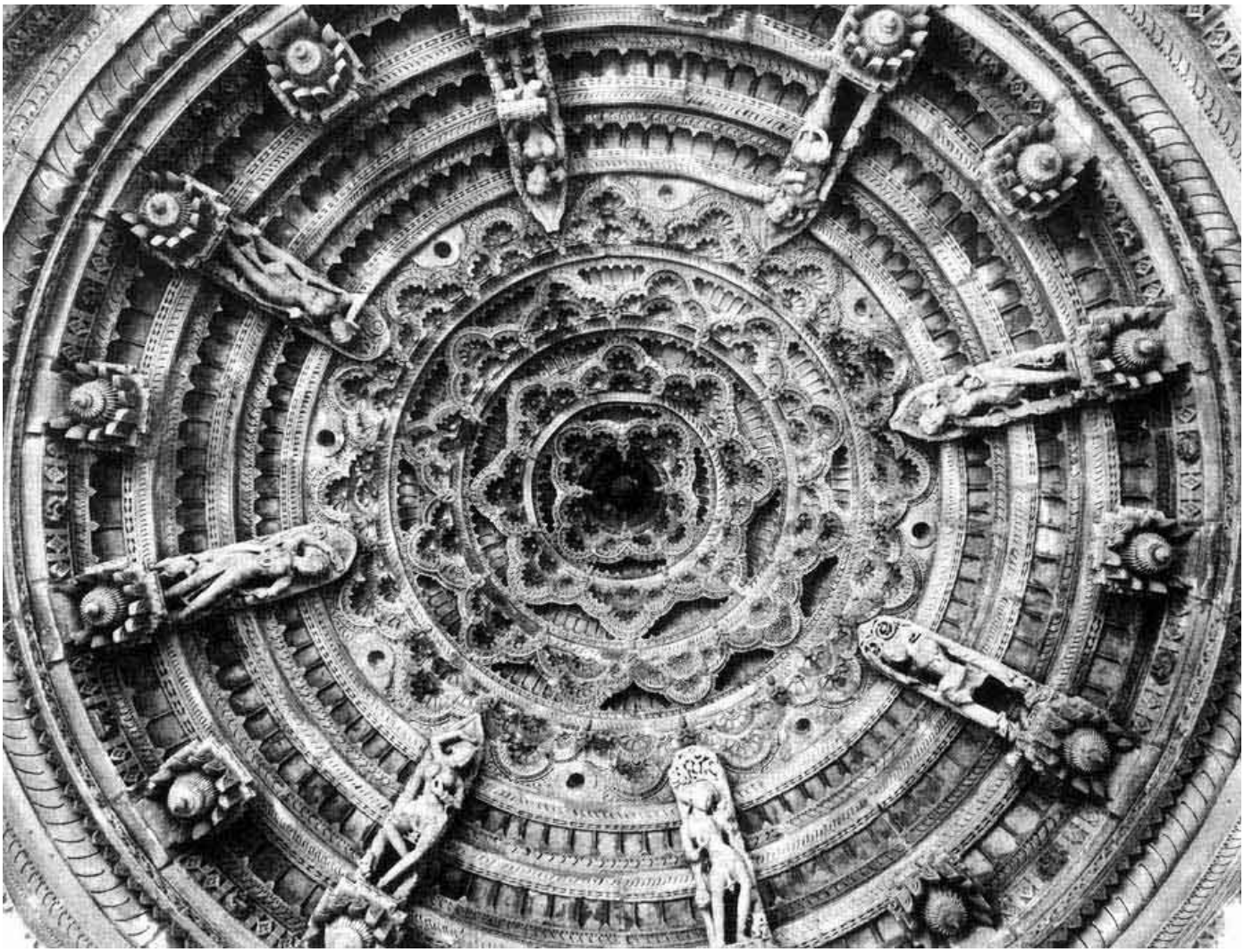


Fig. No. 26: A circular *ksipta vitana* of *nabhicchanda* order in the *valanaka* of Mahavira temple, c. 11th cent.

These ceilings are composed of four circles within a square frame. The innermost circle is decorated with a *kola* of five ribs projecting a *padmakesara* (stamenal tube) in the centre. Other three circles are carved with *kola* courses, separated by a plain or decorated *valika*. On each corner of square frame, elaborately made *kirttimukha* and scrolls are carved. Each *kola* consists of five ribs decorated with *campaka* buds on the top and half lotus flower in the centre. The decoration of smaller *kirttimukhas* at the junction of the two *kolas* is also noteworthy. The ribs and top of the *kola* junctions are decorated with lotus petals and stenciled leaves. In these ceilings the presentation of carvings is very impressive despite the archaic character of the *kolas*. Though their form is still primitive, as the ribs of the *kolas* are quarter-cut and do not show perfect semi-circularity in the beginning but later on the heaviness of *kolas* is slightly reduced and these are carved deeper than the *mandapa* ceiling of Maladevi temple (9th cent.) at Gyaraspur (district Vidisa, M.P.).

Thus, we can conclude that most of the temples of Osian in their *antarala* and *mukha-mandapa* are adorned with *samatala* (flat) *vitanas* decorated with full bloomed lotus medallions in the centre and few of them are ornamented with bands of *nagapasa* and *vidyadharas,* while some of them have one of the earliest ceilings of *kshipta* (projected in) variety introducing for the first time

in Rajasthan represented with boldly carved simple *gajatalu* (cusps) and *kola* (coffered cusps) courses showing primitive feature.

The Jain temple or Mahavira temple which was modified later on and its subsidiary shrines also have richly ornamented ceilings of tenth and eleventh centuries. These are of the *kshipta* (projected in) type *vitanas* represented by multiple layers of *gajatalu* (cusps) and *kola* (coffered cusps) courses showing an advancement in the decoration. There seems a uniformity in expression and affinity in characteristic features of the mature ceilings of Central India, Gujarat and Rajasthan.

Thus, the *nabhicchanda* (concentric) type central ceiling of the *gudhamandapa* of Mahavira temple (late eighth century) adorned with *gajatalus* and *kolas* (early coffered cusps), the Hari Hara temple No. 2 and 3 of early ninth century embellished with ceilings of the *antarala* decorated with *nagapasa* and *vidyadharas* and the *mandapa* ceiling ornamented with simple *gajatalus* and *kola* courses show their primitive character and these are probably the earliest examples in the Rajasthan.

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Iron Metallurgy in Manipur With Reference to the Ancient Iron Smelting Sites at Kakching: An Archaeological and Empirical Approach

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Introduction: Iron is the most abundant metal found on earth (by mass). It is considered as one of the most important metal for the social and economic development of the human society. The ancient civilizations experienced a big jump in technological advancement and economic growth within a short period of time by using iron tools and weapons for household, agriculture, war purposes, etc. Historically, the use and production of iron have come a long way. V. Tripathi expressed "*Iron as a metal undertook a long journey from one of the most expensive metals (four times more expensive than gold) to the cheapest one, from the costume apparel of mobility to the tools of the craftsman and the farmer*"[1].The earliest known iron artefacts are the nine small beads which are dated to circa 3200 BCE, found in the burials of Gerzeh, Egypt, by G.A. Wainwrigh[2]. Based on their 7.5% nickel content, they are found to be made of meteoritic iron shaped by hammering into beads and strung into ornaments with gold, lapis lazuli, carnelian, etc.[3]. Similar was the case with the blade discovered from the royal tomb in Ur[4]. It is generally accepted that the type of iron first used by humans was of meteoritic origin. Meteoritic-iron is different from terrestrial-iron which is rust-resistant due to its high nickel content. It was used in making decorative ornaments and expensive weaponry in ancient times. Iron metallurgy is important. It is the process of producing iron from its ores and using it to make different types of tools and weapons for both domestic and social uses. The process requires a set of technological skills and knowledge. V. Tripathi has rightly stated that "*The innovations in metallurgy led to its (iron) adaptation on a much larger scale than ever before*"[5]. The topic of the origin of iron and

ferrous metal metallurgy is still in debate. But according to the archaeological findings, Hittites in Anatolia appear to have produced iron from their ores between 1500 and 1200 BCE.[6]. Historians like Weeks, N.R. Banerjee, and DP Agrawal suggested that iron metallurgy originated in Anatolia and was spread to other parts of the world after the fall of the Hittites in 1180 BCE. This theory of the single origin of iron metallurgy is strongly argued by other scholars like Dilip, K. Chakrabarti, Jane Waldbaum, John Newton Friend, and Vinay Tripathi with a different theory of multiple origins of the technique.

India is well known for its crafts in the field of iron metallurgy. Damascus steel also known as Woodz steel, which is considered as a valuable metal in antiquity first appeared in India. The Iron Pillar of Mehrauli, Delhi, which is also known as the Rustless Wonder, has been a worldwide sensation for a long time. And it is also reported that during the revolt of 1857, the British found it very hard to destroy the Indian blades seized from the Indian armies[7]. According to earlier researchers like Gordon and Wheeler, the beginning of ironworking in India may be traced back to 700–600 BCE. But with the introduction of radiocarbon dating in association with archaeological evidence of the Painted Grey Ware culture, it had been pushed back to the second millennium BCE[8], which is generally accepted among the majority of scholars.

On the question of how it was started in India, two primary theories have been developed. The first one suggests that the knowledge of the iron working process was diffused from the Hittites of Anatolia and was brought to India by the Aryans after the fall of the Hittite empire. This theory is supported by scholars like Wheeler, Gordon, M.N. Banerji, Roy, N.R. Banerjee, Neogi, etc.[9]. But scholars like Chakrabarti, V. Tripathi, and Rakesh Tiwari, strongly challenged the theory on the basis of archaeological and metallurgical facts and data. These groups of scholars propound the second theory which indicates the indigenous origin of iron metallurgy in India. Chakrabarti said "*In any case, there is no reason to relate it (the origin of iron in India) to any process of dispersal from a fixed centre of origin in Anatolia*"[10]. Rakesh Tiwari also stated that ironworking in India developed independently[11]. V. Tripathi had also done extensive work on the emergence of iron technology in India. She said that, "*Archaeological evidence on iron technology at its earliest level has been examined in divergent cultural zones that existed in different ecological settings. Each of these cultural units was almost independent of each other, having few common traits*."[12]. She then deduced "*a detailed evaluation of the literary, archaeological, and metallurgical data on iron technology in ancient India is suggestive of its independent beginning in the subcontinent*."[13]. However, in both cases, northeast India had not been touched.

Regarding the history of iron metallurgy in North East India, there is the same question of whether the knowledge of iron smelting is of indigenous origin or was it brought to the region. It is a fact that very few works have been done focusing on the history of iron metallurgy in North India. The area deserves more attention from scholars and researchers. Two scholars, Pawel Prokop and Ireneusz from Poland, had done extensive work on the history of iron smelting in the Khasi Hills,

Meghalaya (North East).They collected charcoal samples from the different layers of iron slag and sandy colluvial deposits at the Nongkrem and Raitkteng sites in the Khasi hills. The samples were radio carbon dated. A sample from the Nongkrem site was dated 2040±80 years BP[14]. Pawel claimed it as "*the earliest studied iron smelting site in the Khasi Hills and consequently, in the whole of NE India*" (*Ibid*). But the given date is quite late as compared to the evidences found from mainland India.The metallurgical tradition was also found to be accompanied by the erection of megalithic memorial monuments, which is similar to other megalithic sites in India that are frequently associated with the Copper-Bronze or Iron Age. Regarding the origin of the knowledge, Pawel wrote "*The relative isolation of the Khasi people, who inhabited a highly elevated plateau, is evidence of the indigenous origin of manufacturing technology. On the other hand, given their trade contacts with the surrounding lowlands, one cannot exclude the possibility of the diffusion of iron production knowledge from the west*."[15].

Iron metallurgy in Manipur: Manipur is one of the eight states of North East India, sharing the international border with Myanmar in the west. In spite of being quite an isolated place because of its geographical location and terrain, like other ancient kingdoms, Manipur has its own history of iron technology and the development of iron industry. It also has a number of significant ancient iron smelting sites which are the clear evidences of the practice of Iron Metallurgy in ancient Manipur.
This study focuses on two main points for the reconstruction of the history iron in Manipur. These are:

1. When did the use of iron start in Manipur?
2. How did the people of Manipur possess the knowledge of iron metallurgy?

To determine the answers to these two questions, both relevant literary and archaeological sources are to be examined carefully.

Analysis of the literary evidences: According to *Poireiton Khunthok*, an ancient Manipuri text, Poireiton came to Manipur with a number of followers and wandered in search of a place for settlement, to which he brought an iron staff[16]. It also writes about an incident where he encountered a person while wandering around the kingdom and the person was holding an axe probably made of iron. These are possibly the first reference of iron in the historical texts of Manipur. From the statements, it may be concluded that Poireiton came from or through a place where the Iron Age had already been developed. According to Kulachandra, a Manipuri scholar, the axe held by the random person was an iron axe[17]. If it is true, it may be inferred that the Iron Age had already commenced in Manipur at that point of time. But no information was given on Poireiton's origin and the time of his arrival. However, based on other literary sources, Kulachandra stated that the arrival of Poireiton in

Manipur took place during the reign of Nongda Lairen Pakhangba[18]. K. Ruhinikumar and O. Ranjit Singh have also given the opinion that Poireiton arrived in Manipur around the 1st century AD. [19]

Khamlangba Khunkumlon is another Manipuri text that deals with the history of Khamlangba and his settlement. He is a local deity of Kakching, and also referred to as the god of iron smelting and its associated works[20]. J. Shakespear, who was a British Political Agent of Manipur (1905-8) also remarked about the iron deposits, "*All these deposits are under the protection of an Umang Lai, i.e., forest god, named Khumlangba, who has to be propitiated before the iron can be worked*"[21]. The text mentions about his settlement at Uripok (Manipur) from where he went to Takhel (presently Tripura) in search of iron ores. This assertion suggests that the knowledge of iron smelting from its ores had already been there in Manipur during that time. Unfortunately, the time of the event was not given in the text. So, for finding the period of Khamlangba and his ventures, another Manipuri text called *Sagol Kangjei* is needed to be referred. It indicated about a mega event organized by Nongda Lairen Pakhangba in which a Sagolkangjeimatch (recognized as polo) was played and Khamlangba was one of the players who was praised for his performance[22]. So, it has suggested that Khamlangba was a contemporary of Nongda Lairen Pakhangba.

Meitei Ningthourol, an ancient Manipuri text, also says that Khuyoi Tompok, whose reign started from 154 AD to 263 AD, found lumps of iron while excavating the ground at Kakching[23] which was the first indication of the availability of iron ore in Manipur. And according to O. Ranjit Singh and Englangbam Nixon Singh, Khuyoi Tompok's reign is regarded as the age of technological advancement[24].

Meitrabakki Yot Thanggi Chak (*The Iron Age of Manipur*) written by B. Kulachandra Sharma is an elaborate work on the history of iron in Manipur. After the examination of a number of relevant sources, he assumed that the iron-age in Manipur started from around 2100-2050 years ago, which means the 1st Century BCE[25]. He also made another significant claim that the chronological sequence of the metal ages of Manipur was completely different to the conventional metal age sequence of other parts of the world.

Conventional Metal age sequence:

1. Copper age 7000-6000 years ago
2. Bronze age- 6000-3700 years ago and
3. Iron age 3700 years ago

Metal age sequence of Manipur as claimed by *Kulachandra* is as folllows:

1. Iron Age-1970-1200 years ago
2. Copper age- 1200-900 years ago and
3. Bronze age 900-200years ago[26]

On the part of the British colonial records and accounts, a note penned by J. Shakespear (Political agent of Manipur, 1905-08 and 1909-14) titled "*Notes on the iron workers of Manipur and the*

annual festival in honour of their special diety, Khumlangba", is found to be quite useful in tracing the history of iron metallurgy in Manipur. It stated about the origin of the Kakching people (an iron smelting community), as well as the processes and requirements of iron smelting by this group of people.

The analysis of the literary sources has revealed that the earliest references of iron in Manipur falls in the reign of Nongda Lairen Pakhangba's. He was the founder of the Ningthouja dynasty of Manipur. According to various sources, it is conventionally accepted that he came to power in 33 CE which is the 1st Century AD. [27]

Analysis of archaeological data: Archaeological research, which is the backbone of history was started in Manipur very late. Very few archaeological studies on the history of iron have been done in the region. Some important data on the findings of the archaeological surveys done by the State Archaeology Department, Manipur, at different sites of the state[28] are given below:

Sites	Findings
Mongjam (Imphal- West District)	A small Iron knife, grayish loam fan deposit overlain the light yellowish brown fissure clays deposit probably of late Holocene, plain and decorated potsherds.
Nongpok Keithelmanbi (Senapati District)	Iron slag, large number of potsherds.
Panjaopallumching, (Kakching District)	Iron implements like a barbed harpoon, a barbed arrowhead and a sword were found along with some cultural remains of human burial
Moirang (Bishnupur District)	Faintly painted pots, a wooden coffin of about 12ft. long and some other remains were found. The cultural remains were found to be similar with that of Panjaopallum Kakching.

However, no record of carbon dating or any kind of scientific dating of the remains can be found except for the 12ft long coffin from the Moirang site. The coffin was carbon dated and was assigned to 1170 A.D. The data also indicate that the cultural remains of the Panjaopallum and Moirang sites were found to be similar, which means that the iron remains of Panjaopallum were

possibly of the same period. But 1170 AD is very late as compared to the literary evidences of the iron. So, this fact appears to be insignificant in tracing the origin of use of iron in the region.

The data also shows that the cultural remains from Nongpok Keithelmanbi are similar to those found in Mongjam. Since there are no records on the scientific dating of the remains of these two sites, no concrete facts regarding the subject can be extracted. So, the available facts from the data are found to be less useful for the concerned objective.

Now, for a deeper understanding of the history of iron and its metallurgy in Manipur, evidences of iron smelting at Kakching needs to be closely examined.

Iron Smelting at Kakching: Kakching is a small town situated along National Highway No. 102 and is 45 kilometers south of Imphal, the state capital of Manipur. It is home to a community of Loi people who are famous for their iron smelting tradition and is located roughly 70 kilometers away from Indo-Myanmar. It is more like a cultural identity for this group of people. The knowledge and skills required for making iron have been passed down from generations to generations. They are also considered to be the last iron smelters of the Manipur. There are a number of theories and arguments from different scholars and historians regarding the origin of the knowledge of iron smelting possessed by this group of people. It is believed that they migrated from place to place in search of iron ores before settling at the present location. Their ethnic history is also found to be very much associated with the history of Khamlangba (the god of iron smelting), who is still worshiped by the people as their local deity.

The importance of studying the history of iron smelting at this particular region is that it will not only help in understanding the history of iron and its metallurgy in Manipur but will also help in the reconstruction of the history of iron in the North East India.

According to some literary works and accounts from the local elders, there were a number of sites in and around the Kakching area where iron was smelted.

They are:

a) Panjaopallumching,
b) Tumu-ching,
c) Yotshungbam Pareng, and
d) Kereching (conversation with KshetriBira)

It is generally believed that the people of Kakching brought the knowledge of the iron smelting in that area. J. Shakespear's has also expressed, "*The people claim that their ancestors came from Cachar, whence their most important clan's name, Meyanglangbam, Meyang denoting a foreigner from Cachar. The story runs that the ancestors of the Meyanglangbamand Khettrimayum clan were one day walking near Thobal, and noticed some earth thrown out of a bamboo rat's burrow, which resembled the clay in which*

iron was found in Cachar, so they gathered it and on their way home they met the Raja, who asked what they were carrying, and, being told, ordered them to experiment and report the result. Eventually the community, numbering then only five or six households, was settled near the spot where the ore was found, and subsequently moved to their present /locations, where the deposits of ore are more extensive" (J. Shakespear:*opcit*:349). So, according to this story, the introduction of iron smelting in the area automatically falls in the time when the iron smelting community settled there for the first time. And according to '*Meitrabakki Puwarida Kakching'* by Mayanglambam Gourachandra, the Kakching people are said to have migrated from the Thoubal area which is about 25 kms away north to the present location in 1740, during the reign of Maharaj Gambhir Singh[29]. On the other hand, this concept is contradicted by the findings of the surveys recently done by M.R. Sheikh and his team. Charcoal samples were collected in the survey from one of the iron smelting sites at the outskirt of Kakching, locally called Tumu Ching, situated at about 5 Kms. to the South-West from the central Market of the Kakching town. The age of the samples was determined with the Thermoluminescence dating method and was found to be 1600±80 years old i.e. 4th–5th century A.D. [30]. It is very much earlier than the date of first settlement of the people in the region.

Another important piece of relevant information from the book *Meitei Ningthourol* is about the incident when Khuyoi Tompok found lumps of iron while digging the earth at Kakching[31]. This information has suggested that the people knew about the occurrence of iron ore in the Kakching area during the reign of Khuyoi Tompok (154 AD to 263 AD) which is also very much earlier than the said settlement of the Kakching people.

Contrary to general belief, these facts show that iron smelting activities had already been carried out at the Tumu-Ching prior before the coming of Kakching people in the area. And this new development raises an entirely new question concerning who smelted iron for the first time in that specific area and from where they came.

Now, looking from that angle, the association of the people from Myanmar with the iron metallurgy at Tamu-Ching has been expressed in various sources. It is already said that the charcoal samples found in Tumu Ching were found to be 1600±80 years old. One interesting fact about the name 'Tumu Ching' or 'Tumu Hill' is that it is similar to the name of a town called 'Tamu' in Sagaing Region in north-west Myanmar near the Indo-Border, locally known to the people of Manipur as 'Tumu'.

M.R. Sheikh also wrote about a conversation he had with the watchman of that area. When asked about how the hill was covered with such slag, the watchman replied,"*The place has remained covered with such slag, which they called Yotthi, since time immemorial. The hillock was known as Tumuching simply because the people from Tumu now in Myanmar crossed the series of mountain ranges in search of iron ores and settled here to take up the work of iron smelting*"[32]. Sheikh has also conducted a comparative study on the traditional iron works in Manipur and Bagan District of Myanmar and found that the

shiny glassy matrix that formed the iron slag from Kakching is similar to those found attached to the lumps of bricks that formed the furnaces of Bagan in Myanmar. Different tests like Thermoluminescence analysis (TL), X-ray fluorescence analysis (XRF), X-ray diffraction analysis (XRD) were performed. The phosphorous content in the iron slag of Tumu Ching (Kakching) was found to be higher compared to the conventional iron produced in other parts of India[33]. So, with these assertions in connection with Sheikhs's archaeological findings show that people from Tamu (Myanmar), which is on the eastern side of Manipur, came to this particular area and started iron smelting during the 4th or 5th century AD, much earlier than the settlement of the Kakching community in the area (1740, as stated by Gourachandra). However, it is still a fact that the people of Kakching, who are considered to be an iron-smelting community, had a historical connection with Tripura and Assam regarding their origin and their local deity, Khamlangba (god of iron smelting).So, according to the analysis, when it comes to the question of how the people of Kakching possessed the art of iron smelting, it points towards both eastern (Myanmar)and western (Tripura and Assam) sides of the kingdom.But, the existence of ancient iron smelting sites other than Tumu-Ching at the region, still imply that there is the possibility of the presence of indigenous or other iron smelting communities in and around Kakching. Therefore, it may be concluded that the area of Kakching might have been an iron smelting hub in the ancient times where people from different directions and places came to the region and smelted iron at different points of time. That is how iron smelting ultimately became part of the culture of this area.

Conclusion: After thoroughly analyzing the information gathered from different sources and connecting the dots in an attempt to understand the historical development of iron use and its metallurgy in Manipur, it is evident that iron, as a metal locally called '*YOT*'(iron), was known to the ancient people of Manipur since or before the reign of Nongda Lairen Pakhangba (33 AD-154 AD). They were also aware of the occurrence of iron ore in the kingdom. The art of iron smelting, which requires certain level of technological expertise, was being practiced as early as the fourth or fifth century AD in a region presently known as Kakching, which is in the southern part of the kingdom. The evidence that people from Myanmar smelted iron at Tumu Ching (Manipur) has indicated the possibility of the diffusion of iron-smelting knowledge from Myanmar to Manipur. This finding has created a new area of historical research. However, the historical connection of the iron smelting community of Kakching with Cachar (presently Assam) and Takhel (Presently Tripura) cannot be ruled out. So, it is concluded that people with iron smelting skills came from different directions and places, including those from outside the kingdom, at different periods of ancient Manipur. On the other hand, with the presence of ancient iron smelting sites in Manipur, where archaeological surveys are yet to be done on scientific lines, the possibility of indigenous origin of iron smelting in Manipur still exist. However, the sources available for the reconstruction of a more precise history of iron in

Manipur are still very limited. More archaeological surveys are needed to be conducted at the remaining iron smelting sites of Kakching and Mongjam areas, followed by comparative studies of the findings with those from other parts of India (especially the north-eastern states) and Myanmar. A study on the ethnic history of the people of Kakching is also needed to trace the origin of the art of iron smelting possessed by the people of Manipur.

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A Study on *Rasamancha* of Bishnupur, Bankura, West Bengal, India

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Introduction: The making of terracotta images is an ancient art and it is widely used as a wall-panels in temples (A. Guha 2012). The Bishnupur is famous for the Terracotta temples of Bengal and the Archaeological Survey of India takes care of these temples. The literary meaning of Bishnupur is the town of Lord Vishnu (Fig.1). *Rasamancha* is not solely a temple rather it's a dance floor of Lord Vishnu. *Rasamancha* includes the words *rasa* and *mancha*. *Raasa* means divine dance of Krishna and it represents a metaphorical connotation of *Vaishnavism*. *Mancha* is the stage or the floor. Indian deities are associated with a particular dance style and the dance style of Lord Vishnu is known as *rasalila* (Mangaonkar 2011). The core ideology of *rasalila* is found in Bhagavata Purana. Al-Biruni (1034AD) (M. S. Khan 1987) gave the list of the eighteen Puranas and Bhagavata Purana was one of them. Bhagavata puran

describes the core ideology of *Vaishnavism* as well as *rasalila* (Schweig, Dance of divine love: India's classical sacred love story: The Rasa Lila of Krishna. 2005). *Rasamancha* doesn't house a permanent idol and there are no regular religious rituals. The sanctum remains empty throughout the year and during the *rasa* festival, idols are brought from the nearby temples. The *Rasamancha* is the unique archaeological structure (in shape and pattern) among the terracotta structures of the Bishnupur (Guha and Bandyopadhyay 2016). The structure of Rasammancha depicts the unique sequences of concentric circles and squares (Fig.3). The platform of the *Rasamancha* is similar to the Islamic structure (Desai 1970), middle part is the combination of pillars (vertical pillars and doorway curves) and curvatures which are replicating the roof pattern of rural Bengal (sail dome) and topmost part looks like the pyramid. The *Rasamancha* has a single chamber in the center (Fig 4). Terracotta tiles have been reported from all over the world and it is an integral part of clay pottery art of Bengal (Mangaonkar 2011). The earlier terracotta art found at the site of Mehrgarh in Baluchistan, Pakistanis, dated to around 8th-7th millennium BCE (Guha and Bandyopadhyay 2016). A lot of terracotta artifacts are founded in Mohenjo-Daro and Harappa (Guha and Bandyopadhyay 2016). The images on the terracotta plaques are mainly based on the stories of Ramayana, Mahabharata, and other myths (A. Guha 2012). Among the laterite base (bricks and blocks) terracotta temples, *Rasamancha*, Bankura district, West Bengal (Fig.9) is the oldest one (Guha and Bandyopadhyay 2016).

Objective: Study aims to depict the structure and pattern of *Rasamancha*, Bishnupur Bankura, West Bengal (Fig.1). It includes the details study of floor design, arrangement of doorways and pillars and roof pattern of *Rasamancha*.

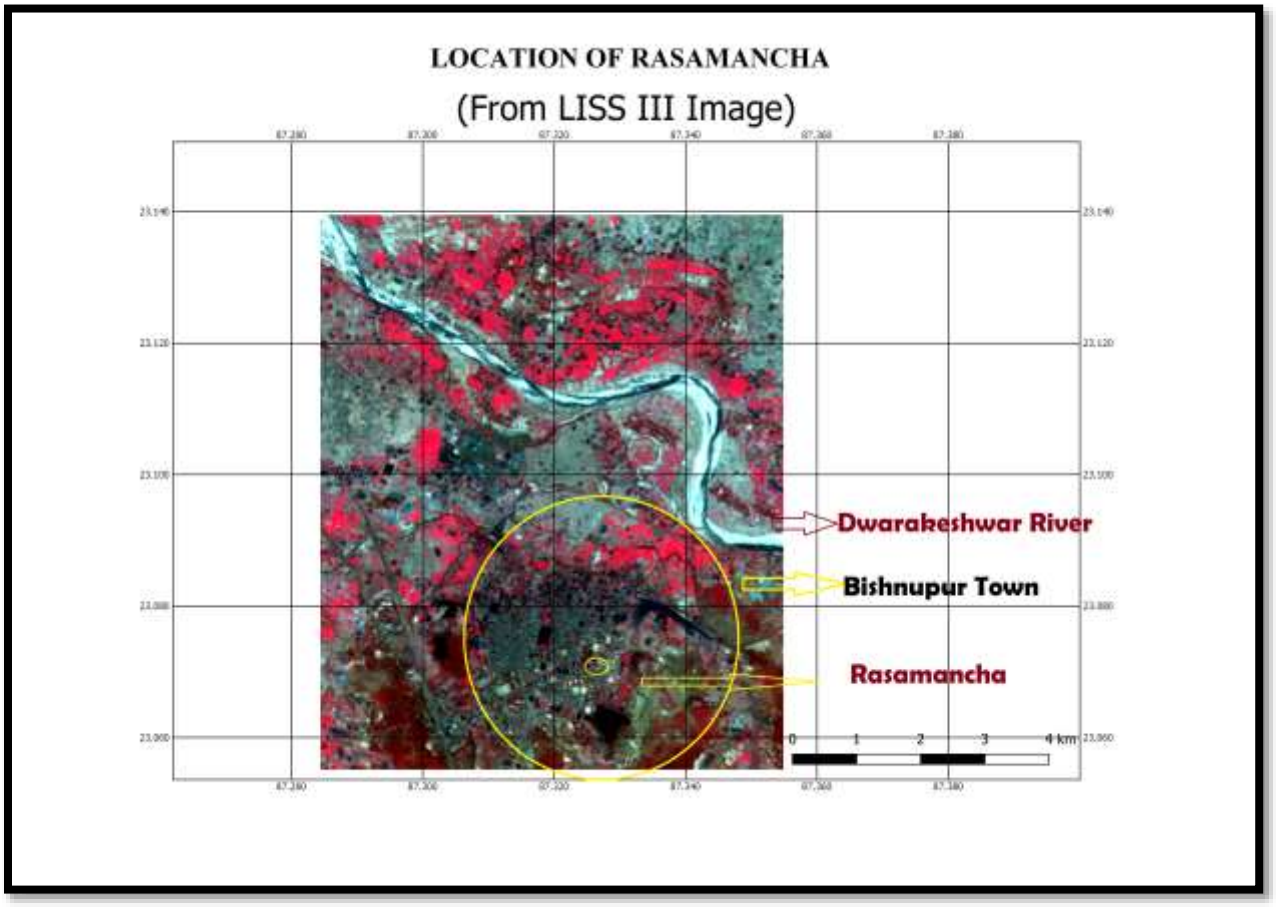
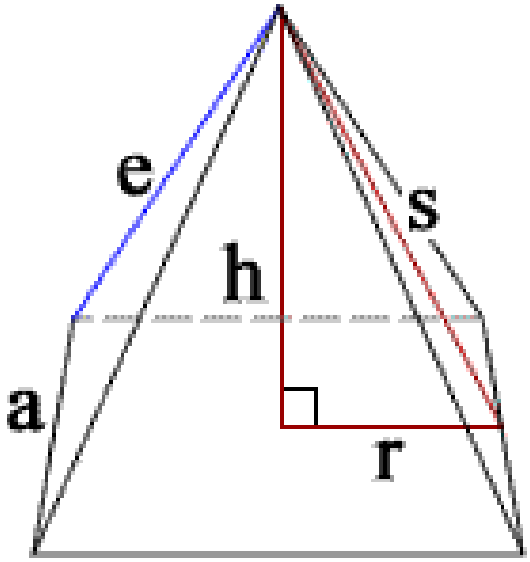


Fig. No. 01: Location of *Rasamancha*

Methodology: The study is based on detailed survey of the *Rasamancha* (Fig.9). It includes the measurements of various attributes of *Rasamancha* such as width, height, shape of the arches, roof etc. and the study depicts the graphical presentation of the structure. The pattern of *Rasamancha* has been compared with the arrangement of Fibonacci number and the golden ratio. The surface area, lateral surface area, slanting surface area etc. have been calculated through the formula of a square pyramid as follows: Height (h) = 12.5 m, slant height (s) = 17.50 m, side length (a) = 24.5 m, lateral edge length (e) = 21.36 m, 1/2 side length (r) = 12.25 m, Volume (V) = 2501.04 $m^{3,}$ lateral surface area (L) = 857.58 m^2 , base surface area (B) = 600.25 m^2 , total surface area (A) = 1457.83 $m^{2.}$ . .



(h = height, s = slant height, a = side length, e = lateral edge length, r = a/2, V = volume, L = lateral surface area, B = base surface area, A = total surface area, Volume of a square pyramid: V = (1/3) a^2h) Slant height of a square pyramid: (according to Pythagorean Theorem) $s^2 = r^2 + h^2$, since r = a/2, $s^2 = (1/4)\ a^2 + h^2$, and $s = \sqrt{(h^2 + (1/4)a^2)}$. This is also applicable for the calculation of the height of the side of a triangle. Lateral Surface Area of a pyramid with square base (4 isosceles triangles) has been calculated by using the following formula:

$$L = 4 \times (1/2)\ as = 2as = 2a\sqrt{(h^2 + (1/4)a^2)}$$

(Where, isosceles triangle Area = (1/2), Base height is x, side length is (a) and height for the triangle is slant height s and 4 depicts the four sides (multiply by 4).

Area of the square base of the pyramid and total Surface Area of a square pyramid have been calculated using the following formula:

$$B = a^2 \text{ and } A = L + B = a^2 + a\sqrt{(a^2 + 4h^2)}.$$

The numerical arrangements of doorways and pillars have been counted and the similarities to the cosmological facts of the universe and celestial bodies have been discussed. The arrangements of doorways, shape of pillars and other details of *Rasamancha* have been plotted in graph with accuracy. The land use and land cover surveys have been conducted in *Rasamancha* and its surrounding areas. The QGIS 3.14 version has been used to prepare the location map of *Rasamancha*. To identify the location of laterite quarrying sites, the topographical map (Map. number. 45D08, Survey of India, RF.1:50000) has been consulted and LISS III Image of the study area has been downloaded from the site of Bhuvan ISRO Geo-portal (bhuvan.nrsc.gov.in). The location has been plotted on the base of LISS III Image (QGIS 3014 version).

Discussion: The *Rasamancha* is located in Bishnupur, Bankura District, West Bengal. The site lies on the right-hand side of the bank of river Dwarekeshwar (Fig.1, 2) and it drains the western part of Bengal

(Fig.1)**.** The structure was built by Bir Humbir (Malla king) (1564-1620) who was the 49th Malla king (A. Guha 2012). The construction of *Rasamancha* was completed before 1600AD. The earlier name of the town (Mallabhum) was converted to Vishnupur (Bishnupur) after Bir Humbir (Mangaonkar 2011). The *rasa* festival was celebrated on *Rasamancha* up to 1932. The dance of Lord Shiva (deity of destruction) is known as *Tandava* and the *Rasalila* is the dance of Lord Vishnu (deities of creation) and therefore dance of the creator god is accompanied by the female dance partners. Conventionally, *Rasalila* is the cyclic dance as well as a group dance (Schweig, The divine feminine in the theology of Krishna.Krishka 2007). *Rasalila* is the traditional lyrical melodrama.

The laterite blocks and bricks are the basic raw materials (Fig.2) of *Rasamancha* (A. Guha 2012). The use of laterite brick in temple wall was the common practice of 12th to 15th century. The Angkor Wat temple (12th to 15th century) largely used the laterite bricks and the rectangular temple enclosure (wall) was built by laterite brick (Sonnemann, et al. 2015) . The use of indigenous materials is an important step to sustainable construction and the use of indigenous material reduces the transportation cost, saves energy, labour and protects the environment (Marto, Latifi and Sohaei 2013). The foundation of *Rasamancha* is constituted by the lateritic blocks. The middle and upper part covers the lateritic bricks but the thickness of the brick is not uniformly distributed. The laterite is the most common soil type of the Bishnupur (Fig.2) and its surroundings (Pani and Mishra 2019) . There is a similarity in colour of terracotta structure and reddish lateritic soil. Laterite mining occurs below the saturated zone of the groundwater table (Fig.2) and beneath the water table laterite normally acts as a soft block (Marto, Latifi and Sohaei 2013). Therefore, it is very easy to cut in matrix (square to rectangular) shape but when it is exposed to air, it becomes a hard and lateritic wall acts as an insulator. Laterite soil is one of the valuable sources of building material, as it can be easily cut with a spade but hardens like iron when it is exposed to air (Marto, Latifi and Sohaei 2013). The Bishnupur and its surrounding are rich in Laterite deposition and Bishnupur is still popular as laterite quarrying sites (Fig.2) which are locally known as *Moram Khadan* (O'Malley 1908). Temple at Bhitargaon in Kanpur (Uttar Pradesh) is one of the earliest surviving brick temples of India (5AD) (Mangaonkar 2011). Temple was built using bricks (laterite) and decorated with the terracotta plaques (Slaczka 2007). The *Rasamancha* is earliest Indian example of terracotta structure (A. Guha 2012) using lateritic bricks.

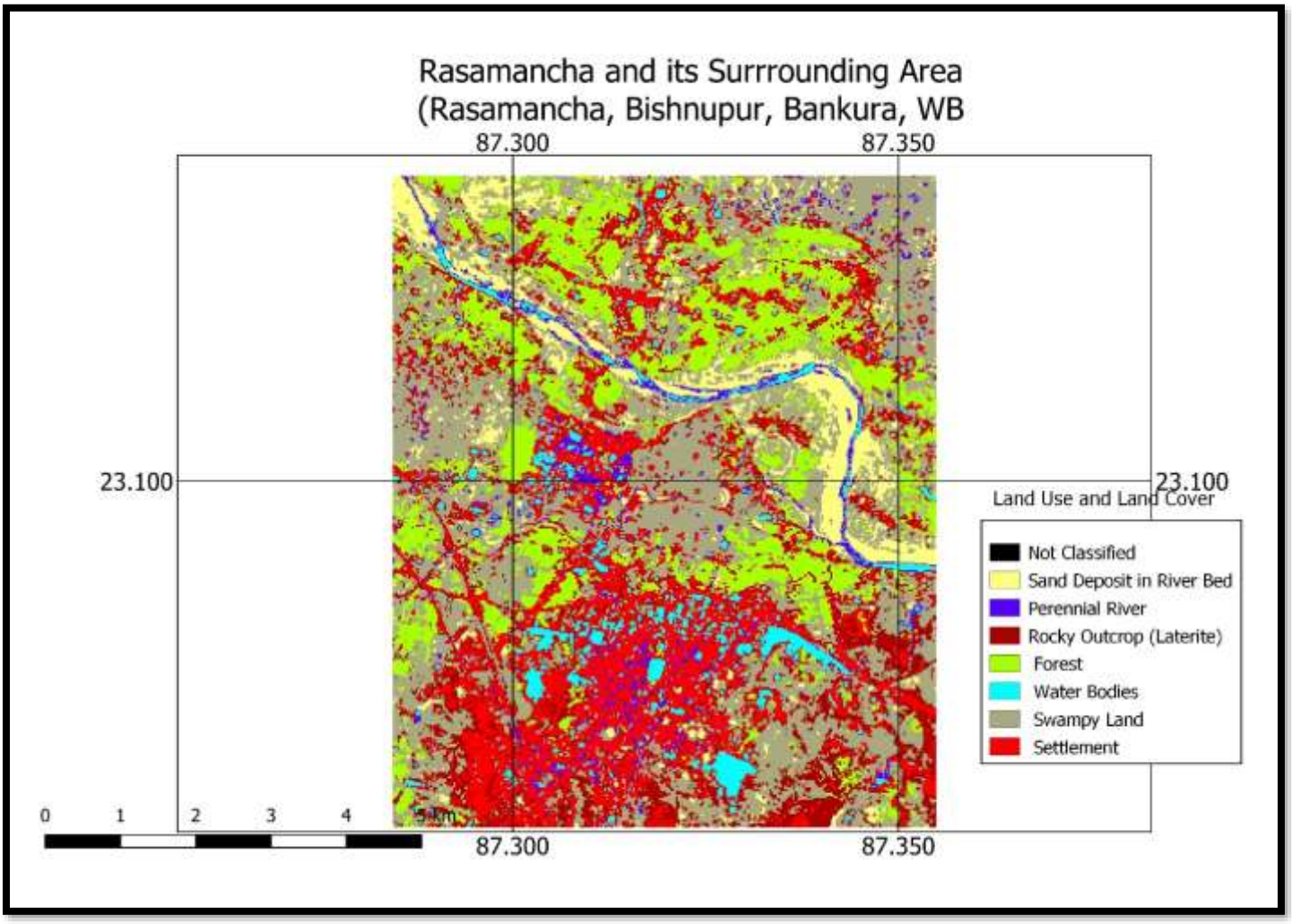


Fig. No. 02: *Rasamancha* and its Surrounding Area

Design and Pattern of Rasamancha*:* The *Rasamancha* is standing on a square platform (Fig.3, 4) and the area of the base (square platform) is 600.25 m ² (24.5m X 24.5m). The height of *Rasamancha* is 12.5m (bottom to crest) and the height from the base to the surface of platform (square platform) is 1.5m (Fig.5 and 6). The floor (24.5m X 24.5m) is the combination of five successive layers of squares (Fig.3) and all layers are the combination of pillars and doorways (Fig.4). The ratio in between the height of the structure and length of the one side of base is 1:1.96 (12.5m and 24.5m) (Fig.5). From sanctum (inner core square area) to outer most square the areas are the 380.25 m², 420.25 m², 462.25 m², 506.25 m² and 552.25 m² simultaneously and the ratio of areas from sanctum to outer square is 0.20:0.21:0.22:0.23 (Fig.3). All the square layers (four sides) are segmented into doorways and pillars (Fig.4). Each side of the outer most layers is segmented into 10 doorways and 11 pillars (Fig.4). Overall outer most square layer is the combination of 40 doorways and 44 pillars (Fig.4). The successive adjacent layer have eight doorways (total number of pillar is 32 and 36 pillars), five doorways (total number of pillar is 20 and 24 pillars) and three doorways (total number of pillars is 12 and the both the sides are blocked) in each

side and the sanctum has two doorways which lies opposite to each other. The east facing doorway is open one and the doorway of western part of sanctum is closed (Fig. 4). Ratio of the number of doorways from core area (sanctum) to outer layer is 0:1:1:2:3:5:8:10 (Fig.4) (Sanctum to outer doorways). The front (east) side has 28 doorways (Fig.4) and *Rasamancha* as a whole depicts 108 (40+32+20+12+3+1) doorways and 108 pillars (44+36+24+3+1) (Fig.4). The radius of base circle is 13.82m (πr^2=600.25 m^2) (Fig 3) and ratio of the side of base and radius of the circle is 24.5/13.82=$\sqrt{3}$ (Fig.3) (Alford 2010).

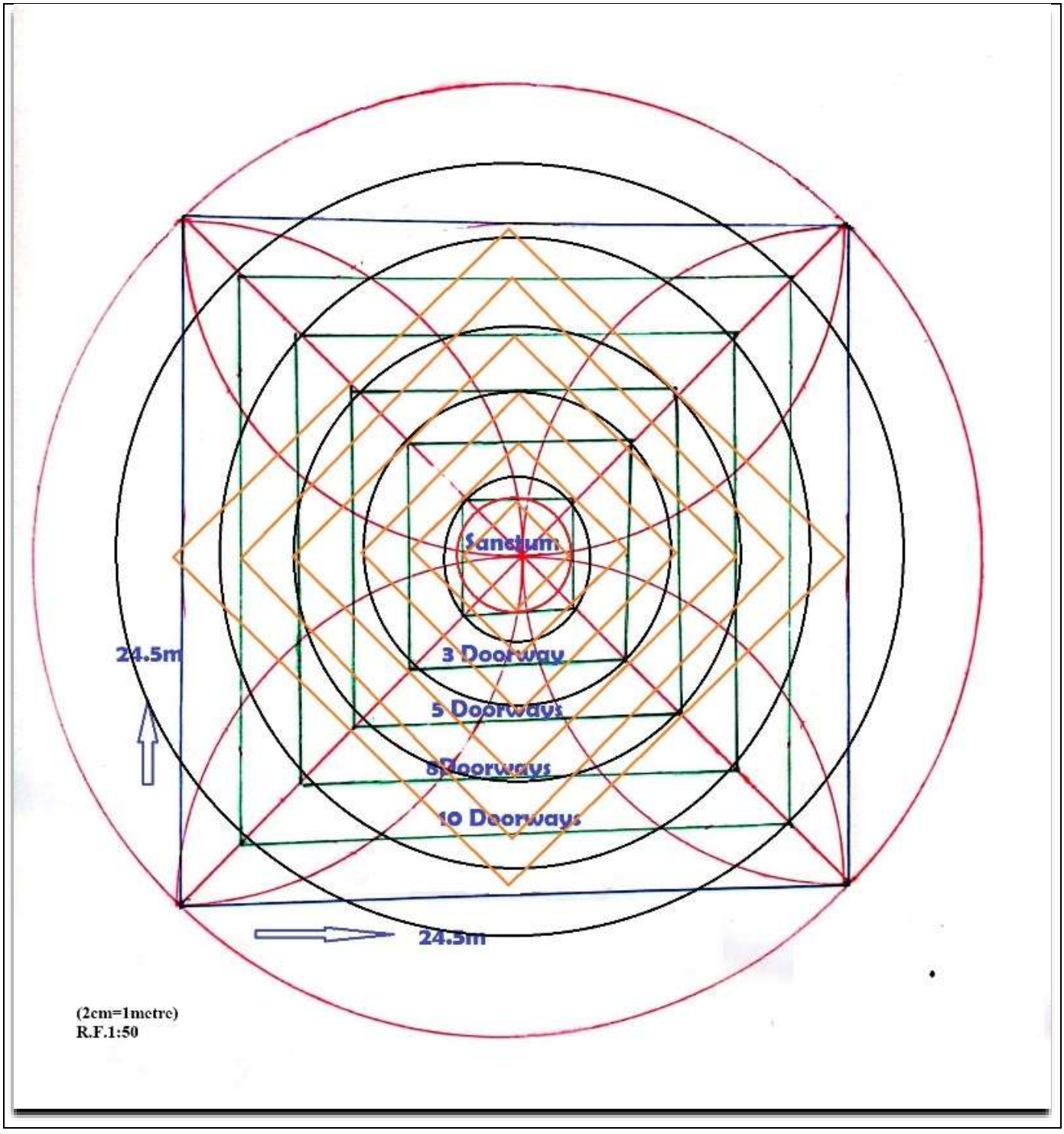


Fig. No. 03: Floor Pattern of *Rasamancha*

The angle of the sloping triangular portion is 45◦ (Fig.6). The alignment of doorways and pillars depict the asymmetry in arrangement (Fig 4). The arrangement of doorways ratio (0:1:1:2:3:5:8) (Fig.4) follows the principle of Fibonacci number; fib(1)=0 fib(2)=1 fib(3)=3 fib(2)+fib(1) fib(4)=fib(3)+fib(2)=5 and fib(n)=fib(n-1)+fib(n-2). The height from base (surface) to top of doorway is 4.69 m and the top of doorways to crest is 7.81m (Fig.5 and 6) and the height ratio in between two segments is 1: 1.6 (Gruson 2019) and its perfect golden ratio (Rowland and Howe 2001). The top of the *Rasamancha* is pyramid-shape and the base of the pyramid is square in shape (square pyramid) (Fig.6). The top has four sloping triangular (trapezoidal) sides. The wall of the *Rasamancha* is decorated with the terracotta plaques. The artisan of from Panchmura village (22 km away from Bishnupur) decorated the monuments (Mangaonkar 2011). Fine clay has been used for making temple plaques and colour can be change by adding iron oxide content in clay. The use of terracotta plaque was very common during the fifteen to sixteen century and the terracotta plaque was also common tool to decorate the mosque's wall (Adina mosque in 1375, at Pandua) (Guha and Bandyopadhyay 2016).

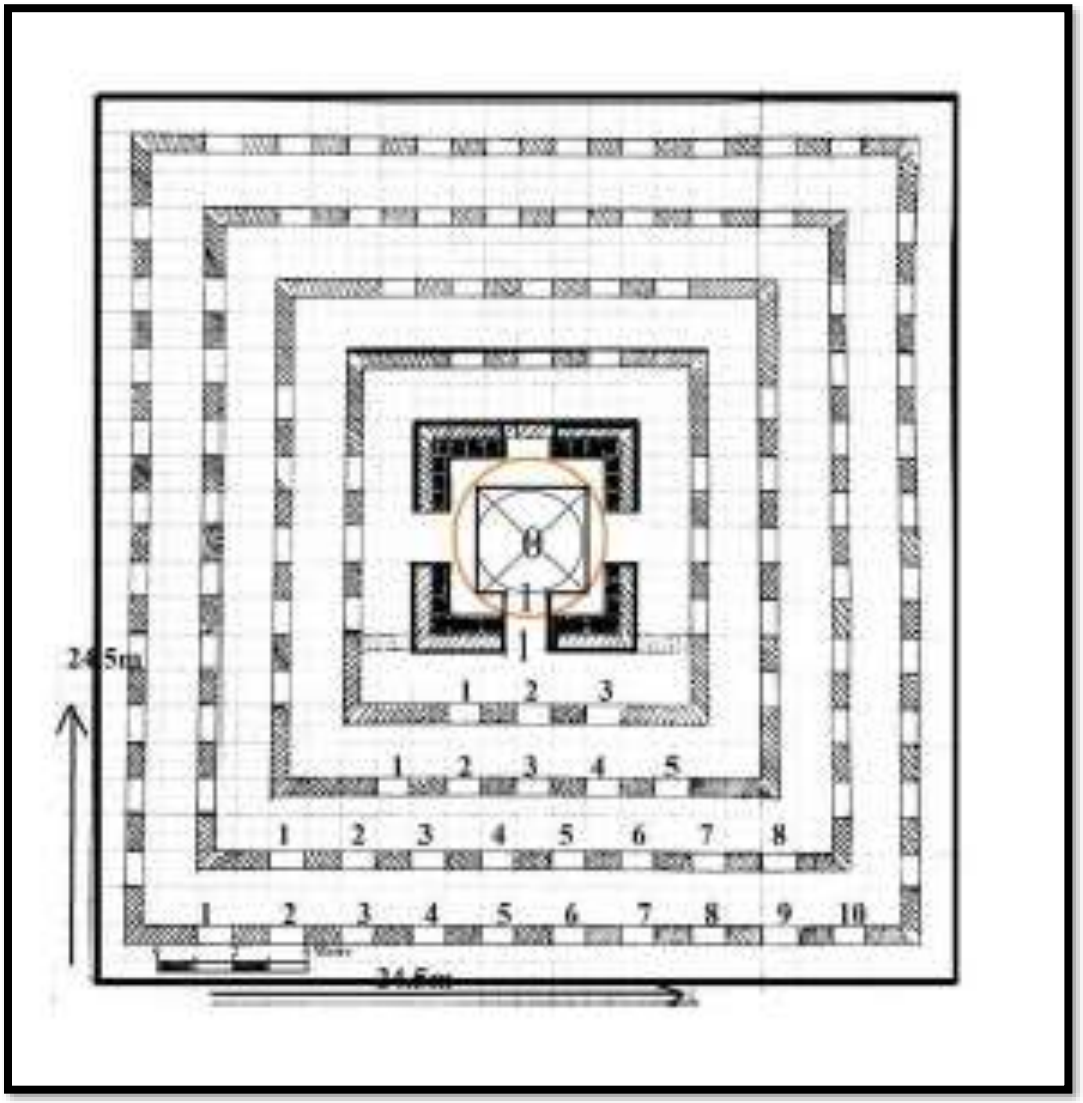


Fig. No. 04: Floor of *Rasamancha* with Pillars and Doorways

Rasamancha and Cosmology*:* The structure of Hindu temples are mainly base on the divine concept of '*Vastupurushamandala'* (Sachdev 2001). The floor pattern of *Rasamancha* is quite dissimilar to the ancient Hindu temple (Fig.4). The arrangement of pillar and doorways are unique (Fig.4 and 5).The numerical arrangement of the doorways and pillars of *Rasamancha* (square and circle) depicts the similarity to the Vitruvian Man measurement ratio (Fig.5) (Mascia 2016). The human body makes a perfect circle and it is already mentioned by Vitruvius (Gruson 2019) and it's an anatomical construction (Fig.5). The gnomon of *Rasamancha* lies 13.82 m away from the perimeter (Fig. 3 and 5). Most of Hindu temples conventionally depict eight doorways (in each side) (Elan 2001) but *Rasamancha* has ten doorways instead of eight (Fig.4). The number ten has an anatomical symmetry; from the hairline to the bottom of the chin is 1/10 of the height of a man (Rowland & Howe, 2001), the length of the hand is 1/10 of the height of a man (Pedretti 1962) and two hand of human being have ten fingers. Moreover hand is the symbol of work and creativity and face is the mirror of the human mind (Young 1998). Pythagoras and his followers considered 10 the most sacred number, as 10 = 1+2+3+4, which represented existence (1), creation (2), life (3) and the four elements, earth, air, fire and water (4) (C. H. Khan 2001). Therefore, the outer square layer depicts the anatomical measurement ratio as well as Pythagorean numerical ideology (Rowland and Howe 2001) (Fig.4). The square layer with eight pillars (each side) depicts the zone of deities and eight is the first cubic number (2 x 2 x 2) (Numerology report: The secret meaning of numbers 0 to 9 2021). The number eight is very significant in the ratio of human anatomy (Fig.5) and from elbow to armpit and from chin to the top of the head is 1/8 of the height of a man (Mascia 2016)(Fig.4). The eight is significant number in *Vaishnavism* (Bhatia 2017) and *Buddhism* (Keown 2016). The square layer of five doorways signifies the sum of first female (2) and male number (3) (C. H. Khan 2001).

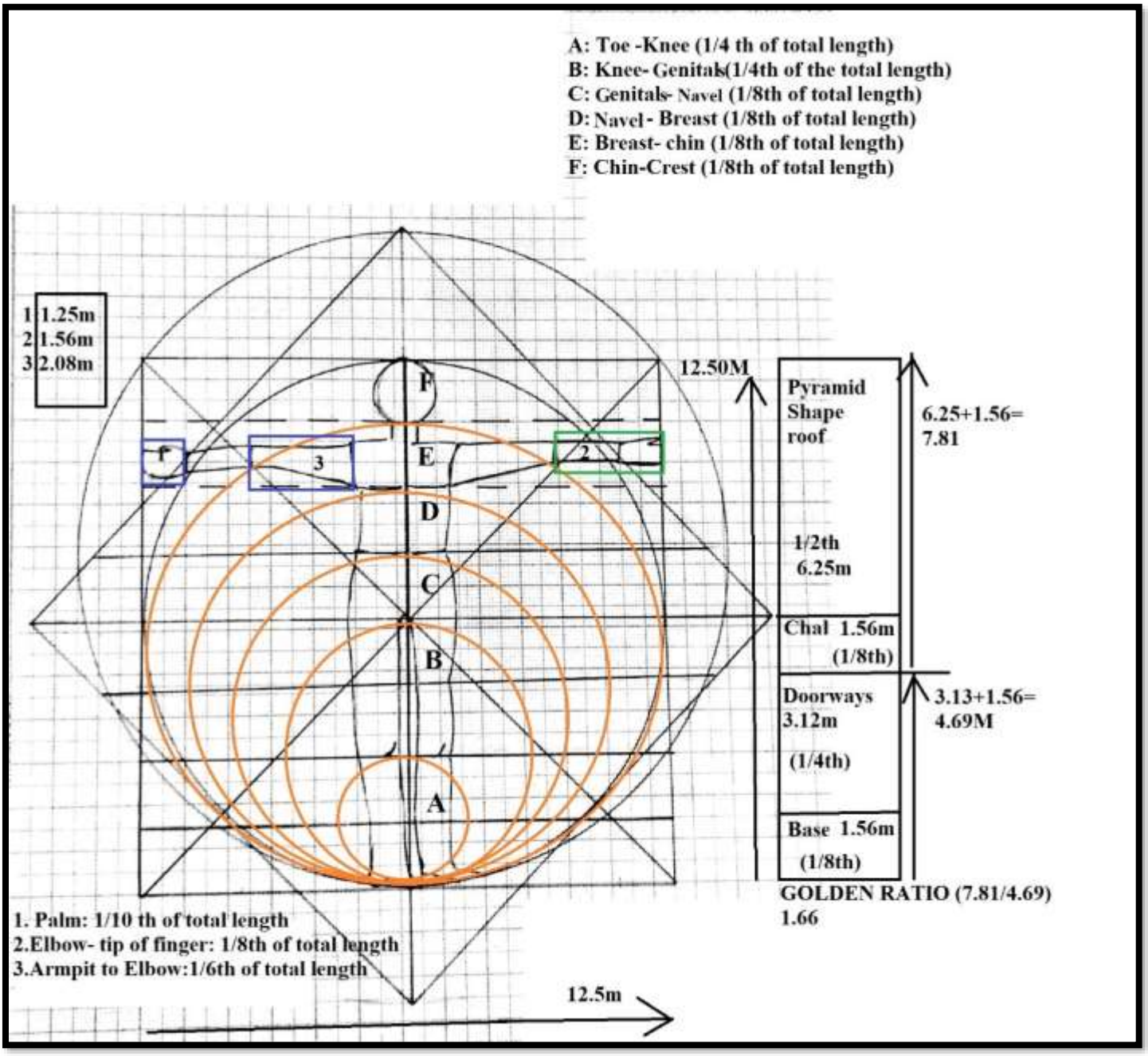


Fig. No. 05: *Rasamancha* (Anatomical Arrangement)

The first elements of universe are earth, fire, water, air and space (sky) and these are also the five basic elements of earth. The five aspects of *vaishnavism* are the *para* (transcendent), *vyuha* (emanating), *vibhava* (incarnating), *antaryami* (immanent), *archavatara* (consecrated image) (Schweig, The divine feminine in the theology of Krishna.Krishka 2007). The square layer of three doorways is the symbol of creation and terrestrial earth and it includes heaven, earth, and hell. Three depicts the time scale of past (before), present (now) and future (after). This layer is blocked by the wall (Fig.4). (Adrian 2013). It is opposed to the view of three dimensional time scale (Franz Brentano (Stanford Encyclopedia of Philosophy) 2021). The time is linear and unidirectional like the arrow (Arrow of Time 2021) and the time resembles

the flowage of river water (Adrian 2013). The square layer of two doorways are the symbol of duality and it is the representation of life and death, black and white or light and dark or day and night, it depicts the integrity and as well as the contrast. Moreover, the number zero and one (zero: closed doorway and one: open doorway) are base of binary system. The light and dark, black and white, life and death; these all the mutually exclusive events of nature and those events never occur simultaneously. Therefore, in spite of two doorways in sanctum, one has been blocked. The empty sanctum with single doorway is the symbol of unity and singularity and it depicts the concept of universe (C. H. Khan 2001). The number of doorways and pillars show the astronomical similarities of celestial bodies. The moon takes (one revolution in reference to earth) 27.32 days to complete a revolution (sidereal period of moon), and it is equally true that from a new moon to successive new moon the time period is 29.53 days (in reference to sun, synodic month) (Sun, Moon and Earth 2021). The average of lunar revolution is (27.3+29.5=28.42, or 28 days) 28 days. The 28 doorways (in eastern part) of *Rasamancha* is replicating the cycle of moon. The height of *Rasamancha* (12.5m) depicts the numerical ratio between earth synodic period (365days) and lunar synodic period (29days) (365.25/29.5=12.5). The northern and southern parts have 27 doorways and the number 27 depicts two astronomical events; the average speed of Earth revolution (around the sun) is 27 km/sce and lunar sidereal period is 27 days. The total number of doorways are 108 and it depicts celestial similarity. The diameter of the Sun multiplied by 108 equals the distance between Sun and Earth, and the diameter of the Moon multiplied by 108 equals the distance between Earth and Moon (Sun, Moon and Earth 2021). The diameter of the Sun is 108 times the diameter of the Earth. The total number of the doorways epitomizes the reality about the distance and volume of the celestial's earth.

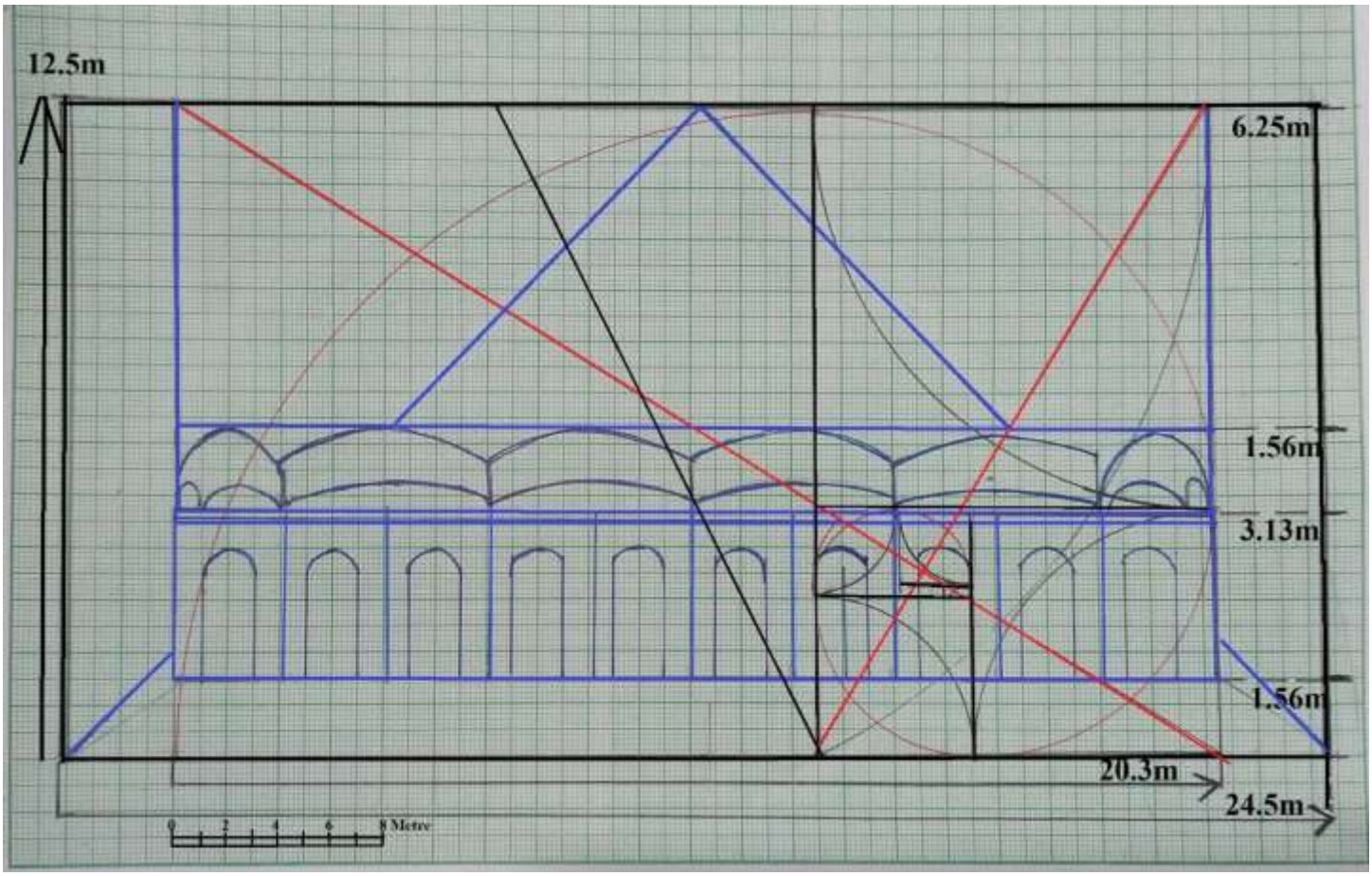


Fig. No. 06: *Rasamancha* (Front View)

Rasamancha and Structure*:* The base (square platform) of the *Rasamancha* is similar to the bases of Humayun tomb (1558) and the tomb of Sher Sha Suri (1545) (Desai 1970). Two dominant aspects of Indo Persian architecture are the square base (Blair and Bloom 1995) and canopy. Both the attributes are observed in Rasamsancha. The roofs of the terracotta temples are of the following types *Chala, Ratna, Deul* and *Dalan* and *Rasamancha* is famous for Bengal *Chala*. The *chala* of *Rasamancha* is not the roof type of temple. The unique *chala* lies in between the top of the pillar and beneath the roof (Fig.6,7) (slanted plane of pyramid).

The *Chala* is the curvilinear arch (Fig.7). The assimilation of Indo Persian dome (Blair and Bloom 1995) and roof pattern of Bengal's hut (*chhariti, chala*) gives a distinctive look. The domes and *chharitis* were widely used in the various Islamic structures in India (Desai 1970). The curvilinear arch (which looks like the roof of Bengal huts) in *Rasamancha* is the regional modified version of canopy with sail dome shaped (Sachdev 2001) (Fig.7).

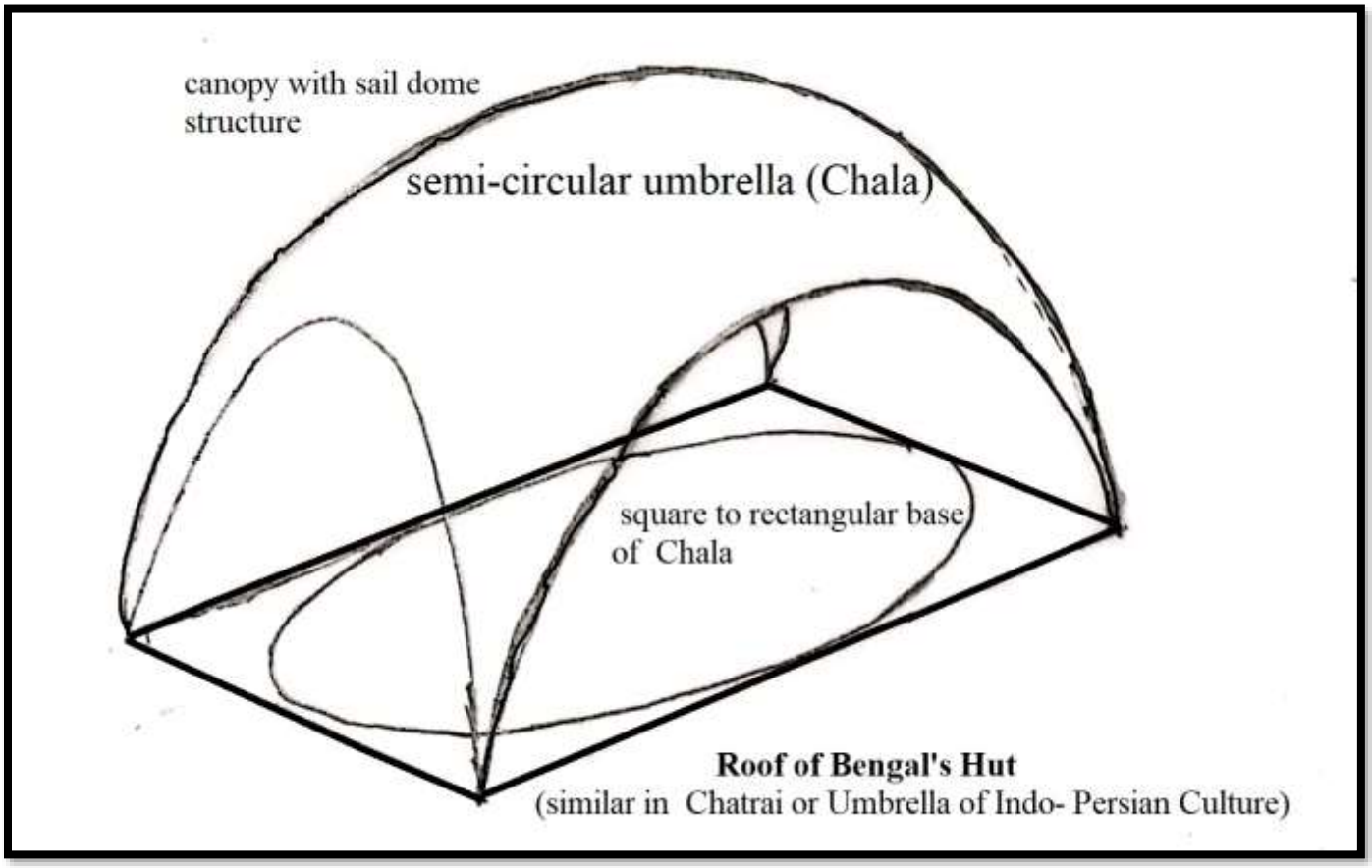


Fig. No. 07: Chala of *Rasamancha*

The *chala* of *Rasamancha* appears as a dome like structure with semi-circular umbrella on a square to rectangular bases (canopy with sail dome like structure) (Blair and Bloom 1995). The canopy of curved roof with dome pattern is intensively used by the Rajasthan royal architecture after 1600th AD. The dome was the important attribute of Indo Persian architecture and the *chala* of *Rasamancha* is the regional assimilation of square to rectangular base sail dome structure and roof pattern of Bengal huts. The pyramid is the repository of artifacts and it depicts an ancient religious idea of Egypt (Spence 1990). It is widely accepted that the pyramid is a tomb but in reality, it is something other than a monument (Spence 1990). The pyramid was not the sole symbol of the sun or king as personified as the son of Sun god rather it was the simulacrum of the cult of creation or creator god (Alford 2010). The corbelled square chamber (in sanctum) and pyramid-shaped roof of *Rasamancha* portrays the similarity to the Egyptian pyramid and pyramid as a symbol of the cult of creation (Pinch 2004) and the *Rasamancha* is the dance floor for the Hindu creator god. The doorways are similar to Gothic architecture (Desai 1970) and doorways are the combination of two dominant types of arches. The upper part of the doorway looks like the parabolic curve and the bottom part depicts the horseshoe arch. The ratio in-between height (3.12m) and width (1.93m) of doorways, the width of pillars (0.7 m) and width doorways (1.20m) depict the principal of golden ratio (Fig.8).

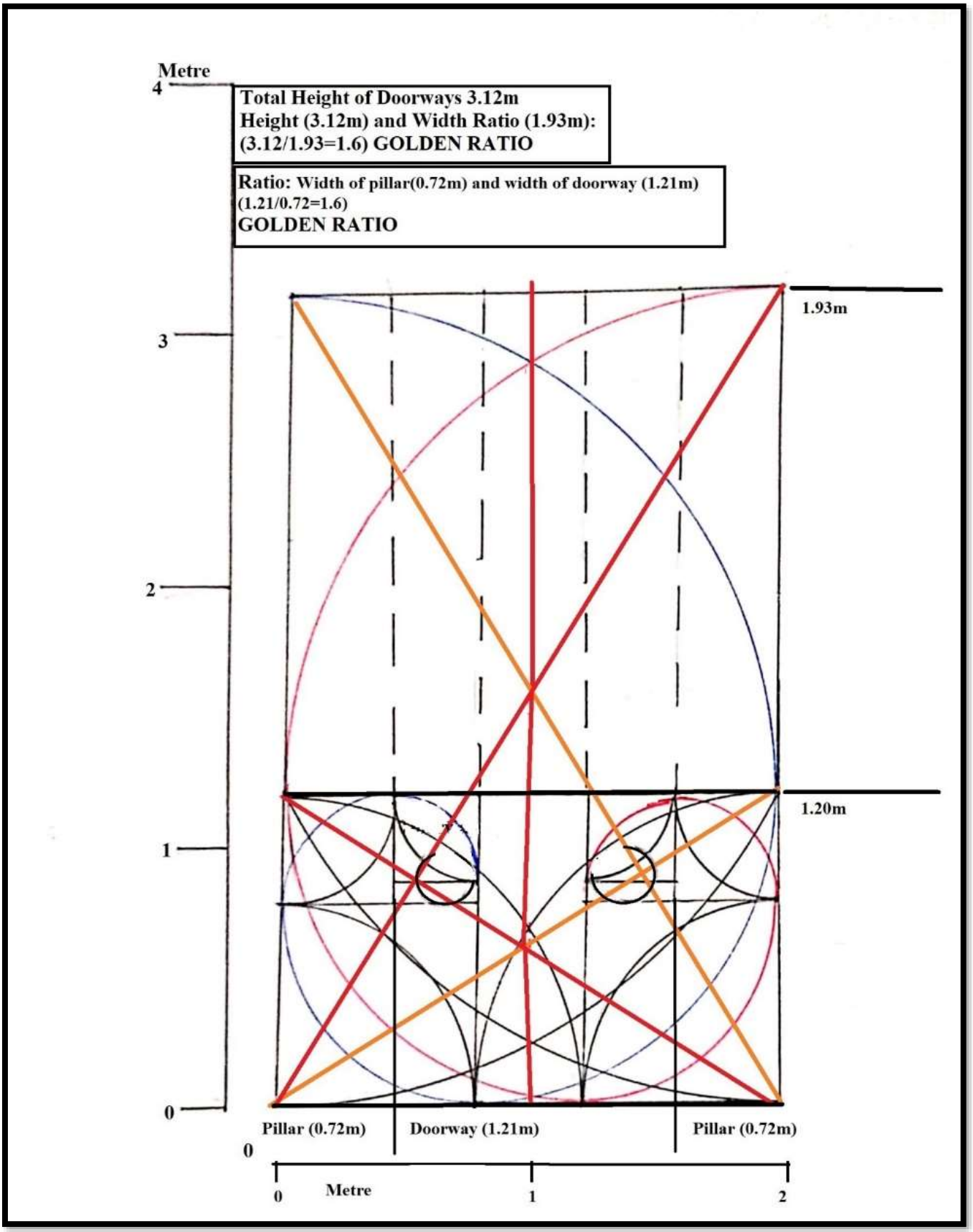


Fig. No. 08: Doorways of *Rasamancha*

The obelisk and benben stone are integral part of pyramid. The benben stone of the pyramid (Alford 2010) is used in *Rasamancha* after regional modification and it is used as the doorway pillars. The pillars of *Rasamancha* are the true solar symbol or the symbol of life. The roof with pyramid is the symbol of universe and symbol of the cult of creation (Alford 2010). The lower part of *Rasamancha* which lies on square platform, it the symbol of terrestrial earth or the soil on which life is flourishing. The parabolic arch shape is normally used for the gateway and horseshoe–shape doorways are normally used in mosque. The empty sanctum and single doorway epitomizes the concept of universe and singularity. The three doorways are the replica of Earth, heaven and hell, five doorways are the symbol of five basic elements and eight doorways depict the core ideology of *vaishnavism* (Bhatia 2017), as well as the eight-wheel of *Buddhism* (Keown 2016) and the outer doorway of *Rasamancha* (parabolic pathway) is the symbolic expression of the union of god and men.



Fig. No. 09: *Rasamancha*, Bishnupur

Result: Though the *Rasamancha* (Fig.9) is the religious structure made as the dance floor of Lord Vishnu but *Rasamancha* is not the temple of specific deity and the sanctum is not housing any god (Guha and Bandyopadhyay 2016). It depicts the Egyptian pyramid style in roof, Italian numerical measurement (golden ratio) in the sequential arrangement of pillars and doorways, Islamic platform at the base, conventional Bengals hut roofs (chala) at the top of doorways and pillars. The structure of *Rasamancha* shows the assimilation of diverse cultural concepts. The arrangement of pillars and doorways follow the Fibonacci number (C. H. Khan 2001), golden ratio and Pythagorean numerical ideology. The pyramidal roof is the symbol of Universe and sky, vacuum sanctum has been taken from Islamic ideology. The pillars (benben stone and in later the minar) symbolize sun (solar deity) and it signifies the symbol of life and square flat base signifies the landscape. The *Rasamancha* is the symbol of religious integrity.

Conclusion: The *Rasamancha* is an example of a unique blending of Indian philosophy (*Hinduism, vaishnuvaism, Buddhism*), ancient Egyptian ideology, Islamic theology. The arrangement of doorways and pillars demonstrated the numerical principle of Fibonacci number, golden ratio and Pythagorean ideology (M. S. Khan 1987). The structural pattern of doorways portrays the Gothic style (Slaczka 2007) with Italian measurement ratio (Elan 2001). The roof pattern solely followed the pyramid style (Alford 2010). The curvilinear arches (Bengal hut-pattern of *chala*) in-between top of the doorways and slant of pyramid-plane portrays congruity of Indo Persian as well as indigenous cultural identity (Desai 1970). *Rasamancha* displays the ideological assimilation of diverse cultural elements and portrays the cultural panorama of Bengal.

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