

## Stucco Art of Nalanda Excavated Site, District Nalanda, Bihar: An Archaeological Overview

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### ABSTRACT

Stucco art is the manifestation of innate beliefs, outlook and purpose expressing the materialised vitality and activity of religious believe. Stucco art in any form is an expression of religion, the inner self of an individual, person or group of people. Every culture on Earth produces visual art as an expression of its creative self. Stucco art is one of them. The present paper is mainly going to discuss about the Stucco work done in the land of ancient Magadh i.e. Bihar. Their Nomenclatures, Method of Preparation and Purpose, Brief about Ruins of Ancient University Nalanda, Decade of Excavations, Stucco of Nalanda as Nalanda School of Art, Process of making, Technique behind its creation, Different Period and its gradual development, Comparative study with other Buddhist site in India, Threats of Stucco art, Preventive Conservation and Review of Archaeological Conservation.

**Keywords:** Stucco, Nalanda, Maniyarmath, Apsad, Kesariya, Vikramshila, Bodhgaya, Conservation

### INTRODUCTION

The stucco art is one of the most outstanding expressions of the technical and artistic abilities developed in different periods from Gupta period onward in the India. In ancient India since sculpture and painting were two separate disciplines, C. Sivaramamurti has rightly pointed out that the sculptures and the painters were known as *rupakara* and *citrakara*, respectively, while the term *silpi* was commonly used for both (Sivaramamurti, 1961:1).

First time in Indian sub-continent the stuccowork discovered at Gandhara (Chauley, 2002:11) later on techniques or methods adopted in early Christian era has undergone many a change.

The earliest stucco art was performed on dwellings 4,000 years ago such as the pyramids of Egypt and structures in Central and South America.

### NOMENCLATURES

Stucco means a plaster of lime and fine sand, used as coating for walls and for decorations. Stucco is a type of plastic medium made of a combination of small stone pieces and brickbats with jelly by which the model of a figure or

image is made within the niche or outer wall of a temple (Fig.1). When it was completely dried up, another thick coating (1/2 to 1/4 ") of lime plaster was used as a final coating to achieve anatomical details and final finish of the image as in the case of Nalanda.

The difference in nomenclature between stucco, plaster, and mortar is based more on use than composition. Until the later part of the nineteenth century, it was common that plaster, which was used inside a building, and stucco, which was used outside, would consist of the same primary materials: lime and sand (which are also used in mortar). Animal or plant fibers were often added for additional strength.

### METHOD OF PREPARATION AND PURPOSE

Stucco is a material made of an aggregate, a binder and water. Stucco is applied wet and hardens to a very dense solid. The detail as follows:

- Stucco is a mixture of Lime + Sand + *Surkhi/Jira* + Stone piece + Clay + Animal or Plant Fibers + Water.
- It is used as decorative coating for walls and ceilings and as a sculptural and artistic material in art and architecture.

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- As the case with Gandhara region stucco is composed of lime mixed freely with small broken stones and other alien matters.

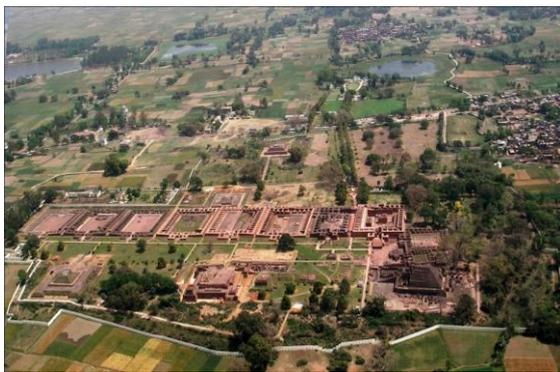
The purpose of creating stucco art and plaster over the architecture and sculpture is to decorate the monument for the beautification and for its religious belief. Stucco used for ornamentation, sculpting and as a finishing material.



**Figure1.** General view of the stucco panel from Bodhgaya temple, Bihar

### RUINS OF ANCIENT UNIVERSITY NALANDA

The origin of the name may derive from *nalam* ("lotus" -a symbol of knowledge and *da*, (to give). The Chinese pilgrim-monk Hwen-tsang gives explanations of the name Nālandā as, the origin of the word may come from the "Naga" (semi-divine serpent beings) who lived by a pool of water in the middle of a mango grove.



**Figure2.** Bird eye view of the Nalanda archaeological site, Nalanda, Bihar

The extensive remains of Buddhist monasteries and shrines (**Fig.2**) belong to Nalanda Mahavihar is one of the greatest universities of ancient times and celebrated centre of oriental art and learning by the Gupta emperor, Kumar Gupta –I (Circa A.D. 413-55). Hieun Tsang studied here between A.D. 637 and 642 during the reign of King Harshvardhana of Kannauj. The Pala Kings of East India (8<sup>th</sup> -12<sup>th</sup> century A.D.) also extended patronage to this university.

Devapala (Circa A.D. 815-54) granted five villages near Rajgir for maintenance of the monastery built at Nalanda by Sailendra Balaputra Deva of Sumatra. It seems to have been destroyed by the invasion of Bakhtiyar Khilji in circa A.D. 1200.

### EXCAVATIONS

It was Major Kitto who discovered the site on the basis of images at Bargaon in 1847 and he described the site as Brahmanical site. Later on for the first time Alexander Cunningham excavated the site in 1861-62. Subsequently, M. Broadley (1871), D. B. Spooner (1915-16, 1937), G. C. Chandra, M. Nazim (1936-37), V. K. Mishra (1974), R. S. Bisht (1977-78, 1979-80) and H. K. Narain (1981-82 and 1982-83) conducted excavations and time to time conservation on different locations. The excavations exposed eleven major monasteries and six temples in additions to a number of minor shrines, votive stupas, sculptures, coins, mural paintings, seal-sealing, decorative life size and minute motifs in stucco and decorative motifs in terracotta and stone etc. Antiquities and detached stuccos discovered from the site are displayed at the Archaeological site Museum, Nalanda opened in the year 1917 for the public.

The excavation of this site has exposed eleven major monasteries and six temples in additions to a number of minor shrines, votive stupas and other structure. The excavations carried out by the Archaeological Survey of India continuously from the years 1915 to 1983 (**Chauley, 2002:35**) have brought to light innumerable stucco images detached (**Fig.3**) and attached on both form



**Figure3.** The stucco made Kirtimukha and other panels displayed in Nalanda Site Museum, Nalanda, Bihar

## STUCCO OF NALANDA AS NALANDA SCHOOL OF ART

Nalanda was the center of Gupta, Pala and Sena art as it should be known as “Nalanda School of Art”. The stuccos were most inexpensive material, used mostly in decorative purposes and even the colossal images within the sanctum sanctorum were made of stuccos, as a result of which necessity of stone images were not felt by the devotees. The stucco is in bold relief (**Fig.4**) giving an idea of three-dimensional effect as if they were carved-in-round.

As per the nomination dossier prepared for Excavated Remains of Nalanda Mahavihara by Archaeological Survey of India “Traces of stucco art in Nalanda is evident in Site no. 01, Site no 12 and Site no 13 and most elaborately in the Site no. 03. As an established medium by the 5<sup>th</sup> century CE, stucco-work in Nalanda show a high degree of finesse and syncretism between the iconography developed in the Sarnath School with themes of the Gandhara School. The finest example of such a fusion are the panels in the 5<sup>th</sup> layer of Site No 3 depicting the Dipankara Jataka and Rahula’s inheritance which show the assimilation of Gandhara themes with Sarnath features in stucco.



**Figure4.** High relief stucco images, Nalanda archaeological site, Nalanda, Bihar

Iconographically, the figures of the Buddha in these stucco images show a prominent urna, hair bundled forming an ushnisha (knotted locks), serene expression, smooth delineation of torso, subtly modeled corporeal frame, diaphanous drapery, deeply chiseled waist and fleshy bulge which show prominent Sarnath features while

the plain prabhamandala and also a prominent urna depicts Gandhara traditions. Another characteristic development in the stucco art of Nalanda is the initiation of elaboration of the Buddhist pantheon. This can be noted in the increased number of Bodhisattvas accompanying the Buddha with their own retinues. With the gradual elaboration in rituals, these figures (Bodhisattvas and their retinue) received further definition gaining a distinct form during the Mature Pala period (10<sup>th</sup> -11<sup>th</sup> century CE). The finest example of stucco-art in Nalanda can be seen adorning the eastern surface of the 5th layer of construction of the principle structure and the tall stupa at its south-eastern corner. The main stupa shows scenes from Buddha’s life and Jataka Kathas where the Bodhisattvas and their respective retinue show definition of features in individual figures while on the surfaces of the tall tower are images of the Buddha with Bodhisattvas and a standalone figure of Tara set in the chaitya-windowed niches. Another field of application of stucco art in Nalanda is the colossal stucco image of Buddha installed in the Chaityas, only traces of which remain. Placed on the pedestal of the sanctum, these figures were almost 80’ tall, and are elaborately described in records of Xuanzang. Apart from the height, no other feature of this figure can be identified.”

The base frame of stuccos of Nalanda can be dividing in to six types:

### Earlier in Gupta Period

- Stuccos with base of brick (**Fig.5**),
- Stuccos with base of stone,
- Stuccos with base of mud,
- Stuccos with base of mixture of *zira* (small crunch of brick bats) and clay.

### Later in Pala Period

- Burnt clay model mixed with cow dung and corn husks,
- Some time Burnt and some time unburnt Clay model is prepared and finally covered with lime or stucco plaster.

The stuccos in Nalanda are noticed in various mode such as; Part of temple and votive stupas as attached sculpture and floral motifs, Wheel of temple, Small geometric and non geometric art on the temple, *jalies*, decorative plaster withmural in temples and in votive stupas.

At temple no. 3 (**Fig.6**) the earliest stuccos are assigned to c. 5<sup>th</sup> cen. A.D. but they are actually buried deep in the same temple. The stuccos that

decorate the towers and the facades of the fifth temple at the site 3 of Nalanda have been assigned to c. 6<sup>th</sup> cen. A.D. on account of the dated brick inscriptions, Gupta Era 197=516-17, A.D. discovered from the core of two votive stupas at the southern side of the site, although sometimes they have been relegated to the 7<sup>th</sup> or to 7<sup>th</sup>-8<sup>th</sup> Cen. A.D.



**Figure 5.** Stucco work over the brick, Nalanda archaeological site, Nalanda, Bihar



**Figure 6.** General view of the temple no. 03, Nalanda archaeological site, Nalanda, Bihar

Most of the stuccos of Nalanda found within the niches surrounding the outer surface of the temple no. 3 are badly damaged but a few of them are surviving. The theme is purely Buddhist figure like: *Buddha*, *Bodhisattva*, *Jataka* stories and life scene of Buddha. The faces of the male figures are along and sometimes round and the lower lips, prominent noses and with prominent feminine characteristics. Wear round earrings and a toque. Others ornament like, armllets, bangles, griddle, necklaces are visible. The figures are representing either standing in the attention, *Abhanga*, seated in *Padmasana* or *Lalitasana*. The figures of the Buddha are also found in seated and standing pose. Sometimes he is represented in the *Bhadrasana* pose. Unlike the drapery of the

Buddha figures the drapery of *Bodhisattvas* are delineated in a different manner.

The stuccos of Nalanda have not successfully represented as evident in the Sarnath Buddha figure possibly a group of artists consisting of both skilled and unskilled were employed to execute the work. Some of the images have produced the typical *Sarnath* facial expression. Mention may be made of the figures of the Buddha in *Dharmachakra Mudra* existing on the topmost niche of the south-east corner tower of temple no. 3 facing east. Whereas, the figure of the Buddha existing on the same tower facing south has failed to produce the same tone as shown in case of the former. The same thing happened in the case of the Bodhisattva also.

The Gupta stucco art legacy continued even in the Pala period, but it underwent a medication both in technique and in style. The remains of the Pala stuccos have been found in temple nos. 13 and 14 and the available detached parts of the figures of the Buddha and Bodhisattva show the degenerate phase of stuccos work in eastern India which are displayed in archaeological museum Nalanda. The remains of Pala stuccos are degenerated phase of stucco work has found at temple no. 12, 13 and 14.

### PROCESS OF MAKING

The process of stucco art is based on various ways of techniques i.e.; manufacturing, casting and carving on lather hard condition. The stuccos are output of three major techniques i.e.; molded, handmade and carving. Its takes four steps in the process;

#### Earlier in Gupta Period

- Mud and concrete used for preparing the figures on the core part that is brick or stone,
- Than the lime plaster is used for giving shape to the figures, flora, geometric designs,,
- Than over the stuccos frame through sharp soft tool its carving,
- And then finally they are covered with various colour as red is evident in many cases (**Fig.7**).

#### Later in Pala Period

- In the Pala period the inner core is replaced by burnt clay model mixed with cow dung and corn husks and finally coated with lime plaster.



**Figure 7.** Red painting over the wall of Sarai mound, Nalanda archaeological site, Nalanda, Bihar

- Even sometimes the clay model is prepared and finally covered with lime or stucco plaster without burning the inner core (Ghosh, 1965:18, 53-54). It is better to infer that the Pala stuccos were nothing but burnt and unburnt clay models coated with thick lime plaster.

This is evident from the remains of a huge clay model of the temple lying to the south of the temple no. 12 and in the *Garbhagriha* of temple nos. 13 and 14. Even the in the Sarai Mound situated to the extreme east of the excavation area, also unearthed the remains of a colossal clay figure of the Buddha with thick coat of lime plaster on it.

Dr. R. D. Banerji observes, the displayed frieze of images within niches on the surface of the walls seems to have been a favorite method of establishing a sculpture gallery, with the Magadhan architects in their original design. The same method is noticeable at Maniyar matha, Rajgir, Kesariya, Apsad, and Nalanda temples and in votive stupas.

**There are broadly two types of stuccos art:**

- Iconic (human, animal) and
- Non-iconic (floral, geometric) form.

**Stuccos used as different way such as**

- Iconic and non-iconic forms,
- Plaster over wall,
- Miniature replica,
- Plaster over the four corner temples,
- Plaster over Votive Stupa,
- Stuccos used in niches,
- Stuccos plaster over *Jalis*,
- Plaster over pilaster,
- Garlands and rosettes,

- *Chaitya*-window: Trefoil *chaitya*-window exhibits a Buddha figure seated cross-legged in *padmasana* extending the *samadhimudra*.
- *Kirtimukha* with scroll.

**Human form of stuccos**

**Seated and standing postures of Buddhist icon**

- Buddha seated on a high throne in *Bhadrasana* or *Pralambapadasana*, extending the *Dharmachakra mudra* (Fig.8).
- Scene of Rajgir miracle (Fig.9).
- Buddha seated on throne in *Dharmachakra mudra*.
- Buddha stands in the middle on his right leg, placing his leg in *sukhasana mudra*.
- *Dipankara* Buddha stands in *sukhasana mudra* (Fig.10).
- Buddha extends *varada mudra*.
- Buddha is seated cross-legged in *padmasana*.
- The *Nidanakatha* jataka story in which the Buddha is seen a three-hooded Cobra male figure with folded hands *anjali mudra* in *sampadaasthanaka mudra*.
- Buddha in *bhumisparsa mudra*.
- Buddha in *Samadhi mudra*,
- Buddha figure is seated on a high throne in *bhadrasana* or *pralambapadasana* and expounding the first sermon with *dharmachakra mudra*.
- Buddha seated cross-legged on an inverted lotus.

Buddha seated on a *chauki* in *bhadrasana* or *pralambasana* exhibiting *dharmachakra mudra*.



**Figure 8.** Image of Lord Buddha in preaching posture, Nalanda archaeological site, Nalanda, Bihar (Above)



**Figure 9.** Scene of a miracle related to Rajgir-NalHasthi-Daman, Nalanda archaeological site, Nalanda, Bihar (Below right with an elephant icon)



**Figure 10.** Lord Buddha image in Varad posture, Nalanda archaeological site, Nalanda, Bihar

#### Bodhisattva seated and standing posture

- Bodhisattva standing in *samapad asthanak amudra* against wall on the proper right side of the Buddha, holds the *akshasutra*.
- Bodhisattva stand in *samapad asthanaka mudra* and hands in *katihastha mudra*.
- Bodhisattva Maitreya with a plain circular halo and bearing a miniature stupa in headdress in the *samapada sthanaka mudra*.
- Bodhisattva Manjusri in the *samapad asthanaka mudra*.
- Bodhisattva Manjusri is seated on lotus extending *varada mudra* with right hand holding lotus-stalk with left hand.
- Two-armed Bodhisattva is seated cross-legged on a lotus expounding *dharmachakra mudra* and holding the lotus –stalk, an effigy of *Dhyani Buddha Amitabha* decorates its head-dress.

- Two armed Bodhisattva *Avalokiteshvara*,
- *Avalokiteshvara* with *Tara*, *Bhrikuti*, *Prajnas* and *Dhyani- Buddhas*.
- Bodhisattva *Jatamukuta-lokeshvara*.
- Bodhisattva figure in standing posture holds lotus-stalk in left hand.

#### Others

- Two-armed *Tara* (**Fig.11**) seated at ease extending *varadmudra* with right hand. Mallar Ghosh has declared that the cult of the Buddhist goddess *Tara* originated at Nalanda in the 5<sup>th</sup> Century A.D. (**Mishra, 1998: 39-68**)



**Figure 11.** Image of goddess *Tara*, Nalanda archaeological site, Nalanda, Bihar

- *Yasodhara buddhasakti* with her son *Rahula* to her front and holding him by both of his shoulders, she stands in *samapad athanaka mudra* in profile.
- *Rahula* with *Buddha*.
- *Anand*.
- **Animals:** Deer, Naga.
- *Dharmachakra* icon.

#### COMPARATIVE STUDY WITH OTHER BUDDHIST SITE IN INDIA

These stuccos have offered a rare panorama of Eastern Indian art and they have been widely appreciated. *Yasodhara* along *Rahula* noticed in Amravati medallion-scene, Ajanta painting in the cave 17 that depict the same. *Yasodhara* with *Rahula* in front stands to the proper right of the Buddha who is handing over his bowl. The genital organ as shown in the Sarnath figures is absent in this figure at Nalanda. The three-hooded Cobra also depicted at Nagarjunikonda, Sanchi and other Buddhist sites. The *naga* of the

Nalnada stuccos is absent in a Gandhara sculpture depicting the same scene. The *samadhimudra* of the Buddha form represent the Bodhisattava in his first trace at Kapilvastu under the Jambu tree. In the stuccos figure the *yagnopavita* shows subtle modeling which is eliminated in the stone figure hose stark surface shows little of that subtleness.

The figures of Nalanda some time feels that the entire scene is physically shifted from Ajanta to Nalanda or may be Nalanda to Ajanta. The elongated lotus shaped eyes are downcast in meditation, a key-note of all the stuccos, probably taken from the Bodhgaya and the Sarnath Buddha and Bodhisattva. The detached kirtimukha displayed in Nalanda Site museum is similar with the Nalanda temple no.02, terracotta plaque of Vikramshila and the kirtimukha of Bodhgaya railing. The sculptors of the Nalnada stuccos appear to have prepared terracotta at Mahasthanagarh (Bogra District) represented by the famous figure of Surya discovered there. The art of Nalanda stuccos continued at Nalanda monuments themselves viz; Temple 2,12,13,14, the Sarai mound temple, the Surya Temple (Fig.12) at Apsadh (7<sup>th</sup> cen. A.D.) (Sinha, 1968:212-118), Bodhgaya, Mahasthanagarh, Maniyarmath (Fig.13), Rajgir, Mundeshwari temple and others. The sculptures of Sarnath have borrowed them from the Nalanda stuccos during the 7<sup>th</sup> century A.D. the Nalanda stuccos became the base source of inspiration to the Gupta site at Nalanda as well as to the other sites. B. Rowland observes that “the style of the figure sculpture in stuccos at Nalnada is a dry repetition of the Gupta statuary of Sarnath, as may be seen by comparing the statue in the top-most niche with the famous preaching Buddha.

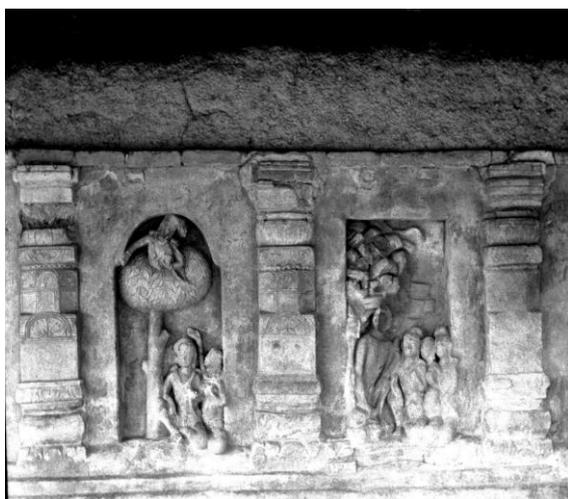


Figure12. Scene from Apsadh, Bihar (Source- B.P.Sinha, JBRS, 1968)



Figure13. General view of the stucco panel from Maniyar Math, Rajgir, Bihar

### THREATS OF STUCCO ART

In practice the two reasons cannot be always separated effectively: a factor of natural deterioration may be indirectly attributable to human modification of the environment. Sometimes the connection may be very obscure, if indeed it can be determined. For instance, ecological imbalances introduced by humans are frequently responsible for new conservation threats. Experience shows that it is judicious to first look for a humanly introduced cause in most instance of rock art deterioration. It was during the invasion of Islam many art specimens from the structure have destroyed and major part of the physical infrastructure and delicate details of stucco.

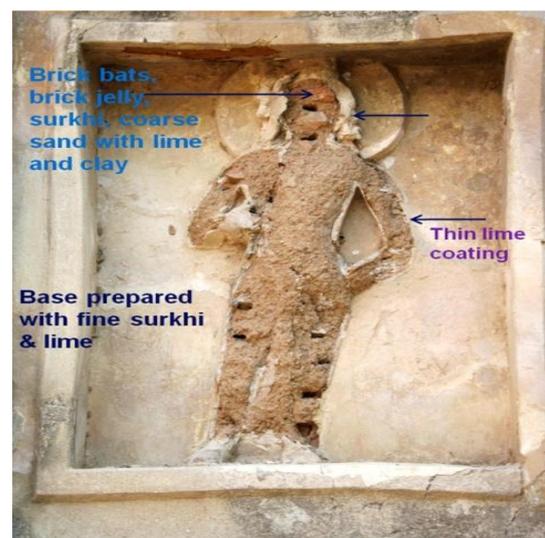


Figure14. An example of problem on Stucco image, Nalanda archaeological site, Nalanda, Bihar (Left)

Deterioration (Fig.14) to Stucco art is mainly caused due to natural weathering like water, wind, and direct sunlight, insect, vegetation growth and animals. Detail describe below:

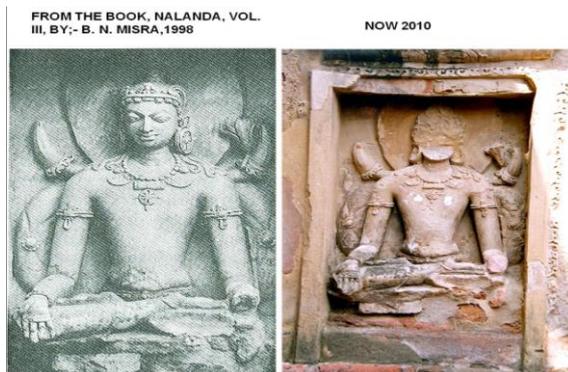
- After a long time due water and humid condition the lime plaster, brick layer and clay layer chip out; layer after layer and in this process cracks in every layer occurs and take out the painting. Parts of stucco have fallen down (Fig.15) on account of continued splitting, flaking, and spilling, weathering and physico-chemical disintegration of the rock. For this type of problems till now we do not have any solution



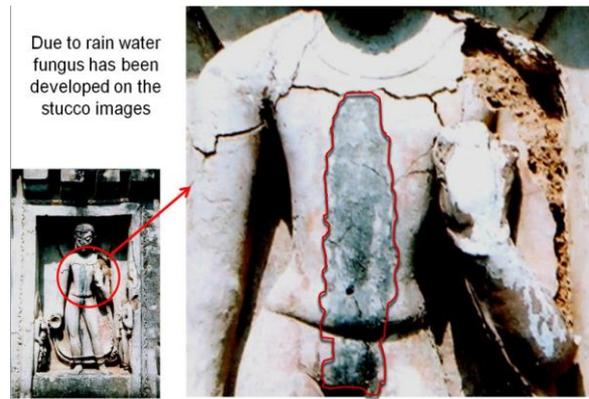
**Figure15.** On site example of stucco flaking, Nalanda archaeological site, Nalanda, Bihar (Right)

### Water problem

In depth studies of the observations and practical experiences of other scholars have confirmed that water and water associated factors are directly or indirectly behind all the physical and biological damages that take place in these structures. Relative atmospheric humidity, and in the form of air humidity, water affects stuccos both mechanically and chemically. Flow of water (Fig.16) affects not only the outer face of stuccos but even inner core of the stucco and core medium in which the stuccos are stable. The stucco art deteriorated in three ways: (i) By washing off thin layer of mural, (ii) By depositing salts, clays and mineral components on the surface on it, (iii) By creating conditions suitable for cryptogammic growth.



**Figure16.** Water seepage problem, Nalanda archaeological site, Nalanda, Bihar



**Figure17.** The past and present of the same image, Nalanda archaeological site, Nalanda, Bihar

The most insidious destroyer of all is considered to be ground-water seepage and water percolation from top (Fig.17). The water movement carries salts such as calcium carbonate, calcium sulphate, sodium chloride and manganese oxide etc., all severely detrimental to these invaluable stuccos.

### Damage by Insect

I observed that some of the stucco images provide ideal humidity conditions for wasps to build their nest and cryptogammic growth. Types of termites which build ant-hills from ground level affect the stuccos. During the rainy season when water seepages through the cracks it dissolves these mud channels made by the termites, which adversely affect and damage the stuccos under the area by coating of mud on it.

### Damage by Vegetation Growth

Due to favourable condition for the growth of vegetation like humidity, water seepage from the developed cracks on the rocks. It is divided in to three groups – Micro Vegetation growth (Biological growth like fungi, algae and lichens are also problem for the rock art), Macro vegetation growth (shrubs and creepers growing) and Mega vegetation growth. Here the much damage caused by micro vegetation growth in close proximity to or over the stuccos.

### Human Activities

The only method to prevent this hazard is to educate the staffs.

Air is also big problem because cyclone, blasting by winds, soil deposition, and accretion of dust, dirt, cobwebs and soot on the stuccos create another layer over the stuccos.

Insolation or solar radiation is capable of breaking up some stucco art and core of it, through thermal expansion and contraction,

particularly in arid or semi-arid regions experiencing significant diurnal temperature variation. Natural tectonic causes are also destroying the rock art sites.

### PREVENTIVE CONSERVATION

From Conservation point of view maintenance should be done to the natural conditions and original environment of the stuccos. Conservation practices should keep sites as dry as possible should be adopted. Periodic checks should be made so that the water does not come on the stucco art and architecture where it is slowly directed towards the art work through porous rock and through cracks and fissures on the roof or floor. Water should be directed off the roof by natural looks pipe, and by allowing the water to runoff, by opening drainage lines to the side of the stucco work. In addition some minor drainage channels should be made above the stucco niches and locality. In this way runoff water can be diverted away from the stucco sculptures and other art.

Micro vegetation growth should be remove periodical. Just like regularly uprooting and cutting are necessary, Removal of the nests regularly at least before the monsoon, during this period the nests appear even more. To remove the wasps nest, the stucco art directly below should be covered with a section of polyethylene sheet and thereafter the nest either pulled off by hand or knocked off using the blunt wooden handle of a soft brush. It has noticed that the cleaning of stuccos the staffs of the sites are using cloth to *jhada* the art thing by way of force on it even some time by broom on it. This is wrong way of brushing it might flak the stucco layer and deposit further dust on other adjoined stuccos. This is another way of problem of stuccos. The staffs of that site should be trained properly.

### REVIEW OF ARCHAEOLOGICAL CONSERVATION

The exposed stupas and temples are beautifully decorated with stucco figures, which are deteriorating day by day. It is a big challenge to

preserve and protect them. Conservation has been taken to temple no. and 3. The bulged portion of structures has been conserved by archaeological Survey of India as per original with traditionally prepared stucco plaster and special sized bricks. (IAR, 1953-54:19) The shrine still exists alone and bears traces of a colossal stucco image of Buddha. Some brick found in salt-eaten patches which is repaired in 1954. (IAR, 1954-55:34) Temple site 14: 1 m. high from ground level we have noticed 9 colossal stucco image of Buddha, the temple is the existence of painting in the Niches of the pedestal of the image.

Archaeological chemist, conservation (Fig.17) has been done during 1919-20 to 2000 stucco specimens (IAR, 1954-55:38) Nalanda consist of chlorides and sulphate of alkalies and in the proximity of the sea, they are the sea salts deposited by the sea wind. In the rainy season they form a solution with water and penetrate the walls to certain height by capillary action, and crystallize at the exposed parts in dry weather, causing disintegration thereby. The cycle is repeated over and over again with changes of weather. That is why it's causing danger for this class of art.

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