

ANCIENT CEYLON

Journal of the Archaeological Survey Department of Sri Lanka

No: 7

1990

Papers submitted to the International seminar –
Towards the Second Century of Archaeology in Sri Lanka
on 7th–13th July 1990
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Volume 2

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PREFACE

The International Seminar titled "Towards the Second Century of Archaeology in Sri Lanka" is organised by the Department of Archaeology in order to commemorate the event of the establishment of the Department of Archaeology of Sri Lanka in 1890. The papers of the present publications are the contributions by the invited delegates to the seminar from the seven SAARC countries and the international community of South Asian Archaeology. The themes of the seminar are as follows: **a.** Letters, Literature and Archaeology **b.** Man, Environment and Archaeology **c.** Science, Research and Archaeology **d.** Culture, Tourism and Archaeology. In this connection it may be mentioned that due to lack of time and the delay in the submission of papers, the organising committee was compelled to publish unedited versions of papers in order to complete the publication in time for the Seminar and give the delegates an opportunity to participate actively in the forthcoming deliberations. However, it has been decided to publish an edited version of the proceedings later. The diacritical marks which have been omitted due to technical reasons will be included in the final print. Any inconvenience caused to the authors and the readers in this regard is very much regretted. Finally, the organising committee takes this opportunity to thank all the delegates who made their contributions in time accepting our invitation. We also extend our thanks to all the members in the department and our friends and wellwishers who helped in various ways to get this publication in a successful manner.

Organising Committee.

LUMBINI - THE BIRTH PLACE OF LORD BUDDHA

By

Basanta Bidari

Lumbini, the birth place of Lord Buddha, is an important and foremost site of religious pilgrimage and tourist of the whole world. It is located about 22 KM west of Bhairahawa (Siddhartha Nagar) in the district of Rupendehi of Lumbini Zone of Nepal. It is situated at the foothills of Western Himalayas and the Churia (Siwalik) range which rise from the plains of the Tarai. In the 7th century B.C. Lumbini was a pleasant and beautiful grove which was utilized by Sakyas of Kapilavastu and Koliyas of Ramagrama. According to the Buddhist literature, Lumbini during the life time of Lord Buddha, was a big sal (Shorea robusta) garden which was jointly owned by the Sakya and Koliyas. The earliest reference to the birth of Buddha in Lumbini mentioned in classical Buddhist text Suttanipata. This text describes that Buddha was born for good and for blessing in the country of Lumbini. Lalitavistara and other Buddhist literatures mention that Buddha was born in Lumbini during the fullmoon day, in the month of Vaishaka. It was a Pleasure resort called "Pradimiksha vana" and comparable to the "Chitta-late" grove of Indra's Paradise in the heaven. The name Lumbini Devi is also spelled as Rummindei or Rupadevi (beautiful lady). According to the story Rupadevi, the queen of Anjana King of Devadaha, the capital city of Koliyan state requested to king to make a beautiful garden on the Bank of River of Oil (Tela River) thus the place was named Lumbini after her name.

BIRTH OF BUDDHA.

The famous story of Buddha's birth tells that Mayadevi, the mother of Buddha was travelling in state from Kapilavastu to Devadaha, her parents home to deliver her first child. On her way, while the queen gave birth to a divine son in the Lumbini garden, the pangs of labour caused her to stand against the trunk of a tree with raised hand.

A male child came forth from her right side and walked seven steps towards north and proclaimed the following words "I am the foremost for all creatures to cross the riddle of the ocean of existence. I have come to this world to show the path

INDONESIA - THE BIRTH PLACE OF LORD BUDDHA

BY
S. S. S. S.



Nativity Scene of Lord Buddha

of emancipation. This is my last birth and here after I will not be born again."

LUMBINI, A PILGRIM'S DREAM

When Buddha was eighty years old he was lying down in the death bed surrounded monks and nuns in Kushinara. Before his parinirvana. The Buddha spoke of the four places which a Buddhist should visit. They are the Lumbini where Tathagata was born. Bodh Gaya where he attained bodhi (enlightenment) the Deer Park at Isipatan(Sarnatha) where he reached the unconditioned state of Nirvana. Thus Lumbini, where the blessed one was born has become a Buddhist Pilgrim's dream.

EARLY VISITORS TO LUMBINI

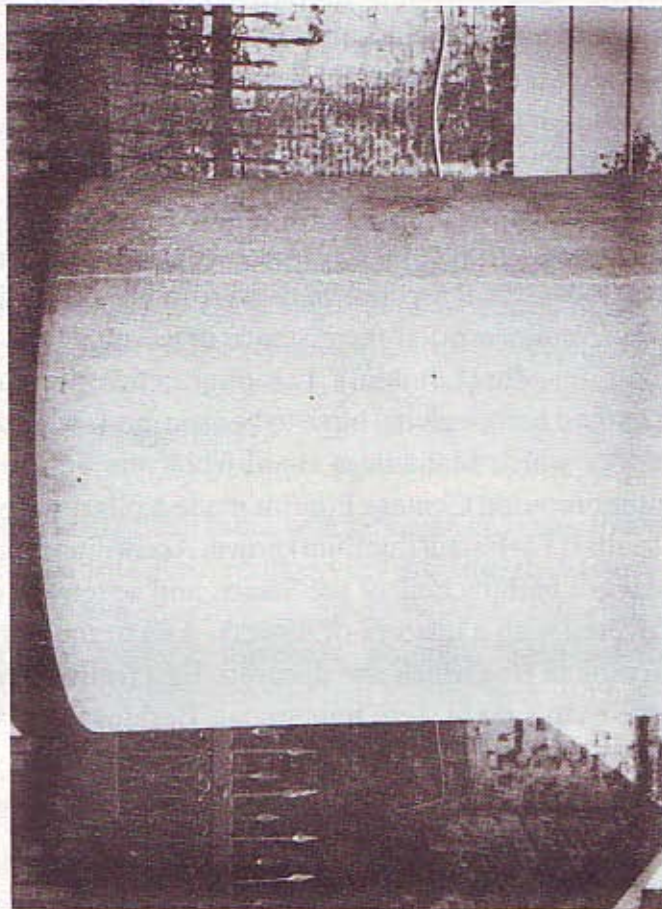
After the Mahaparinirvana of Buddha, Lumbini was no more a pleasant garden resort but was regarded as a centre of pilgrimage for Buddhist. It was visited by royalties, scholars and devotees from all over the World. The spot of the birth of Lord Buddha developed as a religious site with many votive stupas and monasteries. In 3rd Century B.C. Emperor Asoka visited Lumbini and resumed the legendary fame of the site.

His Pilgrimage in Buddhist sites is narrated in "Divyavadana" and he was accompanied with his religious teacher Upagupta. At Lumbini Upagupta pointed a tree with right hand and said " Behold, O! merciful king, this is the spot where Sakyamuni Buddha was born" Ashoka saw the tree with over whelming joy (There are controversies regarding to the identification of that tree underwhich the Tathagata was born. According to Sarvata Vinaya and other authorities it was an asoka tree.

When King Asoka visited Lumbini he saw the actual asokan tree. Fa-Hien saw this asokan tree still alive and Hiuen Tsang saw it in its place but dead. The Lalitavistara makes the tree to have been a peepal (Bodhi). Harry and Bigandet call this tree a sal tree. One chinese translation merely has 'Lin-pi (Lumbi) tree and under one of these the Tathagata was born. He worshipped the spot, installed a commemorative pillar with horse capital on top, the pillar inscription reads as "Twenty years after his coronation, King Priyadarsi Beloved of Gods, visited this



Asokan Pillar with Brahmi inscription.



Asokan Pillar with Brahmi inscription.

spot in person and offered worship at this place, because the Buddha, the sage of Sakya, was born here. He caused to be built a stone wall around the place and also erected this stone pillar to commemorate his visit. Because the Lord Buddha was born here, he made the village of Lumbini free from taxes and subject to pay only one-eighth of the produce as land revenue instead of the usual rate". The King gave away one hundred thousand gold coins in charity. He is said to have constructed a few votive stupas and monasteries in Lumbini. (The total height of the pillar is 30 feet 10 1/2 inches and 17 feet 2 inches is above the surface and 13 feet 8 1/2 inches is below the surface. Below the surface 6 feet 9 inches is well polished and remaining 6 feet 9 1/2 inches is rough with chisel marks.)

In the beginning of fifth century A.D. Fa-Hien, a Chinese Pilgrim visited Lumbini. According to his travel account he came from the town of Kapilavastu. To the east of the town (Kapilavastu) at the distance of 8.3 miles was the royal grove. This grove is called Lum-Min (Lumbini). This pilgrim mentions a bathing tank in which Mahamaya bathed before giving birth to her son, and also a dragon Well, and the asokan tree under which Mahamaya stood when she delivered of her child. Huiyen-Tsang, another reputed Chinese Pilgrim made a pilgrimage to Lumbini in 7th century A.D. He spells it La-Fa-Ni(Lumbini) grove. According to his travel account in this grove there was a bathing tank of the Sakyas and water was clear as a mirror and surface was covered with a mixture of flowers. And to the northeast of this 24 or 25 paces was an asokan tree which was decayed. East from this was a stupa built by Asoka raja. Close to this there were four stupas. Besides these stupas there was a great stone pillar on the top was the figure of a horse which was built by Asoka raja and it was broken in the middle. By the side of it was a small river, when people called it river of oil (Telar Nadi).

After Huiyen-Tsang many other travellers visited Lumbini from time to time. Among them was Wu-Kung from China who came here in 764 A.D. but because of the absence of records very little is known about the conditions of the area.

After a long gap of time another visitor was the king Ripu Malla from western Nepal. He visited Lumbini and Kapilavastu in 1314 A.D. He engraved his name on both the Asokan Pillars in Lumbini and Kapilavastu (Niglihawa), to commemorate his visit in these sites. Thus the remains of few monasteries, stupas and other archaeological fragments of the site show that Lumbini was a prominent centre of

Buddhist pilgrimage from the sixth-fifth century B.C. until the fourteenth century A.D.

From the beginning of the fifteenth century A.D. Lumbini faced the dark period for about three centuries. According to some scholars this dark period might have caused due to Sikandar Lodi, a bigoted man who destroyed the many religious sites in Northern India.

Lumbini the birth place of Lord Buddha also suffered a great set back during the rule of the Muslims, possibly the reign of Sultan Lodi. The later ruler like Mughals, Rajput Kings also helped to decay and extinction of the Lumbini. On the other hand revival of Hinduism and Muslim invasion in North India caused the total negligence of Buddhist sites. Thus, Lumbini a foremost Buddhist Pilgrim centre slowly shrouded into bush and remained obscured for a long time.

RE-DISCOVERY OF LUMBINI

During the British rule in India, scholars such as James Princep and Alexander Cunningham contributed to rediscovery of Indian history and culture. A Cunningham organized a countrywide survey of Archaeological remains following the foot steps of the Chinese travellers' accounts. Study of the early Buddhist literatures and travel accounts revealed that Kapilavastu and Lumbini were located on the foot hills of the Himalayas. Hence, in 1985 Dr. A. Fuhrer was deputed to explore the archaeological potentialities of Nepalese Terai. In the same year he discovered the Asokan pillar in Lumbini with the help of General Khadga Shamsher Rana. The Asokan pillar containing an inscription describing the birth place of Buddha confirmed the exact location of Lumbini. Dr. Fuhrer mentions in his report that the sculpture of Mayadevi was lying on the ruins of Stupa. He had seen the four ruined stupas close to the Pillars and the Sakya tank.

ARCHAEOLOGICAL ACTIVITIES IN LUMBINI

With the important and facinating discovery of Asokan pillar at Lumbini in 1899 Babu P.C. Mucharjee was sent to Nepal to explore and accurate the archaeological remains of Lumbini Garden and Kapilavastu. The main discoveries of archaeological activities at Lumbini are the details of the plinth of the Mayadevi



Plinth of Mayadevi Temple



Mayadevi Temple and Sakya Pond

temple on which the nativity sculpture of Buddha Lies. He found the brick railing around the Ashokan pillar, the bathing tank, few stupas few structures belonging to the monasteries.

Then between 1933 and 1939 Field Marshall Keshar Shamsheer J.B.R. extensively excavated the ruins of the Lumbini Garden. However, he did not publish any report of his discoveries. He is credited with providing a high platform around the Mayadevi Temple, enlarging the sakya tank and building some rest houses for the accommodation to the pilgrims.

In 1962 Mrs. D. Mitra of the Archaeological survey of India excavated a small trench in the western side of the Asokan pillar to ascertain the nature of the brick enclosure described by Mukharjee.

RECENT ARCHAEOLOGICAL ACTIVITIES IN LUMBINI

The Department of Archaeology H.M.G. Nepal began excavation at Lumbini in 1970 - 71. The main aim of the first excavation was to locate the Lumbini village mentioned in Asokan Pillar. Excavation, south of Mayadevi temple revealed the four cultural periods of human occupation from the 6th century B.C. onwards. Traces of a mudwall, a T.C. ring, circular tomb containing a portion of a human skull, one iron sickle, one T.C. plaques of Buddha of Gupta period are some of the important discoveries. Besides there is a large amount of the T.C. shards of Northern Black polished Ware from the lower level.

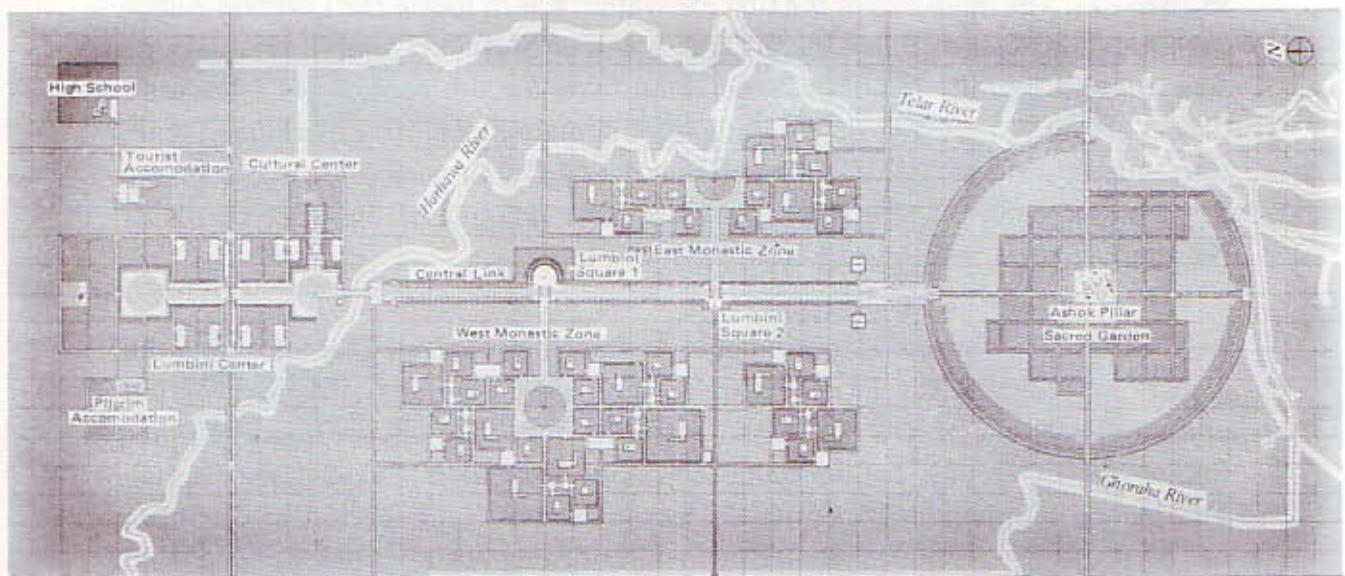
From 1975 onwards Department of Archaeology excavated the site under the aegis of the Lumbini Development Committee. Some structures of Mauryan period and a stupa with a lid of a gold casket were the important discoveries. The other findings were a fragment of the cunar sand stone probably a piece of horse capital, T.C. plaque with Dharmachakra, T.C. Human head of Gupta period, and number of T.C. potsherds are noticeable. The structures like monasteries belongs to second century B.C. to fourth century A.D. and stupas from third century B.C. to eighth/ninth centuries A.D.

NEW ERA



Stupas and Monasteries

THE MASTER PLAN OF LUMBINI



The plan is designed by Mr. Kenzo Tange. It is known as the Sacred Garden and to develop

Lumbini might have remained an isolated holy place accessible only to the devout few willing to face severe hardships in pursuit of their religion, had it not been for the visit, in April 1967, by the late U. Thant, former Secretary-General of the United Nations. He and late H.M King Mahendra discussed about the development of Lumbini as a sacred garden and centre of world peace. Then the preliminary work began soon after. In 1970 with the support of the United Nations an International Committee for the Development of Lumbini was formed. The Committee now has fifteen member nations, with permanent Representative of Nepal to the United Nations as Chairman.

MASTER PLAN.

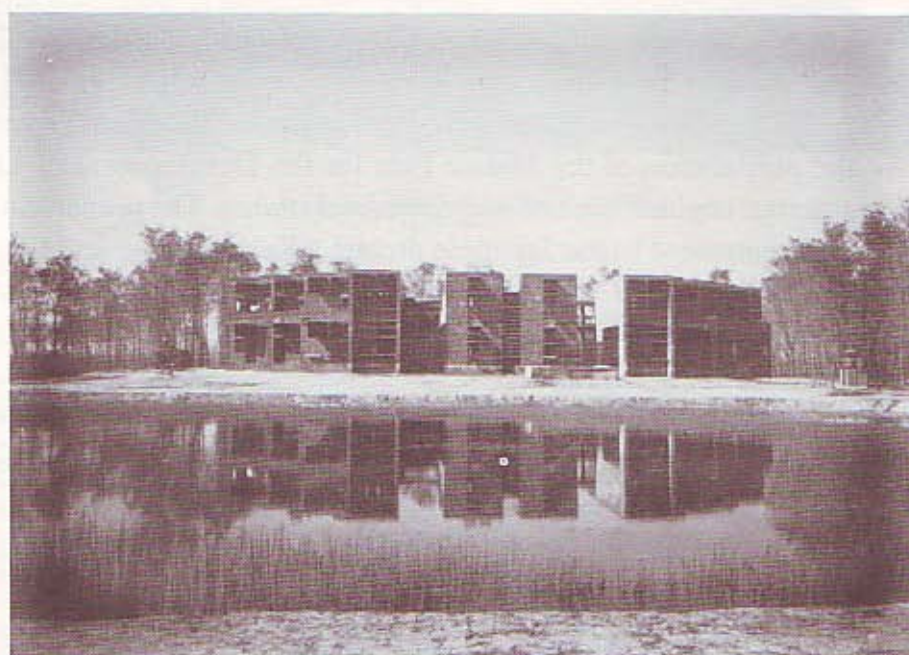
The United Nations Development Programme contributed nearly one million dollars for the preparation of the Master Plan for the Development of Lumbini, including numerous engineering and archaeological studies. The preparation of the Master Plan was entrusted to the Japanese architect Kenzo Tange and Urtec. The Plan which was completed in 1978, has as its objective to restore an area of about three square miles, divided into Sacred Garden, Monastic Enclave and Lumbini Village respectively.

Development of Lumbini includes road construction, airport extension, water supply, electrification, communication, land acquisition, landscaping and afforestation and flood control. After more than a decade of work the realization of this ambitious task looks to be withing sight.

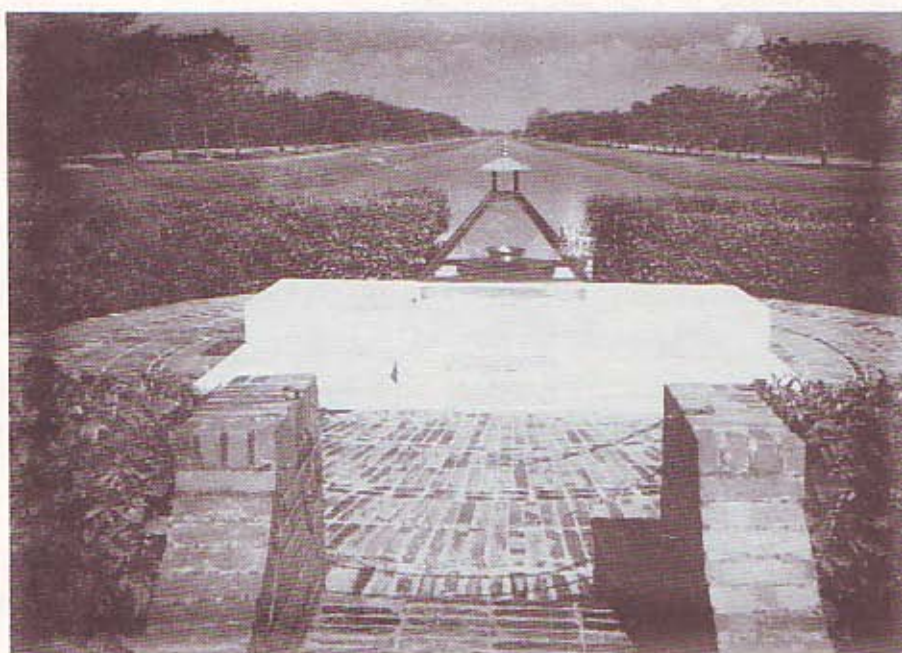
FORMATION OF TRUST.

To further expedite the development of Lumbini, in 1985. His Majesty the King Birendra Bir Bikram Shah Dev created the Lumbini Development Trust an autonomous, non-governmental organization. The mission of Lumbini Development Trust is one of the most challenging in Asia today the restoration of Lumini as a pilgrimage site, tourist and cultural centre and a place to make the teaching of Gautam Buddha accessible to all the world's people.

H.R.H. prince Gyanendra Bir Bikram Shah was appointed as the Chairman of the Trust. Several components and activities of the Master Plan have been



Pilgrim Accomodation



Eternal peace flame with central canal

executed under the dynamic chairmanship of H.R.H. The Pilgrim Accommodation, having 32 rooms with 188 bed lodge is donated by Sri Lanka Government and now complete and ready for operation. It is a low price accommodation for the pilgrims and low budget minded tourist.

The direct involvement of such a highest level reflects the Commitment of Nepal and attests to the sense of urgency and seriousness on the part of Nepal. Indeed after the formation of the Trust a sustained campaign is on to project Lumbini to the U.N. and the World at large. H.R.H. Prince Gyanendra paid a visit to the United Nations in 1986 and addressed the International committee for the development of Lumbini. With him was the U.N. Secretary General Mr. Javier Perez De Cuellar who for the first time formally addressed the committee. H.R.H. Prince Gyanendra paid visits to Japan and the Republic of Korea in 1986 in a promotional campaign which created a tremendous awareness about Lumbini among the different segments of the Japanese and Korean population.

The 1986, a peace torch came all the way from United Nations in New York through sixty countries, in commemoration of the International year of peace. While His Majesty graciously performed the lighting a flame from the peace torch in Kathmandu, His Royal Highness lit an eternal peace flame in Lumbini from the same peace torch.

The eternal peace flame in Lumbini today stands as a symbol and a monument to world peace which represented the essence of all that is the best and the finest in mankind emanating from Lord Gautam Buddha.

CONSTRUCTION OF MONUMENTAL BUILDING

An agreement was signed between the Lumbini Development Trust and Sambu Construction Co. Ltd., of South Korea awarding the contract for the construction of the Library, Museum, Central Link Bridge, additional civil work and soil improvement works in the cultural centre in 1987.

The above construction works were completed in scheduled time. The building will be handed over to the Trust after a maintenance period of the year



Museum, Library & Central Link bridge

from the completion date.

TOURIST ACCOMMODATION

An agreement was signed between Lumbini Development Trust and Hokke Club of Japan to construct a four star hotel at Lumbini on November 1986. The construction of the hotel is due to commence soon and is expected to take about two years to complete the first phase.

PRESENT CONSTRUCTION WORKS

The trust has concentrated on civil works like gravelling on one side of the Central Canal, gravelling in service roads, erecting electrical transmission lines and construction of a main receiving substation, construction of storage one overhead water tank and laying of water supply lines, construction of pump houses. The fund for all these activities were contributed by H.M.G. grant and general donations.

Earthwork on pedestrian path of Central Canal. Telar River diversion plaza and in and around the Sacred Garden have already been completed. Assistance for all these activities was provided by the world Food Programme under their Food for Work Scheme with 30% of the expense borne by the Trust in cash as counterpart funding. The WFP granted assistance for 220.000 mandays of works at the rate of their daily ration mix.

ARCHAEOLOGY

The Trust has attended to the periodic conservation of archaeological remains of Lumbini and Kapilavastu, grid alignment in and around Mayadevi temple, preparation of structural map and trial trenching in the around sacred garden area in the field of archaeology.

FORESTRY AND LANDSCAPING

Ornamental flower and hedge plantation has been done in Sacred Garden.

Preparation of seeding, pruning, Culture and replantation of plants in the project area have been carried out. A landscape architect is made available by Japan Overseas Corporation Volunteers (JOCV) to development of the forest and other landscaping works in Lumbini project.

PUBLICITY

A tourists information centre was established inside the sacred garden and necessary staffs were appointed to run the centre. Free guide service was also provided for the interested tourists. The Trust has published a booklet "Lumbini at a Glance " and started the sale of souvenirs related to Lumbini.

U.N.D.P.

The service of a technical advisor a construction engineer were made available by U.N.D.P. during the construction of the monumental buildings (Museum, Library and Central Link Bridge). The aid provided by U.N.D.P. in the success of the implementation of masterplan has been crucial and important. So is the help provided by the World Food Programme. The food for work programme has not only helped carrying out earth work and landscaping and various other works. But in this process has also contributed to the economy of the surrounding villages by providing employment to nearly a thousand labourers for three forth of a year.

Thus, the U.N.D.P. and the World Food Programme as the major operational agencies of the United Nations have played a very constructive role in the development of Lumbini- something but for which the international dimension of Lumbini would have been lost and the implementation of Masterplan would have offered a blow.

CONCLUSION

Lumbini has both a national and international dimension. On the national plan have provided a distinct identity to Nepal and for all that Nepal stands for. Nepalese people do not have to go outside their frontiers and seek a path to a virtuous world. Traits in Nepalese character and way of life are basically drawn

among others from the mainstream of Buddhist thought and philosophy.

Internationally, Lumbini represents a civilization and culture, transcending national frontiers and surviving the vicissitudes of history through the sheer force of its spiritual values centring on the most precious commodity sought after by the whole of humanity - peace. No wonder therefore, three Secretary Generals of the United Nations professing different faiths, have made it a point to visit Lumbini.

Let us preserve that unique character of Lumbini.

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SOME OBSERVATIONS ON ROMAN COINS FOUND IN RECENT EXCAVATIONS AT SIGIRIYA*

By

Osmund Bopearachchi

We give below a list of all the identified coins found in the excavations of Sigiriya conducted under Cultural Triangle Project, during 1982 and 1983 campaigns. Although some more coins were found during the following campaigns, I have to limit this study to the ones found during 1982-83 diggings, they were the only coins that I was able to examine personally¹. The following catalogue is based on the identifications proposed by Dr. R. Walburg,² P.A. Deutsche Bundesbank - Geldmuseum, Frankfurt, to whom I express my sincere gratitude. In my catalogue, I have taken a certain liberty to make a number of additions and alterations, and I alone am responsible for them³.

Sigiriya excavations (1982-83) yielded 157 coins. They are all small coppers, in very worn condition, as most of the Roman or Indo-Roman copper coins found in Sri Lanka. Out of the lot 60 coins were identified : 25 genuine Roman coins; 7 Roman or Indo-Roman coins, and 28 Indo-Roman imitations.

Genuine Roman coins are catalogued according to the chronological order of the emperors, and the types follow the method adopted in LRBC.⁴

Regarding Indo-Roman imitations, we have given the description of the reverse type when legible.

Next to our catalogue number, the inventory number of the excavation is given, eg. 82/341. Then we indicate the name of the site and the layer in which each coin was found.

CATALOGUE

ROMAN COINS

Constantine I

Follis. Rome : Sol rad. stg. 1., raising r. hand, globe in 1., chlamys across 1. shoulder.
RIC, 78,⁵ A.D.317

1 83/341 Inner rampart. Layer 2.

Follis. Constantinopolis or URBS ROMA type, RIC, P. 282-3.A.D. 330-333.
2 82/855 Island through four ponds. Layer 1.

Divvs Constantine I

Follis. Quadriga. LRBCI, 1374. Antioch / SMANA. A.D.337-340

3 82/240 Moat site, near the rampart. Layer 3.

Constantine I and sons.

Follis. GLORIA EXERCITVS, 3 type: Two solders stg., each holding spear and leaning on shield, one standard between them. LRBCI, 87. A. D. 335-337.

4 82/115 Moat site,near rampart wall. Layer 2.

5 82/235 Garden site. Layer 6.

Valentinian I and II, Valens, Gratian.

AE 3. SECVRITAS REIPVBLICAE type : Victory to 1., holding wreath and palm.
A.D. 364-378.

6 82/852 Island through four ponds. Layer 2.

Valentinian I and II, Valens, Gratian, Theodosius I, Arcadius.

AE 3. GLORIA ROMANORVM, 6 - 8 type : Emperor draped, with r. hand dragging captive r. and holding labarum in 1. A. D. 364-378, 383-392.

7 83/112 Inner rampart. Layer 2.

Valentinian II, Theodosius I, Arcadius and Honorius.

AE 4. SALVS REIPVBLICAE, 2 type : Victory to 1., trophy on shoulder, dragging

captive. LRBC II, 796 type. A.D. 388 - 392; 393 - 408

8 82/615 Garden site. Layer 3.

9 83/333 Monastery site. Layer 3

10 83/448 Inner rampart. Layer 1.

Arcadius, Honorius (?)

AE 3. VIRTUS EXERCITI, 2 type : Emperor with spear and shield. LRBC II, 1992 type. A.D. 395 - 408

11 83/113 Moat site, on the rampart. Layer 4.

Arcadius, Honorius, Theodosius II

AE 3. GLORIA ROMANORVM, 21 type : Three emperors facing, each holding a spear with one hand, the other hand of emperors on l. and r. on shield. LRBC II, 2214. A.D. 395-408.

12 83/388 Inner rampart. Layer 2.

13 82/637 Moat site. Layer 2.

14 82/840 Monastery site. Layer 2.

Honorius

AE 3. GLORIA ROMANORVM, 23 type : Three emperors facing, each holding a spear. A.D. 408 - 423.

15 82/849 Island through four ponds. Layer 2.

Theodosius II, Valentinian III

AE 4. Cross within wreath. LRBC II, 867 type. A.D. 425 - 455.

16 82/841 Garden site. Layer 2.

17 82/437 Summer palace. Layer 3.

18 82/545 Garden site. Layer 4.

Theodosius II

AE 4. Cross within wreath type. LRBC II, 2238. A.D. 425 - 450.

19 83/110 Summer palace. Layer 2.

20 82/189 Summer palace. Layer 3.

AE 4. Marcian. Monogram. A.D. 450 - 457.

21 82/616 Moat site, near rampart. Layer 4.

Uncertain :

AE 3. Mid 4th - beginning 5th cent. Obv.: Diademed bust r. Rev.:?

22 83/446 Inner rampart. Layer 4.

23 83/105 Garden site. Layer 7.

Uncertain :

AE 4. End of 4th - mid 5th cent.

24 82/194 Inner moat. Layer 2.

25 82/430 Summer palace. Layer 6.

ROMAN OR INDO-ROMAN

Uncertain. Obv.: Diademed head r. Rev.:? 4 - 5 cent.

26 82/324 Garden site. Layer 6.

27 82/843 Moat site. Layer 2.

28 82/854 Island through four ponds. Layer 2.

29 83/16 Garden site. Layer 3.

30 83/24 Garden site. Layer 3.

31 83/309 Inner rampart. Layer 1.

32 83/455 Inner rampart. Layer 2.

INDO-ROMAN IMITATIONS

GLORIA EXERCITVS, 3 type : Two soldiers stg., each holding spear and leaning on shield, one standard between them. LRBC I, 87. After A.D.335.

33 82/262 Moat site. Layer 3.

34 82/327 Garden site. Layer 5.

35 82/334 Near the rampart. Layer 4.

36 83/27⁶ Near the rampart. Layer 3.

37 83/143 Moat site, near the rampart. Layer 1.

38 83/393D Inner rampart. Layer 2.

39 83/393E Inner rampart. Layer 2.

FEL TEMP PREPARATIO, FH type. Virtus to 1., spearing fallen horseman.
LRBC II, 26 type. After A.D. 351.

40 82/186 Inner rampart. Layer 4.

41 83/26 Garden site. Layer 3.

GLORIA ROMANORVM, 6-8 type : Emperor draped with r. hand dragging captive After A.D. 364.

42 82/41 Garden site. Layer 7.

43 82/197 Summer palace. Layer 1.

GLORIA ROMANORVM, 21 type. Three emperors facing, holding spears. After A.D. 395.

44 82/325 Garden site. Layer 6.

Cross within circle. After A.D. 425.

45 83/335 Inner rampart. Layer 1.

Cross within wreath type. After A.D. 425.

46 82/328 Summer palace. Layer 6.

47 82/547 Moat site, near rampart. Layer 2

48 83/28 Garden site. Layer 3.

49 83/108 Garden site. Layer 3.

Swastika type. 4 - 5 cent.

50 82/239 Summer palace. Layer 7.

51 83/30 Moat site. Layer I.

52 82/449 Summer palace. Layer 6.

Uncertain. Obv.: Diademed bust r. Rev.: ? 4 - 5 cent.

53 82/180 Garden site. Layer 4.

54 82/181 Garden site. Layer 3.

55 82/542 Moat site, near rampart. Layer 3.

- 56 83/453 Inner rampart. Layer 1.
- 57 82/192 Summer palace. Layer 1.
- 58 82/326 Moat site, near rampart. Layer 2.
- 59 82/332 Summer palace. Layer 2.
- 60 82/433 Summer palace. Layer 6.

COMMENTARY

The fortified royal capital of Sigiriya, as it is well known, was built by king Kasyapa (A.D. 477-495). Having killed his own father king Datusena (A.D. 459-477), Kasyapa, his illegitimate son, left the capital city of Anuradhapura, took refuge on this natural rocky peak and converted it into the most sensational royal city of Sri Lanka. Sigiriya remained as the royal residence of Kasyapa for 18 years until he was finally defeated in battle by his brother Moggallana, the legitimate heir to the throne.

H.W. Codrington was perfectly correct to underline that the coin finds from Sigiriya are extremely important for the understanding of the monetary system of that period in Sri Lanka, because this place was a capital only in the reign of Kasyapa; after his death it was handed over to monks⁷.

The recent excavations at Sigiriya, showed that the site can be divided into three major historical periods :

1. Pre-Kasyapan period, between 1st and 5th century., devoid of cultural materials.
2. Kasyapan period from A.D. 477 to 495, this is the major construction phase, with various sub-phases within the 18 years of Kasyapa's reign.
3. Post-Kasyapan period, later monastery period from 6th-13th century. beginning with semi-dressed gneiss construction and also the first destruction phase⁸. The Kasyapan phase was of course the main period, with major administrative, cultural and commercial activities.

The excavations were conducted in four important sites :

SITE NO.1

Rampart and Garden site. Several interconnected trenches were extending east-west and south-west in the area just below the southern arm of the inner western rampart and the south-western extremity of Water Garden no.1⁹. The excavators divide the strata into two distinct cultural levels : one concentrated in the layer 7 is attributed to the Kasyapan period; the second in the upper levels belongs to the later post-Kasyapan period. This site produced the majority of coins found in the excavations (1982-83).

SITE NO.2

Monastery site. This site is located just inside the principal entrance to the "Inner Citadel". The construction of the monastery is attributed to the post-Kasyapan period. Only nine coins were found in this site.

SITE NO.3

Moat site. The excavations were conducted at the south-west corner of the moat. Fifteen coins were found in this site.

SITE NO.4

Summer Palace. The excavations were conducted on the summit of the summer palace, embarkment wall and the outer wall of the moat. 28 coins were found in this site.

The earliest coin found in the site is a follis of Constantine I dated A.D. 317 struck at the mint of Rome. Two more folles of Constantine from Antioch and Constantinople mints, two coppers of Constantine I had his sons (A.D. 335 - 341) are to be added to the list of earlier issues. The rest of the identified Roman coins belong to other late Roman emperors ; Valentinian I and II, Valens, Gratian, Theodosius I and II, Arcadius and Honorius. The most recent issue belongs to Marcian (A.D. 450-457). Following coin types were mainly represented : SECVRITAS REIPVBLICAE type, SALVS REIPVBLICAE 2 type, VIRTVS EXERCITI 2 type, GLORIA ROMANORVM 21 type, GLORIA

ROMANORVM 23 type, and the cross within wreath type.

Among the Indo-Roman coins following reverses of common types, are represented : two soldiers standing, holding spear with one standard between them; emperor dragging a captive; cross within wreath; cross within circle and swastika.

Having presented the identified coins, I may now proceed to discuss their importance for the understanding of the monetary circulation of that period. In spite of their small number, the coins found at Sigiriya highly contribute to the research on Roman coins found in Sri Lanka. It is not an exaggeration to say that this is the first time we have at our disposal a well documented series of coins found in a scientific archaeological excavation conducted in Sri Lanka.

All the coins were found in the occupational layers, in other words, layers devoid of cultural materials did not produce coins. The large majority of these coins were found in the Kasyapan layers. As we have pointed out earlier, the most recent genuine Roman coin found in the excavations belong to Marcian (A.D. 450-457) ; so now even at the earliest reckoning, Sigiriya did not become the capital until well over twenty years after the death of Marcian. The earliest issue found in the site dates back to A.D.317, that means 160 years before the foundation of this city. This proves, once again the observation made by H.W.Codrington in 1924 : Roman copper coins were in circulation for 150 years before they came to the capital of Kasyapa. The finding of so many much worn coins can only be explained by the fact that they were in circulation for a long period.

It is quite evident that the coins found in the site are the ones which were in circulation mainly during the Kasyapan period. There is no doubt that Sigiriya was a centre of trade and administrative activities. After the death of Kasyapa, as history says, this city was handed over to monks and from that period onwards Sigiriya ceased to play a central role in the island. It is noteworthy that the monastery site, with post-Kasyapan buildings yielded only nine coins. It is accepted that the first phase of building activities in this site should be attributed to Moggallana. Taking into consideration exclusively the strata which have not undergone any disturbances, we notice that the post-Kasyapan layers, dated as late as the 8th century, were devoid of Roman coins. This phase coincides with the complete disappearance of Roman coins from circulation all over the country.

H.W.Codrington correctly suggested that the Roman coins disappeared the circulation by mid 7th century. His hypothesis was based on two arguments. Firstly the fall of Alexandria in Egypt in 638 put an end to the direct trade with Rome and the western world. Secondly, he pointed out that the use of Roman coins and imitations must have ceased practically before the rise of Polonnaruwa, where only one coin has been found; this city first mentioned in the reign of Aggabodhi III (624-640), appears to have been used as royal residence at least as early as the time of the fourth of the same name (637-689)¹⁰. However N.Wijesekera suggested that the Roman coins disappeared from circulation only after the 7th century¹¹. His hypothesis is based on a hoard containing 2000 imitations which alleged to have come from Polonnaruwa. Codrington in his inventory noted that the provenance of this hoard is not certain. Even if it was found in Polonnaruwa, one cannot attach much importance to it unless it was situated in a well defined archaeological stratum attributed to post 7th century. As a matter of fact, we do not know where and under what circumstances this hoard was buried. On the contrary, Codrington's hypothesis is further confirmed by the total absence of Roman or Indo- Roman coins in the recent excavations conducted at Polonnaruwa under the Cultural Triangle Project.

A certain number of important observations can be made regarding the Roman and Indo-Roman coins found at Sigiriya excavations. Firstly, all of them without exception belong either to the 4th or to the 5th century. Secondly, Roman and Indo-Roman coins from Sigiriya are far more superior in number to those found in Anuradhapura, the long-lived ancient capital of Sri Lanka. To my knowledge, the total number of coins found in the whole district of Anuradhapura is between 130 and 140, whereas Sigiriya, the short-lived residence of Kasyapa, produced nearly 3000 coins. The account of J. Still¹² with regard to the coinfinds from Sigiriya is very clear : "Roman coins have been found singly and in small quantities together all over Sigiriya, wherever excavated, summit, terrace and the city below". According to Still there were 1687 specimens. Many other coins were also found from time to time at Sigiriya. In 1935, four separate batches comprised of 605 Roman and Indo-Roman coins found in that area were given to the Colombo National Museum. In 1945, a hoard of 200 small copper coins was discovered in a semi broken pot by a villager in Sigiriya jungle¹³. I once learnt from the competent authorities of the Sigiriya museum, that an important coin hoard containing hundreds of coins was discovered, in 1979, during the construction of a tourist hotel

situated a few hundred yards from the Sigiriya rock.

Furthermore, one may also observe that the genuine Roman coins are very important in number compared to the other coins finds made elsewhere all over the island. They represent more than 40% of the identified coins from Sigiriya excavations (1982-83). It is also noteworthy that out of 1687 coins from Sigiriya, mentioned earlier, published by H.W. Codrington¹⁴ and the ones from the same site published by R. Walburg, a large majority are genuine Roman coins¹⁵. The most abundant issues range from Constantine the Great to Arcadius and Honorius.

The finding of great quantities of Roman and Indo-Roman small coppers and the absence of any local coinage during this period can only be explained by the fact they formed the unique means of small payments during that phase of the history. The Kasyapan period coincides with the rise in eastern trade in the fourth and fifth centuries, with the circumnavigation, connected with Sri Lanka. A great quantities of Roman and Indo-Roman copper coins of the 4th and 5th centuries, were also found in Madura along the Coromandel coast in India. According to Warmington there were two main reasons for the the abundance of the "third brass" in South India and Sri Lanka : the revival of western energy through a Axumite, Himyarite and Persian middlemen, which coincides with the foundation of Constantinople as the seat of the Roman empire on the one hand, and on the other hand, the gradual shift of the focus of trade from the Malabar and Coromandel coasts southward to Sri Lanka, which becomes the main centre of trade in the Indian seas by the 6th century. Apart from Warmington, many other specialists in this field like Wheeler¹⁶, and recently V. A. Dhile¹⁷, M. G. Raschke¹⁸ and I. C. Glover¹⁹ have discussed in detail the reasons for the sudden outburst of these trade activities focused towards South-India and Sri Lanka.

A good image regarding the trade activities during this period, emerges from the account of Cosmas Indicopleustes, the Egyptian Greek of the sixth century A.D. According to a description, in his Christian Topography²⁰ of the 6th century, Sri Lanka was playing an important role in transmitting merchandise between East and West, a role once played by Western India. Introducing the island he says, "This is the great island in the Ocean, lying in the Indian sea. By the Indians it is called Sielediba, but by the Greeks Taprobane²¹". After that Cosmas goes to demonstrate the central position that the island held in international commerce: "the island is a

great resort of ships from all parts of India and from Persia and Ethiopia, and in like manner the dispatches many of its own to foreign ports; and from the inner countries, I mean China and other marts in that, it receives silk, aloes, clove-woods, and their products, and these it again passes on to the outer ports, I mean to Male, where pepper grows, and to Calliana, where copper is produced, and sesame-wood, and material for dress : for it is also a great mart of trade; and to Sindu also, where musk or coster is got, as well as androstanchus, and to Persia and the Homerite country, and to Adole. Receiving in return the traffic of these marts and transmitting to the inner ports, the island exports to each of these at the same time its own products". Further Cosmas confirms, "Silediba being thus in a central position with her reference to the Indies, and possessing the hyacinth, receives wares from all trading marts and again distributes them over the world and thus becomes a great emporium" ²².

It is evident from this account that the island took an active part as intermediary in international trade. As Cosmas points out, not only foreign ships with merchandise pass through the island, but Sri Lanka also exported its own products. Some other classical writers complete the list of local products sent out from the island. Pliny (VI, 22) mentions pearls, the author of the Periplus Mare Erythraeum (61, 5) adds precious stones, tortoise-shell and muslins, Strabo (11, 14) ivory, and Ptolemy (VII, 4, 1) rice, ginger and honey. There is no doubt that the abundance of Roman and Indo-Roman coins of the 4th and 5th centuries is also connected with the exportation of local products of precious items.

Cosmas gives some information about the political situation in the island, at the time when his Sopatros reached Taprobane on a trading adventure. Cosmas says, "there are two kings in the island, and they are at enmity with one another". When speaking about the king of Silediba, he refers to one king as a single ruling authority. The identification of this king in question is not certain. However Cosmas, writing before 547 A.D., says that Sopatros, "who had been dead for the last 35 years,... once reached the island". As Wimal Weerakkody correctly pointed out "We need not assume that Sopatros made this voyage in the last years of his life. The vivid narrative has all the marks of an elderly man reminiscing on the achievements of his youth" ²³. So Sopatros' voyage to the island may have taken place during the second half of the 5th century. Relying on this probable chronology on the one hand and the fact that there were two antagonistic kings on the other,

two main suggestions were made to identify the king in question: either king Datusena who opposed to the South Indian invaders (459-477)²⁴; or Moggallana's war with his brother Kasyapa (477-495).²⁵ Whoever may be the king in question, we are certain that Cosmas' account of the island took place by the end of the 5th century; it gives a vivid picture of the trade activities; when Sopatros reached the island, Cosmas says, "... a ship from Persia had just cast anchor. So the people from Adoulis, and Sopatros with them, disembarked, as did the people from Persia, with whom there was a Persian envoy also. Then as was the custom, the local magistrates and tax collectors welcomed them off to the king". This account coincides with Cosmas reference to the island as a great emporium".²⁶

The episode narrated by Cosmas corroborates perfectly with the numismatic date obtained from Sigiriya. Sigiriya coin finds account for the presence of foreign traders in this capital. Some of these coins bear the mint marks of famous mint cities of the Roman empire, such as Rome, Constantinople and Antioch (nos.1-3)²⁷. Likewise Sigiriya would have become a land of welcome for trade activities.

Then Cosmas narrates the famous episode of the king's audience with his friend Sopatros and the Persian ambassador. Cosmas described how, during this audience, the Roman could convince the king on the superiority of the Byzantine empire over the Persians by effecting a comparison of the coins of the two nations. What is convincing in this story is the king's confrontation with a new monetary system. The king was of course pleased with the Byzantine gold coins, and at the same time it gives us the impression that he was not used to this currency. One is certainly tempted to draw a parallel line between Cosmas' witness and the findings of Byzantine solidi of later expeors both in India and Sri Lanka.²⁸ The fact that these Solidi too were imitated, may indicate a certain change in the monetary pattern, which would have taken from by the beginning of Polonnaruwa period. Paranavitane thinks that the Roman solidus may have inspired the local gold coinage of Sri Lanka, with the Kalanda as standard, and fractional pieces of half, quarter, and eighth, which are said to have been current in the 9th and 10th centuries²⁹.

We now wish to deal with the so-called "Indo-Roman" coins. It is very difficult to estimate the exact percentage of Indo-Roman coins in relation to genuine Roman specimens found in Sri Lanka. Paula Turner quoting the opinion of an authority on

this subject says that the Indo-Roman coins are represented by 90% ³⁰. In a following chapter in the same book, quoting J.Still, she says that 99% are Imitations³¹. In reality what J.Still ³² assumed as 99% were the Roman coppers of the 4th and 5th centuries as a whole, but not imitations. However, even 90% seem to me improbable. Thanks to R.Walburg's catalogue, we know today that most of the coins labelled as Indo-Roman coins were in reality genuine Roman ones. The coins from Udivila Gangarama Rajamahavihara, Tissamahara, labelled as "519 Indo-Roman coins" are, according to Walburg, genuine Roman coins.³³ Out of 1600 coins found in the Rekave Girawapattu in 1957, 1581 coins were identified as Roman coins ³⁴.

Of course one cannot underestimate the presence of many imitations found everywhere in the island. Apart from the genuine Roman coins, many imitations have also been discovered in the excavations of 1982-83 and in the previous coin finds at Sigiriya. Codrington divided these Indo-Roman imitations into two groups, while insisting on the difficulty of drawing a clear line of demarcation between the two. The coins of the first group of imitations adhere closely to the original with the exception of the lettering, "which baffled the native minters" ³⁵. The coins bearing signs of poor workmanship, characterized by a stereotyped portrait of the emperor with a straight nose and hair taking the form of a cap or a turban, and the legends replaced by strokes or stars or by row of dots, are classified as the second group. J.Still named them Na-imana type according to the name of the village where they were first found ³⁶. The legible Indo-Roman coins found at Sigiriya apparently fall into the first group.

It is quite interesting to observe, in this connection, that the genuine Roman coins were found in all the layers which also produced Indo-Roman imitations. For example, two genuine Roman coins of Theodosius II and Valentinian II (nos. 16 and 18) with the reverse, cross within a wreath were found in the layers 2 and 4 of the Garden site, while two Indo-Roman coins (nos. 48 and 49) imitating the same reverse type came from the same site in the layer 3, situated in between. Let me also underline that out of 20 well identified Indo-Roman coins (nos. 33-52) from Sigiriya (1982-83), seven (nos.33-39) were the prototype of GLORIA EXERCITVS 3 (335-337 A.D.) type which was one of the earliest issues found in the excavation. The most recent Roman coin, that of Marcian (450-457 A.D.) was found in the moat site in the layer 4, and the next upper layer of the same site

produced a follis of Constantine I (337-340) minted at least 110 years before. The obvious conclusion that one may draw from these observations is that these coins were in circulation more or less at the same time. In this context one cannot fully approve the hypothesis according to which the Indo-Roman coins begin to appear only from the second half of the 5th century. Codrington quoting an eminent Roman numismatist says, "Mr. H. Mattingly suggests that the local imitations of the Roman "third brass" may be due to the fact that very few of this species were issued by the Roman mints after the reign of Theodosius II. The Indo-Roman series would have commenced in the second half of the fifth century"³⁷. This hypothesis contradicts the data obtained from the Sigiriya excavations, as we have pointed out earlier: Indo-Roman coins were found together with the genuine coins which serves as prototype for the imitations. If all the Indo-Roman coins were issued in the second part of the 5th century, the coins of this class found in Sigiriya excavations should be in good condition, because, this city was founded only in 479 A.D., in other words, less than thirty years after they were minted. However the reality is quite different: both genuine coins and imitations found in the excavations are characterized by varying degrees of wear.

We know now that along with genuine Roman coins, many Indo-Roman coins were also found at Madura in India. These imitations from South India have the same characteristics as the first group of Indo-Roman coins found in Sri Lanka. Warmington suggested that the middlemen seeing that the supplies of local imitations were adequate enough to fulfil the demand, stopped importing genuine issues³⁸. It is quite certain that the Indo-Roman coins were continuously issued for a long time after the reign of Theodosius II. The gradual degeneration of the style of the second group of imitations named "Na-imana" can be explained by the fact that they were issued during a later phase. We have already underlined the apparent absence of the imitations of the second group among the identified coins from 1982-83 the excavations of Sigiriya. Nevertheless Codrington reports that very few coins of this type were found at Sigiriya³⁹. It is not impossible that the second group of coins were issued during the period the Roman genuine coins ceased to reach the circulation. Were they local fabrications? Since no copper deposits were ever found in Sri Lanka, J. E. Tennent⁴⁰ suggested that this basic raw material needed for the fabrication of the imitations were bought from Calliana (close to Bombay), the Indian harbour mentioned by Cosmas⁴¹. One cannot exclude such a possibility. Then we will have to explain how two monetary types, one genuine, the other

imitation, with technical, iconographical and especially metrological differences co-existed in the same short-lived capital and all over the island. To what extent Roman coinage influenced the local coinage of Sri Lanka which apperas in the 9th and 10th centuries ? Answers to these questions can only come from further investigations in both archaeological and literary sources.

NOTES

* I wish to express my sincere gratitude to Prof. Senake Bandaranayake, Director of Sigiriya Cultural Triangle Project, for authorizing me to study these coins, and for providing me with all the relevant data.

1. These coins were held at the Institute of Archaeology, London for cleaning, and it was thanks to the courtesy of Dr. N. J. Seely, former Head of the Department, Archaeological Conservation and Materials Science, that I could examine them. I am extremely grateful to him for providing me with all the facilities to carry out this project.

2. Dr. Walburg also published 40 legible coins of this lot in Antike Munzen aus Sri Lanka/Ceylon. Studien zu Fundmunzen der Antike, Berlin 3, 1985, p. 129-132.

3. I should like to acknowledge my debt to Dr. Richard Reece of the Institute of Archaeology, University of London, for his guidance.

4. Late Roman Bronze Coinage A.D. 324-498. London, 1978. P.V.Hill and J. P. C. Kent, part I, The Bronze coinage of the House of Constantine A.D. 324-326; R. A. G. Carson and J. P. C. Kent, part II, Bronze Roman Imperial Coinage of the later Empire.

5. C. H. V. Sutherland, The Roman Imperial Coinage, Vol II, London, 1966, p. 307, Rome, No. 78.

6. R. Walburg, Antike Munzen aus Sri Lanka, 1985, p.131, no. 22 thinks that this coin can also be an Indo-Sassanian imitation of 4-5 cent. A.D. LRBCI, 87 type, Rev. Fire altar.

7. H. W. Codrington's Ceylon Coins and Currency, Colombo, 1924.

8. These information are based on S. Bandaranayake, Sigiriya Project. First Archaeological Excavation and Research Report (Jan-Sep. 1982, Colombo, 1984; Sigiriya Project. Second Progress Report Excavations at Sigiriya (Oct.-December, Colombo, 1988.

9. According to Sigiriya Project, 1984, p. 26.

10. Ceylon Coins and Currency, p. 33.

11. "Historical background of Sinhalese -foreign relations ...", Ceylon Historical Journal, 1952, p. 189.

12. "Roman coins found in Ceylon", JRAS.CB, 1907, p. 165.
13. R. Walburg, Antike Munzen aus Sri Lanka, p. 116-129.
14. Ceylon Coins and Currency, p. 32-33.
15. Antike Munzen aus Sri Lanka, p. 116-132.
16. Rome beyond the Imperial Frontiers, London, 1955; "Arikamedu : an Indo-Roman trading station on the east coast of India", Ancient India, 1946, p. 17-124.
17. "Die entdeckungsgeschichtlichen Voraussetzungen des Indienhandels der romischen Kaiserzeit", Aufstieg und Niedergang der Romischen Welt, Berlin, II, 9, 2, (1979), p. 546-580.
18. "New Studies in Roman Commerce with the East", Aufstieg und Niedergang der Romischen Welt, Berlin, II, 9, 2, (1979), p. 604-1361.
19. Early Trade between India and South-East Asia, Hull, 1989.
20. Cosmas Indicopleustes : Topographie chretienne, trans. by Wolska-Conus, 3 Vols., Paris, 1973. The Christian Topography of Cosmas, and Egyptian monk, trans. by J. W. MacCrindel, London, 1897. Also see F. F. Schwarz, "Kosmos und Siedlediba", Ziva Antika, 1975, p. 469-489; D. P. M. Weerakkody, "Ancient Sri Lanka as described by Cosmas", Sri Lanka Journal of Humanities, Vol. VII, 1981, p. 107-127.
21. XI, 13.
22. XI, 15.
23. Sri Lanka Journal of Humanities, 1981, p. 122.
24. D. P. M. Weerakkody, Sri Lanka Journal of Humanities, 1981, p. 122.
25. F. F. Schwarz, Ziva Antika, 1975, p. 484.
26. XI, 15.

27. Apart from these names of Roman mint cities revealed by Sigiriya excavations, many others, such as Aquilea, Sicia, Nicomedia, Cyzicus, Alexandria, Arles, Thessalonica and Heraclea were attested by coin hoards found elsewhere in the island : R. Walburg, Antike Munzen aus Sri Lanka, p. 90 and 103.
28. Codrington, Ceylon Coins and Currency, p. 32, R. Walburg, Antike Munzen aus Sri Lanka, 1985, p. 185.
29. C. W. Nicholas and S. Paranavitane, A Concise History of Ceylon, Colombo, 1961, p. 165.
30. Roman Coins from India, London, 1989, p. 20.
31. Ibid., p. 90.
32. The reference (Still, 1908, p. 13) given in her book is not correct, it should JRAS. CB, 1907, p.13; In Still's own words : "Of the several thousand specimens found in Ceylon, quite 99% are small copper (3rd brass) coins of the later Roman Empire, when the capital was at Constantinople".
33. Antike Munzen aus Sri Lanka, p. 91-103.
34. Antike Munzen aus Sri Lanka, p. 77-90.
35. Ceylon Coins and Currency, p. 33.
36. Catalogue of Coins exhibited in the Colombo Museum, Colombo, 1909, p. 25.
37. Ceylon Coins and Currency, p. 240.
38. Op. cit., p. 123-124.
39. Ceylon Coins and Currency, p.33.
40. An account of the island, physical, historical, and topographical with notices of its natural history, antiquities and productions, 4th ed., London, 1860, p. 388.
41. XI, 15.

THE ELEPHANT-HEADED GANA AT MIHINTALE

By

M. K. Dhavalikar

Buddhism, as is well-known, was introduced in Sri Lanka, by Asoka in the middle of the third century B.C. and along with Buddhist art, many art motifs travelled to Sri Lanka from India. A very minor motif, though not insignificant, is the elephant genus which occurs on the Buddhist Stupa at Mihintale in Sri Lanka. Here it occurs as an elephant-headed, corpulent dwarf among several ganas. According to S. Paranavitana, it is a yahalkada or 'frontispiece' which was usually employed in the decoration of a Sinhalese stupa. The elephant-headed gana is shown seated and has two hands and one tusk recalling the epithet eka-danta of the latter day Ganesha. This undoubtedly is a very early representation of an elephant-headed figure and its occurrence in the Buddhist context cannot be without significance.

The elephant-headed gana at Mihintale has a parallel at Amaravati.² There is little doubt that the elephant-headed figure tempts one to identify it with Ganesha, an important divinity of the Brahmanical pantheon and it is therefore enigmatic that the motif should occur in Buddhist art. In this connection it must be stated that elephant was sacred also to the Buddhist. Buddha's mother had seen a white elephant in a dream before the birth of Buddha. One Niddesa passage includes elephant as an object of worship along with suparna, Yaksas, asuras and gandharvas, etc.³ This suggests that the motif travelled from north India to south long before the beginning of the Christian era. There is adequate evidence to show that elephant was a very sacred animal in the north-western part of the Indian sub-continent and even beyond.

The elephant genus of Mihintale and Amaravati recall to the mind that on a coin of Hermeus which has been noticed by A. K. Narain in the collections of the British Museum. According to him, " This is also an example of how a local deity was transformed or, if you may like to say, elevated to the respectable status."⁴ There should be little doubt that this represents an attempt by the Greeks to give the anthropomorphic form to a sacred animal. The Greeks no doubt were adept at it. It has generally been agreed that elephant was a sacred animal in the northwestern part of the sub-continent and hence it occurs quite commonly on the coinage of the

Indo-Greeks.

The most realistic and full bodied representation of elephant occurs on the coins of Apollodotus and some other Indo-Greek rulers.⁵ On some of the issues the elephant has a bell round its neck. W. W. Tarn is inclined to identify it as the sacred elephant of Taxila. He states that, "There is a story which may bear on the elephant of Taxila. It is known that Philostratus when he wrote on the life of Apollonius he had before him a pretty accurate description of Parthian Taxila by someone who had visited it, and he says that at Taxila there was a very old elephant, once belonging to Porus whom Alexander had dedicated in the temple of the Sun and had named Aias, and whom the people used to annoint with myrrh and adorn with fillets (Life of Apollonius, II, 20). Philostratus attributes many things to Alexander and Porus, but the story might really be the evidence for the existence at Taxila of a sacred elephant, the elephant of the coins; the bell round the elephant's neck on the elephant head coin type of Demetrius, Menander and Maues would support this."⁶ However, J. N. Banerjea is inclined to identify the elephant with the elephant deity of Kapisa. He states : "On the basis of our main hypothesis, it will be possible for us to suggest that the device 'elephant's head' with a bell round his neck used by Demetrius on some of his copper coins and other Indo-Greek and the Saka rulers like Menander and Maues was associated with this elephant deity, peculiar to Kapisa and its environs. We are not certain whether the elephant used as a device on so many coins of these kings is in any way connected with it; but if any connection between two could be proved, then one could demonstrate the extreme popularity of the device."⁷

The Kapisa coin was issued by Eukratides, an Indo-Greek king who ruled over the Asiatic possessions of Alexander from Circa 171-150 B.C. The coin type is described below:

Obv. Diadmed bust of king to right wearing helmet. Greek legend : Basileos
Megalou Eukratidou.

Rev. A deity wearing a mural crown, seated on throne to front, holds wreath and palm; to right of throne forepart of elephant to right, and to left, a pilos (?) Kharosthi legent - "Kavi(pi)siye nagara devata"

The coin has been discussed at great length by several numismatists. Charles Mason, the first discoverer of the coin, found one at Begram which has been identified with the ancient Kapisa. He identified the enthroned figure as a female deity.⁸ But E. Thomas suggested that the deity might be identical with Zeus of Antialcidas' coin.⁹ Cunningham, however, straightway called the deity Zeus¹⁰ and many later scholars accepted his description of the coin.¹¹ Tarn also accepted it and has given reasons for the identification of the deity as Zeus.¹² Whitehead, however, came across a beautiful specimen of this type in the British Museum. He observed that, "The divinity in so many words called a city deity, wears a mural crown, carries a palm but not a sceptre, in fact she is a city goddess. She precisely resembles the city Tyche on the copper coin of Hippostratus."¹³ A. K. Narain, who has examined all the five specimens in the British Museum and a few more in private collections, is also convinced that the divinity wears "a mural crown and carries a palm but not a sceptre." He feels that it may rather be compared with the city fortune on a copper coin of Hippostratus, on a silver coin of Maues and on a copper coin of Azilizes; on certain specimens the figure seems certainly female. Further two other points observed by Whitehead are also quite pertinent: the legend itself precisely calls it the city deity of Kapisa, and that the deity cannot be Zeus on the coins of Maues and Azilizes, since in each case he appears on the reverse of the coin.¹⁴

The coin has thus become the subject of much discussion. Moreover, the enthroned figure on the coin has also been variously interpreted. Some scholars would like to connect the elephant on the coin with Buddhism.¹⁵ The most interesting interpretation has been given by J. N. Banerjea. He identifies the enthroned figure as that of Indra who was also known as the Yaksa of Indrapura in the Mahamayuri. According to him the place Si-pi-to-fa-la-tzu referred to by Yuan Chwang that is, Svetavatalaya, the abode of Indra who incidentally was also known as Svetavat. He further states that, "It is possible to identify the central device of the coin as 'Indra enthroned with the partial representation of his mount Airavata with the White Elephant before him" Svetasvatalaya, according to the description of Yuan Chwang, was a suburb of Kapisa in the seventh century A.D., and its very name indicates that it had Indra as its tutelary deity. Banerjea concludes : "So in the Indo-Bactrian money, enthroned Zeus and Devaraja Indra are often confused and it will be better to describe those figures as Indra where he is accompanied by an elephant or partial representation of an elephant."¹⁶

It thus becomes apparent that the enthroned deity on the coin is not Zeus but the city deity of Kapisa. But whether it is a male or a female is doubtful. It has been taken to be a female because of its resemblance with city Tyche on the copper coin of Hippostratus. It should, however, be borne in mind that a majority of scholars identified the figure as that of Zeus because they took it to be a male figure. It is possible that she can be taken to be a female because a majority of city deities were females such as the city goddess of Puskaravati. Here we should take into consideration the identification of the coin by Rapson. Of the two symbols viz., the elephant head and the mountain, Rapson identifies the former as the mountain Pilusara and the other as the elephant god, of the mountain as also the city of Kapisa. Rapson was the first to connect the two symbols and the legend recorded by Yuan Chwang regarding the tutelary deity of Kapisa.¹⁷ The celebrated Chinese traveller visited India during 629-645 A.D. In 630 A.D. he travelled through Afghanistan where he spent considerable time visiting Buddhist establishments and spent a whole summer in Kapisa. He has recorded a very curious and interesting legend regarding the tutelary deity of the city of Kapisa. We can do no better than quote the words of the pilgrim:

"To the southwest of the capital (Kapisa) was Pi-lo-sho-lo mountain. This name was given to the mountain from its presiding genius who had the form of an elephant and was therefore called Pi-lo-sho-lo."¹⁸

Yuan Chwang's testimony amply demonstrates that in the seventh century Pilusara was the tutelary deity of Kapisa which had the form of an elephant. It seems that the tradition had great antiquity for the deity, as pointed out by Rapson, was depicted on an early Indo-Greek coin of second century B.C. The scholars who tried to identify the enthroned deity on the coin as Zeus or Indra as also those who take it to be a female deity have overlooked the guardian deity of Kapisa which is portrayed on the coin and is also specified by the legend. That the guardian deity was the elephant genus has been clearly testified by Yuan Chwang. Whether the deity is male or female is immaterial, for the mint masters were here facing a curious problem of depicting a sacred animal—that of the therianthropic representation. What they did was to portray the deity enthroned and show the forepart of an elephant by its side; they could not possibly think of the combination of the theriomorphic and the anthropomorphic representation of the deity. This would also show that they never bothered about the male or the female character of the

deity. This ultimately has caused a controversy among scholars. However, in the light of the discussion in the preceding pages it should become clear that the coin depicts the anthropomorphic form of the tutelary deity of Kapisa enthroned; but that it was in the form of an elephant is clear from the forepart of the beast and its abode in the mountain to the southwest of the city is shown by pilos on the coin. Hence the representation of Zeus because to Greeks a god who lived on a mountain could not well become anything but Zeus.¹⁹

The foregoing account of the elephant motif on the coins of foreign rulers, more particularly of the Indo-Greeks, shows that the animal which was sacred to the Hindus was also held in reverence by the foreign rulers who wanted to win over the population to their side. It may be interesting to note in this connection the fact that there are quite a good number of places in Panjab, more appropriately in the ancient Gandhara, which are associated with elephant in their names. To begin with Kapisa, the name signifies that the place was 'endowed with elephants'. So also is the case of Puskaravati, for Puskar means elephant. It is also significant that the ancient site Hastanagar is named after king Hastin, the hero of the eponymous tribe. It was a city of elephants like the Hastinapura of the Kauravas and Varanavata of the Pandavas. We have already narrated the story of the sacred elephant of Taxila. Cunningham identified the ancient site at Palo-dheri which was the ancient township of Polusa²⁰ referred to by Yuan Chwang. According to him to the north-east of the town rose the hill of Dantaloka, with a cave in which Prince Sudana and his wife had taken refuge. It is about forty miles from Potali. Very probably the association of elephant with several places in the Gandhara region may be due to its being the habitat of the tribe of the Hastikas. The historians of Alexander mention of a king named Astes (Hasti) as ruling over a people called Astakenoi (Hastikas) living in the region of Puskaravati. Arrian states that when Alexander's army together with the local chiefs, reached the Indus, they carried out all orders of Alexander. But Astes, the ruler of the land of Peucelaotis (Pushkaravati), rose in revolt which both ruined himself and brought ruin also upon the city which he fled for refuge. Hephastion, the general of Alexander, captured it after a siege of thirty days and Astes himself was killed.²¹

Strabo also in his Geography describes that after the Cophes (the Kabul river) followed Indus and the region between these rivers was occupied by Astacenoï (Hastikas), Masiani, Myasi, and Hispacii.²² Pliny records that "They (many writers)

include also the Astaceni, in whose country the vine grows abundantly and the laurel and boxwood and every kind of fruit tree found in Greece."²³

The accounts of classical writers thus show that there lived in the fourth century B.C. in the Kabul valley the valiant tribe of Hastikas who were ruled at the time of Alexander's invasion by a king named Hasti. The tribe was there even in 6th-5th cent. B.C. as Panini refers to the Hastinayanas as occupying the area near the confluence of the Swat and the Kabul, with their capital at Puskaravati.²⁴ The Hastinayanas of Panini are in all probability the Hastikas of the classical accounts. The region occupied by the Hastikas formed in ancient times a part of the Gandhara country which in its turn was an integral part of India from the earliest epoch of Indo-Aryan civilization.

We do not know about the hastikas beyond what has been recorded by classical writers and Panini. They appear to be quite a valiant people. The name of their king - Hasti - and their capital and many places in their country were associated with elephant. It is therefore not unlikely that the elephant was extremely sacred to them; it might have been their totem as well. After conquering them, the Indo-Greek rulers possibly introduced elephant on their coins to win over the loyalty of the Hastikas.

The early representations of the elephant-headed genus point to its being of the Yaksa class. Perhaps this is one reason why the worship of the elephant-headed divinity was considered abhorrent by the people belonging to the upper classes for a long time. But that also explains its easy acceptance by the Hindus and the Buddhist as well. That the elephant-headed genus belonged to the yaksa class is also evident from the description of Vinayakas, who were of malevolent character. They were evil beings of attacking disposition. But although malevolent, they could be propitiated. Their propitiatory rites have been mentioned in both epics (MB III, 65, 23; Ramayana, VI, 128, 113). Vinayakas are also mentioned in the Manava-grihya-sutra in the sub-section which is titled Vinayaka-kalpa or 'the Pacificatory rites for Vinayakas' where the four names of Vinayakas appear as Usmita, Devayajana, Salakatankata and Kusmanda-Rajaputra, and their appeasement is prescribed. In the Baudhayana-grihya-sutra (III, 10) which can be assigned to the same period as the Yajnavalkya Smriti i.e. about the 2nd-3rd cent. A.D. we come across reference to Vinayakas in singular. Herein the group of four

Vinayakas is addressed as one god and he is looked upon the son of Ambika. This one Vinayaka was appointed by Siva as Ganapati Vinayaka, who may be considered as the earliest form of Ganisha. He is given the role of creating difficulties and obstructions if not properly propitiated. In the Baudhayana-grihya-parisesa sutra (III, 10), among many invocations to the spirit under various epithets there is one which speaks of it as hasti-mukha or elephant-faced. It is interesting that the same epithet has been applied to Vighna and Vinayaka in the Baudhayana Dharmasutra. In it the spirit or deity Vighna (obstacle) is given most of the epithets of Ganesha like Vinayaka, hasti-mukha, yakratunda, eka-danta, lambodara etc.

Thus it appears from the literary evidence that in the early centuries of the Christian era one Vinayaka had come to supercede the concept of four or more, making his identification with Ganapati easier. But his malevolent character is conspicuous, for he is invoked both as Vighna (obstacles) or Vighnasvara (Lord of obstacles). "Only one step further" writes G.S.Ghurye, "and that a very radical transformation was needed to enthrone Ganesha being the 'Lord of obstacles' as 'the Destroyer of Remover of Obstacles'. Such transformations inhere in the very nature of early religio-magical system of beliefs ... So Vinayaka, the trouble-maker becomes the much prayed trouble-avertter Ganesha."²⁵ This transformation was in all probability completed long before fifth century and hence the occurrence of the images of Ganesha in the Kushan period in the second century A.D.²⁶

The foregoing analysis of the evidence demonstrates that the elephant-headed figure on the Mihintale Stupa is in all probability a yaksa, who can be identified as Vinayaka of the literature. He was originally an elephant who was sacred to many people in the north-western regions of the sub-continent and was later given a therianthropic form probably by the Indo-Greek rulers as the evidence of the coin-type of Hermes would show. Being a lesser divinity, he was adopted by the Hindus and the Buddhists as well and later by the Jainas too. His importance began to increase from the Gupta period, so much so, that in the early mediaeval period Ganesha becomes a most important god of the Hindu pantheon and even the cult of Ganapatyas also comes into being more particularly in South India. At the end it may be noted that the original name of the elephant genus, Pilusara, survives even to the present in South India where the god is known as Pillaiyar.²⁷

NOTES

1. A.Coomaraswamy, Yaksas, Pt. I (New Delhi, 1971), Pl. 23-1. See also Alice Getty, Ganesha - A Monograph on the elephant-headed God, (New Delhi, 1971), p. 25, Pl. 22(c).
2. C.Sivaramamurthy, Amaravati Sculptures in the Madras Government Museum (Madras, 1958), p. 28, Pl. 15. See for a recent discovery of an elephant-headed figure at Amaravati, datable to C.1st Cent.B.C. which, however, is not convincing. I.Kartikeya Sarma, "A unique Usnisa (coping stone) from Amaravati", Jr.of Andhra Hist. Soc., Vol.XXXV (1975-76), Sarma Somasekhara Sarma Vol., pp. 279-284.
3. Quoted by R.G.Bhandarkar, Saivism, Vaisnavism and minor religious systems, (Strassburg, 1913), p. 37. See also J.N.Banerjea, "Indian elephants on coin devices of foreign rulers of India", IHR, Vol.XIV (1938), p.108, f.n.3.
4. Presidential Address, JNSI, Vol.XXXVI (1974), p.190.
5. Percy Gardner. Coins of Greek and Scythic Kings of Bactria and India in the British Museum, (Chicago, 1966 new print), 34, No.10 (This work is hereafter referred to as BMC).
6. W. W. Tarn, Greeks in Bactria and India, (Cambridge 1951, 2nd ed.), p.164.
7. 'Indian Elements on Coin Devices of Foreign Rulers of India', IHO, Vol.XIV (1938), pp.300-301.
8. JASB, (1834), p.164, Pl.VIII, 11.
9. Cited by Lahiri, op.cit. p.127.
10. Numismatic Chronicle, (1869), p. 225, No. 21, Pl. (c), VI, 6.
11. BMC, p. 19, Pl.VI,8.
12. W. W. Tarn, op.cit., p.1 35.
13. Numismatic Chronicle, (1947), p. 30, fig. 1.

14. A.K.Narain, The Indo-Greeks. (Oxford, 1957), p. .63.
15. JRAS. (1941), pp.63-64; MASI, No.46, pp.28-32.
16. "Indian Elements in Coin Devices of Foreign Rulers of India", IHQ, Vol.XIV (1938), pp.299-300.
17. E.J.Rapson, The Cambridge History of India, Vol.I, (Cambridge, 1922), pp.555-56.
18. Thomas Watters, On Yuan Chwang's Travels in India, (Delhi, 1961, first Indian edn.), Vol.I, p.129.
19. Tarn, op.cit., p.138.
20. S.Majumdar Sastri (ed.), Cunningham's Ancient Geography of India, (Calcutta, 1924), p.60.
21. R.C.Majumdar, Classical Accounts of India (Calcutta, 1960), p.257.
22. Ibid.
23. Ibid., p.345.
24. V.S.Agrawala, India as known to Panini, (Lucknow, 1953), pp.453-54.
25. Gods and Men, (Bombay, 1962), p.61.
26. See for a discussion of Ganesha images of the Kushan period M.K.Dhavalikar, "Origin of Ganesha", Annals of the Bhandarkar Oriental Research Institute (in press).
27. In the case of Sanskrit words borrowed into Dravidian, sa becomes ya as in the case of kalasa kalaya; Dasaratha Dayaratha. See for a discussion M.R.Rajagopala Iyengar "Phonetic changes in Tamil words borrowed from classical Sanskrit", Jr. of Oriental Research, Vol.XVI (1940), p.57; also C.R.Sankaran, Phonemics in Tamil, (Poona, 1951), p.22.

VASTU - PURUSA

By

M. K. Dhavalikar

The concept of Vastu-purusa has so far proved to be a puzzle and has remained a myth. Several scholars have tried to explain it, but there is as yet no satisfactory explanation. It is generally supposed that the concept of vastu-purusa has its origin in the Vedic Srauta tradition of fire sacrifice.¹ It has been suggested that god and his temple correspond to soul and human body. What is more, the temple building ceremonies are taken to be rituals which are akin to our jataka samskaras.² The Vastu-silpa texts describe the vastu-purusa as follows:

"Finally the presiding deity of the site (vastu-purusa), who is described as hump-backed and of crooked shaped, is said to occupy the habited area (vastu) in such a manner that his limbs cover the several squares or groups which are assigned to and named after various deities. As he is supposed to lie down with his face turned downwards his head being in the central square on the east side (assigned to Surya), his right and left hands must be in the partitions of Agni (southeast) and Isana (northeast) respectively; and his right and left feet on those of Nairitta (southwest) and Vayu (northwest) respectively. The middle part of the body occupies the central portion of the plot which is assigned to Brahma."³

The description of the Vastu-purusa given in the Agni purana is quite different. It describes the door of the temple as its mouth, the platform terminating the trunk of the superstructure as the skandha (shoulders) of the purusa, the bhadra or the projections as the arms, and the jangha and the lowermost moulding as the feet (padukas). The analogy of the human body is considerably followed on the structural plan of the temple and although it is not to be taken literally, its importance is not minimal. Later texts follow this image and in may we find reference to the worship of prasada (the temple) as purusa. It appears from various descriptions that purusa refers to the ground plan but he is also the vertical plan, with his head being the sky (the amalaka), his nabhi (navel), the garbha-griha, and the lower moundings the feet.

The Vastu-Vidhana of the Narada (VII, 26-32) pertinently points out that the

Vastu-purusa-mandala is the diagram (yantra) and the form (rupa) of the vastu-purusa who, like his counterpart, the Vedic and Upanisadic purusa is beyond form. The Vastu-purusa-mandala is his body (sarira), the principal device (sarira-yantra) for building a temple.

According to Stella Kramirisch, a leading authority on Indian Vastu-silpa, the Vastu-purusa-mandala represents a sacrificial body of the fallen asura and is analogous to the ritual body which the sacrificer builds for himself when piling up the Vedic altar. It is called yajna-tanu (Taittiriya Samhita IV, 4,9). The sacrificial body of the Vastu-purusa is the dwelling of gods.⁴

The textual descriptions show that the concept of Vastu-purusa which became very complex later, was quite different originally. It appears from the later Vedic literature that it simply represented the fallen body of an asura. In other words, we can identify as Vastu-purusa that particular structure which resembles the fallen body of an asura. Fortunately we have come across such a structure in the course of our excavations at Kandhar.

Kandhar (18° 50'N 10° E), the taluka headquarters of the same name, is located 50 km. southwest of Nanded city (District Nanded, Maharashtra). The present town stands on the left bank of river Manyad, a tributary of the Manjira which forms part of the Godavari system⁵. Kandhar has been identified as one of the capitals of the Rashtrakutas. Although an insignificant town now, Kandhar must have been a very important city in the ancient past. It appears to have been much larger than the present one for the simple reason that the ruins have spread far beyond the present township into villages of Bahadarpur and Manaspura (Fig. 1).

A fragmentary stone inscription was found at Kandhar in 1959 near an old well known as the 'Khas Bag' well in the village of Bahadarpur which is about 1.5 km. from Kandhar.⁶ The inscribed stone was actually lying in the well, but in the summer of 1957 the well dried up and the stone was noticed. It was later removed by Sri Keshavrao Dhondge, a local leader, to his house and has been fixed in the Tulsi vrindavan.

The record is extremely important inasmuch as it gives us a detailed

description of the buildings in the capital city and the munificent activities probably of Krishna III of the Rashtrakuta dynasty. The donor of the record is one Kalamegha. Among the deeds of the king were the construction of a mandapa named Sarva-lokasraya⁷ near the temple of the well known god Ksetrapala. He also established five centres for distribution of water (prapa) at the following places:

1. New makara-torana in the royal palace (Raja-griha).
2. Near Yaksa-dvara which was adorned with mandala-siddhi Vinayaka.
3. In front of the temple of Kamadev close to the house of the royal courtesan(pradhana-rajya-Vilasini-pataka).
4. In the courtyard of the 'temple of Kalapriya'.
5. In the pavilion named Sarva-lokasraya.

The king had constructed fire places at five places for poor people for protecting themselves during the cold season. They were located at the following places:

1. Sarvalokasraya pavilion in the courtyard of Mandalasiddhi Vinayaka worshipped at the Yaksa-dvara.
- 2 & 3. Near the Kalapriyanatha temple.
4. In front of the Sagareshwar temple.
5. In the vicinity of Bankeshwar temple situated to the north of the Sagareshwar temple.

In addition the king built two water tanks (jala-dronyo) and established five centres for supplying fodder to cattle (go-grasah) which were located as follows:

1. In the market of the people from Gujarat (Gurajara-apana).
- 2, 3 & 4. Near the temples of Viranarayana, Srikrishneshwar and Ksetrapala.
5. At the much frequented market place (ksunna-hattika).

For this, the king had made provision of 50 drammas a day.

Among other munificent deeds of the king, the inscription mentions that he

had made a provision of 500 drammas a month for supplying panch-amrit and for pancha-upachara as also for curds, milk and flowers for the gods in Bankeshwar, Chhalleshwar, Gojjiga-somanatha, Tumbeshwara and Tudigeshwar in the town. Provision was also made for sugar and sandal. It also mentions the provision of two prasthas of oil and one prastha of salt daily to the college (vidya-sthana) situated on the banks of Nandi in the Godavari valley (Godavari - tat- adhyasini Nandi- tate) and belonging to the Brahmanas engaged in studies. Arrangements were made for this purpose for the storing of nine khandikas of oil and four and a half khandikas of salt by purchasing them from grama-katakas. For the bulk purchase of articles, arrangements were made for the daily payment, in a lump sum of the price of oil and salt required per day.

The inscription is important because it helps us to identify satisfactorily the ancient city of Kandharapura with the present town of Kandhar. The Rashtrakuta monarch Krishna III has been described as Kandharapuravar - adhisvara in some epigraphs.⁸ He was also referred to as Krishna-Kandhara and Krishna-Kandhara with the title Kandhara-puravara-adhisvara that is "the supreme Lord of Kandharapura, the best of towns". The town could not therefore be identified earlier, but the Kandhar inscription helps us to identify it with the present town of the same name.⁹

This, however, led to the problem of the identification of King Kandhara > Krishna. In this connection, it should be stated that there is a tradition according to which Kandhar was built by and named after a king¹⁰ called Kandhar. As late Dr. D.C. Sircar has rightly concluded, the name of the king and the absence of pre-Rashtrakuta antiquities at Kandhar suggest that this Kandhar was a Rashtrakuta King¹¹. Furthermore, this king was none else than Krishna III because most of the names of the temples in the ancient city were the titles of Krishna III.¹² It is, however, quite likely that the town may have been built by and named after an earlier Krishna of the Rashtrakuta family.

The town of Kandhar and its environs are littered with the ruins of ancient structures. Some of these buildings were ancient temples as is evident from the fragmentary sculptures and carvings scattered here and there. Some of them were converted into mosques by the Muslim invaders in the mediaeval period. They are mostly located on the banks of the ancient tank in the town. Recently several

sculptures were brought to light in the precincts of the Shivaji College which is located on the eastern bank of the tank.

As already stated, the ancient ruins are also seen scattered in the neighbouring villages of Manaspuri and Bahadarpura. But the most noteworthy among these were those at Manaspuri because of their massive proportions. Among these could be recognised the fragments of gigantic sculptures of a male and a female. These were found in a field (Survey No. 279) at Manaspuri. From time to time these fragments were discovered and were brought for safe custody to the mediaeval fort at Kandhar which is a protected monument of the State Government of Maharashtra. Dr. Shobhana Gokhale of Deccan College has identified some of the buildings described in the epigraph.¹³ This led us to select the site for excavation.

SITE

The ancient site where the fragments of huge sculptures were found is a cultivated field (S. No. 279) owned by Sri Narayan Vithoba Manaspure. It is located about 2 km. east of the town of Kandhar. The site resembles a small mound about 2 m in height, and is spread over an area of about 100 x 100 m. Since all the large sculpture fragments came from this site, this area was selected for excavation. In the course of our excavation we encountered a structure built of dressed stones. It is very enigmatic as it does not conform to any known temple plan. It resembles an anthropomorph (Pl. I). The left arm of the structure is 10m. long and right one is 9.9m. long. The portion in between two arms, which resembles a human body, has a maximum width of 4.65 m.; the legs are 15.35 m. long.

SCULPTURE

We have already stated that the site was selected for excavation because fragments of a colossal image were found here. We, therefore made an attempt to find out whether this sculpture could be fitted into the structure. We have already observed that this structure does not appear to be residential, but on the other hand can be identified as a shrine because of the discovery of the fragments of the colossal sculpture at the site.

The sculpture is gigantic in size as is clear from the fragments so far found. The face, which is in two parts, measures from the top of head to nose 1.57 m. in height and the width across from eye to eye and up to the left ear is 2.48 m. (Pl. II). The face appears to be carved in two separate slabs which join at the eye level because the edges of both the slabs at this point are smoothened. The left part of the forehead is slightly broken. The ears too appear to have been carved separately. The left ear (Pl. III) which has been found is 1.60m. high and it has an elongated ear-lobe (pralamba-karna-pasa) in which is a heavy disc (tatankachakra). In the upper part of the ear-lobe are two rings containing three pearls each; they are clearly of the bali of balika variety. The slabs of the face are not very thick (maximum thickness 23 cm.), nor do they appear to have been broken. This would suggest that the sculpture was not finished at the back and was not intended to be seen from the back.

Of the body portion only a small fragment of the belly has been recovered. There are two pieces of hands which are broken at the wrist. The left hand holds a citrus fruit (bija-puraka) whereas the object in the right hand being broken, cannot be identified properly. The left hand is 77 cm. broad and the right hand is 1.15 m. broad. The height of the latter is 1.08 m. The hands were carved separately as the squarish projection below the wrist of the right hand indicates. Both the hands have thick bangles on them.

There are two leg fragments which have been recovered. They are broken at the left leg (Pl. IV) is 1.75 m. long and is 55cm. broad at the back near the ankle. On the leg are two anklets and there are rings on all the toes. A most remarkable feature of the right leg which we could examine from all sides is that even its sole is finished properly and so also is the lower side of the toes. In the case of such a massive sculpture, if it was intended to be installed in a standing position, there was no need to finish the underside of the feet, much less that of the toes. This would suggest that the image probably was intended to be kept in a reclining posture. This surmise gains strength from the squarish tenon which has been provided at the back of the ankle; it was obviously meant for fitting into the mortice hole in the floor. There should therefore be little doubt that the colossal image was probably placed in the shrine in a reclining posture. This then would be the sayana class of Siva image which are extremely rare or almost absent in the entire range of Indian sculpture. The only parallel that can be cited is the painted representation of Vasuki-sayana

Siva in the Vatakkunatha temple at Trichur in Kerala which belongs to 16th century.¹⁴

The next problem that crops up is the fitting of the image in the temple proper. The sculpture fragments are huge and are unlikely to be moved much from their original location. We made inquiries with the owner of the field, Sri Narayanrao Manaspure, and others as also with the employees of the State Department of Archaeology who had shifted the fragments to the fort. Our inquiries reveal that the two slabs of the face and the ear were found in the circular part of the shrine; these were slightly removed from each other. The two hands were somewhere near the arm like projections of the structure whereas the two legs were found at the lower extremities of the structure.

The total height of the image can be estimated on the basis of the size of the face and also that of the foot. The extant length of the face from nose to the forehead is 1.57 m. and the total length of the face from the top of the head to the chin would be about 2.25 m. If we accept that the total height of a person is seven times that of the face, then the total height of the image would be around 16 m. This is commensurate with the dimensions of the structure and as such the image can be easily accommodated in the shrine in the reclining posture.

Besides the fragments of the gigantic sculpture described above there are some more which do not belong to it and are hence problematic. There are two pairs of hands and one pair of legs which are identical. They probably belong to Yogeshwari. Her shrine also anthropomorphic on plan was found to the left of the main shrine.

It appears that this gigantic sculpture was carved out on the small hillock which is situated very close to the site, about 100 m. to the east. A massive dyke of dolerite runs north-south through this hillock from which stone was quarried for the sculpture. The top surface and the slopes of the hillock are full of chips of stone which suggest that the different parts of the image were fashioned here. Besides, it was easier to haul them to the site of the shrine over the slope of the hill.

KSETRAPALA

It has been suggested that this gigantic image is probably of the god Kalapriya whose temple, as the stone inscription records, existed in the ancient capital.¹⁵ This cannot be accepted because the image is that of Siva as the third eye clearly shows. It may be stated that late Prof. V.V. Mirashi has made it explicitly clear that Kalapriya is one of the names of Surya.¹⁶ It is, therefore, clear that there existed a sun temple in ancient Kandhar.

The image appears to be the Bhairava form of Siva. It was appropriate that the temple of Bhairava, who were also worshipped as Ksetrapala, should have been built on the outskirts of the ancient capital, in the fields. In this connection, it must be mentioned that the inscription refers, among the many meritorious deeds of the King, the construction of a mandapa (pavilion) named Sarva-lokasraya near the temple of the well known god Ksetrapala.¹⁷ It further records that fire-palaces (agni-sthitika) were constructed at five places for saving the poor from cold during winter, and one of these places was the pavilion called Sarva-lokasraya in the courtyard of the Mandalasiddhi which was probably the same as the Mandalasiddhi Vinayaka worshipped at the Yaksa-dvara.¹⁸ It may be stated in this connection that very close to the temple of Ksetrapala exposed in the course of excavation, in the adjoining field on the south was found, in the course of ploughing, an image of Ganesh which, in all probability, is the image of the Mandalasiddhi Vinayaka referred to in the epigraph. The Yaksa-dvara, that is a gateway adorned with a yaksa figure, was perhaps one of the gateways for entering into the city, and was therefore located on the outskirts of the ancient capital. A similar gateway adorned with the image of a goddess is referred to in another Rashtrakuta inscription.¹⁹

The giant image can be identified as that of Ksetrapala Bhairava which has been referred to in the inscription.²⁰ It may be stated that the cult of Ksetrapala was not very popular in Maharashtra as it was in the south in the early mediaeval period. The Saivites in the south worshipped Ksetrapala usually in the form of Bhairava. The cult was very widespread in south India from very early days for the god was the protector of earth and was sometimes called the son of Siva (Sambhu-tanay). His main function was to protect the cultivated fields and hence his popularity.

The iconography of the god has been described in the Vishnudharmottar

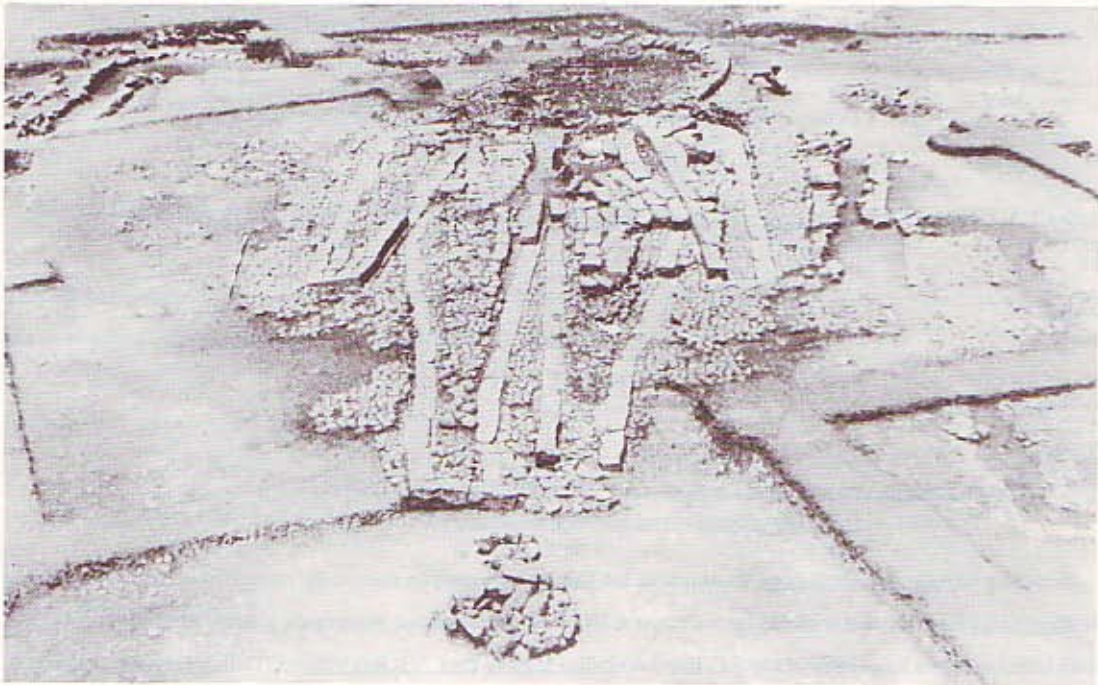
Purana according to which he should have three eyes which are large, round and protruding. His long hair are straight and project upwards. The god wears serpent jewels, naga-yajnopavita, a girdle of small bells and a necklace of skulls. 21. His form should be somewhat gruesome with fierce fangs and should be awe-inspiring. He is shown with two, four or six hands. It may be noted that the giant image from Kandhar probably had four arms. This form, according to texts, is the Satvika form of the god. 22 He holds a khadga (back right) and a bell (ghanta) or a sula (lance) in his back left hand; the two front hands are in the varada and abhaya mudra. The **kandhar** image therefore can be said to be the representation of the satvika form of Bhairava Ksetrapala. 23

It is highly likely that the Kestrapala shrine at Kandhar was built by Krishna III probably as a result of his south Indian conquests. There is ample evidence to show that he had conquered a large part of South India. He had conquered Kanchi and Tanjor by 950 A.D. and was occupying Tondai-mandalam. 24 As we have observed, the Kestrapala worship was already quite common in South India even in the earlier period. Krishna III therefore may have built the Kestrapala shrine in the capital city after his successful conquests in South India. 25 The plan of the shrine devised by him is no doubt unique.

NOTES.

1. P.P. Apte and S.G. Supekar "Vastu-puruskara-samhita and Brihatsamhita: A comparative study" Bulletin of Deccan College Res. Inst., Vol. 42 (1983), pp. 5-17.
2. D.N. Shukla, Vastu-shastra. Hindu Science of Architecture, (Lucknow, 1960), Vol. I, p. 403.
3. P.K. Acharya, Hindu Architecture in India and Abroad, Vol VI, (London, year not given), pp. 101 - 102.
4. The Hindu Temple, Vol. I, (Calcutta, 1946), p. 95.
5. It has been suggested that in ancient times the river was known as Nandi. See D.C. Sircar, "Fragmentary Rastrakuta inscription from Kandhar", Epigraphia Indica, Vol. XXXV (1964 - 65), p. 111.
6. Ibid.
7. This reminds us of the other epithet of the King Samasta-bhuvana-asrya (Bombay Gazetteer, p. 419).
8. D.C. Sircar, op.cit., p. 108
9. See for discussion, M.K. Dhavalikar, The Kandhar of the Deccan. South Asian Studies (in press)
10. Ibid. p. 109
11. Ibid
12. Ibid.
13. "Kandhar through Epigraphy and Archaeology", Jr. of the Epigraphical Society of India, Vol. VII (1980), pp. 22-24.

14. V.S. Nayar, 'VASuki-Sayana: A rare motif' , Jr. of Kerala Studies, Vol. IV (1977), pp. 517 - 524.
15. Shobhana Gokhale, op.cit. p.22.
16. "Identification of Kalapriyanatha", Studies in Indology, Vol. VI, (Nagpur, 1968), pp. 37-44.
17. Sircar, op.cit., p. 107.
18. Ibid. pp. 107-108.
19. Cf. Chinchani Plates of the time of Karka III, EL, XXXII, p. 56.
20. Sircar, op.cit., p. 107.
21. See T.A. Gopinatha Rao, Elements of Hindu Iconography (Madras, 1916), Vol. II, Pt. 2, pp. 495 - 98.
22. Ibid.
23. Ibid.
24. A.S. Altekar, Rashtrakutas and their Times. (Poona, 1967, 2nd rev.edn.), pp. 116-117.
25. According to Amsumadbhadagama the shrine of the Ksetrapala should be built in the north-east corner of the city but the mayamata prescribes that it should be in the north. See K.K. Ramamurthy, "Ksetrapala concept and Cult Images from South India" in Amita Ray, H.Sanyal and S.C. Ray (ed.) Indian Studies. Prof. N.R.Ray Volume (Delhi, year not given), p. 123.



PL I



Pl. II



Pl. III



PLIV

THE EXPORT OF ROMAN REPUBLICAN DENARII TO SOUTH ASIA

By

David W. Mac Dowall

Although they are relatively rare compared with denarii of the early Empire, finds of Roman Republican denarii struck in the second and first centuries BC have been reported from various places in the Indian subcontinent-from Pakistan, India and Sri Lanka :-

- (a) in four hoards from the north
 - the Manikyala stupa deposit ¹
 - the Pakli hoard from the Hazara district²
 - Capt. Howell's hoard from the neighbourhood of Kohat³
 - Capt. Howell's second hoard from the neighbourhood of Kohat
- (b) in four hoards from the south
 - the Iyyal hoard from Kerala ⁴
 - the Kallakinar hoard from Tamil Nadu ⁵
 - the Laccadive Island hoard ⁶
 - the South India hoard represented by four coins in the Madras museum
- (c) in isolated finds that may represent either a casual loss or the remnant of what was originally a hoard
 - the denarius reported by Codrington from Sri Lanka⁷

It has usually been assumed that these silver denarii of the Roman Republic were exported to the east during the period of the Roman Republic, before Augustus established the Empire after defeating Mark Antony at the battle of Actium in 31 BC. Warmington, ⁸ who only knew of Roman Republican coins from the northern finds from Manikyala, Pakli and Kohat regarded them as "the result of early coasting voyages during the last years of the Republic". As the regions of the Indus were the first to be visited he was not surprised that "in most northern districts of India Roman coins have been found of earlier date than any in South India". In her recent publication, Turner, who knows of the southern group, suggests that "prior to the main thrust of western trade in the early imperial period there may

have been some contact"⁹ and thinks that the so called Laccadive hoard "may support the possibility that coins began to arrive in India rather earlier than the Julio-Claudian hoards, which are well attested in numbers, suggest".¹⁰

Silver denarii of the Roman Republic and, however, been struck in enormous quantities during the second and first centuries BC and remained in circulation inside the Empire until the second century AD. Indeed during the Flavian period, in hoards buried inside the Empire between AD 70 and 96, Republican denarii constitute on average 64% of denarii in a hoard.¹¹ The Republican denarii found in India could have been exported from Rome at any time during the period when they continued to circulate in the west i.e. from the time of their issue up to the middle of the second century AD. Finds of Republican denarii provide no evidence for early trade links unless it can be demonstrated that they were exported at a particular time.

In the case of six of the eight hoards of Republican denarii noted above there is important additional evidence for the date of the deposit of the hoard in India:-

The Manikyala deposit has a terminus postquem of AD 96 at the earliest and more probably fifty years later circa AD 145. When General Court opened the Manikyala stupa in 1830,¹² he found that the deposit was sealed by a stone which had a Kharoshthi inscription on the underside dated to the 18th year of the Kushan King Kanishka. The date of the era of Kanishka is disputed. No one now dates the era before AD 78, but in recent years scholars have argued for AD 103, 120, 128, 144 and later dates.¹⁴ Taking the earliest possible reference date for the era in AD 78 gives a terminus postquem of AD 96 for the deposit. The t.p.q. will be much later in the second century AD if the Kanishka era is dated later. In the stupa, at a depth of ten feet, Court found a stone cover on which were placed four copper Kushan coins-one of Vima Kadphises and three of Kanishka. Ten feet lower down he discovered the cell. In the centre of this stood a copper urn, round which eight copper coins (now corroded with verdigris) had been placed. From the line engraving in the publication six of them can be identified. One is of Kujula Kadphises, one is of Vima Kadphises and four are of Kanishka. The copper urn contained a silver urn, which in turn contained the seven worn Roman Republican silver denarii and a much smaller gold vessel enclosing four gold quarter dinars of

Kanishka. Turner¹⁵ is quite wrong in her claim that this Manikyala find was a deliberate accumulation of unusual coins. She regards it as odd that Indo-Scythian rather than Kushan copper coins should have been used for the copper deposit and that worn Roman Republican silver denarii instead of Bactrian silver should have been used for the silver deposit. She has however misidentified the copper coins. The publication describes them as 'Indo-Scythic'¹⁶ at a time when this terminology applied to Kushan coins as well as to those of the Azes dynasty. It is however clear from the line engraving that they are common Kushan copper tetradrachms of the Kushan king Kanishka and his immediate predecessors, Kujula Kadphises and Vima Kadphises. She equally fails to understand the acute silver shortage in the Taxila province, following the great debasement at the end of the reign of Azes II,¹⁷ when the silver denominations of the Indo-Greeks and Indo-Scythians had been replaced by the black billon denominations of their successors. Periplus 41, in which it is said that Indo-Greek drachms of Apollodotus and Menanderat the coastal port of Barygaza, far from Taxila in a province that never came under Indo-Scythian or Kushan rule, surely means 'come to light' rather than circulate, and must refer to the hoards of Indo-Greek drachms that come to light from time to time in Gujerat.¹⁸ At the time of the Manikyala deposit, at the beginning of the second century AD, worn Republican denarii still circulated at Rome and had in fact become the denarii with the highest percentage silver content-a category of denarii that we know were exported to north west India.

The Pakli Hoard had a terminus post quem of AD 119-122, from the denarius it contained of Hadrian COS III (RIC Hadrian 137a). Turner¹⁹ comments "while it is unwise to dismiss the Hadrianic coin as inconsistent with the rest of the hoard, it is an attractive notion that it might have been added to the hoard later".

Captain Howell's Hoard I probably has a terminus post quem of AD 14-37 because it seems to have included a silver denarius of Tiberius.²⁰

Captain Howell's Hoard II probably has a terminus post quem of Flavian (AD 70-96) or later date because of the later imperial denarii it contained.²¹

The Iyyal Hoard has a terminus post quem of AD 98-99, because of the gold

aureus of Trajan (RIC 18) that it contained.²²

The Laccadive Island Hoard has a terminus post quem of Hadrian's reign (AD 119-138) because of the denarius of Hadrian that it contained.²³

In each of these cases we have good evidence of a terminus post quem for the deposit of these hoards containing Roman Republican denarii well into the period of the Roman Empire: and in four cases a terminus post quem into the second century AD. This does not of course necessarily mean that these Republican denarii were exported from Rome to India near the date of their deposit. They could have been exported at any time subsequent to their date of issue and remained in India until the time of their deposit in the hoards. This is apparently Turner's view.²⁴ She claims that the Pakli and Kohat hoards are "hoards collected over a long period of time"-the Pakli hoard because it contained eight Republican, eleven Augustan and two Tiberian issues in addition to a post reform denarius of Nero. This is hardly evidence that it was assembled over a long period in India rather than selected from the wide range of coins available about the same time within the Roman Empire.-the 'Kohat hoard' because it "may have included Indo-Greek coins as well which would make it unique". This comment on the 'Kohat' coins is based on a major misunderstanding. Although Turner quotes the Progress Report of the A.S.I. Western Circle for the year ending 1917,²⁵ she does not take cognisance of its contents. The Report refers to the collection of coins purchased from Mrs. Howell -"a thoroughly representative one strong in Indo-Greek and Gupta sections" with two hundred modern coins of minor importance. "Perhaps the most interesting part of Mrs. Howell's collection was the sixty nine coins of both the Republican and Imperial Roman times. They were all collected by captain Howell in Kohat and the neighbouring provinces." "As Roman coinage is thus seen to be in circulation in provinces north west of India, it becomes clear why its specimens were discovered in almost all the stupas opened there". It seems reasonable to suppose that the Republican silver denarii come from a hoard or hoards, but not that they were found with Indo-Greek silver. In my study of the Roman coins in the Prince of Wales Museum I have pointed out that there two separate groups of Republican denarii, one with the main group of Roman coins and one registered quite separately-suggesting that there were probably two hoards of Roman Republican denarii from Capt. Howell's collection. I see no valid evidence to support the view that they were collected over a period of time in India. On the other hand there is clear positive

evidence that Republican denarii were exported after long circulation in the west.

Pausanias,²⁶ writing in the second century AD about the non-monetary economy that had once operated in Laconia, gives a most interesting reference to the way in which trade with India was conducted. 'The sailors on the ships that go to India say the Indians will give produce in exchange for a Greek cargo, but coins are meaningless to them, even though they have an enormous amount of gold and bronze'-literary evidence for what one would have supposed anyhow-that Roman coins exported to India were traded as bullion and not as coins with a fixed value.

Valued as bullion, and not as coinage proper in any India monetary system, Republican denarii must have been used to store non-monetary wealth before they were melted down as a source of silver for jewellery plate and other purposes such as the manufacture of local Indian silver coins. Where we have information about their condition, Republican denarii from India have lost weight from circulation and wear. In Captain Howell's hoard I they have lost between 0.2 and 0.5 gm. since they were first issued, and in Captain Howell's hoard II they have lost between 0.3 and 0.6 gm.²⁷ The two documented Republican denarii in the Madras Museum from the Kallakinar hoard²⁸ weigh only 2.9 and 3.41 gm., and the four other Republican denarii in the Madras Museum (probably from another south Indian hoard) weigh only 2.07, 2.47, 3.42 and 3.66gm. compared with the standard of about 4.0gm. at which they were originally issued. The Republican denarii from Manikyala were said to be worn, and this is very evident from the line engravings of the coins in the contemporary publication. All these denarii could only have lost this amount of weight from heavy wear in a monetary system where they circulated as coins in frequent use. This was the position in the Roman Empire but not in India. They must therefore have been exported to South Asia after they had circulated and lost weight through wear inside the Roman Empire.

The composition of these hoards containing Republican denarii from south Asia is fundamentally different from that of hoards of the time of Trajan and Hadrian found inside the Roman Empire-for the same reason-the Indians valued their denarius imports as bullion and not as coinage. The denarii found in India had been specially selected from the range of those current at Rome specifically because of their bullion value. Two factors affect the bullion value of a denarius : -

- (a) the purity of silver at which it was issued. This remains constant throughout the life of that coin
- (b) the weight of the coin although struck at the weight standard of its particular issue, the weight of any individual coin will reflect its own loss of weight through circulation and wear.

The Indian importer will have been concerned about silver purity, and the extent to which reliance can be placed on the silver purity of any particular series. He will not be concerned about the weights of individual coins, because he accepts bullion by its total weight. On the other hand, the Roman exporter will be concerned about the weight of individual coins he exports, because coins with a higher weight contain more silver and still cost him four sesterii (the accounting value of one denarius at Rome).

Thanks to the painstaking studies of D. R. Walker²⁹ we now know the silver content of all the Roman Republican and Imperial denarii in the Ashmolean Museum, Oxford. There are many minor variations between different issues in the same group, but the general pattern of the silver content of the Roman coinage is simple and clear.

THE PERCENTAGE SILVER CONTENT OF ROMAN DENARII

	% Silver	
<u>Republic</u>		
211-40 BC	96-97	
32-31 BC	Legionary denarii	92
<u>Empire</u>		
up to AD 64	Julio-Claudians	96-99
from AD 64	Nero post reform	93-94
from AD 70	Vespasian	80-93
from AD 82	Domitian reform I	96-99 as Julio-Claudian standard
from AD 85	Domitian II	93-94 as Nero AD 64-68
AD 101-102	Trajan	91-95
from AD 107	Trajan reform	78-91
	Hadrian	78-91 un changed
from AD 148	Antoninus pius	77-89 with more coins at lower end

Except for the debased legionary denarii of Mark Antony, the Republican denarii were of good quality silver. Most of the issues of the Julio-Claudian emperors had an even higher silver content. Nero's reform in AD 64 reduced the silver purity to 93-94%. There was a further reduction under Vespasian who struck denarii to a much wider range of purity-from 80 to 93%. This development made it extremely difficult for anyone to know the silver content of any particular denarius without assaying it. The unsuccessful attempt by Domitian to return first to the 96-99% silver standard of the Julio-Claudians and then to the lower 93-94% standard adopted in AD 64³⁰ was eventually followed by the major reform of Trajan in AD 107³¹. Trajan reviewed the coinage, ordered the withdrawal of old worn out coins³² and struck denarii with 78-91 % silver - a standard that remained unchanged for the next forty years under Hadrian and Antoninus Pius. The study of hoards found within the Roman empire shows the result of these changes on circulation. Denarii of poorer silver issued by Vespasian began to drive out of circulation earlier denarii with a higher silver content. Domitian's reforms arrested the process for a time, but the major reform of Trajan in AD 107 accelerated the disappearance of the pre AD 64 denarii. The Julio-Claudian denarii (with 96-99 % silver) disappeared from circulation more rapidly than Republican denarii (with only 96-97 % silver).

THE COMPOSITION OF HOARDS CONTAINING DENARII FOUND INSIDE THE ROMAN EMPIRE³³

Hoards ending with		Percentage of Republican	Julio-Claudian	Later issues
Claudius	AD 41-54	76.3%	23.7%	-
Flavians	AD 70-96	64.1%	11.6%	24.3%
Trajan	AD 98-117	22.9%	2.4%	74.7%
Hadrian	AD 117-138	3.5%	0.1%	96.4%

Finds of Roman denarii in India follow the pattern one would expect. There are no denarii of the Legionary issues of Mark Antony of 32-31 BC (with only 92% silver). There are very rarely any denarii struck to the lower silver standard of Vespasian after AD 70 (with 80-93% silver) Pre-reform denarii of the Julio-Claudians (with 96-99% silver) are preferred to Republican denarii (with 96-97% silver). Last but not least in Indian hoards of later date, with a terminus post quem under Hadrian (AD 1189-138) and Antoninus Pius (AD 138-161) there is a sharp increase in the proportion of Republican denarii, reflecting the virtual disappearance of Julio-Claudian denarii within the empire - the source from which exported denarii were inevitably drawn.

THE COMPOSITION OF HOARDS CONTAINING REPUBLICAN
DENARII FOUND IN SOUTH ASIA ³⁴

Hoard	Republican	Julio-Claudian	Later	Terminus post
Iyyal	9%	91%	Aureus of Trajan	AD 98-9
Pakli	33%	63%	Denarius of Hadrian	AD 119-122
Laccadive	44%	56%	Denarius of Hadrian	AD 119-138
Manikyala	100%	0%	Gold and copper Kanishka	AD c.145

The kallakinar hoard, now known from only two worn Republican denarii in the Madras Museum, originally contained other silver and gold coins in an earthen jar - none of which was recovered. The gold coins must have been aurei of imperial date, suggesting that the composition of the Kallakinar was basically similar to that of the Iyyal hoard which also contained both Roman gold aurei and silver denarii. The low weight of the two surviving Republican denarii at 2.9 and 3.41 gm. equally suggests that the original coins in the hoard were exported from Rome after long

circulation, early in the second century AD.

The other South Indian hoard, from which the other four Republican denarii in the Madras Museum seem to have come, again seems to have consisted of coins exported after long circulation at the beginning of the second century AD. The four surviving denarii which weigh 2.08, 2.47, 3.42, and 3.62 gm have a weight range much lower than that of the 1959 Pompei hoard of AD 79.³⁵

The weights of the Republican denarii in the two hoards from captain Howell's collection, now in the Prince of Wales Museum, Bombay, between 3.4 and 3.85 gm. cover much the same range as the weights of Republican denarii from 3.1 to 3.85 gm. in the hoard found in the 1959 excavations at Pompei with the remains of the skeleton of a man trying to escape from the eruption of Vesuvius in AD 79 - also suggesting a Flavian or later date.

The isolated find from Sri Lanka of the Republican denarius of L. Antistius Gragulus (struck in 133-126 BC) described by Codrington,³⁶ whether an isolated find or the remnant of a larger hoard, was no doubt another of this class of Republican denarii exported in the first half of the second century AD. The famous passage in Pliny's *Natural History*³⁷ dates to the time of Claudius (AD 41-54) the first accurate information that the Romans had about Taprobane, the name by which they called Sri Lanka. A freedman of Annius Plocamus who farmed the revenues of the Red Sea was blown seriously off course and after fifteen days drifted to hippuros, a port of Taprobane, where he was kindly received by the king. The king was particularly impressed with Roman notions of justice when he discovered that among the coins found on the person of his captive the denarii were all of equal weight even though the figures on them plainly showed that they had been struck in the reigns of several emperors. They must have been silver denarii of Augustus, Tiberius, Gaius and Claudius, the first four Roman emperors. Warmington³⁸ correctly argues that at this stage the Romans did not know about the use of monsoon winds to reach Sri Lanka, although they did soon afterwards - in part because of the reports given by the Sri Lankan mission sent to Rome and by Plocamus' freedman. Because of this, Warmington is very sceptical about what he calls "the finds of a very few examples dating from the period before the full discovery of the monsoon in Claudius reign." We can agree that Roman coins almost certainly did not reach Sri Lanka before the time of Claudius (AD 41-54); but there is no need to cast doubt on the finds of early silver denarii reported by Codrington³⁹

the Republican denarius struck by L. Antistius Gregulus in 133-126 BC, and the PONTIF MAXIM denarius of Tiberius struck in AD 14-37. We know that denarii of Tiberius and other Julio-Claudian emperors were regularly exported to south Asia in the later Flavian period and under Trajan: and that Republican denarii were regularly exported to south Asia well into the second century AD at the time when they were disappearing from regular circulation in the west.

Although this brief study of Roman Republican denarii found in South Asia comes to the conclusion that they were exported from the west in the first half of the second century AD, and not towards the close of the Roman Republic in the latter half of the first century BC (the view currently held by Warmington, Turner and others), such a conclusion simply confirms what one should have expected from the operation of Gresham's law. It is the inevitable economic consequence of debasing the currency, and is seen repeatedly throughout monetary history whenever there is a significant reduction in the standard of weight and/or purity of a precious metal coinage. It results in 'bad' money driving the 'good' out of circulation. The good money (here denarii of higher silver purity and weight of the Julio-claudian and Republican issues) disappears - either by government recall so that the mint can strike more denarii of the same nominal value from a given weight of pure silver, or into hoards prior to private melting down for use in plate, jewellery or as bullion for export. Beyond the imperial frontiers the old coins are valued as bullion and not as coinage. The major export of these denarii comes exactly at the time when these earlier issues are disappearing from circulation throughout the Roman Empire and is closely related to the successive changes in silver purity of the Roman denarius under the Flavians and Trajan, culminating in the major reform of AD 107.⁴⁰

The second important point to emerge from this study is the positive information that it yields about the attitude of the traders of south Asia to the Roman denarii that they imported. It fully confirms the remarks, quoted above, from Pausanias about the non-monetary character of the trade. They valued the Roman silver that they imported as bullion. The composition of hoards of denarii found in India shows their concern about the purity of silver that they accepted. On the other hand the wide span of the weights of individual denarii in these hoards from India show that the importers were not so concerned about the weight of individual denarii. We can therefore conclude that denarii of particular series,

known to have a consistent silver purity, were traded by weight.

FOOTNOTES

1. JASB 1834, 558ff., 562ff., 635ff..
2. NC 1899, 263-265.
3. ASI Western Circle Progress Report (Bombay, 1918), 2, 51.
4. JNSI XXV (1963), 22-28.
5. MMAR 1909-1910, 3.
6. P.J. Turner Roman Coins from India (London, 1989) 90.
7. H.W. Codrington Ceylon Coins and Currency (Colombo, 1924), 36 no. 7.
8. E.H. Warmington The Commerce between the Roman Empire and India (London, 2nd edn. 1974), 39.
9. Turner op.cit., 18.
10. Ibid., 90.
11. S. Bolin State and Currency in the Roman Empire to 300 AD (Stockholm, 1958) 336-339.
12. JASB 1834, 558ff..
13. S. Konow Corpus Inscriptionum Indicarum Vol II part I Kharoshthi Inscriptions (Calcutta, 1929) 145-150.
14. cf. A.L. Basham (ed.) Papers on the Date of Kanishka (Leiden, 1968).
15. Turner op.cit., 18.
16. JASB 1834 loc.cit.

17. J.Marshall Taxila (Cambridge, 1951),53 and 773.
18. J.S.Deyell NC 1984,115-127.
19. Turner op.cit., 6.
20. These coins are to be published by B. V. Shethi and myself in our forthcoming catalogue of the Roman coins in the Prince of Wales Museum, Bombay.
21. See note 20 above.
22. INSI XXV (1963), 22-28.
23. Turner op.cit.90.
24. Turner op.cit.,17-18.
25. The report makes it absolutely clear that the purchase is of a collection of coins made by capt. Howell, not a hoard. It is of course a reasonable inference that the collection made in Kohat includes Roman Republican coins from one, two or more hoards.
26. Pausanias Descriptio Graecae III,12,3-4.
27. from the weights of the coins in the Prince of Wales Museum, Bombay.
28. quoted by Turner op. cit., 57.
29. I am indebted to D.R. Walker for letting me study the unpublished detailed analyses of the Roman Republican denarii which he summarised in his article 'The silver Content of the Roman Republican Coinage' in D.M.Metcalf and W.A.Oddy (ed.) Metallurgy in Numismatics Vol I (London, 1980),55-72. His analyses of denarii of the Roman Empire are published in The Metrology of the Roman Silver Coinage Parts 1-3 (Oxford,1976-1978)
30. D.R.Walker op.cit. Part I , III-121.

31. D.R.Walker op.cit. Part II, 46-58.
32. Ibid., 56.
33. Calculated from the hoards cited in Table 3 in my further paper 'Finds of Roman coins in South Asia, problems of interpretation' also submitted to this meeting.
34. Calculated from the reports of these finds, see footnotes 1,2, 4 and 6 above.
35. E.Pozzi 'Tesoretto di eta flavia' Annali 5/6 (1958-59), 211 ff..
36. H.W.Codrington op. cit., 36 no.7.
37. Pliny Natural History VI, 84-91.
38. E.H.Warmington op. cit. 43ff..
39. H.W.Codrington loc. cit..
40. D.R.Walker The Metrology of the Roman silver Denarius part 2 (London,1977 46-58).

THE SIGNIFICANCE OF THE IVORY SEALS DEPICTING AUSPICIOUS SYMBOLS FROM JETAVANA STUPA IN ANURADHAPURA

By

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The archaeologists of the Unesco sponsored Jetavana Vihara Project of the Cultural Triangle of Sri Lanka, recently discovered a number of ivory objects from the northern ayaka of the Jetavana stupa, in Anuradhapura. Among these there were six ivory seals displaying auspicious symbols. Commenting on them in a paper submitted to the Second South Asian Archaeological Congress (SAARC) held in Colombo, in December' 1987, Dr. Hema Ratnayake, the Director of the Jetavana Project says, "A few ivory seals we retrieved from the excavations are of interest. The majority of them invariably show a pot, with flowers and leaves along with some emblems ... The majority of these seals are not in a good state of preservation".² Apart from this brief comment no other details have been mentioned. In the opinion of the present writer these seals depicting auspicious symbols, are a unique discovery, and an indepth study of them is bound to shed new light, both in the field of iconography and in the history of art, not only of Sri Lanka but also that of India. The purport of this paper is to identify the symbols depicted on these seals and discuss their significance in comparison with other similar groups of symbols in India and Sri Lanka.

JETAVANA IVORY SEALS

2. A general survey of these ivory seals, shows that they are a homogenous group. All of them display auspicious symbols and the puṇḍarikā (filled vessel) seems to be the cardinal symbol in association with which the remaining symbols are organised. As Hema Ratnayake has stated these artefacts are not in a good state of preservation. Some symbols on account of the damage caused by being buried for over thousand seven hundred years have to a great extent disintegrated and in some instances distorted.

In Dr. Hema Ratnayake's paper line drawings of six seals depicting auspicious symbols have been included.³ These illustrations when compared with the originals,

revealed that they have not been accurately drawn. It is true that the seals are in a bad state of preservation. Even in this condition some symbols such as the srivatsa, ankusa (elephant goad), double fish (matsyayugma), which could be easily recognized, have been more or less completely distorted. My line drawings are based on impressions of these seals on clay. As the seals are not larger than medium size coins' the symbols engraved on them are extremely small and in most instances disintegrated. Hence some of these symbols have not been well reproduced when impressed on clay.

My illustration show that Seals I, II and III are in a fair state of preservation and almost all the symbols depicted on them can be identified. (Figs. 1, 2 and 3). For instance in each seal there are eight symbols, namely, (a) srivatsa, (b) camara (flywhisk), (c) ankusa (elephant goad), (d) matsya or matsya yugma (fish or double fish), (e) svastika, (f) bhadrapiṭha (auspicious seat), (g) sankha (conch shell) and (h) purnaghata (filled vessel). This however does not mean that in all the three seals these symbols are represented in perfect form. The purnaghata (h), is well recognizable in all of them, although in seals II and III the lotus leaves or lotus buds that issue forth from the vessels have been damaged and distorted. The srivatsas (a) have been in all instances represented in classical form and in seals I and II the lotus seats supporting the two symbols have been indicated. Seal I depicts the bhadrapiṭha (f) in perfect form, where as in seal II, though recognisable, it is highly distorted and looks more like a ladder than a tripod. This distortion was intentional on the part of the craftsman, for there was only a narrow space to the right of the purnaghata left for it. In seals II and III the two symbols camara (b) and ankusa (c) have been well represented. These two symbols are very much similar except for the fact that the ankusa displays the characteristic tine (of ankusa-tomara) prominently. Otherwise, the hook of the ankusa and the yak tail of the camara look very much alike. Seals I and III represent the double fish (matsya yugma) (d) where as in seal II a single fish has been shown. The svastika (e) in seal I is well formed while the same symbol in seal II has been distorted. The sankha (g) in seal I is fairly well formed, where as in seal II it has been elegantly represented although slightly eroded. Thus we can arrive at the conclusion that these seals depict the eight auspicious symbols (astamangala) namely, srivatsa, camara, ankusa, matsyayugma, svastika, bhadrapiṭha, sankha and purnaghata. Elsewhere I have shown that these eight auspicious symbols formed the astamangala that was prevalent during the latter half the Anuradhapura period.⁴ The Sanskrit manual on art and architecture

called Manjusri-bhasita Vastu Vidya Sastra,⁵ considered to be a work written in Sri Lanka (6th century A.C.) and the Bali texts of the Sinhalese (17th century) mention these symbols.⁶

The two seals IV and V are rather in bad shape. (Figs. 4 and 5) However, a careful scrutiny of seal IV shows that it too depicts all the eight symbols although some symbols like the ankusa (c) has only its elephant trunk like hook left while a few other symbols sankha (b), bhadrapitha (f), and svastika (e) only faint traces are to be seen. Of the srivatsa (a) only three scrolls are to be seen and its identity is confirmed by its position just above the puṇnaghata (h) The camara (b) as usual in these seals is shown in heraldic opposition to ankusa. The matsya-yugma (d) though partly damaged can be recognised just above the ankusa. In the arrangement of the symbols this seal is some what similar to the seal III. In Seal V too at least traces of six symbols can be discerned. The unusually large puṇnaghata (h) apparently does not display the characteristic lotus leaves or buds. On the other hand the srivatsa (a) depicted above it is unusually large. To the proper left of the puṇnaghata, there is the camara (b), while faint traces of the ankusa (c) can be seen on the opposite side. Above this symbol there is a figure of the matsya (d). Since the matsya usually in these seals pairs with sankha, the hook like sign on the opposite side may be identified as a sankha (g). According to the placement of symbols in this seal, the most likely positions for the two remaining symbols bhadrapitha and svastika should be the empty spaces on either side of the pedestal on which the puṇnakambha is placed. But in this seal, this area to the left of the pedestal appears to be damaged, and the craftsman had on a second thought, depicted the two symbols concerned in the narrow spaces on either side' upper portion of srivatsa (Fig.5).

Seal VI of which I have seen only the line drawing presented in Dr. Hema Ratnayake's paper, 7 shows only a conspicuous puṇnaghata (h) displaying a large number of long strip-like leaves (Fig. 6). The puṇnaghata in all these seals shows only three lotus leaves or lotus buds issuing forth. It is very likely that the foliage like trappings issuing from this puṇnaghata are actually disintegrated, deformed or even inaccurately drawn symbols that once surrounded it. A comparison of Seals IV reproduced in the paper of the Director of the Jetavan Project, with the eye copy made by me of the seal concerned, clearly shows that the artist who drew it had unwittingly incorporated the Srivatsa symbol into the spray of foliage issuing from the vessel.^{7a} (Figs). In short it is evident that all these six seals depicted the

astamangala the Eight Auspicious Symbols. Hence forth in this paper these seals will be referred to as "Jetavana Astamangala".

3. Although the Eight Auspicious Symbols depicted in the Jetavana Ivory Seals are the same as those represented in the astamangala of the latter half of the Anuradhapura period, the two categories differ as regards the manner of displaying the symbols. The astamangala figures of this period were more or less consistently represented in association with the directions. The astamanagala symbols that adorned the octagonal monument at the Pacianatissapabbata Vihara, clearly proves that the Eight Auspicious Symbols were displayed in association with the directions in the following order: srivatsa - east, camara - southeast, ankusa - south, Matsya yugma - south - west, svastika - west, bhadrapiṭh - northwest, snakha - north and puṇnaghata - northeast.⁸ The iconographical accounts of Planetary deities (grahamandala) of the Sinhalese further confirm this directional association of the astmangala symbols.⁹ The Ruvanvalisaya astmanagala¹⁰ in addition to the Eight Auspicious Symbols, in the appropriate directions also displays the four beasts, the elephants, bulls, horses and the lions, in the four cardinal points of the compass, east, south, west and north respectively. All these symbols and figures of beasts are arranged around a large lotus confirming the fact that this relief represents the mythical lake Anavatapta, as described in Mahayana Sanskrit texts,¹¹ Pali commentaries of Buddhaghosa¹² and in Sinhala classics.¹³ Moreover, in depicting the astamangala symbols in association with the directions, the symbols either face or point at the directions concerned. This scheme has been observed even in the Kivulekada astamangala¹⁴ where the symbols have been depicted on the flat surface of a pillar planted in an upright position. On the other hand, the symbols depicted in the Jetavana astamangala seals were not associated with the directions. The placing of symbols was determined by principles of composition on either side of the axis formed by puṇnaghata and srivatsa a motif that was common to all Jetavana astamangala seals. The two pillar like symbols, ankusa and camara, were invariably represented on either side of this axis. where ever possible the symbols in the two pairs, matsya and snakha, and svastika and bhadrapiṭh, were represented in heraldic opposition (Figs. 1 and 2). In short each one of the four seals that exhibit all the eight symbols, presents a different pattern (Figs. 1 to 5). However, this does not mean that their representation in these seals is devoid of any meaningful order. As it will be shown in the sequel the manner of representing the key symbols in these seals is as meaningful as the astamangalas associated with directions and the

Anavatapta concept.

A perusal of the five seals I to V, clearly shows that the srivatsa symbol is invariably represented above the puṇnaghata (Figs.1 to 5). As already stated these two symbols form the axis on either side of which the remaining six symbols are represented. In the depiction of the symbols each one is shown in upright position facing the viewer. Now this scheme of representing the eight auspicious symbols reminds us of another group of astamangala mentioned in Manasara (5th cent. A.C), a Sanskrit manual on art and architecture. According to this authority, the astamangala should be represented in the following order:

"... The srivatsa mark should be made in the middle and below that a full pithar (puṇnaghata). On the side should be chowry (camara) and lamp (dipa) and umbrella (chatra) be on the top. The mirror (darpana) should be fixed on the right, while the conch (sankha) and the cross like svastika figure on the left".¹⁵

The Figure 7 is a conjectural reconstruction of the Manasara astamangala and a comparison of this figure with the Jetavana astamangala seals clearly shows that the srivatsa symbol is represented in a central position and the puṇnaghata below the former symbol in all these examples. In other words Jetavana astamangala can be described as a variation of Manasara astamangala or vice versa.

Although Manasara astamangala in all its details as such has not been represented in any known work, there are instances in Indian¹⁶ and Sinhalese¹⁷ art where srivatsa has been represented above a puṇnaghata. (Figs. 8 and 10).

The discovery of Jetavana astmangala seals is an important land mark in the history of astmangala - nay the history of art - not only that of Sri Lanka but also that of India and Southeast Asia. The two traditions the Buddhist and Hindu, represented by Jetavana astamangala and Manasara astamangala respectively, differ from each other only in a few neglegible details. The ankusa, matsya and bhadrapith of the Jetavana astamangala have been replaced by the chatra (Umbrella), adasa (mirror) and the dipa (lamp) in the Manasara astamangala. Where as the Manasara astamangala account specifically mentions the position, each symbol should occupy in the scheme of its arrangement, the Jetavana

astamangala depicts only the two key symbols, the srivatsa and the purnaghata as stated in the Manasara.

It is now well known that the srivatsa is an aniconic representation of Sri the goddess of beauty and prosperity.¹⁸ When the srivatsa symbols in the Manasara and the Jetavana astamangalas are replaced by a figure of Sri, there appears before the viewer a representation of Sri surrounded by the remaining symbols, which are in fact her emblems. As such both Manasara and Jetavana astmangalas can be considered as aniconic representations of Sri in her full glory emerging from the lotus lake (puskarani). (Fig. 9). In short like the Manasara astamangala, the Jetavan astmangala too represents the Sridevi theme in contrast to Ruvanvalisaya astamangala which is an aniconic representation of Anavatapta lake of the Buddhist accounts. Thus the ancient Sinhalese have known of the astamangalas that represented both Sri as well as Anavatapta concepts. As far as I am aware this is the only instance that this phenomena has been represented in such clear perceptible manner.

Of course in depicting the Sridevi theme in these seals the two elephants that flank the Sri figures of Sanchi¹⁹ and Barhut,²⁰ are not represented on either side of the srivatsa, the sign manual of Sri. But this motif, srivatsa flanked by two elephants is met with in a number of other artefacts. The Ruvanvalisaya astamangala relief depicts this motif as the eastern gate of the magic lake Anavatapta 21 (Fig. 11). A bronze plaque retrieved from a garbhapatra²² (yantragala) from Bunnehapola, too represents this motif in very elaborate form. The Oggomuva moonstone²³ displays not only the two elephants flanking the srivatsa, but also the purnakumbha below it. (Fig. 10). Again this motif too is found only in Sri Lanka. Thus the possibility of finding a Jetavana type astamangala with two elephants flanking the srivatsa cannot be ruled out.

4. I have shown elsewhere, that the development of the astamangala is closely associated with the myth recounting the origin of the world from the Cosmic lotus that arose from the primordial waters at the beginning of an aeon.²⁴ Sri (Padma, Kamala) the lotus goddess, described in Srisukta²⁵ and represented in plastic form in the art of Sanchi²⁶ and Barhut, is a personification of this cosmic lotus. Thus lotus is the earliest symbol of Sri. However, this does not mean that the lotus was used in place of Sri as an aniconic symbol. On the other hand it turned out to be her seat. She was the first divine being to be honoured with the lotus throne. Purnaghata, the

filled vessel, and chatra, the umbrella of sovereignty, were other ancient symbols associated with Sri. An early terra cotta figure of Sri from Mathura displays a pair of fish (matsya yugma) beside her.²⁷ A stone panel now in Madras Museum depicts a Sri figure flanked by two elephants in the centre and on either side of this motif, auspicious symbols such as svastika, purnaghata, dhaja, (flag), pataka (standard), bheri (drum) and ankusa are depicted.²⁸ However the most explicit Sri figure that displays this association of the astamangala with the Lotus Goddess, is the Bangkok artefact. In this stone plaque, on either side of the figure of Sri, two complete sets of astamangala are depicted.²⁹ Evidently these symbols have been represented in this manner as her emblems. Some of these symbols such as the umbrella, flyshisk, auspicious seat, mirror, and the lamp are her paraphernalia. The conch shell and the pair of fish are fertility symbols closely associated with the Sri concept. Svastika is an ancient symbol of general welfare. The purnakhambha (filled vessel) is symbolic of the primordial waters, the birth place of the cosmic lotus. Other astamangala items such as rocana (yellow pigment), candana (sandalwood paste), kumkuma (saffron) vardhamanaka (alamkara cunnam, powder box), mala (garland) etc., which enhance beauty are evidently things that are dear to the goddess of beauty. Thus there is ample evidence to show that the auspicious signs of various categories accumulated around the figure of Sridevi, which later developed into astamangala of different traditions.³⁰

Of all the symbols of the goddess, srivatsa was the only one that could be used in place of Sri figure. Buddhists, Hindus and Jains invariably included it in their lists of astamangalas.³¹ Kanya, (virgin),³² and divyangana (celestial maiden) mentioned in some astamangala lists too represent Sri. I have already pointed out that this srivatsa together with the purnghata below it (and sometimes as in Manasara the chatra above it) forms the axis on either side of which the other symbols of the astamangalas are arranged so as to represent the Sridevi theme.

Although Manasara astmangala explicitly expresses the Sridevi theme so far on representation of it in any form has been discovered. It is in this respect, the astamangala, depicted in the Jetavana Ivory Seals, comes to the fore front as the only material evidence to prove that the astamangala depicting Sridevi theme was not merely a vision of a writer, but an actual fact. As already mentioned, the creators of Jetavana astamangala have made use of the eight auspicious symbols mentioned in Manjusribhasita Vastuvidya Sastra --a form of astamangala that was specifically

confined to the early Buddhist art of the Sinhalese.

The Sridevi theme represented in Jetavana astamangala seems to have been prevalent from about the 3rd century A.C. to about 5th or 6th century. By about the 4th or 5th century A.C. the same set of symbols were used in an astamangala formation representing the eight directions as in Pacinatissapabbata Vihara astamangala (5th century A.C.) and in the Ruvanvalisaya astmanagala (circa 9th century A.C.). In contrast to the Jetavana astamangala, the Ruvanvalisaya astamangala in particular, shows that these eight symbols were depicted not only in association with the directions but also in representing a new concept, the Anavatapta theme.³³ In this scheme as depicted in the Ruvanvalisaya astamangala the large central lotus and the four species of beasts, two elephants in the east, two bulls in the south, two horses in the west and two lions in the north, clearly proves that this is a representation of the mythical lake Anavatapta. Moreover, the eight symbols, srivatsa, camara, ankusa, matsya yugma, svastika, bhadrapitha, sankha and the purnaghata have been depicted in the eight directions, east, southeast, south, southwest, west, northwest, north and northeast respectively, around a lotus rosette.

The development of the Anavatapta theme from the earlier Sridevi theme although appears to be a major change, it is not altogether a complete break from the earlier tradition. On the other hand it was a gradual and logical transformation of the earlier Sridevi theme. Analysis of the Jetavana astamangala shows that its theme, Sridevi (lotus goddess) image implies its association with the lotus and water. In short Jetavana astamangala depicts a lotus lake (puskarani) from which Sri (Padma, Kamala, Apsara) emerges. The attending symbols, purnaghata, sankha, and matsya yugma further enhance this supposition. All these concepts are present in the Ruvanvalisaya astamangala as well. I have already stated that this astamangala with its directional symbolism and the four beasts in the four cardinal points of the compass, represents the mythical lake Anavatapta. In this mandala type formation, at the eastern side, the Srivatsa is flanked by two elephants with their trunks raised up. This motif, as already stated is a representation of the Sridevi theme, which formed the main concept behind the Jetavana astamangala. Here, this device has been confined to the eastern gate of Anavatapta. Since East is the most important direction in Indian thought, the representation of Sridevi motif at the eastern gate of Anavatapta is significant. In other words the Ruvanvalisaya astamangala is a more elaborate version of the Sridevi theme.

This association of Sri with Anavatapta concept is not a mere accident, for there is literary evidence in support of it. For instance, according to Siri Kalakanni Jataka,³⁴ Siri (Sri) the daughter of Dhatarattha (Dhrtarastra) the regent of the east lived with Kalakanni the daughter of Virupapakkha (Virupaksa), the regent of the west. In this contest, Siri emerged the victor and she was awarded the right to bathe in the magic lake. It is specifically stated that the eastern gate of Anavatapta was allocated to her for this purpose. This Jataka story explains not only how Sri came to be associated with the mythical lake Anavatapta, but also why the two elephants that flank Sri are in the act of bathing her by pouring water over her with pots carried in their uplifted trunks. It also shows that the ancient Sri figures of Sanchi and Barhut as well as the aniconic representations of Sri in Manasara and Jetavana astamangalas too are prototypes of the Anavatapta lake motif. In short just as Sri theme is present in the Anavatapta lake represented by the Ruvanvalisaya astamangala, the Anavatapta theme is present in the Manasara and Jetavana astamangalas. The difference lies in the fact that the Jetavana astamangala emphasises the Sridevi theme, whereas the Ruvanvalisaya astamangala highlights the Anavatapta theme. Stylewise, the Jetavana astamangala is a vertical projection, representing the Sri theme, while the Ruvanvalisaya astamangala a "mandala" projection representing the Anavatapta theme.

Although, the Anavatapta concept associated with astamangalas is most explicitly expressed in the Ruvanvalisaya relief, other astamangalas such as the Weligama artefact of the latter period of Anuradhapura too reveal some aspects of this theme in varying degrees of success. One cardinal feature of the astamangala figures representing the Anavatapta theme, is the conspicuous lotus depicted in the centre of the mandala formed by the eight symbols in the eight directions. This lotus is a positive sign of the lake symbolism associated with these astmanagalas. In some as in the case of the Polonnaruva astamangala relief,³⁵ in place of the lotus sign, a saucer like depression (garbha) has been depicted and this feature, together with whatever objects deposited in it, represented the lake. In the Weligama astamangala³⁶ the lotus as well as the garbha features have been combined in an ingenious manner creating a 'louts lake' in plastic form. I have shown elsewhere, that the astamangala symbols arranged according to their directional association around a pillar, a pot, a stupa or a tree too represent this concept.³⁷ In short the bare astamangala figures, whether arranged in mandala form or not alone, are

sufficient to represent the Anavatapta theme.

After the Polonnaruva period the astamangala of the ancient Sinhalese ceased to be used in art and architecture. This was probably due to political and cultural changes that took place during this period. However, after a lapse of about seven or eight hundred years, this group of astamangala reappeared as the emblems (avi/ayudha) of the planetary deities (grahas) of the Sinhalese in temple and folk art. According to Bali texts (circa 18th century A.C.) of the Sinhalese, the eight planetary deities Rivi (Sun), Kivi (Venus), Kuja (Mars), Rahu (the Ascending node of the Moon), Senasuru (Saturn), Sandu (Moon), Buda (Mercury) and Guru (Jupiter) bear as their emblems, sirivasa (srivatsa), valvidunava (camara), ranakusa (ankusa), remasa (matsya yugma), nandavata (nandyavarta/svastika), badavelu (bhadrapiṭha), saka (sankha) and kalasa (purnaghata) respectively.³⁸ There is not the slightest doubt that these are the eight auspicious symbols of the Sinhalese of the Anuradhapura period. It appears that this ancient astamangala had been perpetuated in folk cults like the propitiation of the planetary deities, even during the latter half of the Anuradhapura period and during the Polonnaruva period. After the fall of the Polonnaruva, when this group of astmangala ceased to be used in art and architecture, the folk tradition continued uninterruptedly and when the Bali texts, particularly those describing the planetary deities were committed to writing during the 17th or 18th centuries, along with the iconographical details of the planetary deities, these astmangala symbols too happened to be recorded. However, by this time the Sinhalese had totally forgotten the fact that they had thus preserved the ancient astmangala that they had been using since the early centuries of the Christian era. Apart from the Manjusribhasita Vastuvidya Sastra, which mentions these eight symbols for the first time, this is the only other full record of this astamangala. Later in the latter half of the 19th century and early 20th century, navagraha mandalas as described in Bali texts were painted on the walls and ceilings of Buddhist temples.³⁹ They were also painted on wooden boards and papers for use in Navagraha pujas in devalayas.⁴⁰ In Bali Art this tradition is being continued to this day. In all these instances the planetary deities concerned are depicted as carrying these eight symbols in their hands.

As already stated the emblems of the eight planetary deities are not considered as astamangala by the Sinhalese. On the other hand geometric diagrams consisting of squares divided into nine compartments or its variation, eight cornered

diagrams are today referred to as "astamangala" (astamangala).⁴¹ These magical diagrams (Yantras) are also derived from the ancient astamangala. Such diagrammatic astamangalas drawn in connection with traditional rituals like the netramangallaya are very often incorporated with navagrahas, the latter indicated by bijakasaras, thus unwittingly implying the presence of the ancient astmangala. This brief sketch of the evolution of the astamangala in Sri Lanka clearly shows that the Sinhalese have preserved an uninterrupted tradition from the third century A.C. to the present day. No other culture group in the sub continent of India or in the adjacent lands, where the Indian civilization spread, can lay claim to an uninterrupted history of the astamangala - both literary and physical traditions-as the one the Sinhalese have preserved in Sri Lanka. Moreover, excepting Manasara astamangala and some illustrations of the Mahayana Buddhists of Tibet,⁴² the astamangala of all other traditions are "opaque" and their meanings cannot be elicited easily, although they too were originally associated with the cosmic lotus and Sri concept. On the other hand, the Sinhalese traditon has preserved practically all major phases of the evolution of the astamangala - to wit , Sri theme, Anavatapta theme, Grahamandala, and astamangala yantra-all of which are interconnected and betray their logical development from one theme to the other.

In this long process of evolution of the astamangala from the mythical stage to the material, visual forms, it has passed through several phases, and in this evolutionary process, Jetavana astamangala represents the first Major phase, namely, the Sri theme. In this sense it is unique, for it is the only astamangala depicting this Sri theme so far discovered. In fact it is the missing link in the evolutionary process of the astamangala, about which we knew of only through a literary source, Manasara.

5. There is considerable information as regards the purpose for which astamangala had been used at various times, in different traditions. According to one account astamangala should be used on all auspicious occasions such as pregnancy, marriage and all activities associated with the gods.⁴³ The Mahavasma mentions that the astamangalaika was used in adorning the relic chamber of the mahatupa⁴⁴ and the umbrella that was placed in the central hall of Lohapasada.⁴⁵ The Pacinatissapabbata Vihara⁴⁶ in Anuradhapura, and Natha Devalaya⁴⁷ in Kandy clearly demonstrate that the astamangalas were used in adorning the ancient shrines. Jaina temples too were adorned with astamangala.⁴⁸ The Sikhavalanda

Vinisa refers to the practice of adorning belts with the atamangala⁴⁹ Amavatura mentions that on the occasion Buddha attained Enlightenment, gods attended on him holding atamangala pela.⁵⁰ Ruvanvalisaya slab inscription of queen Lilvati refers to various offerings made to those who performed the netrapuja ceremony at which the use of the astamangala was part of the ritual⁵¹. The astamangala formed an important item in the ritual deposits of garbhapatras.⁵² In folk cults and rituals of the Sinhalese the astamangala yantraya is being used to this day. In contrast to these various uses of the astamangala, the Jetavana astamanglas show that they were used as seals to make impressions on clay or wax. The presence of holes on the conical backs of the seals, evidently meant for the seals to be attached to strings, proves this fact. In this connection it is pertinent to mention that a bell shaped copper seal bearing an ornamented srivatsa, had been recovered by the archaeologists of the Abhagiri Vihara Project.⁵³ This artefact too displays the identical hole on the back of the bell shaped seal.

There is evidence that seals bearing various devices had been used in ancient times for different purposes. But in this instance seals depicting astamangala, which in turn display Sri theme a cosmic symbol are of particular interest and significance. Sri in addition to her general character as the goddess of beauty and prosperity, is the very embodiment of regal power and glory. In as much as Sri is the consort of Visnu, ancients considered the anointed kings as wedded to Sri. She is supposed to adorn the bosom of a king⁵⁴, just as srivatsa the sign manual of Sri, adorns the bosom of Visnu.⁵⁵ This concept of kings marrying the goddess of wealth and prosperity and beauty is a universal one, and Ananda Coomaraswamy commenting on it says, "In just the same way the Indian goddess Sri (-Laksmi) is the personification of the right to rule ... and certainly so when the relationship is a marital one".⁵⁶ According to Satapatha Brahmana one of the attributes of Sri is the universal sovereignty.⁵⁷ As already mentioned the Manasara astamangala which too represents the Sri in her aniconic form in all her glory, is specifically referred to as adorning crowns of kings (sarvesam maulidesetu castamangala samyutam).⁵⁸ It is evident that the Manasara astamangala was represented as a medallion on the crown, just above the forehead, expressing the sovereignty of the monarch. Crowns and headgears of divinities of the Hindus and the Buddhists, clearly depict medallions containing emblematic figures and symbols as mentioned in Manasara.

The depiction of Sri theme on the crown of a king as mentioned in Manasara,

is reminiscent of a legend recounted in Mahabharata concerning the origin of Sri from the forehead of Visnu. It says, "At that time a golden lotus came into being from the forehead of Visnu, wherefrom was born Sri, the consort of Dharma. From Sri by union with Dharma, O, Pandava was born Artha. Therefore, in kingship are established Dharma as well as Artha and Sri."⁵⁹ This myth, not only confirms the fact that Sri is emblematic of sovereignty, but also establishes the appropriateness of depicting the Sri theme on the crown of a king. Since astamangala which is intricically connected to Sri, is a cosmic symbol, the depiction of this composite symbol on a crown, shows that kings were considered as "wearing cosmos on their heads". Ananda Coomaraswamy says that this concept is a universal one.⁶⁰ Thus there is positive evidence that Manasara astamangala, which is the closest equivalent to Jetavan astamangala, has been intended as an emblem of sovereignty.

There is evidence that ancient astmangalas of the Sinhalese, as well as the Sri figures, have been employed by the Sinhalese kings as symbols of sovereignty. The astamangala represented on the royal edict (attani pillar) or Kivulekada, of Sena I (850 A.C.) is the earliest example of the astamangala used as a royal emblem.⁶¹ In another inscription srivatsa the sign manual of Sri flanked by two elephants has been represented as an abridged version of an astamangala.⁶² The Sri (Laksmi) figures incorporated in Galpota inscription of Nissankamalla are a later example of the same device in anthropomorphic form.⁶³ The two Sri figures adorning the golden throne of Sri Wickramarajasingha, the last king of the Sinhalese, is by far the finest and most explicit example of Sri as a Royal emblem of the Sinhalese kings. It is well known that kings of the later medieval period, used the letter 'Sri' as a royal sign in their documents.⁶⁴

The above citations confirming the intimate connection between the astamangala and a sovereignty, is further vouchsafed by the fact Sri and Anavatapta concept, both of which are of cognate origin, are intrinsically associated with the concept of abhiseka, the consecration of a king. Sri who is aniconically represented by Manasara/Jetavana astamangalas, is depicted in her classical form in the reliefs of Sanchi and Barhut. In these reliefs she is shown as being anointed with heavenly waters by the diggajas, the elephants of the quarters. This theme as I have already pointed out is incorporated in the Ruvanvalisaya astamangala, in this instance representing the eastern elephant gate of the mythical lake Anavatapta. here Sri is represented by srivatsa flanked by two elephants, in the act of sprinkling water over

the symbol exactly as in the Sri motifs of Sanchi and Barhut. According to myths associated with the Anavatapta, it is through this gate or elephant-head gargoyle that the river Ganges, the holiest river in India flows forth. The Ruvanvalisaya astamangala clearly demonstrates that it is the stream of water which anointed Sri that gave rise to the river Ganges. This is an important factor for it is the waters of Anavatapta and Ganges that were used in the consecration of ancient kings. The Mahavamsa gives the classical example of this practice, when it mentions that emperor Asoka sent waters of Anavatapta and river Ganges for the second consecration of king Devanampiyatissa of Sri Lanka.⁶⁵ Thailand has perpetuated this tradition till recent times. It is said that at the ceremonies attending the investiture of king Chulalongkorn, a symbolic representation of Anavatapta together with world mountain Meru, was made and the monarch was anointed at the four animal head gargoyles of the magic lake.⁶⁶

The above account bears ample evidence in support of the view that Sri motif and its related concepts such as Anavatapta and sacred Ganges, were directly associated with sovereignty. Moreover, in Sri Lanka we have had a long tradition in which Srivatsa, astamangala and Sri figure were actually used by kings as their royal emblems. Hence it is quit pertinent to consider these unique seals as those of the royalty. In Mahayana Buddhist art astamangala is very often associated with the saptaratna, the Seven Ideal Possessions of a Universal Monarch.⁶⁷ Moreover, Mahayana texts refer to astamangala and saptaratna as the emblems of the spiritual ruler Tathagata,⁶⁸ they are very often offered to the Blessed One as votive offerings (pujabhanda). In the garbhapatras of the Buddhist shrines of Sri Lanka, astamangalas along with saptaratna were deposited as ritual objects.⁶⁹ Hence, these seals symbolising the sovereignty were probably deposited under in the Northern ayaka of Jetavana stupa as fitting offerings to the Buddha, the Universal Monarch of the law (saddharmacakravarti).

6. In conclusion it can be said that the Jetavana astamangala seals are important in a number of ways. With the discovery of these seals at the Jetavana stupa, all the three Colossal stupas of Anuradhapura, have come to possess astamangalas unique in their own way. For instance, although very few are aware, it was at the premises of the Ruvanvalisaya that the finest example of astamangala depicting the Anavatapta theme, was discovered.⁷⁰ The archaeologists of the Abhayagiri Vihara Project too recently discovered a bowl (patra) adorned with the astamangala. This

astamangala of Abhayagiriya is unique in its own way for it is the only bowl adorned with this device, discovered so far. Now, with the discovery of Jetavana ivory seals representing Sri theme, the Jetavana fraternity too is blessed with an astamangala, unique in every sense of the word. Like the Ruvanvalisaya astamangala, the Jetavana astamangala too plays a very significant role in the evolution of the astamangala. As the only one depicting the Sri theme, it covers the first major phase in the evolution of this ancient device. Also, with its discovery, the beginnings of astamangala in Sri Lanka can be traced to at least third century A.C. In other words, in Sri Lanka all major phases of the evolution of the astamangala from the cosmic lotus to the astamangala yantra, can be traced in an uninterrupted sequence. Moreover, Jetavana astamangala is the nearest equivalent to Manasara astamangala, and as such, it has a definite place in the history of art in India as well. As a manifestation of Sri it is rich in symbolic value, particularly as the symbol of universal sovereignty. Thus it was one of the cherished emblems of an anointed monarch.

ACKNOWLEDGEMENTS

I am greatly indebted to Dr. Hema Ratnayake, Director of the Jetavana Vihara Project, Anuradhapura, (UNESCO - Sri Lanka Cultural Triangle), for very graciously granting me permission to study these ivory seals. My thanks also go to Mr. T. K. Nimal P. de Silva, Lecturer in Architecture, University of Moratuwa, and Dr. (Miss) Martha Prickett of the Institute of Fundamental Studies, Hantana, Kandy. They were extremely helpful to me in many ways.

NOTES

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ILLUSTRATIONS

PLATE I. Jetavana Irory Seals

Fig. 1. Seal I. Ref. $\frac{1}{N / AY} / 73$ (Pl. 5. Fig. 6)

Dimensions -- Vert : 1.5 mm.
Horiz : 1.7 mm

Fig. 2 SEal II: Ref. Not available (Pl. 5. Fig. 3)

Dimensions -- Vert : 2.2 mm
Horiz : 2.1 mm

Fig.3. Seal III: Ref. $\frac{316}{N / AY}$ (Pl. 5. Fig. 4)

Dimensions -- Vert : 2 mm
Horiz : 2 mm

Fig. 4. Seal IV : Ref. $\frac{1/318 A}{N / AY}$ (Pl. 5. Fig. 7)

Dimensions -- Vert : 1.7 mm
Horiz : 1.8 mm

Fig. 5. Seal V : Ref. $\frac{A - 89}{A / AY}$ (Pl. 5. Fig. 2)

Dimensions -- Vert : 2.3 mm
Horiz : 2 mm

Fig. 6. Seal VI: Ref. $\frac{1}{N / AY} / 340$ (Pl. 5. Fig. 8)

Dimensions -- Not available.

Reference given here are to the illustrations appearing in Dr. Hema Ratnayake's paper on "Early Ivories from Jetavana".

Identification of symbols: (a) Srivatsa, (b) camara, (c) ankusa, (d) matsya or matsya yugma, (e) svastika, (f) bhadrapitha, (g) sankha, and (h) purnaghata.

Figs. I to 5 are eye copies of the Jetavana seals by the author.
Fig. 6 is after Hema Ratnayake.

PLATE II. Fig. 7. Manasara Astamangala - A conjectural reconstruction based on the account given in Mahasara.

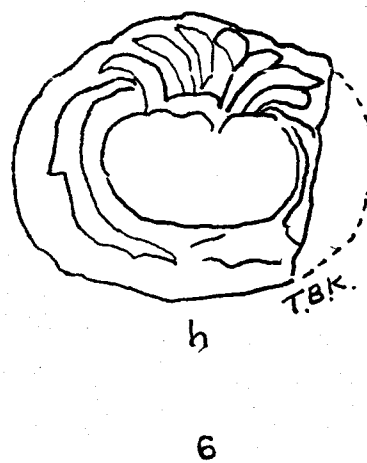
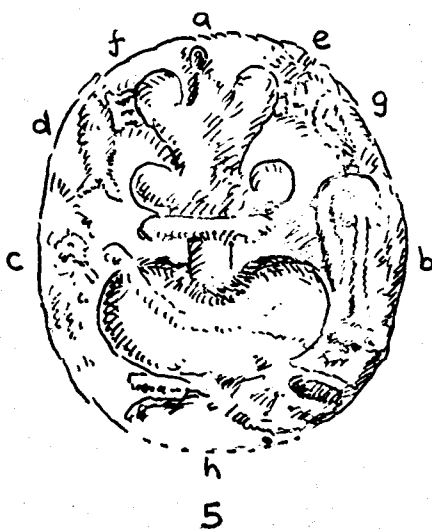
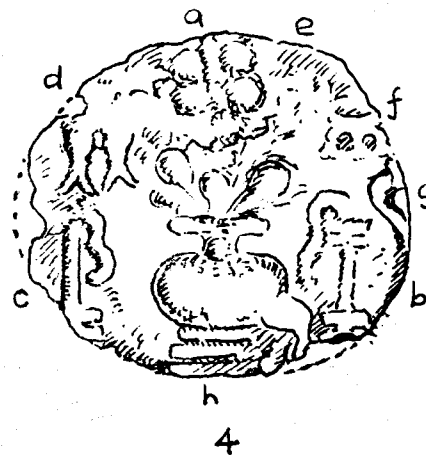
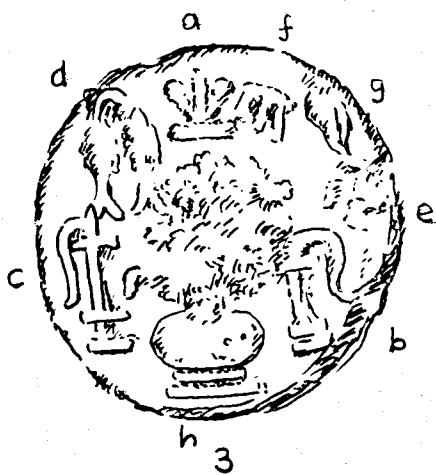
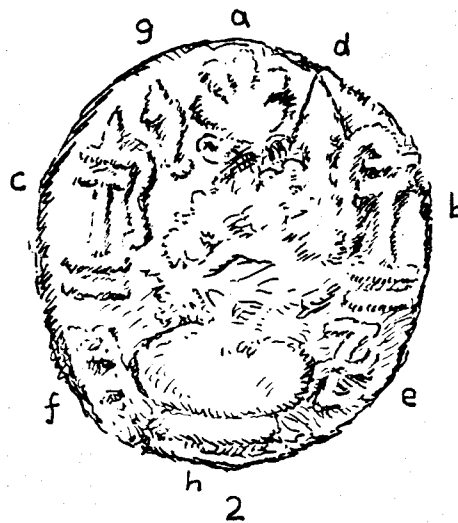
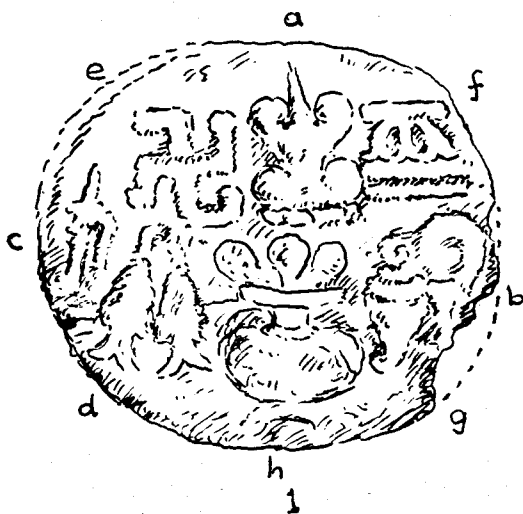
Fig. 8. Sanchi medallion showing srivatsa above purnaghata (Circa 2nd century A.C.) After Marshall et al, Monuments of Sanchi.

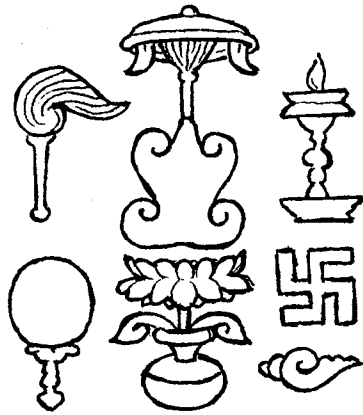
Fig. 9. Sri from Sanchi (Circa 2nd Century A.C.)

Fig. 10 Detail from Oggomuva moonstone showing srivatsa flanked by two elephants emerging from a purnaghata.

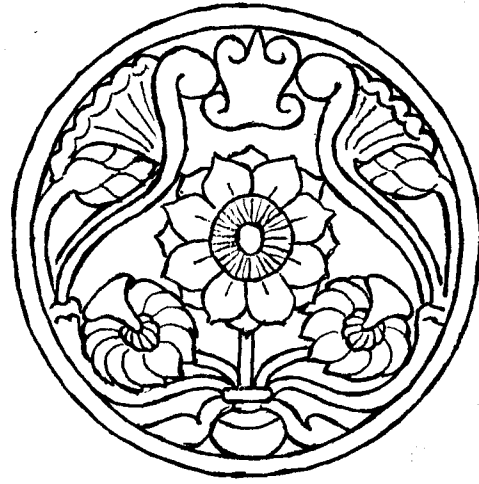
PLATE III. Fig. II. Ruvanvalisaya astamangala -- Damaged portions reconstructed in broken lines.

Chart 1. : Chronological chart showing the place Jetavana astamangala occupies in the evolution of the astamangala.





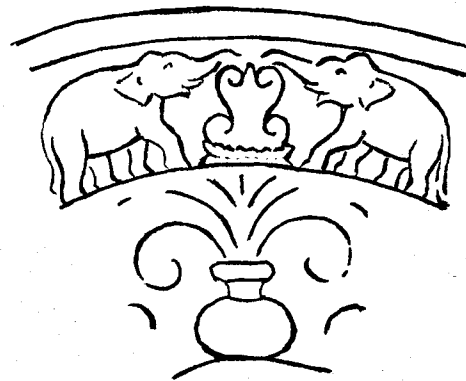
7



8

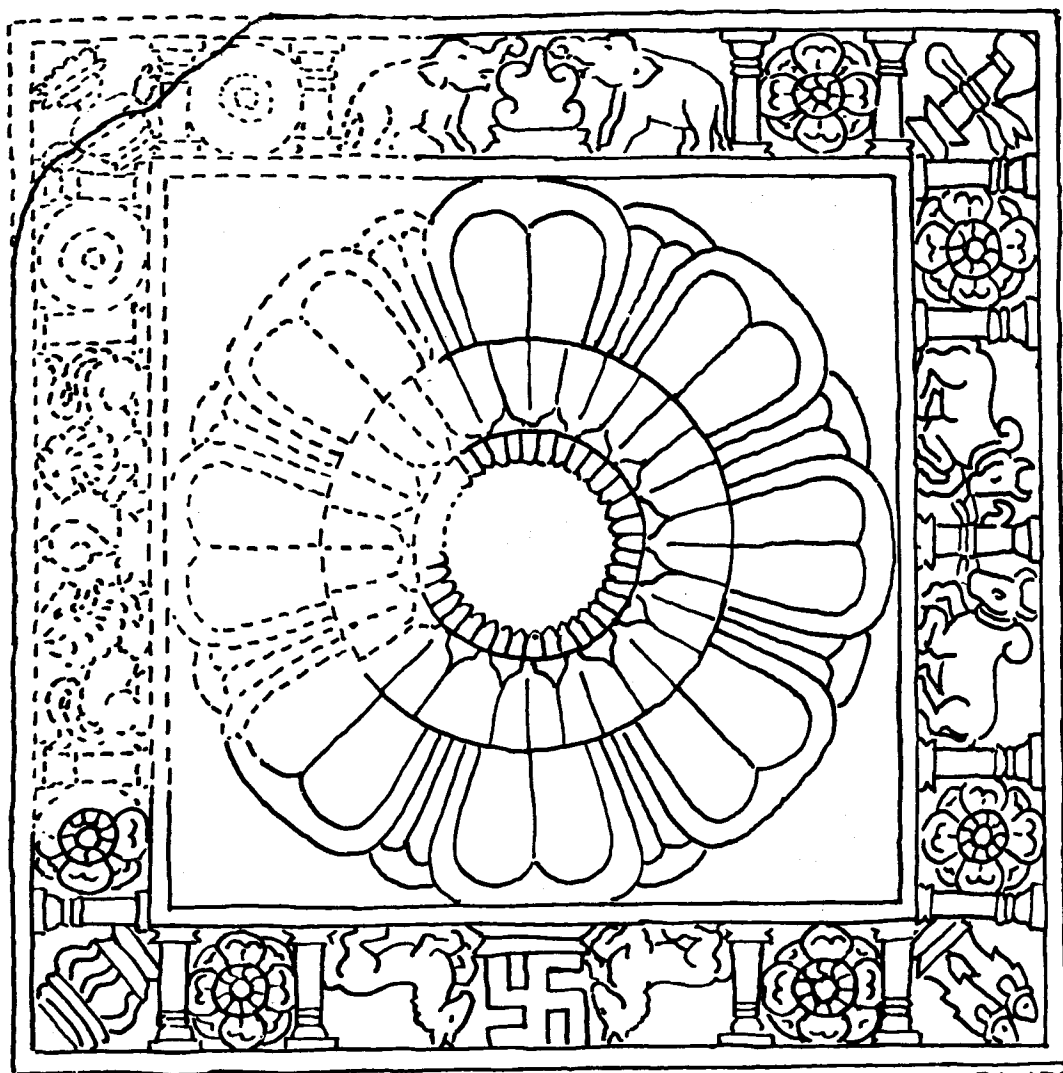


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Pl. II



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Pl. III

CHRONOLOGICAL CHART SHOWING THE PLACE JETAVANA ASTAMANGALA
OCCUPIES IN THE EVOLUTION OF THE ASTAMANGALA

Mythical Stage:
Srisukta, Epics,
Puranas, Jatakas etc.

Cosmic Waters
and
Cosmic Lotus

Circa 5th cent. B.C.
to
1st or 2nd cent. A.C.

Formative Stage of
Astamangala:

Sri
the Lotus Goddess
and her symbols

Circa 3rd cent. B.C.
to
2nd cent. A.C.

Astamangala Stage I:
Jetavana A.M. and
Manasara A.M

Astamangala
depicting Sri theme

Circa 2nd cent. A.C.
to
4th cent. A.C.

Astamangala Stage II:
Ruvanvalisaya A.M.,
Weligama A.M., etc.

Astamangala
depicting Anavatapta
theme

Circa 5th cent. A.C.
to
12th cent. A.C.

Astamangala Stage III:
Astamangala as weapons
of Planetary deities

Astamangala
associated with the
Grahamandala
of the Sinhalese

Circa 12th cent. A.C.
to
20th cent. A.C.

Astamangala Stage IV:
Diagrammatic form
of astamangala

Astamangala Yantra

Circa 17th cent. A.C.
to
20th cent. A.C.

PALAEOLITHIC PHASE IN INDIA

By

V.N.Misra

INTRODUCTION

Palaeolithic research in India has a respectable antiquity, having begun as early as 1963 when Robert Bruce Foote discovered the first palaeolith at Pallavaram near Madras. During four decades of his geological surveys Bruce Foote discovered a large number of Palaeolithic sites in different parts of peninsular India. He maintained a careful record of his finds and their geological context and published them in two well illustrated volumes which contain valuable insights into the functions of the artefacts and the life of their makers (Foote 1914, 1916). Foote's example inspired a few other geologists and civil servants to look for Palaeolithic remains in other parts of the country. However, until as late as 1930 Palaeolithic research was conducted almost entirely by a small number of amateurs. Although many sites of different stages of the Palaeolithic age were discovered from many parts of the country during this early period, the data collected were geographically patchy and quantitatively limited.

The first systematic and interdisciplinary study was conducted by de Terra and Paterson in the valleys of the rivers Sohan, a tributary of the Indus, Narmada, and Kortalar along the coast near Madras in 1935 (de Terra and Paterson 1939). Another notable piece of research during this early phase was the excavation of Acheulian sites in laterite deposits in Orissa by N.K. Bose and D. Sen in the late thirties of this century (Bose and Sen 1948). In the early forties H. D. Sankalia opened a new phase of Palaeolithic research by following up the clues provided by Foote in Gujarat (Sankalia 1946) and initiating similar work in Maharashtra.

However, it is only during the post-Independence period that Palaeolithic research acquired an institutional footing. During thirty-five years of his active career at the Deccan College Sankalia trained a large number of students who carried out extensive and systematic surveys in different parts of the country and brought out evidence of Palaeolithic occupation in them. During this phase anthropology and archaeology departments in a number of universities also initiated

stone age research. The Prehistory Branch of the Archaeological Survey of India and several foreign institutions have also been actively engaged in Palaeolithic research. Even then considering the size of the country the number of active researchers is still quite small, and much more work is needed to build a comprehensive picture of the life and environment of Palaeolithic societies.

Until about 1970 almost all Palaeolithic research was in the nature of explorations aimed at locating new sites and their geological contexts. They were almost entirely confined to search for archaeological material in secondary contexts like river gravels and river beds. The cultural material obtained from such sites was often mixed in time and space and therefore had limited value for understanding the nature of original artefact assemblages, their technological evolution, the ecological context of the occupation sites, and their age.

During last two decades, however, emphasis has shifted to the investigation of relatively undisturbed or primary context sites. A number of sites, specially of the Lower Palaeolithic or Acheulian stage, have been excavated. The visits to India of F. E. Zeuner in 1949 and 1960, and his expeditions to several areas helped train young prehistorians and create an awareness of the importance of environmental archaeology (Zeuner 1950, 1963). In recent decades expertise has developed in the fields of Quaternary geology, sedimentology, palaeontology and palaeobotany which has helped in carrying out interdisciplinary projects. It has become possible now to reconstruct at least in some areas Palaeolithic environments and settlement patterns. Unfortunately, on most sites, specially those in relatively primary context, faunal material has either not been preserved or preserved in very limited quantities and fragmentary condition. Consequently while we have some idea of the animal life of the Pleistocene period in some areas, we know little about the animals hunted by man, the hunting techniques used by him, and his diet. Also, with the singular exception of a skull cap recently found in a secondary context in the Narmada valley, there have been no finds of hominid fossils. And so we know nothing of the biological populations associated with different industrial complexes or about the practices of disposal of the dead.

Several other positive factors have contributed to a better understanding of the Palaeolithic cultures and environments. The development of facilities for absolute dating has helped in knowing at least the approximate ages of different

cultural stages of the Palaeolithic. There is a growing awareness and use of the present-day ecological data and ethnographic information of surviving hunter-gatherer societies for reconstructing Palaeolithic environments and behaviour patterns. The formation of Indian Archaeological Society in 1966 and the Indian Society for Prehistoric and Quaternary Studies in 1976, their annual conferences, and their journals, *Puratattva* and *Man and Environment*, respectively have provided forums for exchange of information and ideas.

What follows below is a synthesis of our current understanding of the various phases of the Palaeolithic period in India.

THE EMERGENCE OF MAN

Palaeoanthropological research during the last three decades overwhelmingly shows that the transition from an anthropoid to the hominid stage took place in Africa. The earliest hominids - Australopithecines and *Homo habilis* - dating from 4 to 2 million years ago were confined to Africa. It was *Homo erectus*, who appeared sometime between 2 and 1.5 million years ago, who colonised the warmer parts of Europe and Asia. Archaeologists have christened the culture of this hominid Acheulian after the type locality of St. Acheul in France. Many fossil finds and a few absolute dates suggest that by at least a million years ago *Homo erectus* was well established in Java and not long afterwards in north China. He could have reached these lands only by traversing the Indian sub-continent. However, neither fossils nor cultural remains of this early date have so far been found anywhere in India. This is probably because the Early Pleistocene geological deposits which could contain such remains have not been preserved in peninsular India, or where they may be preserved as, for example, in the Narmada valley, they are deeply buried, thereby precluding investigation. Recently, British archaeologists have reported late Pliocene age artefacts from the Siwalik Hills at Riwat, near Rawalpindi in Pakistan. The artefacts, comprising simple cores and flakes, come from a conglomerate deposit and are associated with naturally fractured pieces. They are dated to two million years on the basis of magnetic polarity stratigraphy (Rendell *et al.* 1987; Dennel *et al.* 1988). The discovery, though highly exciting, stands for the present in a spatial and temporal isolation. It needs corroboration from more finds of artefacts of unequivocal human workmanship and firm stratigraphical context.

THE EARLIEST HUMAN OCCUPATION : LOWER PALAEOLITHIC

The earliest human occupation of India known to us at present belongs to the Lower Palaeolithic stage of prehistory. Two cultures or technological traditions are known from this stage. These are:

- (1) the Sohanian, represented by pebble tools (choppers and chopping tools), flakes and cores, and
- (2) the Acheulian, represented by bifaces (handaxes and cleavers), pebble tools, a variety of scrapers, flakes, blades, and cores.

SOHANIAN CULTURE

The Sohanian is known only from the Siwalik Hills in northwest India and Pakistan (Fig 1). Half-a-century ago de Terra and Paterson (1939) reported Early Sohan tools from Terrace 1 (T1) of the Sohan river (a tributary of the Indus river) cut into the Boulder Conglomerate of Second Glacial Age in the Potwar plateau of Pakistan. They also found Acheulian tools on the same deposit, though at discrete localities. They dated T1 to the Second Interglacial age in the four-fold scheme of Pleistocene glaciation that they had proposed for the Himalayas. The faunal remains from this deposit included the horse, buffalo, straight-tusked elephant and hippopotamus, suggesting an environment characterized by perennial water sources, tree vegetation and grass steppes. Younger deposits showed the Sohan industry to have evolved over time. T2, with gravel at the base and loess on top, and dating to the Third Glacial period, yielded Acheulian and Late Sohan A industries from the basal gravels. Late Sohan A comprised refined pebble choppers and Levallois flakes. The overlying loess of the same terrace produced the Late Sohan B industry, characterized by Levallois flakes and blades and by the complete absence of Acheulian elements. The fauna of this horizon included horse, bovids, camel and wolf (Wadia 1928: 287).

Many archaeologists have found it difficult to accept the coexistence of two distinct technological traditions in close proximity without any influence on each other. Recent research in the area by the British Archaeological Mission to Pakistan

has shown de Terra and Paterson's geological, climatic and archaeological sequences to be completely untenable. The Sohan terraces turn out to be erosional features rather than true depositional terraces. As the archaeological material found by de Terra and Paterson all came from the surface, it cannot be associated with any specific deposit nor for the same reason can it be dated. The Mission members were unable to corroborate the existence of an independent Sohanian technological tradition though they found artefacts of Acheulian and other traditions (Allchin 1981; Dennell *et al.* 1988).

However, geological and archaeological findings on the Indian side appear to conform with de Terra and Paterson's observations in Pakistan. Five terraces similar to those of the Indus-Sohan in the Potwar region have been recognized in the valleys of the Sutlej, Beas, Banganga and other rivers in the Punjab-Himachal Pradesh region. Pebble tools of Sohanian style have been collected on the older of these terraces (Lal 1956; Karir 1985). Mohapatra (1976) who has discovered both Sohanian and Acheulian sites in the Hoshiarpur-Chandigarh sector of the Siwalik hills has argued that the Acheulian and sohanian populations inhabited two distinct types of environment, the former occupying the flat surfaces of the Siwalik Frontal Range and the latter the *duns* or valleys of the *Himalayan* flnak.

As the archaeological material in the Siwaliks has so far been found almost entirely on the surface, it is not easy to date it accurately. Mohapatra (1976, 1990), using several sets of magnetic polarity data from the Upper Siwalik beds of both India and Pakistan, has tried tentatively to date the two sets of Palaeolithic industries. The Sohanian tradition, according to him, appeared in the Mindel-Riss Interglacial (300 - 400,000 B.P.) and continued evolving up to the end of the Pleistocene. The Acheulian tradition, on the other hand, cannot be older than 200,000 B.P. because it is only around this time that the range became sufficiently stable to support human population.

Occasional claims have been made for the existence of a pre-Acheulian Sohanian tradition in peninsular India (Khatri 1962a; Jayaswal 1982: 57-83; Armand 1983) but they remain to be substantiated by unequivocal stratigraphic evidence.

ACHEULIAN CULTURE

The first effective colonisation of the country was achieved by the makers of the Acheulian culture. The archaeological remains of this culture, almost entirely in the form of stone tools, have been found extensively from the Siwalik Hills in the north to near Madras in peninsular India (Misra 1987b). The only areas devoid of Acheulian occupation are the Western Ghats and the coastal region running parallel to them (Guzder 1980), northeast India, and the Ganga plains. Claims for Acheulian finds in the Garo Hills in Meghalaya (T.C. Sharma 1974) need to be confirmed by the discovery of such tools in stratified context and without the admixture of later tools. Heavy rainfall and dense vegetation probably inhibited early man from colonising the Western Ghats region and northeast India. Elsewhere in the Old world too early hominids avoided dense tropical forests. In the case of the Ganga valley, the non-availability of stone - the basic raw material for making tools - may have been responsible for man avoiding this region. Alternatively, if Acheulian sites existed here in the past, they may lie buried deep in the alluvium (Fig.1)

Acheulian hunter-gatherer populations were adapted to a wide variety of ecozones. Their cultural remains have been found in semi-arid western Rajasthan (Gaillard *et al.* 1983, 1985; Misra and Rajaguru 1986; Misra *et al.* 1982), the Mewar plain (Misra 1967), Saurashtra (Sankalia 1965; S. Chakrabarti 1978; Marathe 1981), the Gujarat alluvial plain (Sankalia 1946; Wainwright 1964), in the sub-humid dry as well as the moist deciduous woodland zones of central India (Krishnaswami and Soundara Rajan 1951; Khatri 1958, 1961; Sen and Ghosh 1963; R. Singh 1965; Ahmed 1966; G. R. Sharma 1973; Jacobson 1970, 1975, 1976, 1985; Wakankar 1973, 1975; Misra 1978; Semans 1981; Pant 1982; Kenoyer and Pal 1983; Sharma and Clark 1983; Supekar 1968, 1985; Mishra 1986; Pandey 1987;), the Deccan plateau (Joshi 1955; Sankalia 1952, 1956; Corvinus 1981, 1983; Paddayya 1968, 1982; Pappu 1974; Korisettar 1979; Kale *et al.* 1986), Chota Nagpur plateau (Bose and Sen 1948; Mohapatra 1962; Ghosh 1970), and the Eastern Ghats and the southeast coast (Soundara Rajan 1952; Isaac 1960; Murty 1966, 1981; S.N. Rao 1968; K. T. Reddy 1968; V. R. Reddy 1968; V. V. M. Rao 1979; Jayaraj 1983; Raju 1983, 1985b).

Acheulian sites are particularly densely concentrated and are richer in central India and the southern Eastern Ghats. Both these regions today receive adequate rainfall, have a thick vegetation cover, and are rich in wild plant and animal food resources (Nagar 1983, 1985; Murty 1985a; Vishnu-Mittre 1985; Schaller 1967).

Chemical analysis of sediments from Bhimbetka shelters in central India suggests that conditions in the past were as humid, if not more humid, than they are today. Both plant and animal life must therefore have been abundant. Fossil faunal evidence from the alluvium of the Narmada, Godavari and their tributaries supports this inference. On the northern Deccan plateau sites are comparatively sparse. A plausible explanation for this phenomenon is that basalt which was the only rock used for tool-making in this region is highly susceptible to disintegration by weathering. Thus many or most of the Acheulian sites that did not get buried under the alluvium soon after their use may have been totally destroyed by weathering (Mishra 1982).

Within these broad zones the Acheulian people occupied a variety of microhabitats. In western Rajasthan the discovery of sites buried in finegrained alluvium around Didwana in Nagaur district suggests that the Acheulian hunter-gatherers camped along lakes and pools in wide flood plains of shallow meandering streams (pl.Ib). In addition they also camped on stable dune surfaces (Fig 3) and on extensively exposed gravel beds (pl. Ia) (Misra *et. al.* 1982; Misra and Rajaguru 1986). In the Vindhya Hills region of central India, where natural rock shelters abound, some of them were occupied by Acheulian groups (Joshi 1978; Wakankar 1975; Misra 1978)(pl. Ila-b) At Bhimbetka, one shelter, III.F-23, revealed a 2.5 m thick Acheulian occupation without any perceptible break. A few other shelters produced evidence of only short-term occupation. Today there are perennial water springs at Bhimbetka which are the only source of water for human as well as animal populations - both domestic and wild. If these springs were also active during the Pleistocene, occupation of the shelters would have been possible throughout the year. However, stone tool industries found in the rock shelters and nearby open-air sites, as at Barkhera near Bhimbetka and Putli Karar area (Jacobson 1985), both in the Raisen district, are so closely similar as to be the work of one and the same people. It would appear that these two locations represent seasonal camping places of the same populations, the rock shelters being used during the rainy season and the open-air sites during the winter months. Over most of the country, however, the hunter-gatherers lived in the open, along perennial as well as seasonal streams. In the latter context the occupation probably took place only during the rainy season and early winter months when water would have been available in the streams and local pools. During the summer months, when water in seasonal streams and pools dried up, all human groups must have been forced to

congregate along perennial rivers.

Direct evidence for ecological conditions during the Acheulian period is limited. Because of its low elevation and relative closeness to the Equator the Peninsula was outside the zone of glaciation. However, the regions immediately to the south of the Himalayas did experience the impact of Quaternary climatic changes. Our best evidence of climatic changes and human responses to them during the Quaternary period comes from the semiarid zone of Rajasthan (Misra 1987a; Misra and Rajaguru 1986). In the drainageless sandy plains of western Rajasthan mighty streams which must have had their origin in the Himalayas existed during the Early Pleistocene. These streams laid down extensive and thick boulder beds in the Nagaur and Jodhpur districts. There is no evidence that man was present in the area during this period. Subsequently the gravel beds were tectonically uplifted and the landscape rejuvenated. The new streams that came into existence were of shallow, anastomosing type, flowing in wide flood plains marked with numerous pools and lakes. They deposited marls and calcareous clays in pans or shallow depressions. Acheulian artefacts in mint condition are found buried in these marly deposits as in the Didwana region (Gaillard *et al.* 1983, 1985; Misra and Rajaguru 1986) suggesting that their makers camped along the pools and lakes in the flood plains. They also camped on widely exposed gravel beds where an unlimited supply of fine-grained quartzite for making tools must have been a strong attraction. The climate during this period was essentially semi-arid but it fluctuated several times between cool and dry on the one hand and warm and wet on the other. During cool and dry phases extensive and thick deposition of sand sheets and sand dunes took place, while during wet and humid phases the dunes were stabilized. Acheulian groups occupied stable dune surfaces. While no faunal or plant remains have survived in fluvial and aeolian sediments, the density of Acheulian sites around Didwana strongly implies that plant and animal life must have flourished in abundance.

For peninsular India, some idea of the Acheulian man's environment is provided by the fluvial deposits. Acheulian artefacts here are usually found buried in bouldery and pebbly gravels of the Son, Chambal, Narmada, Godavari and other rivers and their tributaries. These gravels are believed to have been deposited in a semi-arid climate with intermittent, erratic rainfall and sparse to absent plant cover (Williams and Royce 1983). These gravels are invariably covered by fine silts and

silty clays which are usually devoid of archaeological material. But this situation is almost certainly due to the fact that such sediments were deposited by low energy streams which were unable to carry coarser material including stone artefacts. Acheulian occupations contemporary with the deposition of fine sediments have to be searched for outside fluvial deposits. Numerous surface Acheulian sites found in central India and the Eastern Ghats are probably such occurrences. Faunal remains have been preserved in Acheulian bearing gravels in some of the peninsular rivers. The Lower Group of the Narmada stratigraphy which has yielded Acheulian tools contains fossils of *Sus namadicus*, *Bos namadicus*, *Elephas hysudricus*, *Equus namadicus*, *Hexaprotodon namadicus*, *Stegodon insignis-ganesa* which are all believed to be of Middle Pleistocene age (de Terra and Paterson 1939; Badam 1979, 1984). The coarse gravel unit of the Pravara river, a tributary of the Godavari has yielded fossils of *Bos namadicus*, *Equus namadicus* and *Elephas namadicus* as well as pieces of fossilized tree trunks and branches in association with Acheulian assemblages (Corvinus 1981). These animals indicate the existence of both forest and open grassland environments and the availability of plentiful water round the year. There is little doubt that all these animals formed a source of food for Acheulian populations but whether they were hunted or scavenged or exploited in both these ways can be ascertained only when faunal remains are found in association with undisturbed occupation sites. AT the moment such occurrences are conspicuous by their absence.

Acheulian tool assemblages comprise choppers, chopping tools, polyhedrons, spheroids, discoids, handaxes, cleavers, scrapers, denticulates, notches, flakes and blades. Though our knowledge of the functions of most of these tools at this stage is very imperfect, it is certain that they served a variety of functions like hunting, butchering, skinning of animals, shattering and breaking open bones for the extraction of marrow, digging of roots and tubers, processing of plant foods, and making of wooden tools and weapons.

On the basis of stratigraphy, typology and technology two developmental stages can be recognized in Acheulian industries. One, probably chronologically earlier, is characterized by such core tools as handaxes, choppers, polyhedrons, and spheroids, a low proportion of crudely made cleavers and of flake tools, the predominant use of the stone-hammer technique, and the absence of the Levallois technique (Fig 2). It is represented at sites like Singi Talav in Rajasthan (Gaillard

et al. 1986; Misra and Rajaguru 1986; Misra et al. 1982), Chirki-Nevasa in Maharashtra (Corvinus 1983) and Hunsgi (Paddayya 1982) and Anagwadi (Pappu 1974) in Karnataka. The second, and probably younger one, is marked by the low proportion of bifaces, the high ratio of cleavers to handaxes, the very high proportion of flake tools like scrapers, the extensive use of the soft hammer technique, and the knowledge of the Levallois and discoid core techniques. This stage is best represented in the rock shelters of Bhimbetka (Misra 1978) (Pl. III a-b) and the open air sites in Raisen district of Madhya Pradesh (Jacobson 1975, 1985) and the Tirupati valley in Andhra Pradesh (Murty 1966; Jayaraj 1983).

The raw material used for tool making varied regionally according to the geology of the area and the availability of the rocks. In western Maharashtra dyke basalt or dolerite was the only rock available. Over much of the country quartz and quartzite were used. Wherever fine-grained quartzite was available, it was preferred for its softness and good conchoidal fracture. In the Hunsgi valley in Karnataka the Acheulian people used mainly limestone but occasionally also basalt and granite, and in northern Bundelkhand coarse-grained granite.

Our knowledge of the antiquity and duration of the Lower Palaeolithic culture is far from satisfactory. Reference has already been made to the reported claim of two million year old tools from the Siwalik Hills of the Potwar plateau of Pakistan. The discoverers of these tools have also reported three hand axes from two localities in the same region dated to between 700,000 and 400,000 years on the basis of magnetic polarity stratigraphy (Rendell and Dennell 1985). However more tools and dating by radiometric techniques are needed to confirm the age of the Acheulian industry in the area. In the Indian Siwaliks the Acheulian tradition is thought to be no older than 200,000 B.P. and the Sohanian only slightly older, about 300,000 B.P.

In peninsular India, fauna of the species associated with Acheulian assemblages in the Narmada and Godavari valleys also occurs with the Middle Palaeolithic assemblages, and is therefore of little help for a relative dating of the archaeological material. Dating of Lower Palaeolithic sites and assemblages in absolute years has been hampered by the lack of suitable dating materials such as volcanic ash and tuff. Recently, however, archaeologists from Deccan College, Pune have discovered a thick deposit of volcanic ash underling a gravel deposit containing

an early Acheulian assemblage in the bed of the Kukdi river at Bori, northeast of Pune. The ash has been dated by Potassium-Argon to 1.4 My (Korisettar *et al.* 1989). The Acheulian assemblage is younger than 1.4 My but it is difficult to say by how much. Efforts are also being made to date Acheulian sites by Thermoluminescence and U/Th decay series techniques. Application of these techniques to the sites of Umrethi in Saurashtra (Marathe 1981) and 16R at Didwana in Rajasthan (Misra and Rajaguru 1986; Raghavan *et al.* 1989) suggests that the Acheulian at these sites is older than 200,000 years. There is, however, a strong likelihood that future research will prove the earliest human occupation of India to be considerably older, perhaps going back to the Lower Pleistocene, that is between 2.0 and 0.7 million years ago. The upper limit of the Acheulian culture is equally uncertain. It can, however, be noted that at many sites the Acheulian grades into the Middle Palaeolithic. And, since the available absolute dates for the Middle Palaeolithic range from c. 150,000 to 20,000 B.P., it is quite likely that the Acheulian tradition persisted, at least in some areas, well into the Upper Pleistocene. The discovery of handaxes in an Upper Palaeolithic context at the 16R locality, near Didwana in Rajasthan, shows that in isolated areas some of the Acheulian elements survived well into the later part of the Upper Pleistocene.

A cranium of advanced *Homo erectus* has been discovered in the basal gravels of the Narmada river at Hathnora near Hoshangabad in Madhy Pradesh. From the same deposit Acheulian tools, some of them typologically and technologically similar to those of the Bhimbetka rock shelters, have also been found (Sonakia 1984; Henry de Lumley and Sonakia 1985; M-A de Lumley and Sonakia 1985). Although both the hominid fossil and the tools come from a secondary archaeological context, their association appears quite plausible considering that elsewhere in the Old World too the Acheulian culture is associated with *Homo erectus* fossils.

MIDDLE PALAEOLITHIC

As elsewhere in the Old World, the Acheulian culture slowly developed into the Middle Palaeolithic by shedding some of the older tool types and by incorporating new forms and new techniques of making them. In western Europe, the near East, north Africa and Central Asia the Middle Palaeolithic occupation sites are associated with the physical remains of *Homo sapiens neanderthalensis* or Neanderthal Man. Though rather robustly built and with

prominent supraorbital ridges and residual prognathism of the face, Neanderthal man had attained the brain size of modern man and was of equal intellectual capacity. Though no physical remains of Neanderthal man have been found in India, stone tools very similar to those found with this species in Europe and other areas are widespread in the sub-continent.

The Middle Palaeolithic culture developed during the Upper Pleistocene, a period of intense cold and glaciation in high altitudes and northern latitudes. Areas bordering glaciated regions experienced strong aridity. That is perhaps the reason why Middle Palaeolithic sites are comparatively sparse in western Rajasthan, the Mewar plateau and the Gujarat plain. In general, however, we may say that the Middle Palaeolithic populations occupied the same regions and habitats as the preceding Acheulian populations (Sankalia 1964) (Fig. 4) Middle Palaeolithic stone tool assemblages have been found in the Sanghao cave near Peshawar (Dani 1964), Sohan valley (de Terra and Paterson 1939; Salim 1986) and near Rawalpindi on the Potwar plateau (Rendell and Dennell 1987), all in Pakistan, Luni valley (Misra 1961), around Didwana (Misra 1987a; Misra and Rajaguru 1986), and around Budha Pushkar (Allchin *et al.* 1974, 1978), in western Rajasthan, at numerous sites in the valleys of the Chambal, son and Narmada and their tributaries in central India (Allchin 1959; Khatri 1958, 1962b; Ahmed 1966; Pant 1982; Sharma and Clark 1983; Misra 1985; Pandey 1987), on the Chota Nagpur plateau (Mohapatra 1962; Ghosh 1970), on the Deccan plateau (Sankalia 1956; Malik 1959; Paddayya 1968, 1974; Pappu 1974), and in the Eastern Ghats (Isaac 1960; Murty 1966; S. N. Rao 1966; K. T. Reddy 1968; V. R. Reddy 1968; V. V. M. Rao 1979; Nanda 1984).

As happened during the Acheulian period, Middle Palaeolithic occupations occurred at open-air sites along perennial as well as seasonal streams, along hill slopes and on stable dune surfaces as in western Rajasthan (Allchin *et al.* 1978; Misra and Rajaguru 1986), and in rock shelters as in central India (Joshi 1978; Misra 1985). Evidence from the site of Samnapur in Narsinghpur district, M.P. shows that in this case Middle Palaeolithic groups camped on high alluvial flats away from the river channelled and close to the hills (Pl. IV a-b). This location provided protection from the floods and easy access to good quality chert in the Vindhyan Hills.

Significant changes took place in technology during this period. The use of bifaces (handaxes and cleavers) as also of heavy core tools like choppers,

polyhedrons and spheroids slowly disappeared. Instead, tools made on flakes and blades (parallel-sided thin flakes) became more common. Side scrapers of various types, end scrapers, denticulates, notches, points and borers are the most common tool types of this period (fig.5). These were made by the application of retouch, that is, by finely trimming the edges of parent flakes by the removal of tiny thin flakes or chips. Many of the scraper forms are believed to have been used for manufacturing wooden tools and weapons and also for processing animal hides. Some of the points are thought to have been hafted in wooden shafts for use as spears. Tools became smaller, thinner and lighter. Improved and economical techniques of removing flakes from cores such as the Levallois and discoid core techniques were used extensively. There was also a significant change in the choice of rocks for making tools. While quartz, quartzite and basalt continued to be used, in many areas they were supplanted in varying degrees by chert and jasper and other fine-grained siliceous rocks. Raw material for making tools was sometimes brought from considerable distances. At Samnapur, for example, while the chert used for making the bulk of the tools was available on the hill close to the site, other rocks like quartzite and basalt were brought as cobbles from hill slopes and seasonal stream beds several kilometres away. Factory sites with vast quantities of artefacts in various stages of manufacture occur on chert outcrops as at Choli Dongargaon near Maheshwar on the Narmada and at Sojat in Pali district of Rajasthan. It is obvious that human groups regularly visited these places to exploit the abundant raw material, taking the finished tools to their camping places and leaving the debitage behind. The smaller size of the tools is probably due to the choice of the raw material. Chert and jasper are usually only available in the form of small nodules and therefore impose a natural restriction on the size of the tools.

Our knowledge of the environment of this period is as limited as that of the preceding Middle Pleistocene. In the northern part of western Rajasthan the discovery of Middle Palaeolithic assemblages in fine-grained deposits shows that the drainage system continued to function though perhaps in a considerably weakened condition. The presence of several phases of dune accumulation and stabilization in the 16R profile at Didwana is indicative of multiple fluctuations in rainfall. The faunal remains from the Upper Group of the Narmada alluvium comprising *Equus namadicus*, *bos namadicus*, *Hexaprotodon palaeindicus*, *Elephas hysudricus*, *Stegodon insignis-ganesa* and *Cervus* sp. are largely similar to those from the Lower Group of Middle Pleistocene age. They suggest a savanna grassland

environment interspersed with swamps and forests (de Terra and Paterson 1939; Badam 1979, 1984). Plant fossils have been found in association with Middle Palaeolithic tools in a tufaceous deposit at Wajjal in the Hunsgi valley in Karnataka (Korisettar *et al.* 1977).

Several Thermoluminescence and Uranium/Thorium decay series dates available from the 16R dune profile in western Rajasthan range between 150,000 and 100,000 B.P. Nearly twenty radiocarbon dates obtained mostly on shell and bone are available from the Deccan and central India. These range in age from 40,000 B.P. to 10,000 B.P. In the absence of adequate reports on associated archaeological material one cannot always be sure of the Middle Palaeolithic identification of the stone industries. Also both shell and bone are susceptible to secondary contamination from the residual radioactivity. Keeping these limitations in mind it is clear that Middle Palaeolithic assemblages persisted over a long time span covering the terminal Middle Pleistocene and greater part of the Upper Pleistocene.

UPPER PALAEOOLITHIC

We have a relatively better picture of the climatic and environmental changes during the later part of the Upper Pleistocene when the Upper Palaeolithic cultures flourished. As the course of cultural development was considerably influenced by these changes, we will briefly review the evidence for them before discussing the human response to them.

ENVIRONMENT DURING THE TERMINAL PLEISTOCENE

As a result of a considerably multidisciplinary palaeoclimatic research in various parts of India during the last 10-15 years we have a much better picture of the environment during the terminal Pleistocene. This period witnessed intense glaciation in high latitudes and extreme aridity in most of peninsular India. In western Rajasthan, north of the Luni river, the Himalayan drainage which had been steadily declining in importance and shifting westward from the Early Pleistocene onwards now fell into disuse over the greater part of the desert. However, the presence of several wide palaeochannels with Upper Palaeolithic sites along their banks

between Jaisalmer and Ramgarh shows that, in the extreme northwest corner of the State, rivers continued to flow even during the terminal Pleistocene and probably during the early Holocene as well. Nearly everywhere aeolian activity was intense, leading to deposition of extensive sand sheets and sand dunes in Rajasthan, Punjab, Haryana and Gujarat (Allchin et al. 1978; Wasson et al. 1983; Misra and Rajaguru 1986). Several Thermoluminescence dates obtained on sand quartz from Rajasthan and Gujarat have helped in accurately dating this phase of aridity (Singhvi et al. 1982). Geomorphic evidence also suggests that the aridity extended even to the humid regions of northeast India and the southeast coast. Quaternary sediments including fluvial and colluvial deposits of upland Maharashtra and Manipur, aeolianites and calcarenites of Saurashtra, Kutch and Tamil Nadu, and oolitic limestones of the continental shelf of the Arabian Sea have been dated by Carbon 14 and U/Th decay series methods (Fontugne and Duplessy 1986; Rajaguru 1983; Kale and Rajaguru 1985, 1987; Baskaran et al. 1986). Well dated geomorphic data suggest that the vegetation cover over most of the country thinned out during the terminal Pleistocene. As a result of the decreased rainfall and the reduction in vegetation cover on the valley slopes, considerably colluvial sediments were contributed to upland rivers like the Krishna, Bhima and Godavari in Maharashtra and to the Imphal river in Manipur. Owing to decreased discharge and increased sediment loads, most of the streams in these regions aggraded and developed an anastomosing drainage pattern at this time (Rajaguru 1983; Rajaguru and Korisetlar 1987; Thokchom 1987).

At around 20,000 B.P., the Lokthak lake in the Manipur valley shrank and thick colluvial cones developed on its periphery due to increased frost activity, and reduction in rainfall and possibly also in vegetation density. In coastal areas in the interior parts of southwestern Tamil nadu, Saurashtra and Kutch quartz and carbonate dunes developed as a result of lowered sea level also occurring at approximately 20,000 B.P. Extensive formation of an oolitic carbonate reef on the continental shelf of western India around 12-10,000 B.P. suggests reduction in discharge in the westerly-flowing streams of Maharashtra and Karnataka. In sum, during the terminal Pleistocene southwesterly monsoons were weak and the sea level as lower by scores of metres. Thus the palaeoclimatic evidence suggests that the Indian subcontinent was a part of the global circulation pattern during the peak of the Last Glaciation, that is around 20,000 B.P.

The rich fossil record from the deposits of the peninsular rivers of this period provides us a good picture of the fauna. Finds from the Belan valley, a sub-tributary of the Ganga, south of Allahabad, the Mahanadi and Manjra valleys in central India, and the Godavari, Ghod and Krishna valleys in the Deccan include *Canis* sp., *Bubalus* sp., *Cervus* sp., *Bos namadicus*, and *Hexaprotodon palaeindicus*. The fauna suggests the existence of a grassland environment with pockets of forests and swamps. The discovery of ostrich egg shells at over forty sites in Rajasthan, Madhya Pradesh and Maharashtra, several of them dated by C14, shows that the ostrich, a bird adapted to arid climate, was widely distributed in western India during the later part of the Upper Pleistocene (Kumar *et al.* 1988).

CULTURAL DEVELOPMENT DURING THE TERMINAL PLEISTOCENE

The tendency to use parallel-sided flakes or blades for making tools and the reduction of size of the tools was further accentuated during the terminal Upper Pleistocene. Also regional variation in technology began to be more clearly manifested during this period. The cultures of the terminal Pleistocene are grouped under the broad category of Upper Palaeolithic. In Western Europe and the Near East where such cultures were first found they are invariably associated with the physical remains of modern man that is *Homo sapiens sapiens* in India although so far skeletal remains of modern man of this stage have not been found, there is widespread evidence of his cultural remains.

Because of the arid climate and consequently sparse vegetation and animal life at this time the human populations were faced with much restricted food resources. These circumstances must certainly have led to a reduction in human population. This is suggested by the sparse human settlements found during this period (Fig. 6) In Pakistan (Allchin 1976) and western India (Rajasthan and Gujarat) only isolated sites of this phase have been found. People here camped on sand dunes as at Budha Pushkar (Allchin *et al.* 1974) and Didwana (Misra and Rajaguru 1986) in Rajasthan. In central India too only a limited number of sites are known from the Son valley (Kenoyer *et al.* 1983) and Bhimbetka rock shelters (Misra 1985). It is only in the relatively humid region of the Eastern Ghats that the Upper Palaeolithic sites are plentiful, suggesting a concentration of population in this area (Murty 1968, 1974, 1979, 1981, 1985b; Murty and Reddy 1976; K.T. Reddy

1970; Raju, 1985a, 1987, 1988) (Pl. Va)

The Indian Upper Palaeolithic tool assemblages are essentially characterized by blade tools and show a marked regional diversity in respect of refinement of techniques and standardization and numerical proportion of finished tool forms. Wherever these assemblages occur in a stratified context, they succeed the Middle Palaeolithic and precede the Mesolithic. The principal artefact forms in these assemblages are scrapers (side, convex, notch, end, steep, round, convergent, etc.) made on flakes, flake-blades, blades and cores; backed blade variants (straight back, curved back, backed knives, points with backing confined to either base or tip or both, lunates, triangles and trapezes); burins made on flake-blades, blades and split cores; unifacial, bifacial and tanged points on flakes, blades and nuclei; choppers, and worked nuclei (p8 Vb). Scrapers made on flakes which are common to all regions suggest continuity of the Middle Palaeolithic tradition. Broad and thick blades (flake-blades) struck from crude prismatic cores are the important feature of sites in the Subarnarekha valley of Bihar (Ghosh 1970) and Garo Hills in Meghalaya (T. C. Sharma 1985). Parallel-sided blades struck from standardized prismatic cores are common on sites in the Thar desert (Allchin *et al.* 1974, 1978; Misra and Rajaguru 1986), Belan and son valleys (Sharma and Clark 1983), Damin (dhamni) area of Rajmahal Hills (D. K. Chakrabarti 1985), Bhimbetka shelters (Misra 1985) Maharashtra plateau (Sali 1985, 1989), Telangana plateau (T. R. R. Singh 1984), Mysore plateau (Paddayya 1970) and Eastern Ghats (Murty 1970; K. T. Reddy 1970; V. V. M. Rao 1979; Raju 1988). Though a few backed blades, retouched blade tools and burins occur at most of the sites, assemblages in some regions reveal distinctive features. Simple blades and retouched blade tools are conspicuous at sites in the Deccan plateau (Paddayya 1970). At sites in the hinterland riverine ecosystem of the Eastern Ghats the backed blade component is much higher among the finished tools (Murty 1970; Raju 1988). The Epi-Palaeolithic and Late Palaeolithic of the Son and Belan valleys comprise a low proportion of short blade element and a predominant flake element (Sharma and Clark 1983). In sum the terminal Pleistocene lithic assemblages in most of the regions in India exhibit a predominant component of amorphous elements which shows a striking resemblance to assemblages in Southeast Asia. The bone tool element is so far available only from the Kurnool caves, and it represents a crude facies (Murty 1974).

These lithic assemblages occur in occupation scatters dispersed in desert

grassland, woodland and thorny thicket zones. Several species of game inhabit these regions, the most important of them being nilgai (*Boselaphus tragocamelus*), chinkara (*Gazella gazella*), four - horned antelope (*Tetracerus quadricornis*), sambar (*Cervus unicolor*), chital (*Axis axis*), barking deer (*Muntiacus muntiac*), mouse deer (*Tragulus of meminna*), wild boar (*Sus scrofa cristatus*), jungle cat (*Felis chaus*), porcupine (*Hystrix indica*), hare (*Lepus nigricollis*), giant squirrel (*Ratufa Indica*) monitor lizard (*Varanus dracaena*), and langur (*Presbytis entellus*). While remains of most of these species occur in late Pleistocene riverine deposits, and are also closely associated with Upper Palaeolithic occupations in Kurnool caves (Murty 1975), there is fossil evidence showing the distribution of other species like ox (*Bos sp.*), buffalo (*Bubalus sp.*), horse (*Equus sp.*), hippopotamus (*Hippopotamus sp.*), rhinoceros (*Rhinoceros sp.*), and elephant (*elephas sp.*) (Badam 1979; Sharma and Clark 1983). Besides, these ecosystems are also rich in avifauna and a wild variety of plant foods like yams, fruits, flowers, nuts, bamboo shoots, bamboo grain, leafy vegetables and mushrooms (Murty 1985a; Nagar 1983, 1985; Vishnu Mittre 1985).

Varied ecological niches in these ecosystems are exploited today by traditional ethnic groups (tribes/Adivasis) whose economies are geared to hunting and gathering, riverine fishing, marine fishing, and shifting cultivation. Typical examples are those known as Van Vagri (Thar desert), Birhor (Chota Nagpur), Chenchu, Yanadi, Konda Reddi, Koya, Voda Baliye (Eastern Ghats), Kadars (Kerala), Baiga or bhumiya, Gond, Abujhmara, Muria, Bison-horn Maria gond (Madhya Pradesh), Kandh, Savara, gadaba, Juang (Orissa), and Warli and Koli (Maharashtra). All these ethnic groups, notwithstanding the fact that they are now integrated into the village economies, pursue their traditional modes of food procurement. Since big game is now both scarce and its hunting is prohibited, they hunt small game and birds, and collect insects and honey and wild plant foods. For hunting game and birds they use nets, spring traps, gravity traps, noose traps, snares, pit falls, and different kinds of bow and arrow. They possess an intimate knowledge of their biological environment and are skillful trackers. All these kinds of hunting and fishing aids involve considerable wood work, bamboo work, and cord work. The fact that stone age occupations occur within the tribal habitats indicates that the game and other forest foods now exploited must have formed the subsistence base for the terminal Pleistocene populations, possibly on a much larger scale.

If the food procurement technologies and behaviour as reflected in the ethnographic present are any guide, then it is to be expected that prototypes of traps, snares, nets, etc. must have been in use during the terminal Pleistocene times and later. If that was the case, the scraper variants and other amorphous forms were possibly used for wood and bamboo work. The simple blades and some of the backed blade variants could have been used as inserts for spear points, arrow points, fishing arrows, barbed fishhooks, thrusting spears, slicer knives and daggers. Some of the broad and thick flake-blades and large pointed blades could have been fixed into a resin handgrip or into wooden handles, recalling the Australian Leilira knives. The gum of several species of *Acacia*, lacquer from the nests of tree ants, and the milky juice of *Excoecaria agallocha* (which hardens on exposure to air into a black catechu-like substance) which are used today by traditional ethnic groups, might have been used for hafting purposes. Some of the blades and backed point variants could have been used as pen knives for cutting off the surplus cord work and knot tips in the binding and interlacing of various strands of thin cord into a network for making fishing and hunting nets.

In the hinterland riverine ecosystems of the Eastern Ghats lithic assemblages with a predominant backed blade and burin element also have another important tool - a large crescentic backed piece with blunted arc and straight cord, recalling the Australian Elouera. Most of these tools have damaged cords, indicating that they were certainly used for wood work. Another striking feature of sites in this region is the presence of a considerable number of bored stones and grinding slabs. Similar bored stones today are used by the Yanadi as net sinkers in riverine fishing, and the heavier ones are used by Voda Baliye and other contemporary groups for marine fishing. Further, these occupations in the Eastern Ghats are invariably associated with permanent water bodies, which are exploited today by the Yanadi, lending support to the inference that aquatic foods (fish, prawn, crabs, tortoise, resident and migratory water birds) must have been a valuable food resource during terminal Pleistocene times as they are today. The grinding stones found with these assemblages are likely to have been used in the processing of plant foods including wild rice (*Oryza nivara*) which is widespread in the Eastern Ghats. The small microlithic backed blade element of the Upper Palaeolithic assemblages is suggestive of its use in sickles for harvesting (Misra and Murty 1986).

Continuity from the Upper Palaeolithic to the present may not be confined

to the technological and economic spheres alone. At the site of Baghor II in the son valley archaeologists found a rectangular stone rubble platform with a triangular stone with natural concentric circles installed in its centre. Similar stones installed on stone platforms are today worshipped as mother goddesses by tribal communities in the area. The Baghor structure therefore probably represents the earliest shrine in India and suggests a remarkably long continuity of mother goddess worship (Kenoyer *et al.* 1983).

The Upper Palaeolithic occupations of the Eastern Ghats are far more extensive than those in the rest of the country. Some of the sites in the area such as, for example, vodikalu in the Gunjana valley in the Cuddapah district (Raju 1988) extend over five acres and the artefacts run into several thousands. Two radiocarbon dates from this region are 17,390 B.P. and 24,360 $\pm$ 660/710 B.P. Radiocarbon and TL dates from other parts of the country range between 30,000 and 10,000 B.P. A blade tool assemblage from the Potwar plateau of Pakistan has been dated by TL to c. 40-45,000 years B.P. (Rendell and Dennell 1987).

This broad survey of Palaeolithic cultures covering a period of half-a-million years or so reveals a steady improvement in technology, knowledge of the resources of the environment, sedentariness and expansion of settlement. There were several significant fluctuations in climate during Middle and Upper Pleistocene which must have affected the availability of water and the growth of flora and fauna. The periodic expansion and contraction of water sources and plant and animal food resources affected population growth and migration. The density of sites and concentration of artefacts on them suggest the environmental conditions to have been most congenial during Acheulian times. On the other hand, conditions were definitely arid over much of the country during the later part of the Upper Pleistocene which probably accounts for the comparative scarcity of Upper Palaeolithic sites except in the hilly region of the Eastern Ghats.

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DESCRIPTION OF ILLUSTRATIONS

Fig.1. Lower Palaeolithic Sites in India

Fig.2. Lower Palaeolithic artefacts from Singi Talav, Didwana, district Nagaur, Rajasthan: 1-4 handaxes; 5, cleaver; 6-7 choppers; 8 point; 9-13 flakes; 14 blade; 15 core

Fig.3. Stratigraphy of 16R dune excavation, Didwana district Nagaur, Rajasthan showing weathered horizons, calcretes, radiometrically dated points, and occupation levels

Fig.4. Middle Palaeolithic Sites in India

Fig.5. Middle Palaeolithic artefacts from 16R stie, Didwana, district Nagaur, Rajasthan: 1,3 handaxes; 2, 4-5 side scrapers; 6, 10 Levallois flakes; 7-8, 11-12 blades; 9 discoid core

Fig.6. Upper Palaeolithic sites in India.

P1.Ia. Jayal gravel ridge, district nagaur, Rajasthan. Extensive scatters of artefacts from Lower Palaeolithic to Mesolithic occur on the surface of the ridge. Stone age groups were drawn to the ridge by the abundant supply of fine-grained quartzite and quartz for making their tools.

P1.Ib. Early Acheulian site at Singi Talav, near Didwana Rajasthan. Artefacts in a remarkably fresh condition occur in the silty clay depoist which was formed in sluggishly flowing streams or in lakes and pools. Hunting-gathering groups along such water bodies.

P1.IIa. Bhimbetka hill topped by a broken ridge containing rock shelters at the base, district Raisen, Madhya Pradesh. The dense dry deciduous vegetation on the hill and in the valley contains over forty plant species of food value and harbours many species of herbivores and carnivores. Several perennial springs at the foot of the hill were probably active in the past as well.

P1.IIb. A close of the broken ridge showing shelter III F-23 at the base of the central rock.

P1.IIIA. Late Acheulian handaxes made on fine-grained quartzite from Bhimbetka

P1.IIIb. Late Acheulian cleavers made on fine-grained quartzite from Bhimbetka.

P1.IVa. Open-air Middle Palaeolithic site at Samnapur, district Narsinghpur, Madhya Pradesh. Hominids camped here on the high alluvial terrace of the Narmada river abutting a cherty quartzite hill. The location provided them protection from river floods and easy access to chert from the hill. After its abandonment the site got buried under over 12 m thick river silt.

P1.IVb. Part of an occupation floor at Samnapur. It contains chert cobbles, artefacts and occasional fossil animal bones and teeth. Besides using locally available chert for making tools the occupants also used quartzite and dolerite which they had to procure from several kilometres away.

P1.Va. Muchchatla Chintamanu Gavi, an endogene cave complex near Betamcherla, district Kurnool, Andhra Pradesh. These caves were occupied from Upper Palaeolithic to Neolithic times. Vegetation in the valley after monsoon includes over 30 plants of food value.

P1.Vb. Upper Palaeolithic artefacts from Renigunta, Andhra Pradesh: 1-9 burins; 1, 17, 19, 24 elouera-type backed blades; 11-14, 16, 18, 20-22 backed blades; 23 blade core; 25, 27 triangles; 26 trapeze; 28, 30 unifacial points; 29 pointed blade; 31 tanged point; 32 awl; 17, 19, 32 are on lydianite, and the remaining on fine-grained quartzite.

Appendix I

Late Pleistocene Vertebrate Fossil Fauna of India (after Badam 1984, 1989; Salahuddin 1987; Murty 1975)

	-----River Valleys				-----Caves		
Fossil Fauna	Narmada	Son	Godavari	Ghod	Manjra	Hahanadi	Kurnool
Primates							
<u>Presbytis entellus</u>	-	-	-	-	-	-	+
<u>Papio sp.</u>	-	-	-	-	-	-	+
Carnivora							
<u>Panthera tigris</u>	-	-	-	-	-	-	+
<u>Panthera cf. pardus</u>	-	-	-	-	-	-	+
<u>Felis chaus</u>	-	-	-	-	-	-	+
<u>Felis rubiginosa</u>	-	-	-	-	-	-	+
<u>Crocota crocuta</u>	-	-	-	-	-	-	+
<u>Viverra karnuliensis</u>	-	-	-	-	-	-	+
<u>Priodon sp.</u>	-	-	-	-	-	-	+
<u>Herpestes fuscus</u>	-	-	-	-	-	-	+
<u>Herpestes edwardsi</u>	-	-	-	-	-	-	+
<u>Melursus ursinus</u>	-	-	-	-	-	-	+
<u>Ursus sp.</u>	+	-	-	-	-	-	-
<u>Ursus namadicus</u>	-	-	-	-	-	-	-
<u>Canis sp.</u>	-	-	-	+	-	-	-
Insectivora							
<u>Sorex sp.</u>	-	-	-	-	-	-	+
Chiroptera							
<u>Taphozous saccolaimus</u>	-	-	-	-	-	-	+
<u>Hipposideros diadema</u>	-	-	-	-	-	-	+
Rodentia							
<u>Sciurus sp.</u>	-	-	-	-	-	-	+
<u>Tatera indica</u>	-	-	-	-	-	-	+
<u>Bandicota indica</u>	-	-	-	-	-	-	+
<u>Bandicota bengalensis</u>	-	-	-	-	-	-	+

<u>Mellardis mettada</u>	-	-	-	-	-	-	+
<u>Mus sp.</u>	+	-	-	-	-	-	-
<u>Mus platythrix</u>	-	-	-	-	-	-	+
<u>Golunda ellioti</u>	-	-	-	-	-	-	+(?)
<u>Hystrix sp.</u>	+	-	-	-	-	-	-
<u>Hystrix crassidens</u>	+	-	-	-	-	-	+
<u>Atheruru karnuliensis</u>	-	-	-	-	-	-	+
<u>Lepus cf. nigricollis</u>	-	-	-	-	-	-	+

Perissodactyla

<u>Equus namadicus</u>	+	+	+	+	+	+	-
<u>Equus asinus</u>	-	+	-	-	-	-	+
<u>Equus onager khur</u>	+	-	-	-	-	-	-
<u>Equus caballus</u>	+	-	-	-	-	-	-
<u>Rhinoceros sp.</u>	+	+	-	-	-	-	-
<u>Rhinoceros karnuliensis</u>	-	-	-	-	-	-	+
<u>Rhinoceros unicornis</u>	+	-	-	-	-	-	-

Artiodactyla

<u>Bos sp.</u>	+	-	+	+	-	+	-
<u>Bos namadicus</u>	+	+	-	+	+	+	-
<u>Bos gaurus</u>	+	+	-	-	-	-	-
<u>Bos sp./ Bubalus sp.</u>	-	-	-	-	-	-	+
<u>Bubalus sp.</u>	+	+	+	+	-	-	-
<u>Bubalus bubalis</u>	+	-	-	-	+	+	-
<u>Bubalus palaeindicus</u>	+	-	-	-	-	-	-
<u>Leptobos sp.</u>	-	-	-	+	-	-	-
<u>Leptobos frazeri</u>	+	-	-	-	-	-	-
<u>Bibos sp.</u>	+	-	-	-	-	-	-
<u>Bison sp.</u>	+	-	-	-	-	-	-
<u>Hippopotamus sp.</u>	+	+	-	+	+	-	-
<u>Hippopotamus namadicus</u>	+	-	-	-	-	-	-
<u>Hippopotamus palaeindicus</u>	+	-	-	-	-	-	-
<u>Boselephas tragocamelus</u>	-	+	-	-	-	-	+
<u>Boselephas namadicus</u>	+	-	-	-	-	-	-
<u>Gazella gazella bannetti</u>	+	+	-	-	-	-	+
<u>Antilope cervicapra</u>	+	+	-	-	+	-	+
<u>Tetracerus quadricornis</u>	-	+	-	-	-	-	+

<u>Cervus unicolor</u>	+	+	-	+	-	-	+
<u>Cervus styloceros</u>	+	-	-	-	-	-	-
<u>Cervus duvauceli</u>	+	+	-	-	-	-	-
<u>Cervus affinis</u>	+	-	-	-	-	-	-
<u>Axis axis</u>	+	+	-	-	+	-	+
<u>Muntiacus muntjak</u>	-	+	-	-	-	-	+(?)
<u>Tragulus cf memmina</u>	-	-	-	-	-	-	+
<u>Sus sp.</u>	+	+	-	+	+	-	-
<u>Sus nandicus</u>	+	-	-	-	-	-	-
<u>Sus scrofa cristatus</u>	+	-	-	-	-	-	+
<u>Sus karnuliensis</u>	-	-	-	-	-	-	+

Proboscidea

<u>Elephas maximus</u>	-	-	+	-	+	-	-
<u>Elephas namadicus</u>	+	-	+	-	-	-	-
<u>Elephas hysudricus</u>	+	-	-	-	+	-	-
<u>Elephas sp.</u>	+	+	-	+	-	-	-
<u>Stegodon insignis</u>	+	-	-	-	+	-	-

Pholidota

<u>Smutsia gigantea</u>	-	-	-	-	-	-	+
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Reptilia

<u>Crocodylus sp.</u>	+	-	-	-	+	-	+
<u>Chelonia sp.</u>	-	-	-	-	+	-	-
<u>Gavialis sp.</u>	+	+	-	-	-	-	-
<u>Trionyx sp.</u>	+	+	-	-	-	-	-
<u>Emys namadicus</u>	+	-	-	-	-	-	-
<u>Emys sp.</u>	+	+	-	-	-	-	-
<u>Pengsura tectum</u>	+	-	-	-	-	-	-
<u>Lessemys sp.</u>	+	-	-	-	-	-	-
<u>Varanus dracaena</u>	-	-	-	-	-	-	+
<u>Python molurus</u>	-	-	-	-	-	-	+
<u>Ptyas mucosus</u>	-	-	-	-	-	-	+

Appendix II

Radiometric Dates from Palaeolithic Sites

1. Radiocarbon Dates (After Possehl 1988; Misra and Rajaguru 1986)

Middle Palaeolithic

Site Name	Lab No	5568 BP	5730 BC	Caibration	DateList
Badalpur	PRL 88	24300 $\pm$ 1700	23079 $\pm$ 1750	N.A.	
Bardia Hill	TF 764A	16485 $\pm$ 445	15030 $\pm$ 460	N.A.	
Bardia Hill	TF 764B	11420 $\pm$ 190	9813 $\pm$ 195	N.A.	-
Bhimbetka	PRL 787	15370 $\pm$ 570	13880 $\pm$ 587	N.A.	PRL V
Bhimbetka	PRL 788	17230 $\pm$ 480	15795 $\pm$ 494	N.A.	PRL V
Bhimbetka	PRL 789	17670 $\pm$ 490	16250 $\pm$ 505	N.A.	PRL V
Dhamner	PRL 143	10130 $\pm$ 250	8484 $\pm$ 260	N.A.	PRL II
Dhom Dam	FA 1004	37640 $\pm$ 9200	36819 $\pm$ 9475	N.A.	-
Gerwa Well	PRL 710	26090 $\pm$ 800	24925 $\pm$ 824	N.A.	PRL V
Mula Dam	TF 217	39000	38220	N.A.	
Mula Dam	TF 345	31075 $\pm$ 5550	30057 $\pm$ 5710	N.A.	
Nandipalli	PRL 293	23670 $\pm$ 640	22430 $\pm$ 650	N.A.	
Nandur Madhmeshwar	BS 163	26600 $\pm$ 430	25450 $\pm$ 443	N.A.	BS III
Nirgudsar	PRL609	31000		N.A.	PRL V
Rati Karar	TF 967	32750 $\pm$ 1770	31783 $\pm$ 1825	N.A.	-
Prabhas Patan	PRL 30	20825 $\pm$ 670	19500 $\pm$ 690	N.A.	PRLIII

Upper Palaeolithic

Asla	TF 1178	9740 $\pm$ 125	8082 $\pm$ 130	N.A.	TATA X
Baghor	BETA 4793	25485 $\pm$ 420	24300 $\pm$ 430	N.A.	-
Baghor	PRL 711	12450 $\pm$ 220	10875 $\pm$ 227	N.A.	PRL V
Baghor	BETA 4792	11525 $\pm$ 120	9921 $\pm$ 125	N.A.	
Baghor	SUA 1420	10415 $\pm$ 140	8777 $\pm$ 145	N.A.	-
Baghor III	PRL 714	6460 $\pm$ 180	4705 $\pm$ 185	5565 B.C.	
			5205 B.C.	PRL V	
Didwana	PRL 911	26210 $\pm$ 2200			
		1700			
Gharghaon	TF 1111	10020 $\pm$ 150	8371 $\pm$ 155	N.A.	TATA X
Mahagara	PRL 86	25707 $\pm$ 810	24528 $\pm$ 835	N.A.	PRL II
Mahagara	TF 1245	19160 $\pm$ 330	17785 $\pm$ 340	N.A.	TATA XI
Mahagara	PRL 603	13740 $\pm$ 400	12200 $\pm$ 412	N.A.	PRL V
Mahagara	BS 130	11550 $\pm$ 180	9945 $\pm$ 185	N.A.	BS III
Mahagara	PRL 602	10980 $\pm$ 190	9360 $\pm$ 196	N.A.	PRL V
Patne	GRN 7200	24270 $\pm$ 195	23048 $\pm$ 200	N.A.	-
Sangamner	BS 78	24670 $\pm$ 710	23460 $\pm$ 731	N.A.	BS II
Sangamner	PRL 470	14400 $\pm$ 340	12880 $\pm$ 350	N.A.	PRL IV

Thermoluminescence Dates (After Misra and Rajaguru 1986; Singhvi et al. 1982; Rendell et al 1987; Misra et al. 1988)

Middle Palaeolithic

Didwana (16R) Alpha Lab No. 963 163000 $\pm$ 21000 B.P.

Upper Palaeolithic

Riwat
(Pakistan) 420000 B.P.

U/Th Dates (After Baskaran et al. 1986; Raghavan et al. 1989)

Lower Palaeolithic

Didwana
(16R) 150000 B.P.

Junagadh 69000 B.P.

Umrethi 190000 B.P.

Middle Palaeolithic

Didwana
(16R) 166000 B.P.

Jetpur >56000 B.P.

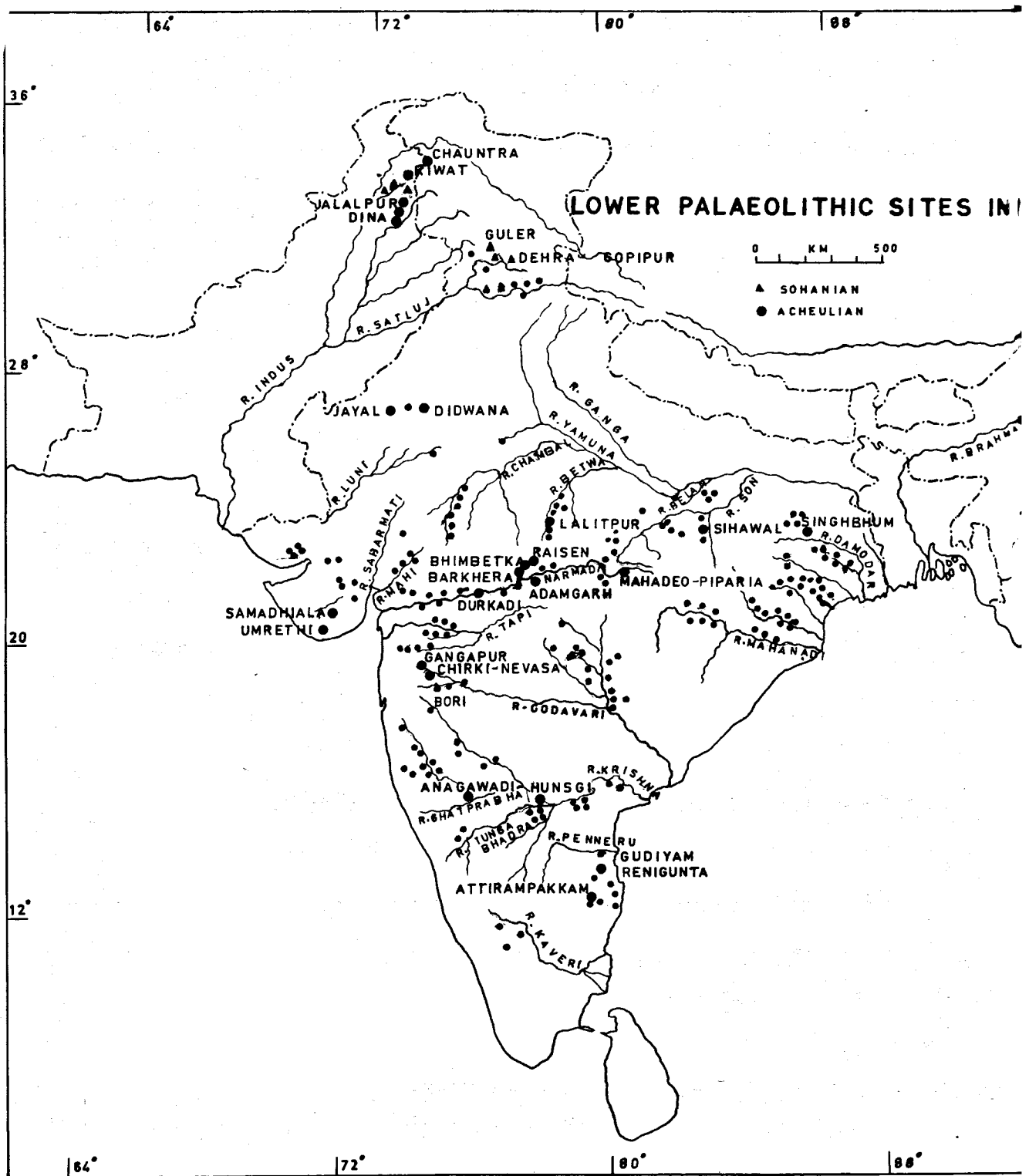


Fig. 1

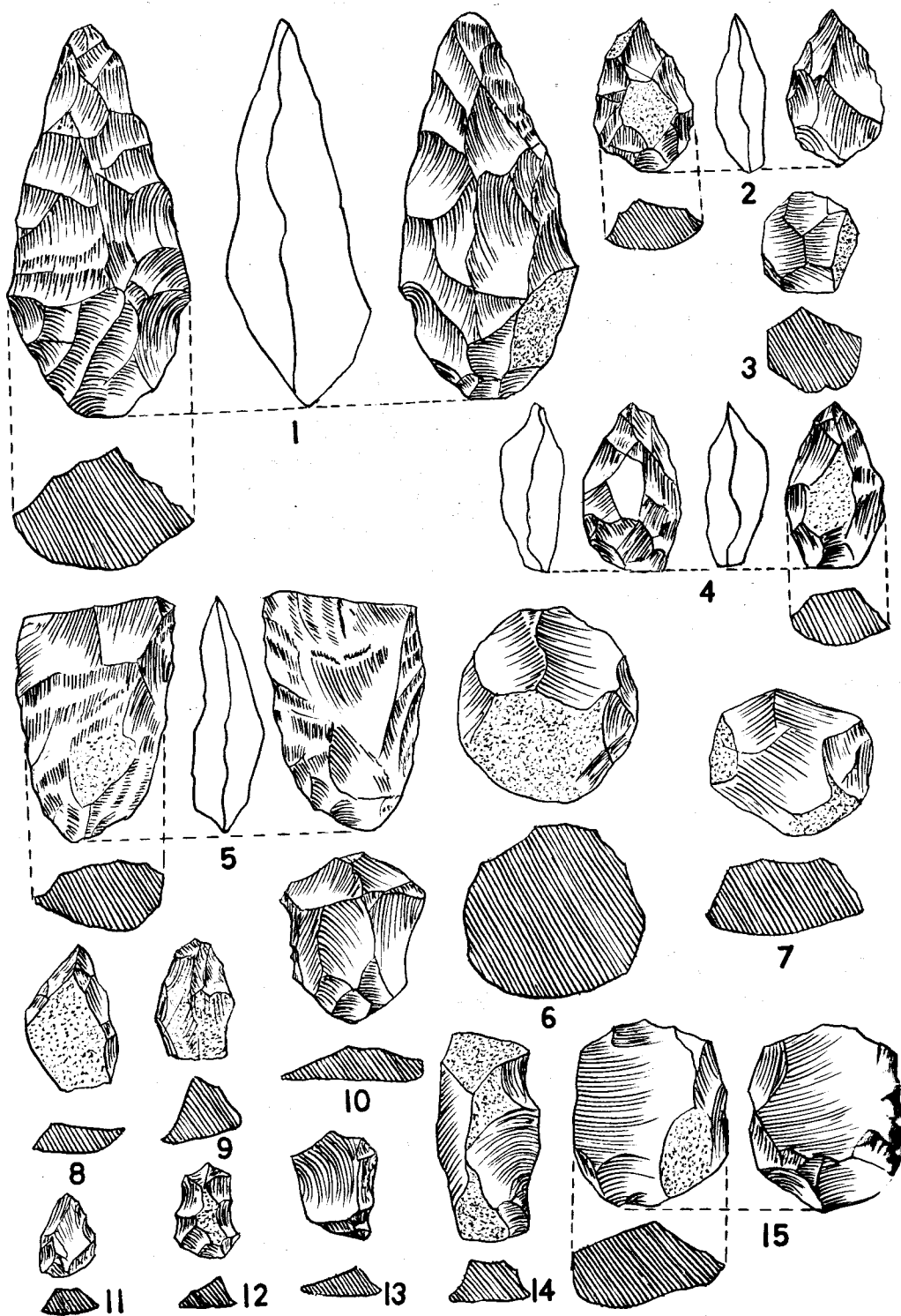


Fig. 2

VERTICAL SECTION FACING WEST
THROUGH DUNE TRENCH AT 16 R. DIDWANA.

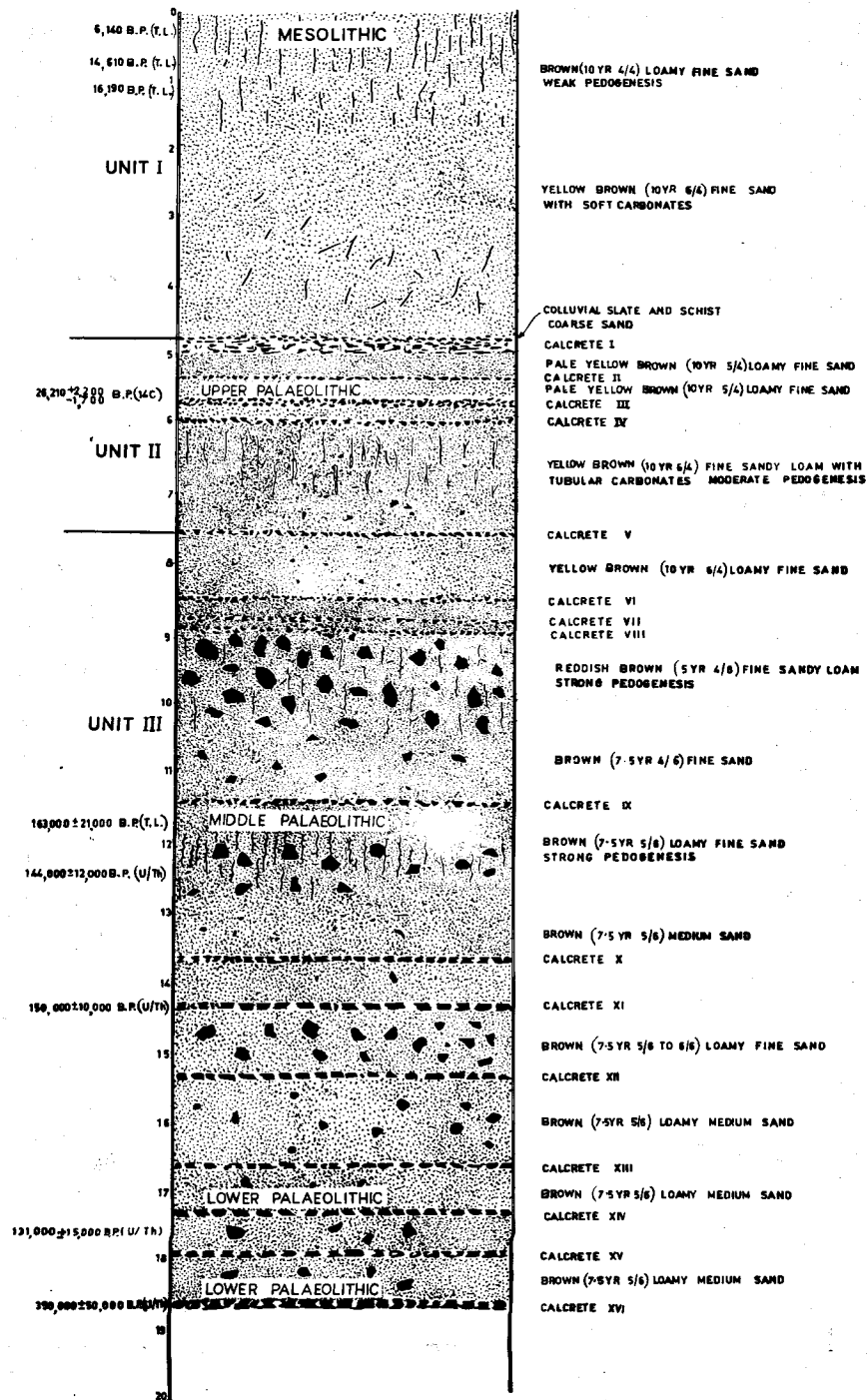


Fig. 3

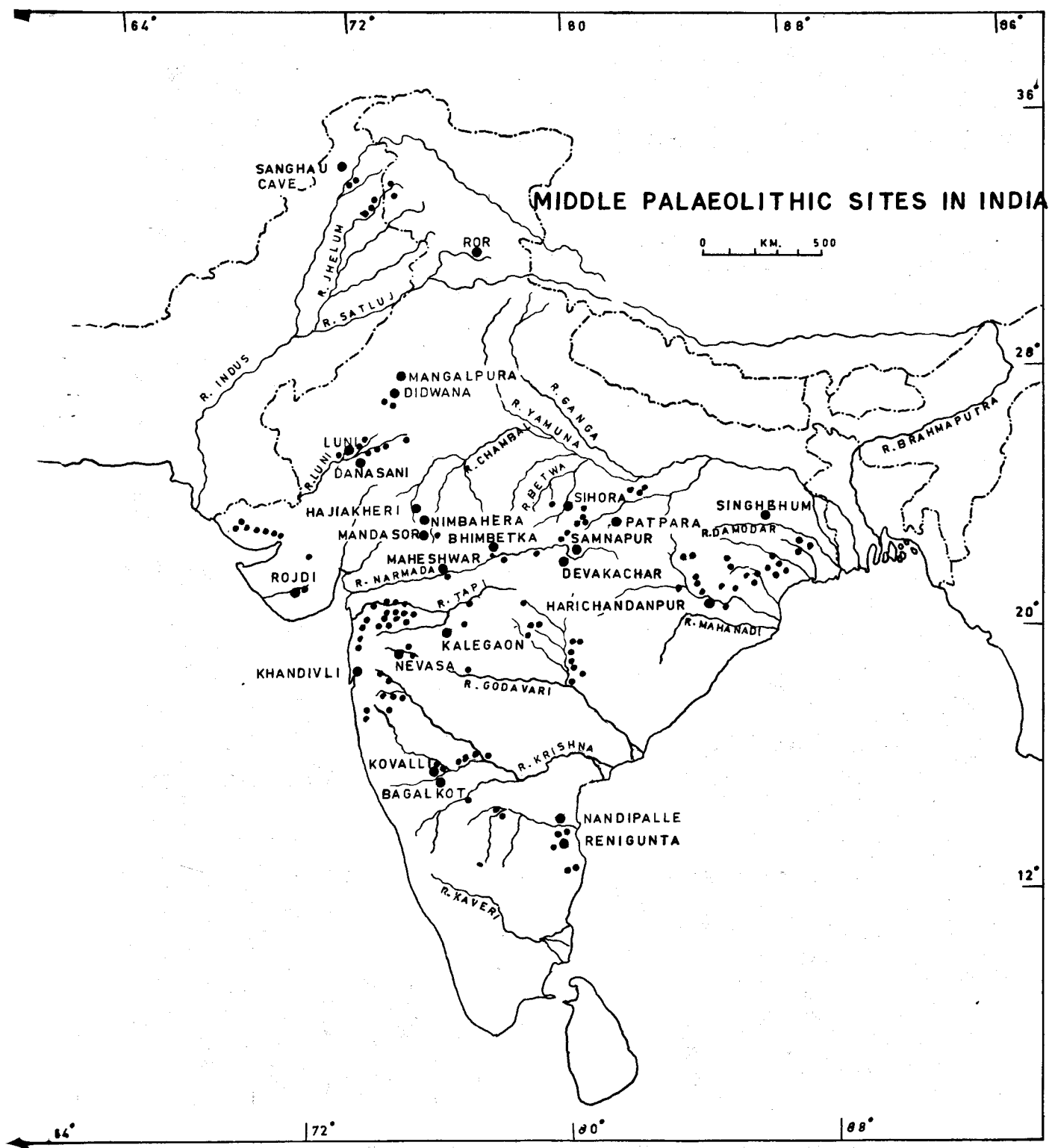


Fig. 4

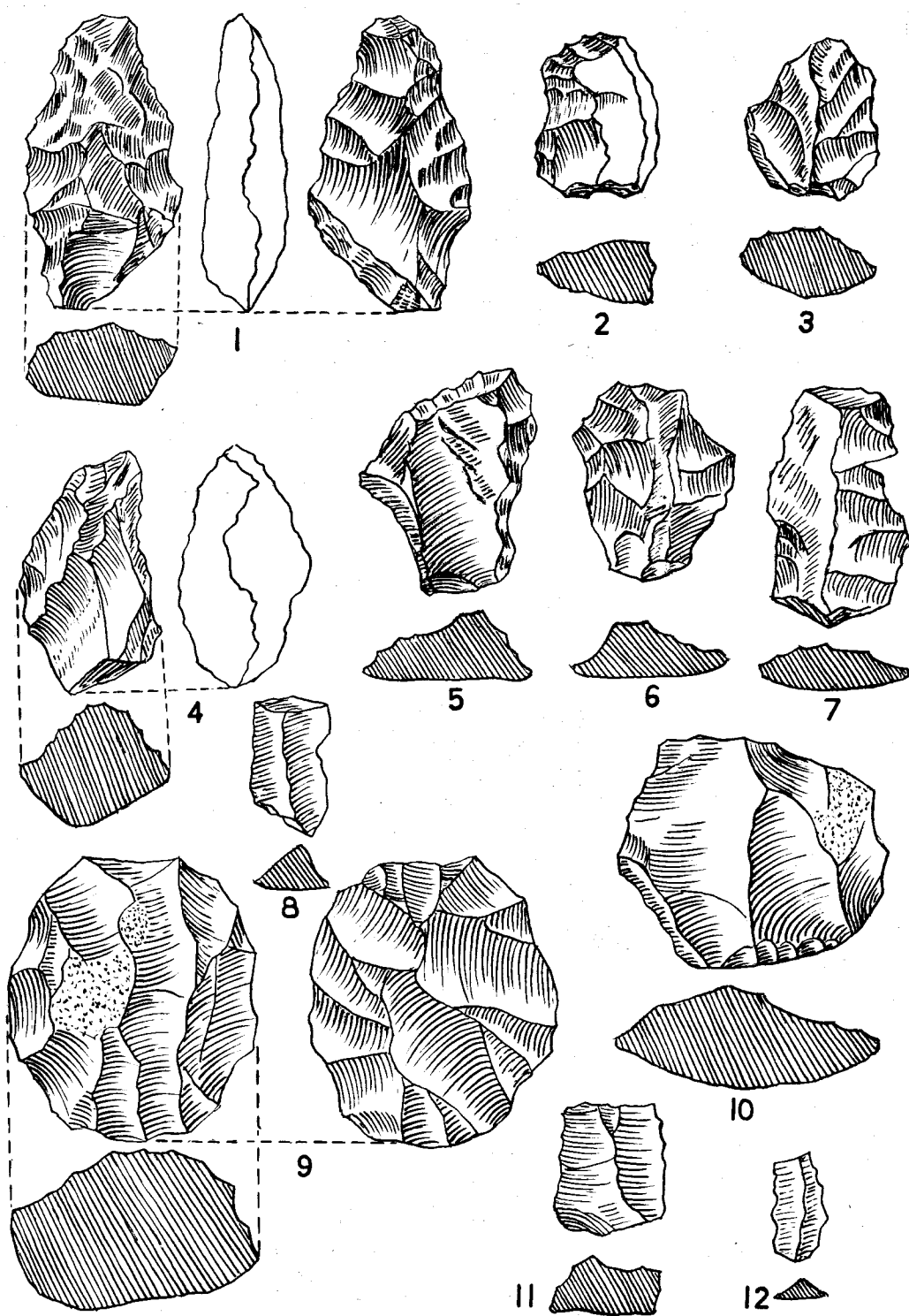


Fig. 5

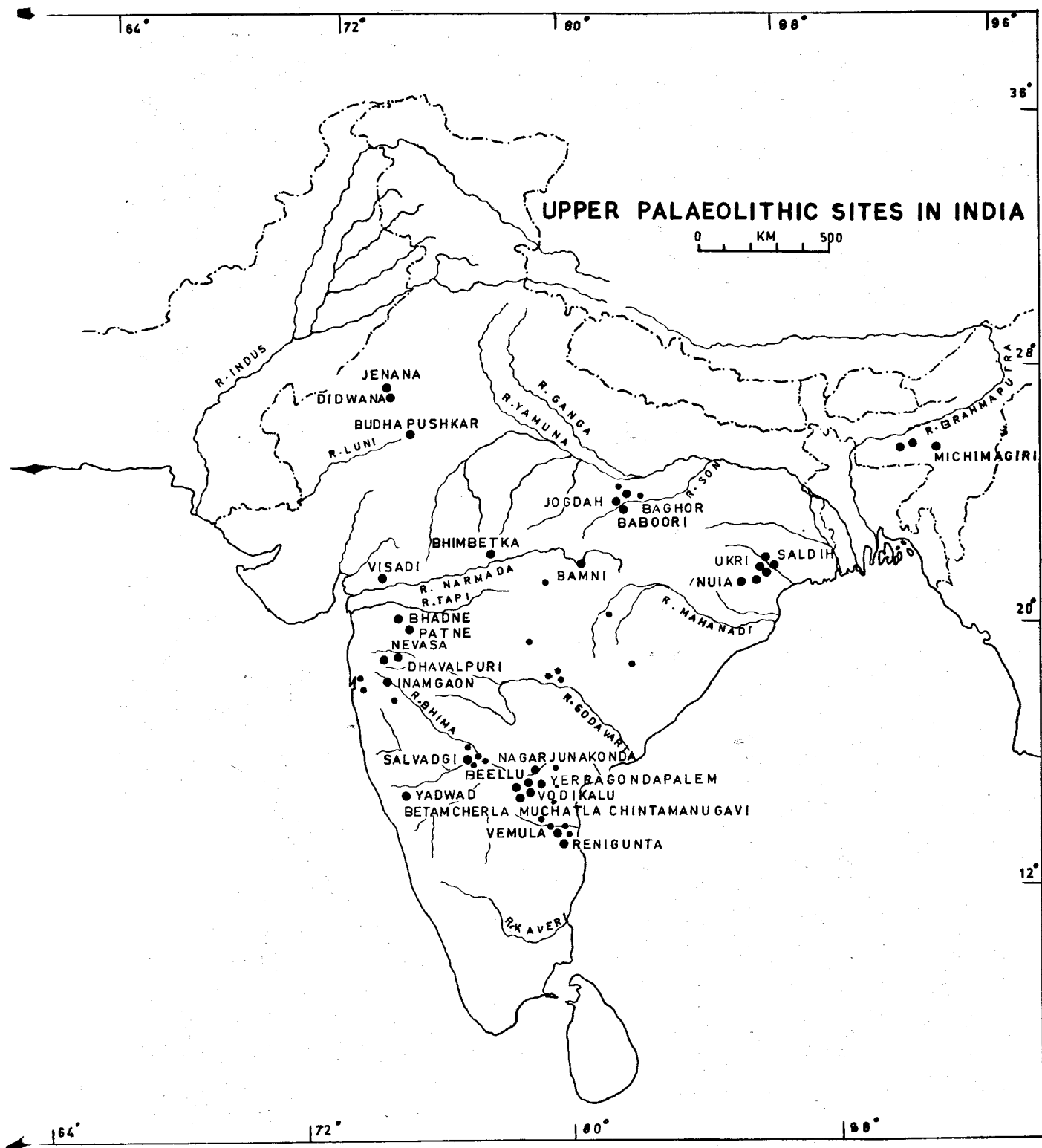


Fig. 6



Pl. 1a



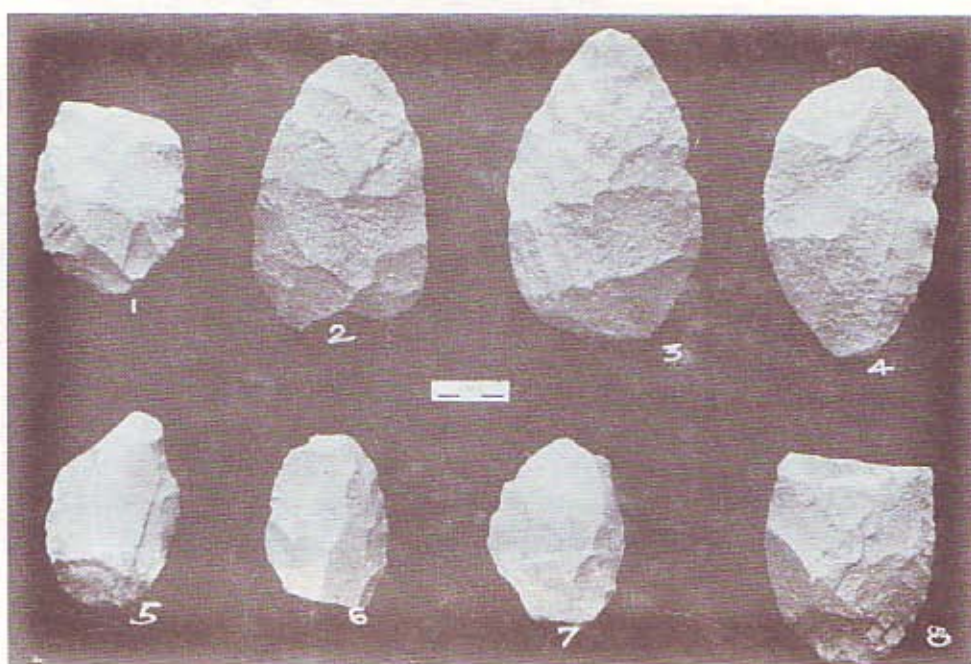
Pl. 1b



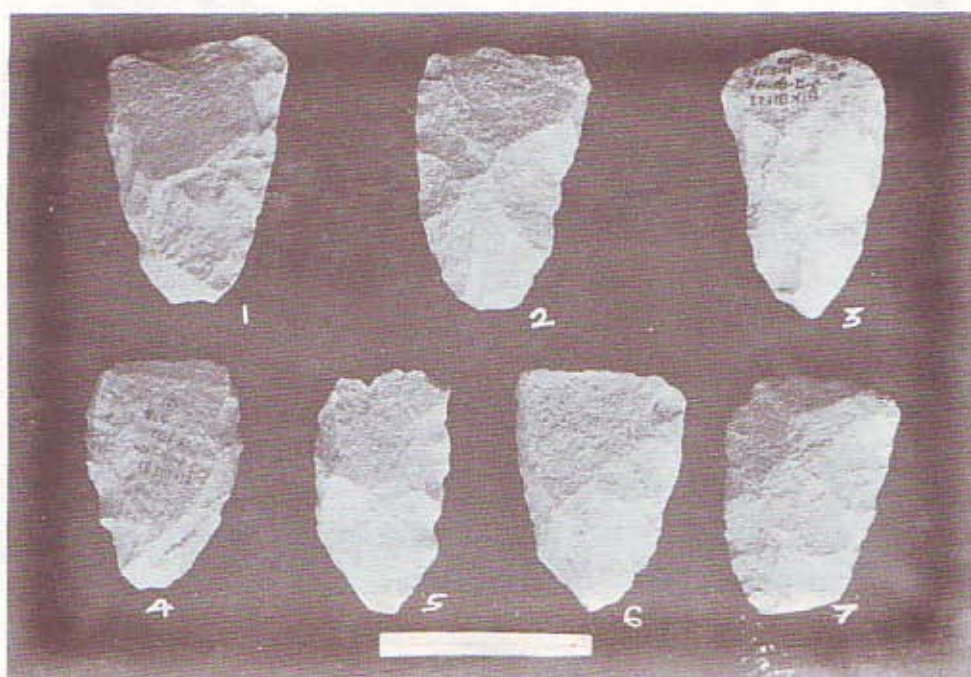
Pl.2a



Pl.2b



Pl. 3a



Pl.3b



Pl. 4a



Pl. 4b



Pl. 5a



Pl. 5b

MATERIALS AND TECHNIQUES OF BUILDINGS IN SRI LANKA

By

H. R. Premaratne

Sri Lanka has a historical record of some 2,500 years.

Although our chronicles of early times make little reference to these matters, we may surmise that with the advent of the Sakayan Princess Baddakachchayana and her brothers who settled down at Uruvela, Vijithapura, Digamadulla, etc., irrigation works in this country had their early beginnings.

With the introduction of Buddhism, structures in brick and stone masonry were constructed for the use of the Sangha.

During this period in our history the threat of invasion was ever present and some attention would no doubt have been given to defensive fortifications as well.

Starting from these beginnings rapid progress was made through the centuries despite the fact that during certain periods these activities waned, due probably to lack of patronage or pre-occupation with matters of more pressing concern.

As is to be expected, the materials used by our ancestors for the construction of engineering works were entirely indigenous, and these can boardly be divided into four categories: (1) earth, (2) brick, (3) stone and (4) timber.

Earth as a building material had been extensively used in irrigation and fortification works particularly in the construction of dams; the earthwork in some cases was of formidable proportions.

Of fortifications, the most notable examples are the outer ramparts of Sigiriya and, to a lesser degree, at Yapahuwa. The fortifications at Sigiriya consist of earthen embankments protected on the outer face with brickwork and square hammered stone.

Evidence of the use of earth in the construction of large stupas is rare. Earth

has however been used at Kotawehera at Dedigama over the birth-place of Parakramabahu the Great. Here selected material has been placed in layers alternately with brick work, in the construction of the dome.¹ On the other hand many of the smaller stupas excavated show that the core had always been of earth in combination with boulders or brickbats rammed down hard with the outer covering of bricks or stone slabs.

Earth no doubt had been used in the construction of ancient buildings particularly for dwellings. It is difficult to state the form, possibly sun-dried bricks or pressed or rammed earth or wattle and daub had been used. From the fact that in existing old buildings which date back to the Kandyan period earth had been used for walls in the form of wattle and daub construction, we may surmise that this method of construction was widely used by the Sinhalese. In more pretentious buildings stone and timber were used, to support the weight of the superstructure.

The existing architectural remains at Anuradhapura and other places too indicate that buildings were constructed in this manner with stone and timber pillars firmly planted in the ground and with earthen walls encasing them presumably of the wattle and daub type. The absence of deep laid foundation or bricks in any quantity tend to confirm this view.

The absence or paucity of remains of any buildings of considerable age indicate that they were of modest construction probably of timber and earth.

BRICKS

Bricks appear to have been used in Ceylon from very early times. It is recorded² that bricks were ordered to be made for the construction of the Thuparama Dagaba in Anuradhapura by Devanampiyatissa circa 245 B.C.

Bricks have been used in the construction of the Mahathupa (i.e. Ruwanwelisaya) also at Anuradhapura in the 2nd century B.C. From these early times there has been a continuous tradition of using bricks in engineering works. Parker in his *Ancient Ceylon* states that every ancient Bisokotuwa (i.e. the valve pit

of today) that he had inspected contained brickwork of excellent quality.

Bricks have been exclusively used in the construction of the stupendous Dagabas which were built in the early centuries of the Christian era. Bricks were invariably made to suit a particular job particularly if the work was of any magnitude or consequence.

The earliest known bricks date back to the 3rd or 2nd century B.C. They averaged 17 1/2" in length x 8 1/2" in breadth x 2 1/2" in thickness and had a cubic content of 372 cubic inches. With the passage of time bricks decreased in size. When we reached the 12th century the dimensions average about 12 1/4" x 8" x 2". These proportions are known to have varied slightly in different parts of the country.

The art of brick manufacture seems to have been clearly understood by the ancients. The process of manufacture could not have been very different from that practised today by the average country brickmaker, i.e. pressing the prepared clay into shape by hand into individual moulds, sun drying and then baking them.

The quality of these bricks is invariably of a high order, both in the preparation of the clay as well as in the burning. Ievers who tunnelled into Jethavana Dagaba in Anuradhapura, the largest in the island, speaks of the well burnt bricks of excellent quality used in the construction of this Dagaba.³

Often special bricks of particular shapes as well as of particular sizes to suit a particular purpose have been made.

Large bricks, one side moulded into an ovolo shape are found as the base or plinth courses of certain stupas.

In some buildings where the familiar mouldings (ovolo, cyma, torus and fillet) have been done in brickwork special bricks differing in size and shape have been used for each detail order. Often even the corner mouldings have bricks specially made for that purpose.

At Sigiriya at one of the main gateways of the ramparts bricks splayed to the

shape of the slope have been used.

In the building of the famous Elephant Wall round Ruwanwelisaya specially prepared bricks of special size and shape for specific positions had been made and used for legs, trunks, head, etc. of the figures. These when placed in their correct positions formed a complete mosaic of the pattern contemplated.

For the lesser known and less elaborate elephant walls at the group of ruins below the Nuwara Wewa bund of the Mihintale Road and on the group of buildings on the Inner Circular Road near Lankarama Dagaba specially shaped bricks have also been used.

Referring to bricks from a Dagaba at Katugampolagama Dr. Paranavitana notes that 'none of the rectangular bricks had engraved on them letters which would have helped us in fixing their date. There were however several wedge shaped bricks, doubtless used for the outer facing of the dome to give it the semi-circular form, which were marked with Brahmi letters of a cursive type datable to the 2nd and 4th centuries of the Christian era. These bricks were not only wedge shaped but had their outer edges splayed; this feature was doubtless to give the necessary curve to the elevation of the dome when the various courses of brick were placed one above the other.'⁴

He further observes that the bricks used in the spire were specially made to suit the dimensions of each dagaba, and as the spire gradually tapered towards the top, the bricks of each course were of a size slightly smaller than those of the course below it, and, in order to guide the brick layers, the bricks of the various courses have been marked before they were baked with words such as 'doloswana' (twelfth) etc., indicating the particular course on which they were to be laid. Such bricks have been found in a number of ancient sites and with the aid of these markings on the bricks old structures have been reconstructed or restored, such for example as the Pidurugala Dagaba whose entire spire was reconstructed in recent years.

From the careful planning of these old brickwork structures and the meticulous attention paid to detail we might even conclude that working to detailed plans was not unknown to the ancient engineer.

In the design of brick built shrines very thick walls (structurally unnecessary) some as thick as 6 feet have been used. In contrast the walls of secular buildings, and monastic dwellings were comparatively thin and of reasonable dimensions, even judging by modern standards. Therefore the reasons for providing unnecessarily thick walls in religious buildings would appear to be not a lack of understanding of the structural requirements but to other factors. In constructing these thick walls, only the facing was built of fairly regular brickwork or of stone masonry. The core consisted of a type of concrete matrix made of brickbats and pebbles in clay or lime mortar.

Bricks laid in lime mortar though known earlier were not used to any extent by the Sinhalese architect until the 7th or 8th centuries. Greater use of lime mortar however was made during the Polonnaruwa period about the 11th and 12th centuries. This enabled the builders of that time to construct buildings of larger size such as the Lankatilaka, Tivanka Pilimage, and Thuparama all of Polonnaruwa and all surpassing in dimensions any attempted earlier. These are all of the vaulted type. Earlier buildings of this type but smaller in dimensions are the Gedige at Anuradhapura and also the Pilimage near Jetawanarama at Anuradhapura.

'Lankatilaka'⁵ the largest of these edifices is 124 feet long with the greatest breadth of 66 feet at the shrine. The height of the building as it stood originally is estimated as having been nearly a 100 feet.

BRICK ARCH

There is evidence that the principle of the true arch was known to the ancients,⁶ but they do not appear to have exploited it to the full, possibly as a result of experiences of failure, due no doubt to the fact that the horizontal thrust was not adequately catered for. This suspicion of the arch seems to have been shared with the ancient Egyptians who eschewed it in their structures for the reason, as they stated, that 'the arch did not sleep'. In consequence of this, they exploited the corbelled arch type of construction which is really not an arch in the correct sense but a cantilever form. The ancient builders of Ceylon did likewise.

A very interesting example of a combination of both the true arch and the

corbelled arch to span a single opening in a building, is to be found in the Thuparama at Polonnaruwa. 'The builders had first to reduce the width of the nave from 13 ft. 7 ins. to 8 ft. 8 ins. This was done by corbelling the courses from a height of 7 ft. 5 ins. above the floor to a height of 15 ft. 6 ins. from which point the true arch sprung'. There is only one arch ring and it is evident that the stability of the roof depended to a large extent on the excellence of the mortar.

STONE

The chronicles record the use of stone as early as the 3rd century B.C.⁷ It is stated that Devanampiyatissa marked the site of Ruwanweli with a huge stone pillar.⁸ A colossal monolithic pillar at Tissamaharama is ascribed to Mahanama (Brother of Devanampiyatissa).

The extensive remains in stone in Anuradhapura provide ample evidence of the use of this material from that early period to about the 9th century A.D. The remains of Polonnaruwa, Yapahuwa, Dambadeniya, Kotte and Kandy indicate the use of stone right through the centuries, but during these later periods a decadence had set in and stonework did not reach the high standards of quality nor was it as extensively used as in the early Anuradhapura period.

Stone no doubt was quarried in a manner similar to that adopted by our stone masons of today working with hand tools. Blocks of stones were separated from the parent rock by a process of chiselling holes (4" to 5" centers) along a line and driving wedges into them.⁹ Blocks so separated were further split into columns and slabs as necessary also by wedging. The masons of those days finally finished off the surface of the stone in more or less fine parallel grooves, as opposed to the present day work which appears pitted all over.

Stone has not only been used as pillars, beams, lintels and for ornamental features such as mouldings, moonstones, steps and balustrades but also for building of bridges, paving of roads, construction of large anicuts and spills, the facing of Bisokotuwas (valve pits) and channels, and as protective wave-breakers.¹⁰ What is more, the ancients knew the stone to be used for any particular purpose.

In the very early works crystalline limestone, has been used as base mouldings of thupas, and for statues and decorative features, such as friezes, etc. It is not possible to say definitely whether this material was selected on account of the comparative ease of working or on account of its appearance ; probably for both reasons.

In later works granite was used more extensively, and the quality and texture of the stone selected varied according to the purpose for which it was intended. In the case of moonstones, steps, balustrades, etc., granite of the highest quality has been used. In later times however it would appear that the same degree of care and attention was not paid to the selection of the stone. The Gadaladeniya Vihara (14th century) for instance has been built of a highly micaceous granite which shows considerable weathering.

Regarding the large blocks that have been used for various purposes, particular mention must be made of the monolithic slabs forming the bridges connecting the two platforms, in the western monasteries. One such measures 14' x 13' x 2' (over 20 tons in weight).

Another instance is the huge yupa pillar of Abayagiri. It is inconceivable how this could have been raised and positioned in the spire about 250' high, and maintained in a vertical position in so limited a space.

The huge slab of stone, known as the Galpotha, was reputed to have been brought from Mihintale, and in the case of the gigantic rock cut images of Maligavila, the monoliths evidently were brought from a considerable distance.

Different types of stone masonry are met with in the old works. In addition to the ordinary rubble wall where stone and boulders in their natural state, are broken up and used, some other types to be seen are the irregular dressed stone masonry where rock slabs sometimes of considerable size shaped so as to fit exactly the slabs adjacent to them.¹¹ The face is sometimes rough but often finished smooth (Fig.D).

There is also the plain ashlar where stones are cut square and finely dressed

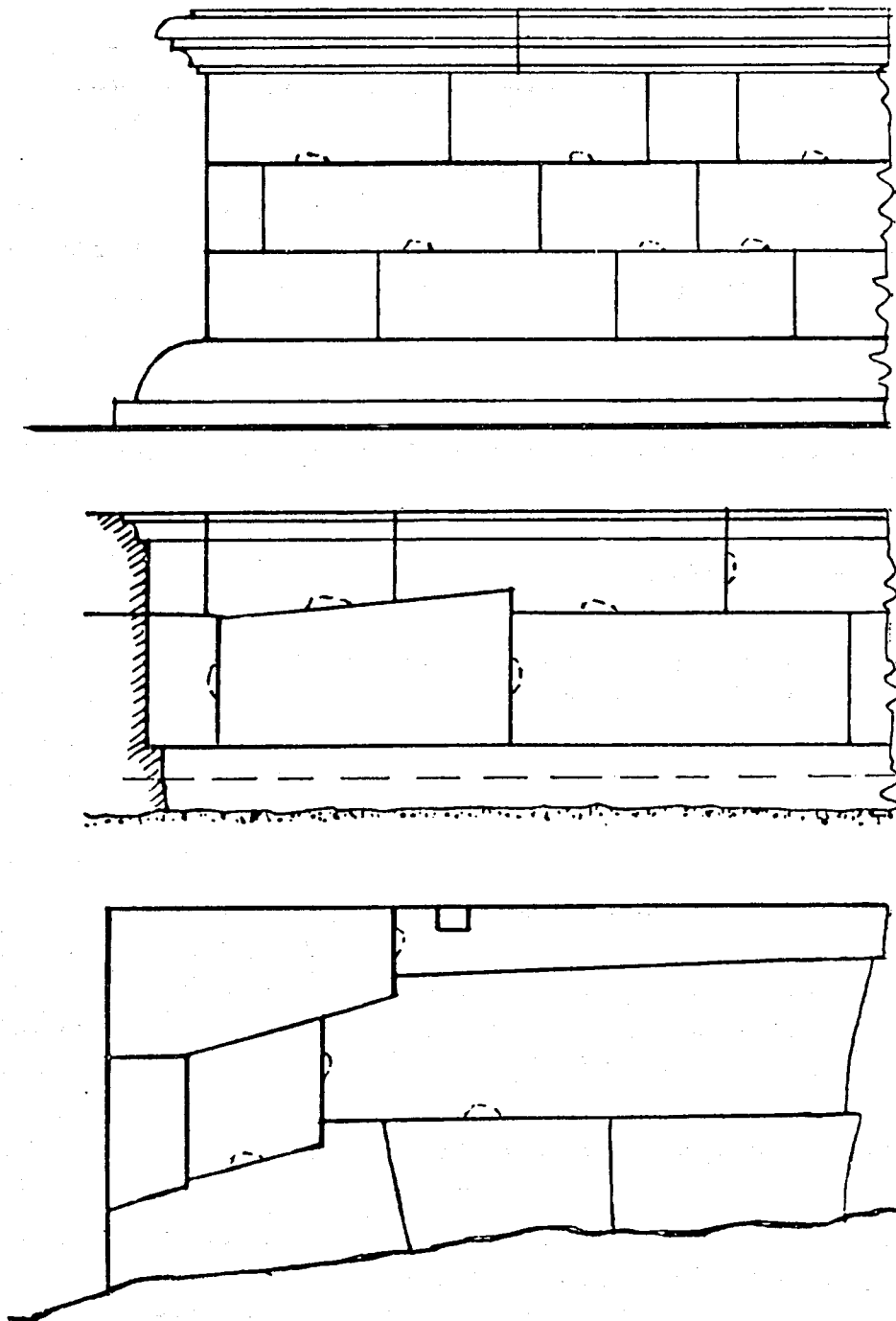


Fig. D

and arranged in regular courses.

Walls were also constructed of blocks of stone roughly hammered and squared. This type of masonry was used at Sigiriya in building the fortress wall and also at Tolvila.

Still another type (there is only one example known so far) is the Cyclopean type of wall found close to Sigiriya Rock at the base of Mapagala. Here huge blocks of granite and small boulders are neatly packed. This is considered to be a pre-historic type but in the case of the wall at Sigiriya. Bell thinks 'They probably date back only to the occupation of Sigiri Nuwara in the 5th century, but for all that are almost as remarkable a proof of the skill and energy of the Ceylon builders of that day, as are the walls of colossal boulders at Sacsahuaman in South America'.¹²

What remains of the stonework of the old buildings is chiefly the base platform and in some cases, pillars. The superstructure being of wooden construction has decayed and completely disappeared. In the earliest times, before the art of quarrying and dressing stones was mastered, the platform was constructed of boulders and weathered rock surmounted sometimes by flat slabs laid as coping stones.

In course of time, with advancing knowledge in the art of dressing stone and increasing ability in handling, setting and positioning them, greater elaboration was attempted. Mouldings were added to the plinth. So that in the final form the base consisted of a flat slab foundation on which rested an ovolo or inverted cyma plinth surmounted by a torous moulding from which rose a plain vertical band. From this projected a finely moulded cornice (Fig.E4). For economy of construction and also for giving emphasis to a particular building or group of buildings less elaborate forms (Figs. E 1 and 2) have been used especially on the less important buildings.

In fact it should be noted here that this is a basic and distinctive style of moulding peculiar to the Sinhalese architect who has developed and exploited it throughout the centuries. Buildings of purely Dravidian type carry different mouldings and are seen side by side with those distinctively Sinhalese in character at Polonnaruwa.

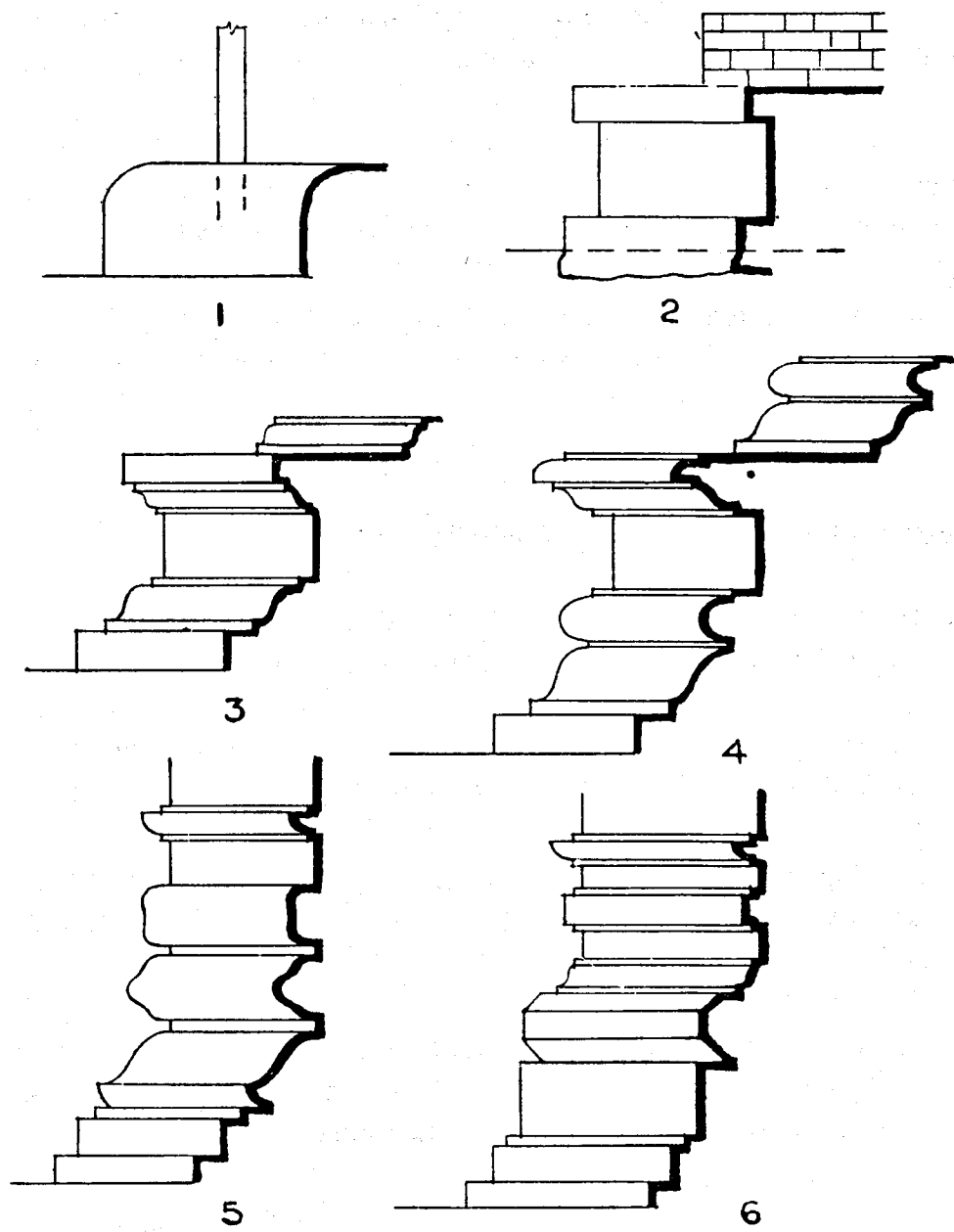


Fig. E

Rock outcrops or high ground had invariably been selected to site monastic buildings, and any rock prominence was incorporated in the building and every use made of it for economic or aesthetic reasons.

Sometimes instead of building a retaining wall over a deep hollow, the plinth of the building was carried on piers like a bridge,¹³ as for example in the outer circular road monasteries and in numerous other instances as well.

A point to be noted is that except in the construction of heavy engineering works such as anicuts, spills, etc., or when used for pillars, lintols and such like, in most other building work, stone was used more as a lining or facing and was laid on edge as thin slabs with the broad face exposed.

This called for special methods of joining and keying.

Thin slabs irregularly shaped have been used effectively to give not only a good bond but also a pleasing and harmonious appearance to a structure.

Where the architecture demanded a formal treatment such as in the Vahalkada to a stupa a regular bond was provided.

For keeping the slabs in position often the beds and joints were provided with mortices and tenons at regular intervals. Sometimes there were rebates or projections¹⁴(Fig.F).

At the twin ponds, for securing in position the moulded copings which cover the horizontal parapet and the sloping wings of the steps leading to the ponds, the stones were not only tenoned at the ends to the adjacent coping stones but also sunk on the underside to fit into the parapet or wing stones and in addition provided with dowels at intervals. The dowel pins or studs were also of stone rectangular in shape -slightly tapering at the ends and fitting into holes of similar shape in the adjacent slabs (Fig.G).

The massive walls of Avukana present an interesting technique-the only one

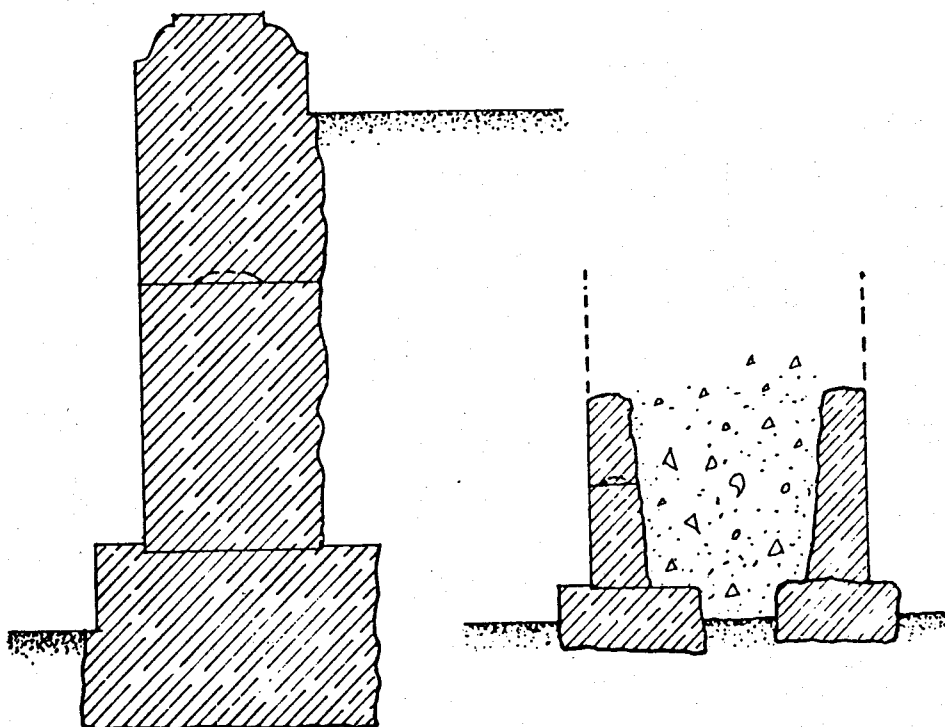


Fig. F

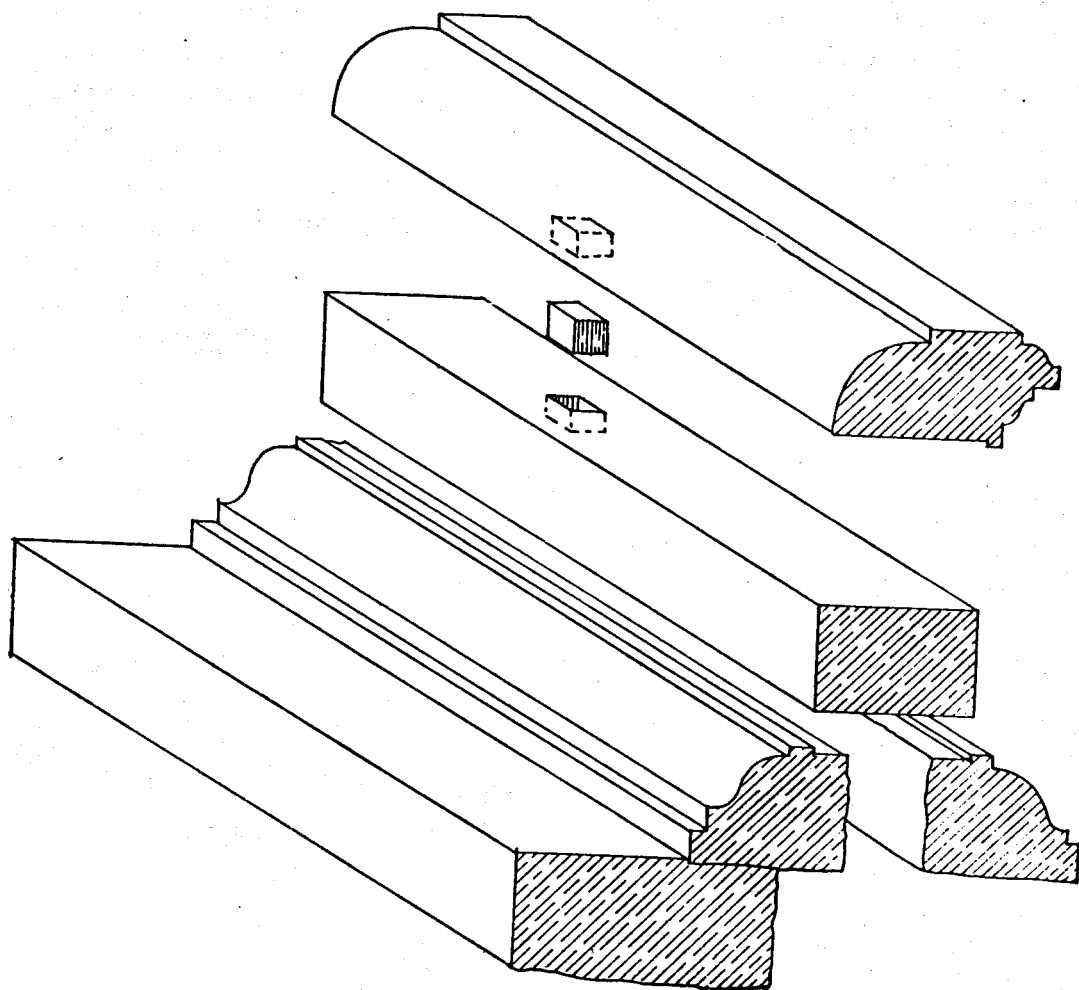


Fig. G

of its type so far met with in Ceylon. All that is preserved of this shrine is the lower part of the walls 10' high built of stone. In keeping with the general character of the rest of the work-the massive proportion of the statue and the rock on which it is chisselled-the stone slabs of which the shrine is built, were also massive in size and roughly finished.

The foundation and base mouldings are of conventional form but in the construction of the wall bond stones of special shape have been used at regular intervals extending from face to face.¹⁵ These provided an effective key for adjacent stones and incidentally gave a striking pattern.

The Kuttam Pokuna (Twin Ponds) at Anuradhapura are constructed of carefully dressed stone laid in regular courses stepping down into the ponds.

The corners have been bonded by allowing alternate stones from the adjacent side to project far into the backing, the end of one stone abutting and fitting into a set on the face of the projecting stone. The successive courses when laid thus formed a sort of dovetail joint. How effective this has been is evidenced from the fact that although the sides of these ponds have collapsed, the corners have remained intact throughout the centuries.

The stones did not serve as a retaining wall but merely as a pitching, and the space between the pitching and the sides of the excavation was filled in by a backing of clay puddle in which a proportion of boulder and quarry chips had been incorporated. The excavation was in decayed rock and appears to have been confined within minimum limits as the puddle backing was comparatively thin.

It is interesting to note that in certain cases, specially in building work the principles of timber construction appear to have been employed in stone work as well. Starting from the purely timber type, with timber posts or pillars to carry the roof, at a later date even when more permanent materials came to be used, the original form of construction was retained and even simulated in the more permanent material. This is evidenced in the embedding of stone or timber pillars (very common in many buildings) though structurally unnecessary, in most positions in brick buildings. Another instance is the construction of the ceilings of pavillions

at the Tissawewa bath where the architect has taken pains to reproduce in stone the form of a planked ceiling supported on cross-beams.

The varied purposes to which stone had been put, the skill with which it had been handled, the ingenuity that has been displayed in its transportation and erection and the delicate finish and artistry of the mouldings, figures and motifs with which these have been embellished command the admiration of every one.

TIMBER

Timber was the earliest and most important structural material known to the ancients.

From the evidence available it would appear that timber was used extensively for pillars and beams and in the construction of roofs, doors and windows.

Although little or nothing of the original timber has been discovered, yet timber fastenings such as nails and spikes have been found in great abundance at many building sites. The large size of some of the fastenings are an indication that timber of fairly large proportions had been used. This is further confirmed by the cavities of considerable size which have been left in the walls after the timber which originally filled the cavities had decayed.

Except the few buildings which had vaulted roofs most of the others would probably have had roofs of timber construction. What shape these took it is difficult to say. From the paintings of the time and the miniature models in relief in ancient carvings we might infer that the roofs were of domical or curvilinear form.

The Embekke Devala, still extant dating from about the 14th or 15th centuries, of wooden construction, has its rafters so shaped that from within, the view presented to the beholder is that of a barrel vault ending in a semi-dome.¹⁶

TILES AND TERRACOTTA

Clay or terracotta tiles have been used both for roofing as well as for ornamentation of walls. Roofing tiles were mostly flat, marked ~~sometimes~~ with roughly fashioned

grooves.

There have been instances of these tiles having been slightly curved perhaps for tiling of domical roofs. It is thought that the 'Vatadages' (circular shrine houses) such as the Thuparama at Anuradhapura, Medirigiriya, Polonnaruwa, Tiriya, etc. had such roofs.

Glazed tiles have been found at several building sites at Anuradhapura, and also at a site in Kantarodai in Jaffna. At the Anuradhapura site, the colour most common was bluish green; some white tiles, a few yellow and a red specimen have also been found.

Commenting on these Dr. Paranavitana says ¹⁷ that 'the tiles were of the typical Sinhalese pattern and that only the lower part visible when placed on the roof was glazed'. The Archaeological Chemist of India who analysed these specimens gives an analysis of the composition of the glaze as follows:-

Silica	66.26%
Alumina	12.09%
Ferric Oxide	0.11%
Manganese Oxide	Nil
Lime	2.10%
Magnesia	traces
Copper Oxide	2.33%
Alkalies (Chiefly Soda)	17.11% (by difference)
Total	<u>100.00%</u>

He further remarks:- 'The lump of glaze of the same colour is probably identical with the material with which the potsherd is coated. The colour is due to the presence of 2.33% oxide of copper; but in its absence a white glaze would be obtained such as can be seen on some of the specimens. The black lump is a fragment of crude glass or glaze which has a dark yellowish colour in their sections due to the presence of ferric oxide. The composition of this glaze does not exhibit any close relationship with those found in Egypt, Mesopotamia, or India, and it is

therefore highly probable that the glazes were prepared independently in Ceylon. It is quite conceivable that the art was originally learnt from some foreign traders and the variation in the chemical composition is due to the nature of the materials (e.g., sand) which were handy locally in Ceylon.

‘The glaze on the tiles discovered by Dr. Pieris at Kantarodai has been examined by Mr.W.N.Rae and found to consist of ferric iron, aluminium, lead, calcium, sodium, copper, and silica’.

In Kandyan times tiles of different shapes have been used to form different patterns in the roofs. This gave the roof an added attraction to the beholders.

Terracotta tiles with figures of animals, and floral designs executed in relief have been used both in buildings and other structures. Other terracotta products used extensively were earthenware pipes.¹⁸

They varied in size and shape, and were so fashioned by the provision of a taper or a well defined socket and spigot although crudely made, that a continuous length of piping could be laid with reasonably water tight joints.

In a vihara at Polonnaruwa we have ‘an example of vertical terracotta pipes embedded in a brick wall, which were laid for the purpose of draining the lustral water from the upper storey of the shrine’ and leading it away from the building.¹⁹

Earthenware rings which fitted one over the other, sometimes spigot and socket fashion without any jointing between successive segments have been used for wells and pits.²⁰ They might have also served the purpose of kerb rings during the process of sinking. Wells lined in such a manner are common today in Kandyan districts and in other parts of the country, and in certain cases are of considerable size.

They were presumably laid dry with the object of facilitating the seepage of water into the well. It is evident that the provision of holes was impracticable as these would have impaired the strength of the cylinders especially whilst handling and sinking.

BONDING

Regular bonding of any type such as English, Flemish, etc. as we understand it today is notably absent in the works of the ancients. Bricks have in the main been laid as stretchers. Occasionally alternate courses of headers and stretchers have been used. In some cases courses of stretchers have been broken by an occasional course of headers. The courses however are uniformly horizontal and regular. It is frequently found that in the same structure some courses are laid in bricks of a different thickness to the average. Such use is understandable in the case of mouldings, bricks for which are specially made, but sometimes the reason is not so obvious. Again little attention appears to have been paid to the elementary but important requirement, that vertical joints in adjacent courses should be staggered. It is not unusual to find a common vertical joint extending through two or three successive courses.

LIME MORTAR

Instances of the use of lime mortar ascribable definitely to the earlier periods are few. Lime mortar however appears to have been used far more freely in the Polonnaruwa and the succeeding periods.

An examination of a sample of mortar from Anuradhapura discloses the fact that one constituent of the lime was obtained from the burning of sea shells. In the mixing of mortar a coarse sand with a high proportion of quartz has been used. In the Polonnaruwa period especially, mouldings have been carried out in plaster, and stucco was used in abundance for architectural embellishments to buildings.

Mortar seems to have also been used from earliest times as the outer finish or plaster to dagabas and buildings, and the finished surface has been either white washed or painted to improve its appearance.

There are instances of highly polished plastered surfaces as is evidenced by the gallery walls of Sigiriya. Plaster of the thinness of an egg-shell has been used on wood and stone, chiefly in images. Even the ornate stone pillars of buildings appear to have been thinly plastered and painted over.

The constituents of mortar and the method of laying it on was so skilfully done that this very thin superficial layer has adhered tenaciously to the rock or clay parent material throughout the centuries, in certain cases lasting up to the present time. It should be noted that the skilful application of this shell of plaster is ascribable particularly to the earlier periods of Sinhalese architecture. When we come to the Polonnaruwa period and more recent times the lime plaster is seen to have been laid on more lavishly, possibly with the object of glossing over defects in the original sculpture or rock moulding which are now known to have been executed not as skilfully in regard to architectural perception and attention to detail as those of the earlier period.

The finest example, without question, of the skilful application of plaster, is in the rock pockets containing the Sigiriya frescoes and the gallery walls. The plaster in the rock pockets has been laid on in three layers each layer of a different constitution.²¹

The first or base coat which is constituted of a matrix of red earth, sand, paddy husk and other fibrous matter laid on no doubt with the object of making up any imperfections in the rock surface. the next coat is a thin layer of plaster composed of sand, some clay, lime and vegetable fibres. The third and uppermost layer also consists of a thin coat composed of sand and lime. The composite thickness of the three coats varies between 3/8 inches and one inch.

FOUNDATIONS

In regard to earth works such as embankments, dams and fortifications, we do not have a very clear idea of the nature of the foundations of the early structures, nor the methods adopted in constructing them. But the fact that several of these have stood the test of time for a period of many centuries, is clear evidence that the principles underlying their construction had been sound.

In regard to buildings, the available evidence supports the view that whereas the stone and timber columns in these structures were sometimes provided with satisfactory foundations such, for example, as stone base slabs or solid blocks of brickwork (Fig. A) for distributing the loads over the subsoil, yet, in the case of walls no attention at all appears to have been paid to their foundations as most of these

have been built up direct from surface level and no attempts have apparently been made to distribute the load or to excavate deep enough to a satisfactory stratum.²² This practice in regard to wall construction might possibly have been a continuation of the wattle and daub tradition.

There is on the other hand evidence that in certain other structures, particularly those of some importance, meticulous attention had been paid to the design and construction of their foundations.

The Mahavamsa²³ gives the following description of the foundation of the Ruwanweli Dagaba. 'When he had ordered to take away the stone pillar the lord of the land had the place for the thupa dug out to a depth of seven cubits to make it firm in every way.'

Round stones that he commanded his soldiers to bring hither did he cause to be broken with hammer : and then did he, having knowledge of the right and the wrong ways, command that the crushed stone, to make the ground firmer, be stamped down by great elephants whose feet were bound with leather.

The fine clay that is to be found on the spot, for ever moist, where the heavenly Ganga falls down (upon the earth) (on a space) thirty yojanas around, is called because of its fineness, "butter-clay".

Samaneras who had overcome the asavas, brought the clay hither from that place. The King commanded that the clay be spread over the layer of stones and that bricks then be laid over the clay, over these a rough cement and over this cinnabar, and over this a network of iron, and over this sweet-scented marumba that was brought by the samaneras from the Himalaya. Over this did the lord of the land command them to lay mountain-crystal. Over the layer of mountain-crystal he had stones spread. Everywhere throughout the work did the clay called butter-clay serve (as cement). With resin of the hapittha-tree, dissolved in sweetened water, the lord of chariots laid over the stones a sheet of copper eight inches thick, and over this, with arsenic dissolved in sesamum-oil, (he laid) a sheet of silver seven inches thick.

The Mahavamsa again says²⁴ that "the three terraces for the flower-offerings

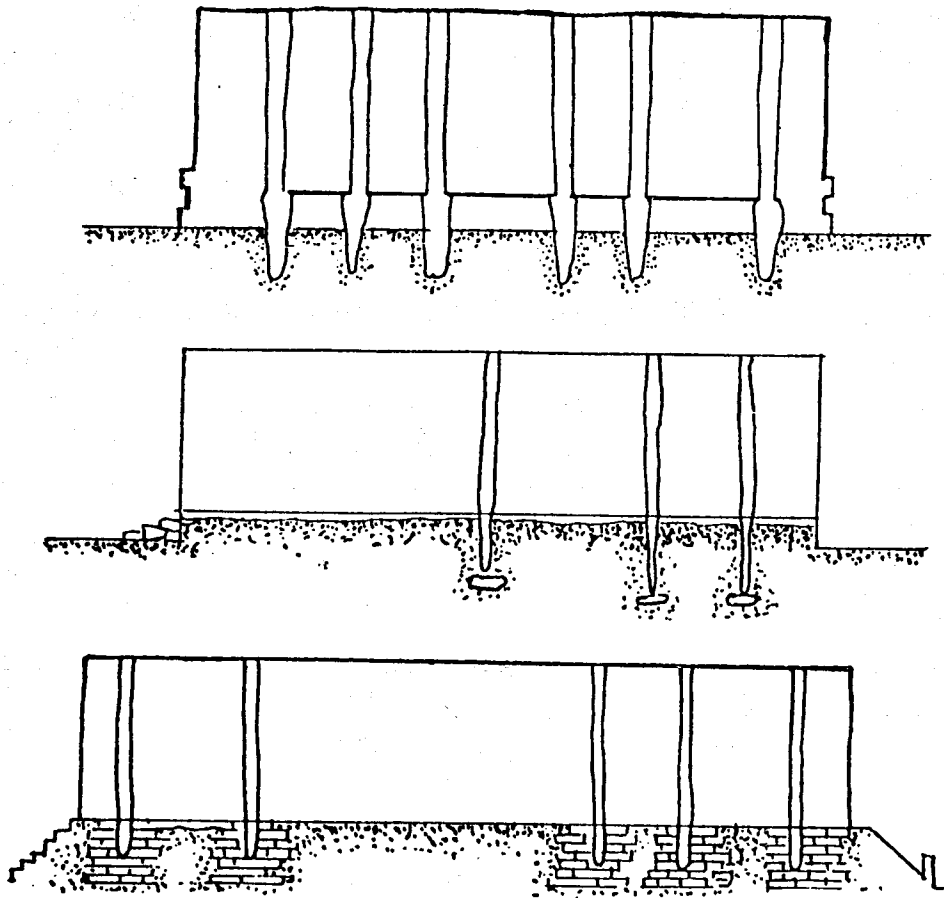


Fig. A

to the thupa did the theras of miraculous power cause to sink down so soon as they were laid with bricks, making them equal to the surface of the soil. Nine times did they cause them to sink down when they were laid. Then the king called together an assembly of the brotherhood of bhikkus assembled there. The King sought out the brotherhood, and when he had paid homage to them with gifts and had reverentially greeted them he asked the reason of the sinking down of the bricks. The brotherhood answered: 'In order that the thupa may not sink down of itself was this thing done by the bhikkus of miraculous power, O great king; they will do it no more, make no alteration and finish the Great Thupa.'

These references indicate that at least the compiler of the Mahavamsa if not the theras of the time of Dutugemunu attached the greatest importance to and had a sound knowledge of foundation problems. The quality of the work described surpasses the most exacting standards of the present day.

Whether or not the building as constructed conformed to the specification laid down in the Mahavamsa it is not possible to say for the reason that no investigations have been carried out.

In the case of certain other stupas however some factual data is available.

In the Jetawana Dagaba of Anuradhapura we are able through the researches of various scholars to get some idea, though by no means a complete picture, of the foundation structure. Mr. Bell who during excavations exposed the base of the Jetawana Sthupa noticed that 'its foundation of stepped brickwork started from a depth of 26 feet below the level of the pavement, this having also a layer of concrete below the brick work'.²⁵ This indicates that the builders of this Dagaba not only excavated the foundation but commenced the brickwork on a layer of concrete. The Maluwa is about 10 feet above ground level. Therefore the depth excavated would have been about 16 feet. Ievers who investigated the internal structure of this Dagaba in 1887 says ²⁶ a tunnel was started 33 feet above the level of the paved courtyard and carried 54 yards to the centre from thence a vertical shaft was sunk to the level of the Maluwa (paved courtyard).

The bricks of which the Dagaba is built were laid in beautiful order and so solidly constructed that it was necessary to cut with chisel and hammer, to form the

tunnel to the centre'.

Mr. Murray, P. E. , reported (October 20, 1888) that his examination of the vertical shaft now 46'-3" showed that the ground level had been reached and even passed, so that at the centre there was hardly any excavation.

According to this information we might conclude that the outer edge of the Maluwa was carried down about 16 feet below ground level but that the centre portion under the dome was founded at a comparatively shallow depth. Although at first sight it might appear that the dome was very superficially founded, yet it is evident from soil mechanics considerations that in view of the deeper encircling walls of the Maluwa the dome had in fact an effective foundation depth of 16 feet.

In the case of the Dakkina Thupa which has been investigated by the Archaeological Department it would appear that very little excavation if any had been done before the foundations were laid. This instance however cannot be taken as evidence that the ancients did not have deep foundations for structures of this type, for according to popular tradition and according to the opinion of the then Archaeological Commissioner, this Dagaba was built on a cremation site and therefore it is conceivable because of the particular sanctity of the site that any excavation would have been taboo. However, for the stability of the structure the base extended for a considerable distance beyond the limits of the superstructure (Fig. B)

The pattern of foundations of most structures, whether for walls of buildings, parapet walls or retaining walls was for the brick work or stone masonry to be commenced on slabs of stone carefully laid to a definite plan 27 (Fig C). Invariably the projections of these stone slabs not covered by the masonry were carefully dressed and finished. The stone slabs themselves were generally placed at ground level. Sometimes they were laid below ground level but at very shallow depths.

This was invariably the case both in the earlier period of Sinhalese architecture where brick was not used extensively as a building material, as well as in the post-Polonnaruwa period where brickwork seems to have been exploited more fully than in earlier times. These foundations are all definitely defective. We are therefore tempted to ask the question whether the brickwalls of these buildings

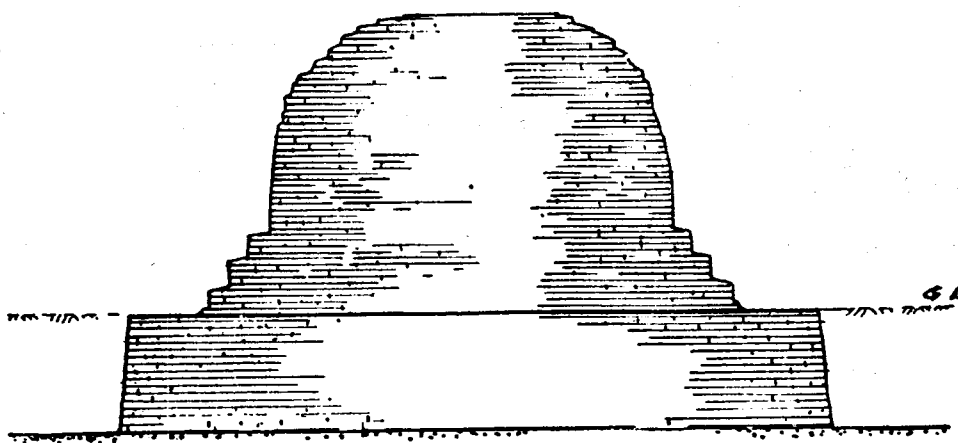


Fig. B

were not the result of a mere substitution of bricks as material in place of the wattle and daub or pressed earth of the walls of the earlier builders, a fact which would probably account for the absence of deep foundations.

I have so far sketchily outlined the different materials of construction and briefly described the uses to which they have been put.

I have made no reference to the irrigation works of ancient Ceylon which take pride of place amongst the engineering achievements of the people of Lanka. This is a vast subject, to which justice cannot be done in a short survey such as this and I propose therefore to make only a passing reference to it. Irrigation works like every other engineering work is not an end in itself but a means to an end. It has to serve a practical purpose.

In the case of irrigation works this practical purpose would be the utilization of a source of water for the irrigation of the maximum extent of land, due regard being paid to economy both in respect of initial cost as well as maintenance charges.

It is evident from a study of the ancient irrigation works in Ceylon that these cardinal factors have consistently been borne in mind by the men who designed and constructed them, indicating that their knowledge of the principles of irrigation engineering and their concept of land utilization had been of a high order.

Very often the charge is levelled against the engineers of old that their irrigation channels were too long and tortuous. But when we examine any such work we find that the trace had always been selected with the object of keeping the channel at the highest possible level, for the obvious reason that by so doing the channel would command the greatest head and render irrigable the largest possible extent of land.

Even when a channel had to perform the work of taking water from one reservoir to another, even then provision was made to keep the water at the highest possible level in order to provide facilities for direct irrigation of land under the channel or to feed other and smaller tanks on the way. The main irrigation channels

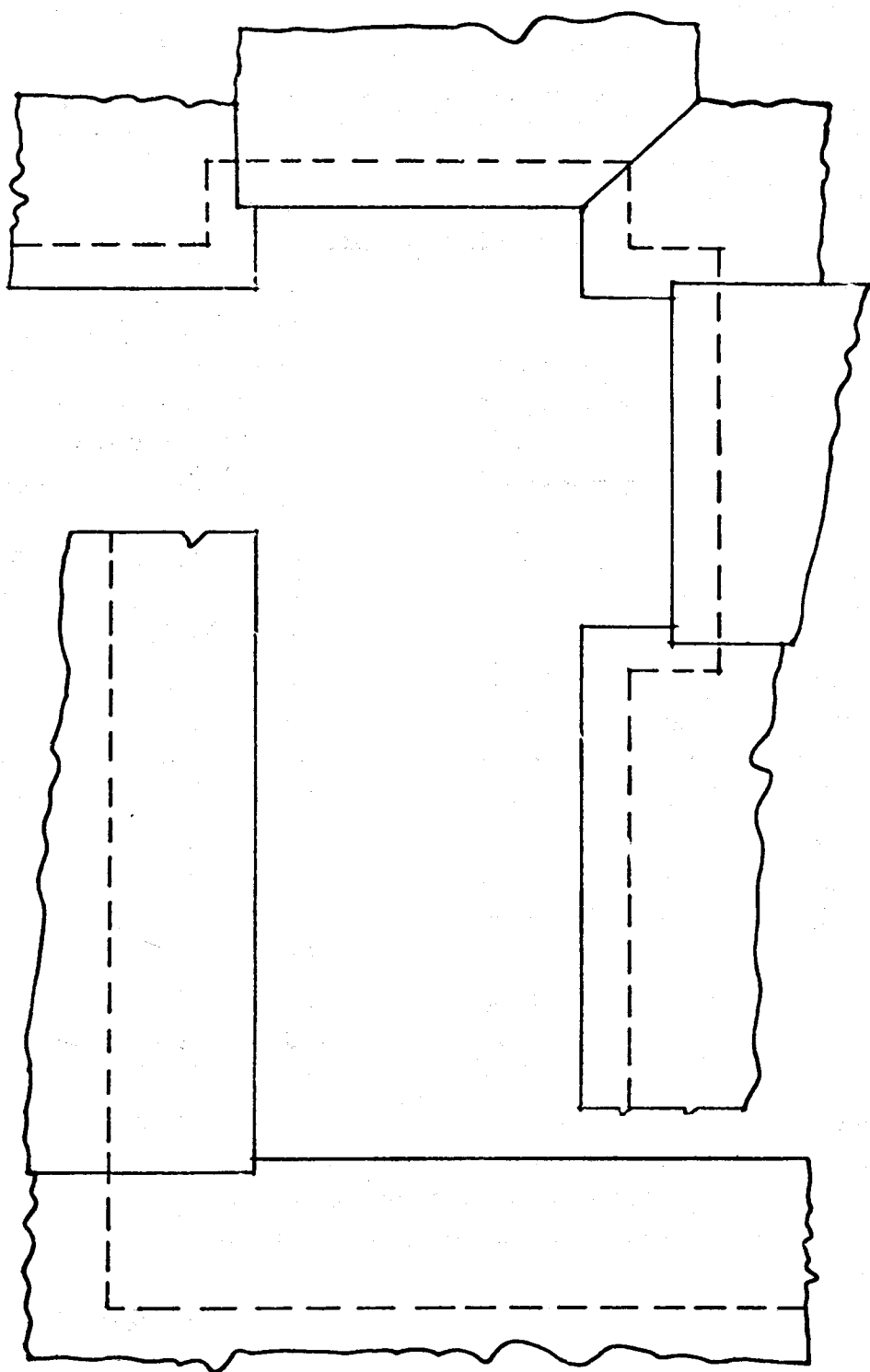


Fig. C

such as the Jaya Ganga, (i.e. the Yoda Ela) leading the water from Kalawewa to Tissawewa. The Minipe Ela and the Elehera channels are examples. The Jaya Ganga follows high ground from Kalawewa, its source to Tissawewa, and irrigates the lands below it' by a perfect system of irrigation. In each of the subsidiary valleys on its course the water is diverted by channels into little village tanks or chains of tanks'. This characteristic is to be noted as well in the cases of most other channels.

A foot lost in the level of water could only be regained by pumping - expensive in first cost-expensive in maintenance. Further every rapid loss of level means release of energy which can only result in ills such as scour, etc. to be remedied by elaborate devices. When they graded their channels to a nicety, the ancient engineers were alive to these facts.

The gradient of Jaya Ganga is so slight that of its 54 miles, the first 17 mile has a gradient of only 6" per mile.

Parker, one of the Irrigation Engineers who served in Ceylon during the latter part of the last century and who made a close study of ancient irrigation works makes the following observations.²⁸

'As one whose duties permitted him to gain an intimate acquaintance with the ancient works, I have never concealed my admiration of the engineering knowledge of the designers of the great irrigation schemes of Ceylon, and the skill with which they constructed the works. When we find, therefore, that the open well is never absent at any sluice in a reservoir we may safely conclude that it fulfilled a very important function.

Since about the middle of last century, open wells, called valve towers and valve pits, have been built at numerous reservoirs in Europe. Their duty is to hold the valves and lifting gear for working them, by means of which the outward flow of the water is regulated or totally stopped. Such also was the function of the *Bisokotuwa* of the Sinhalese engineers. They were the first inventors of the valve pit more than 2,100 years ago'.

Quoting further he says that 'an examination of the *Bisokotuw*as reveal two

invariable and peculiar features in them. They are always rectangular and the faces of their walls are never rough or uncut. It has thick walls of brickwork, laid in mortar, round which there is an excellent watertight backing of tempered clay or "puddle". Where the plan is an oblong the longest sides are always built across the culvert. At most walls the brickwork is faced or lined inside the well with admirably cut thin slabs of stone laid horizontally and invariably on thin edges, which fit closely together..... Usually they extend as monoliths along the whole length of each wall, and all have well cut faces free from any twist. In some cases there is no facing to the brickwork".

As the stone slabs lining these pits are very thin and long, whilst the brickwork behind them is very thick often as much as six feet, he concludes that in most cases they were built in partly to protect the brickwork and partly to permit the accurate fitting of a further lining of woodwork to carry some form of lifting gear by which a door or valve might be raised or lowered so as to regulate the discharge of the water.

Parker goes on further to say that "The use of well tempered clay "puddle" round masonry that was subject to water pressure was perfectly understood at the time when Pavat Kulam was constructed. It continued to be employed in similar positions at nearly all later sluices and sometimes was found round culverts also. It was always of excellent quality'.

Testimony such as this and evidence from a host of other sources prove conclusively that the art and science of irrigation engineering had been developed to a very high degree in early times.

In conclusion I would state that it would appear that the conservation of natural resources and the fullest utilisation of the facilities provided by nature seem to have been uppermost in the minds of the ancient engineer and designer.

From my own observations and from the comments of others on the works they have seen and studied, I must conclude that the designers and engineers of ancient Ceylon made use of every advantage a site offered whether it be for building fortifications, pleasure gardens or irrigation works and with the materials available to them adopted methods and techniques which can be considered as efficient, economic and advanced.

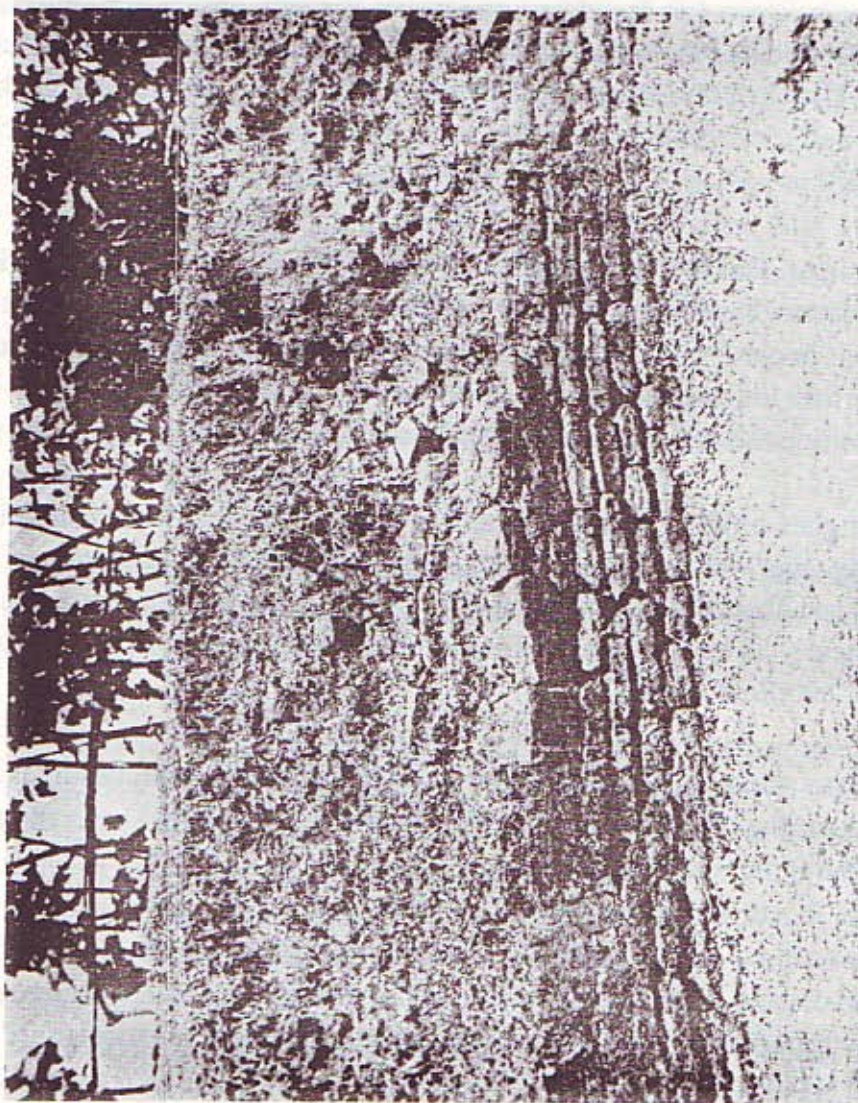
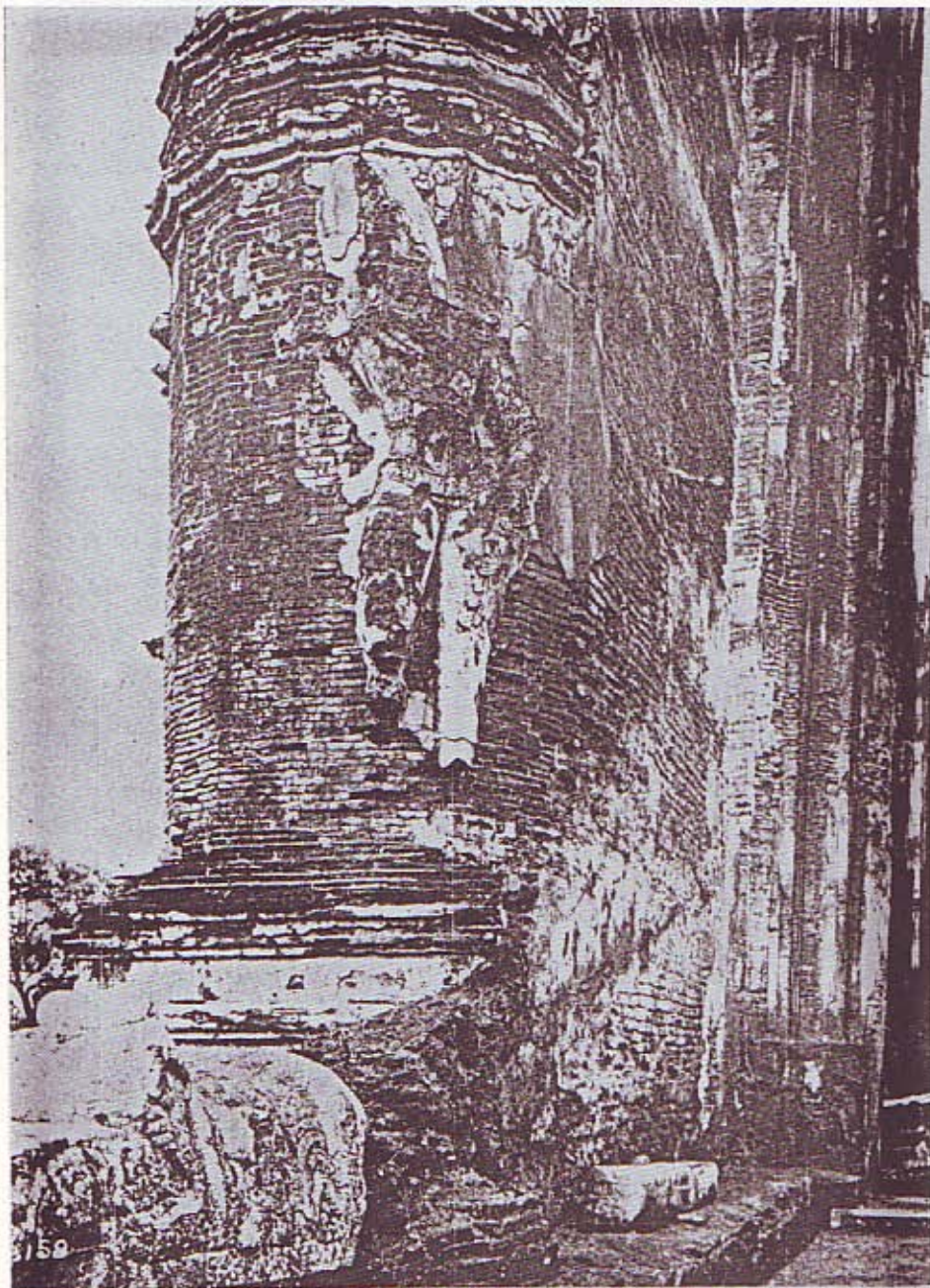


Photo by Author.
BRICKWORK AT PANDIVASNUWARA (CITADEL WALL).

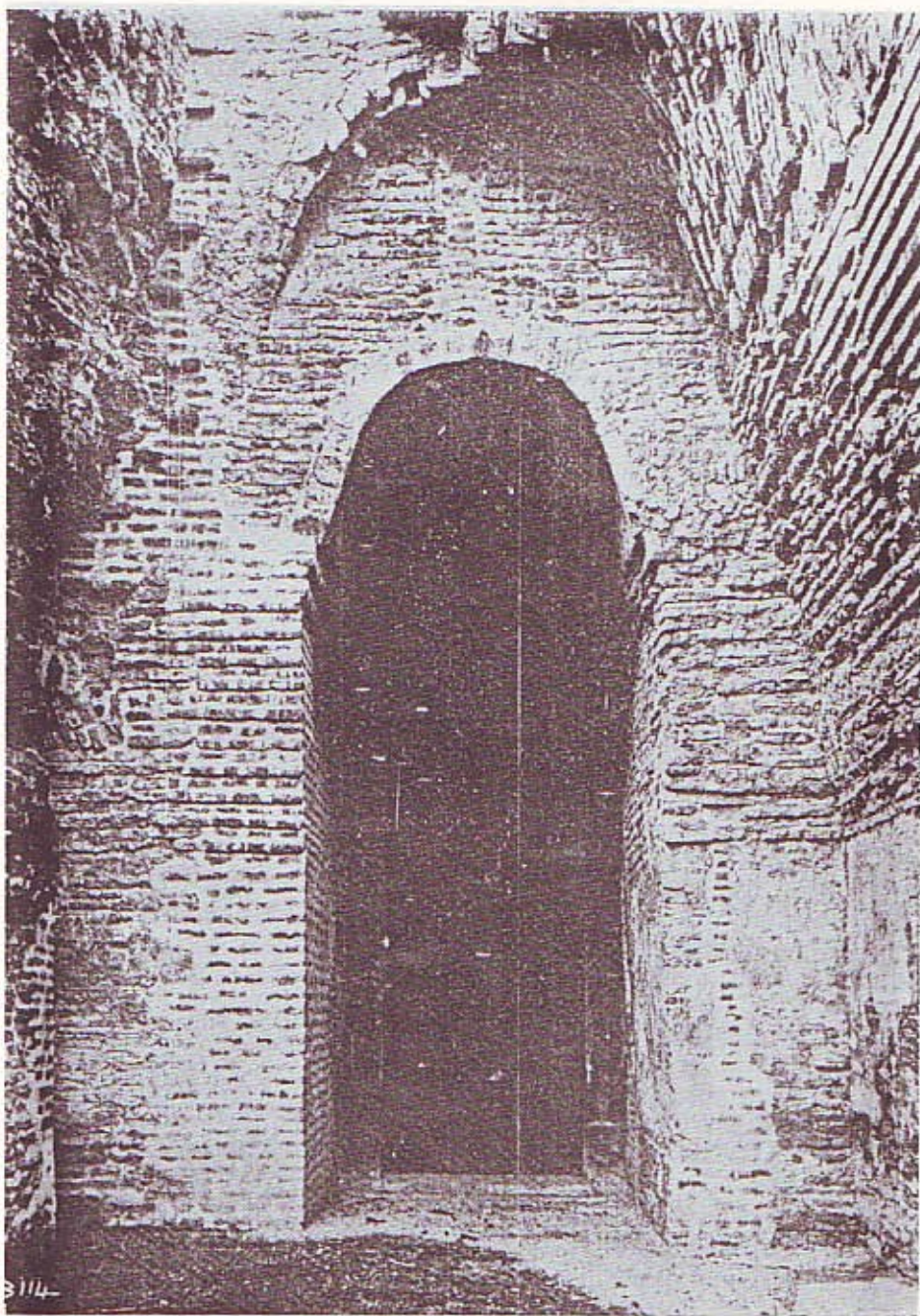
PLATE I



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BRICKWORK SOUTH PIER EXTERIOR, LANKATILAKE,
POLONNARUVA (View from East).

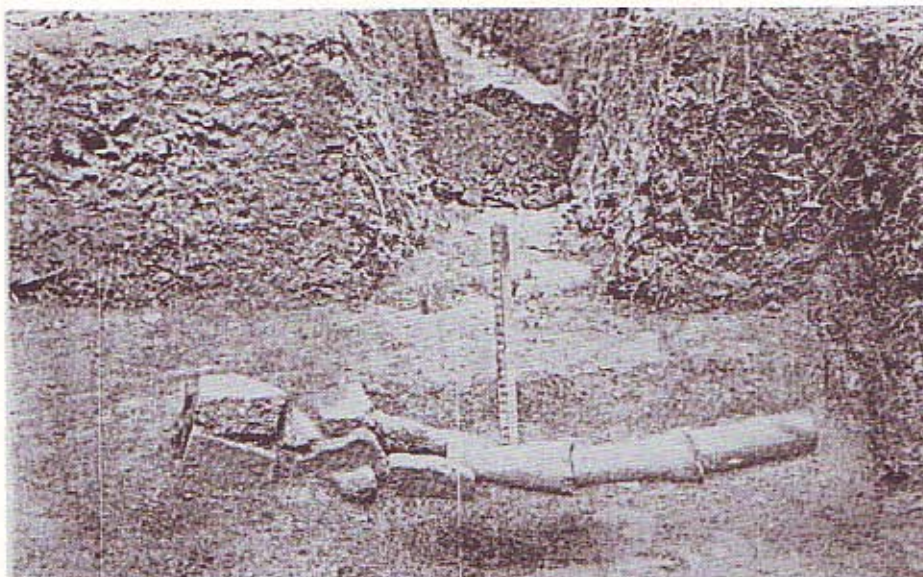
PLATE II



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ENTRANCE TO SHRINE, THUPARAMA, POLONNARUVA.

PLATE III



(a) TERRACOTTA DRAIN-PIPES, ANURADHAPURA GEDIGE.



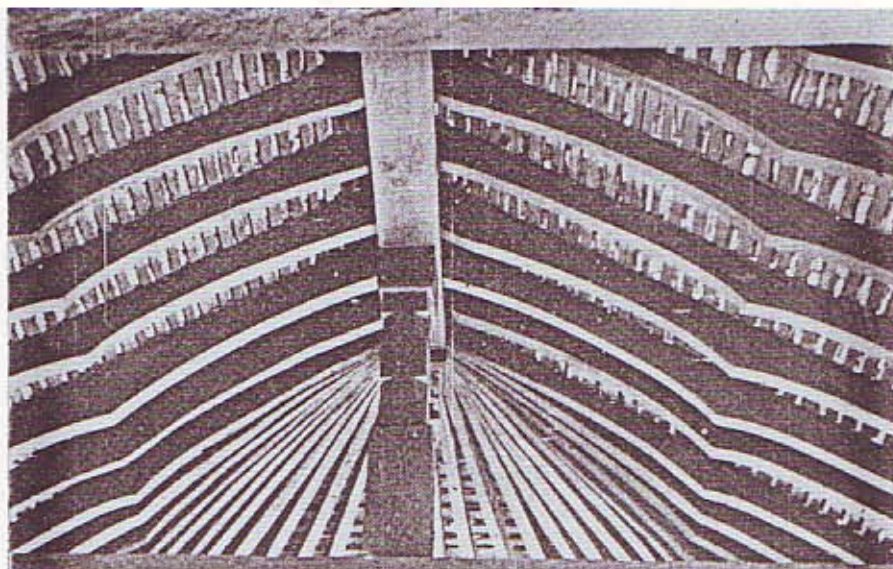
Copyright, Archaeological Survey of Ceylon
(b) PAVILION DRAIN-PIPE, POLONNARUVA.

PLATE IV

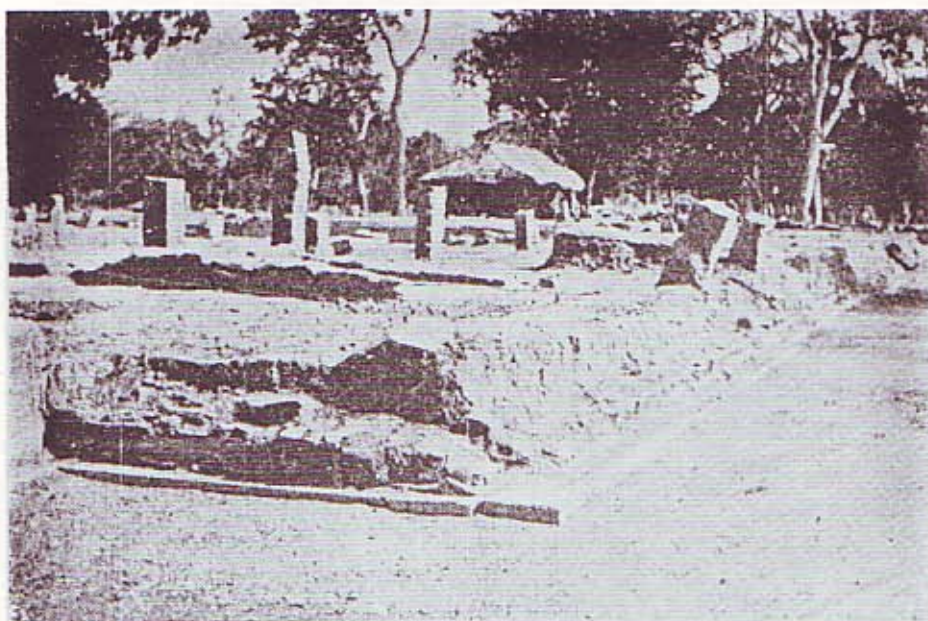


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PLATE V

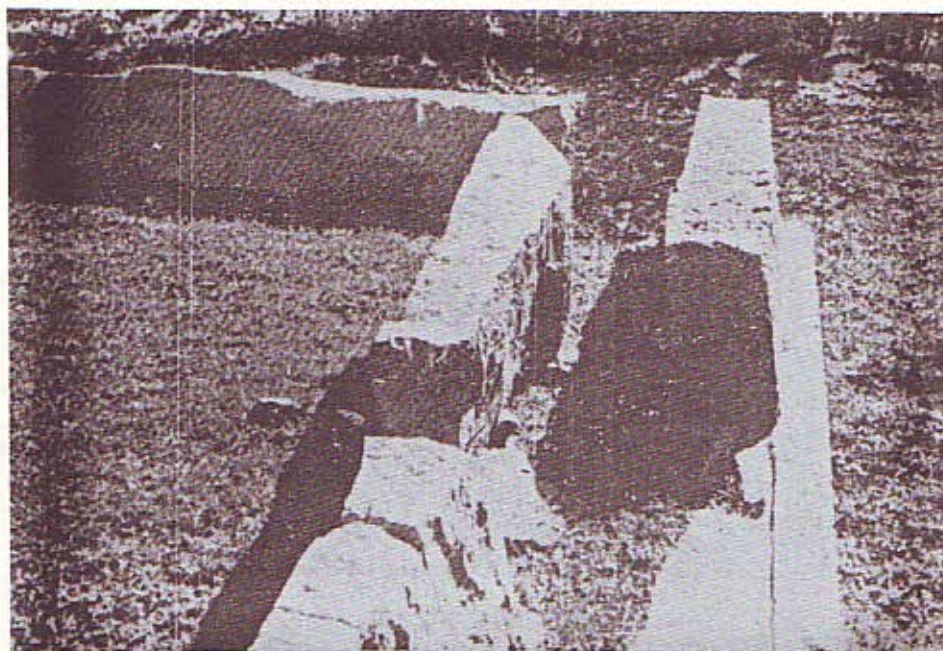


(a) KING POST AND RAFTERS SHOWING METHOD OF
ACHIEVING A DOMICAL INTERIOR EFFECT,
EMBEKKE DEVALE.



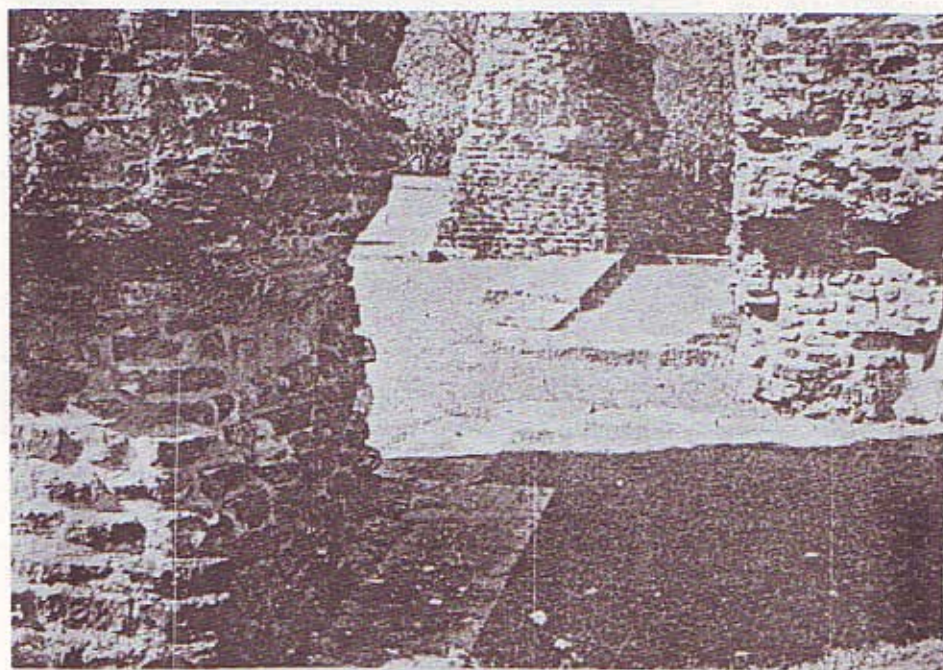
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(b) PALACE SITE AT BASAWAKKULAMA, ANURADHAPURA.

PLATE VI



(a)

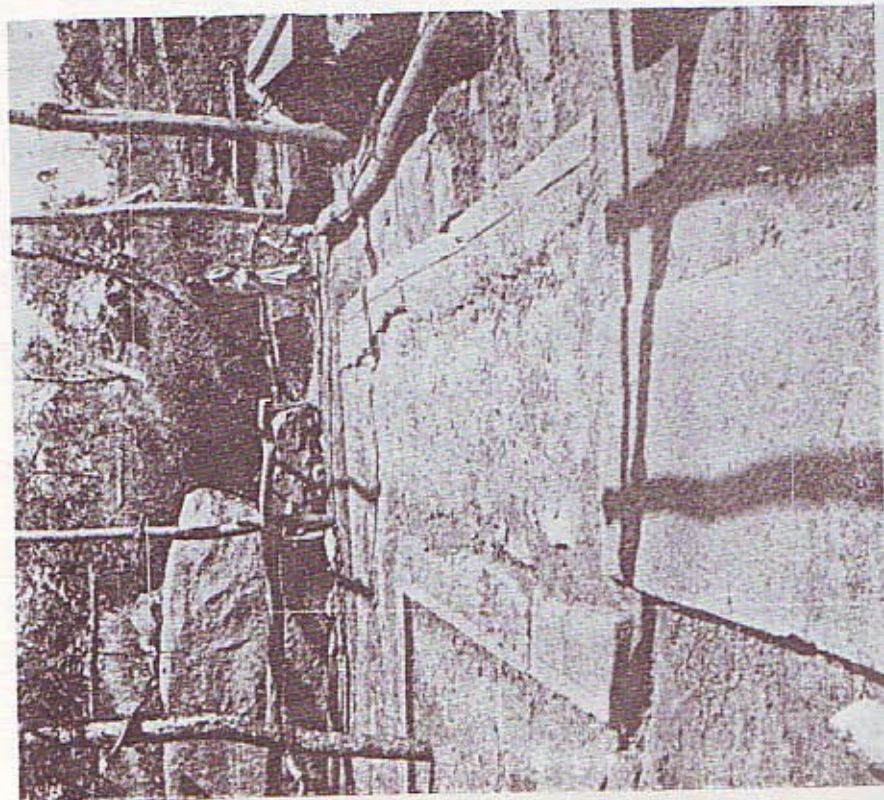
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(b)

Photo by Author.

PLATE VII



Copyright, Archaeological Survey of Ceylon
(a) AVUKANA.

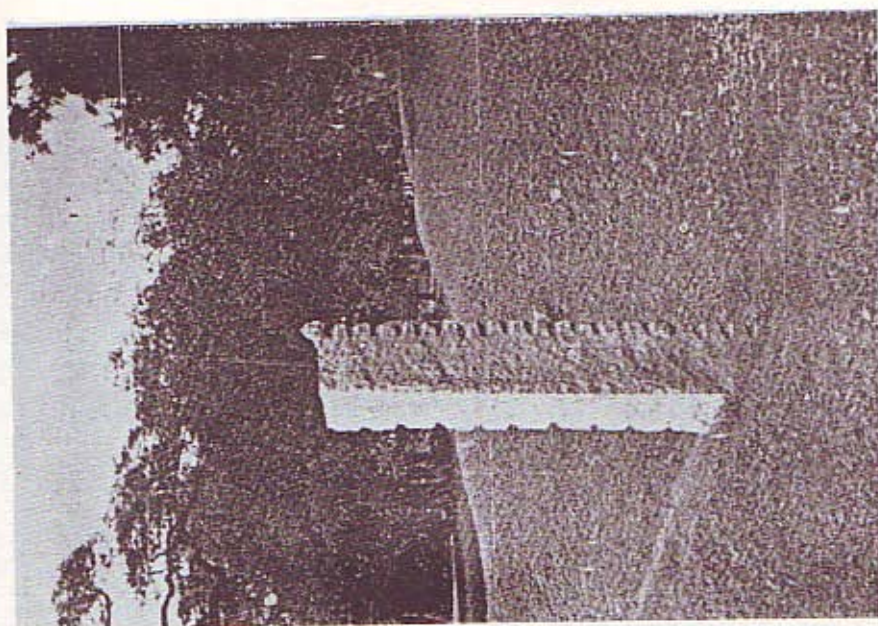
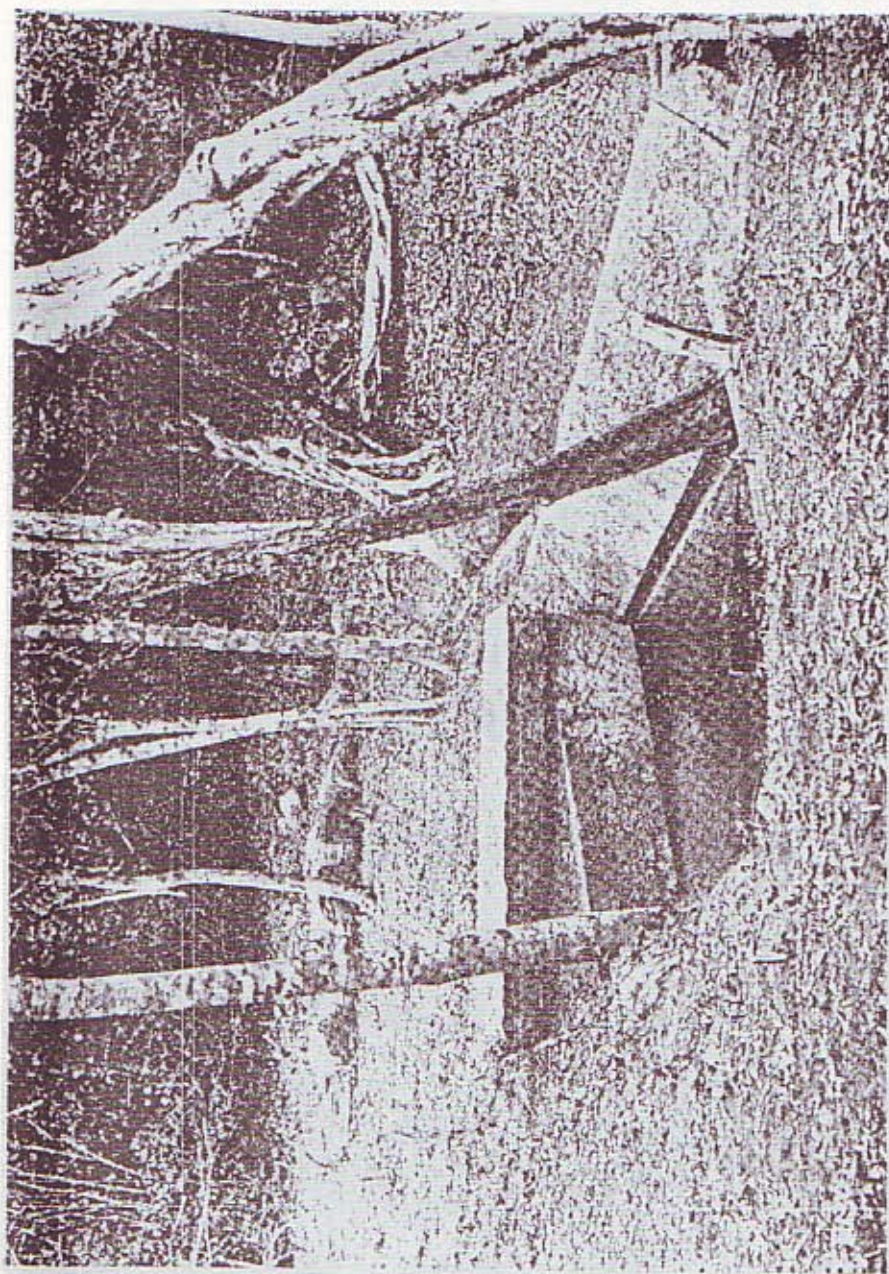
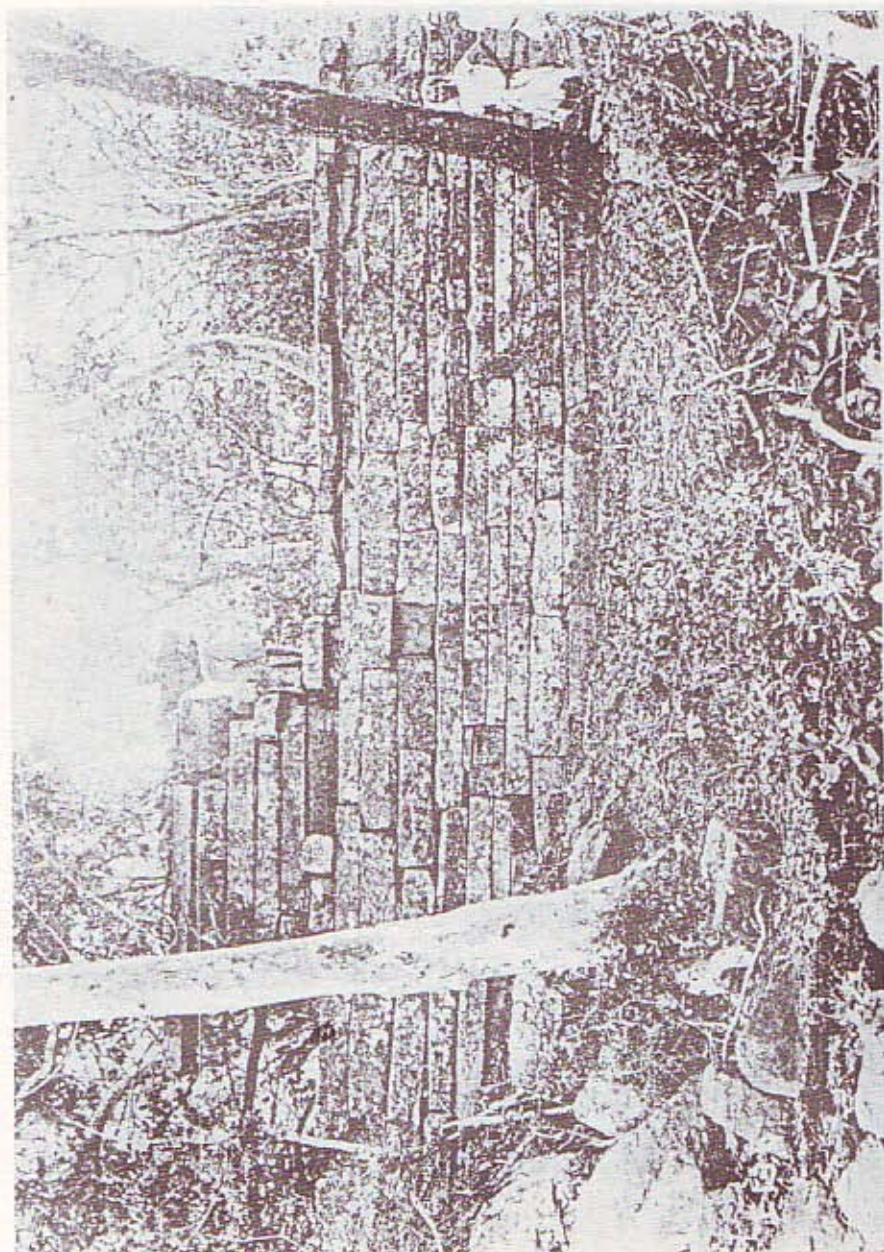


Photo by Author
(b)



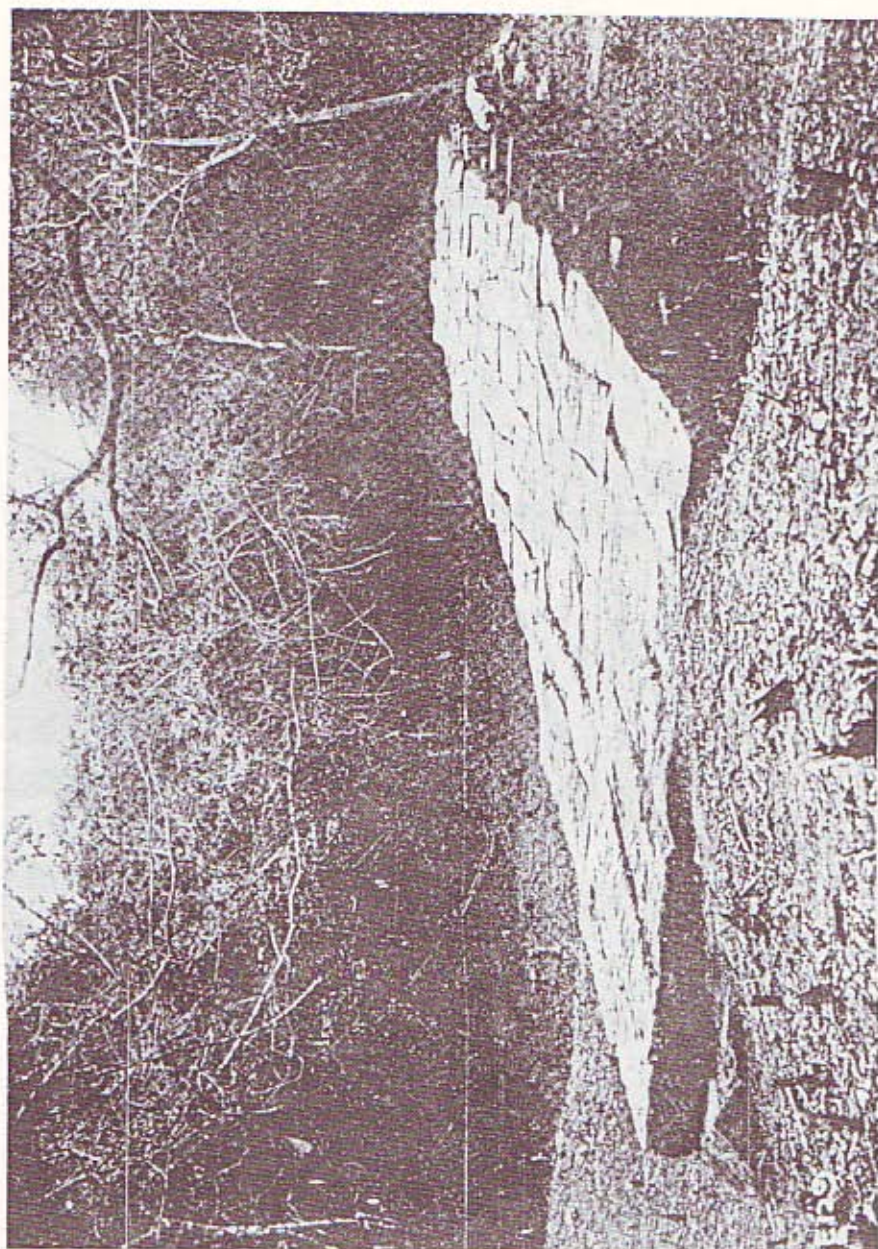
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STONE SHRINE, MAHAKANDARAWA.

PLATE IX



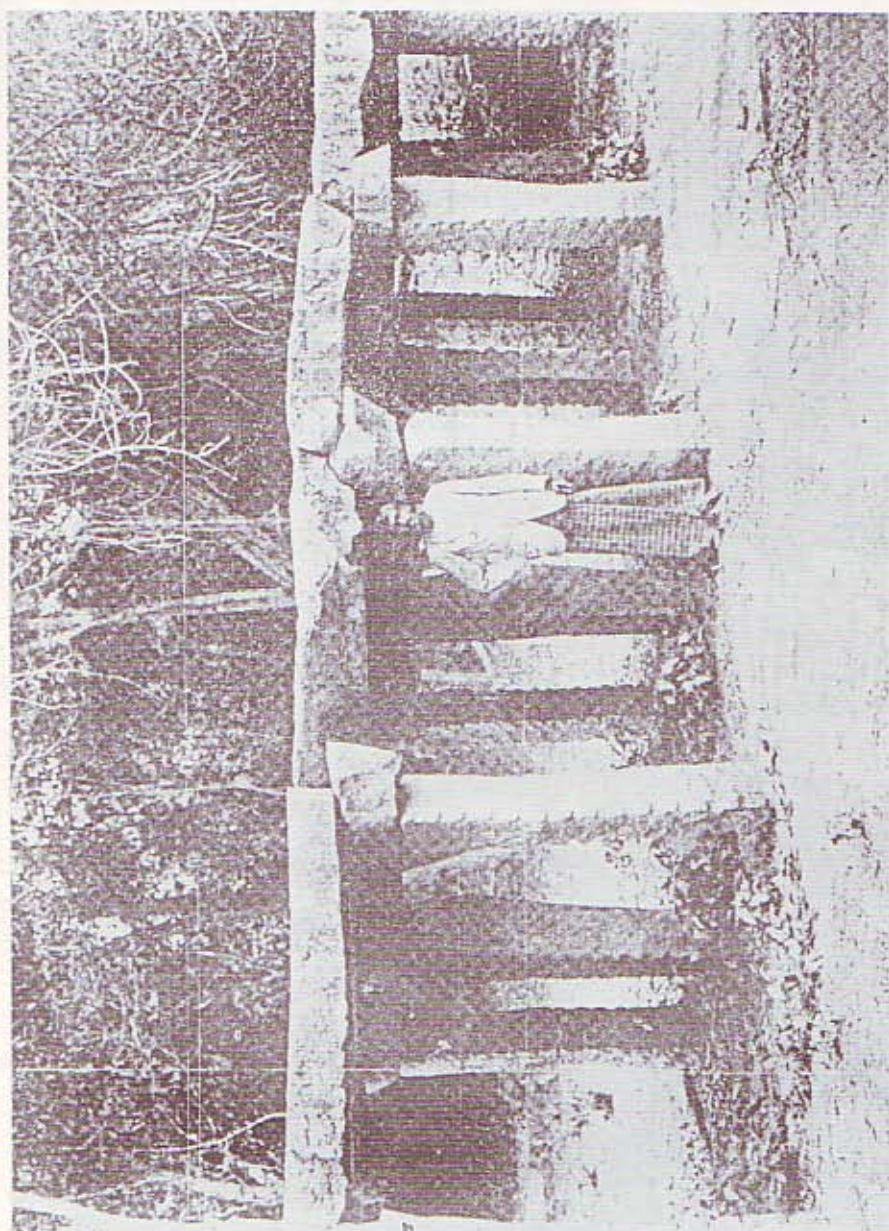
Copyright, Archaeological Survey of Ceylon,
CHETTICULAM ANICUT.

PLATE X



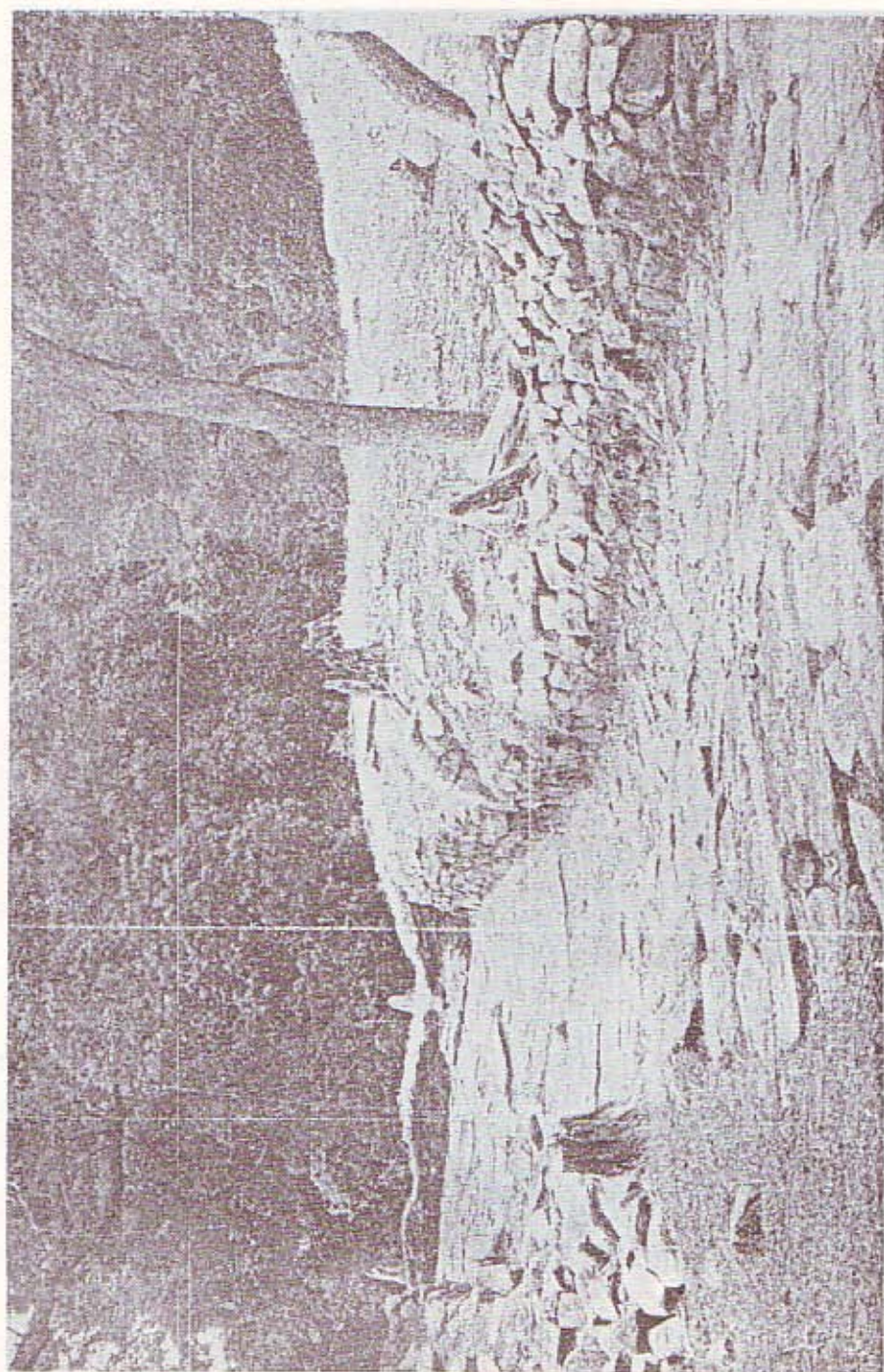
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SURFACE VIEW OF THE STONE BRIDGE, MAHAKANDARAWA.

PLATE XI



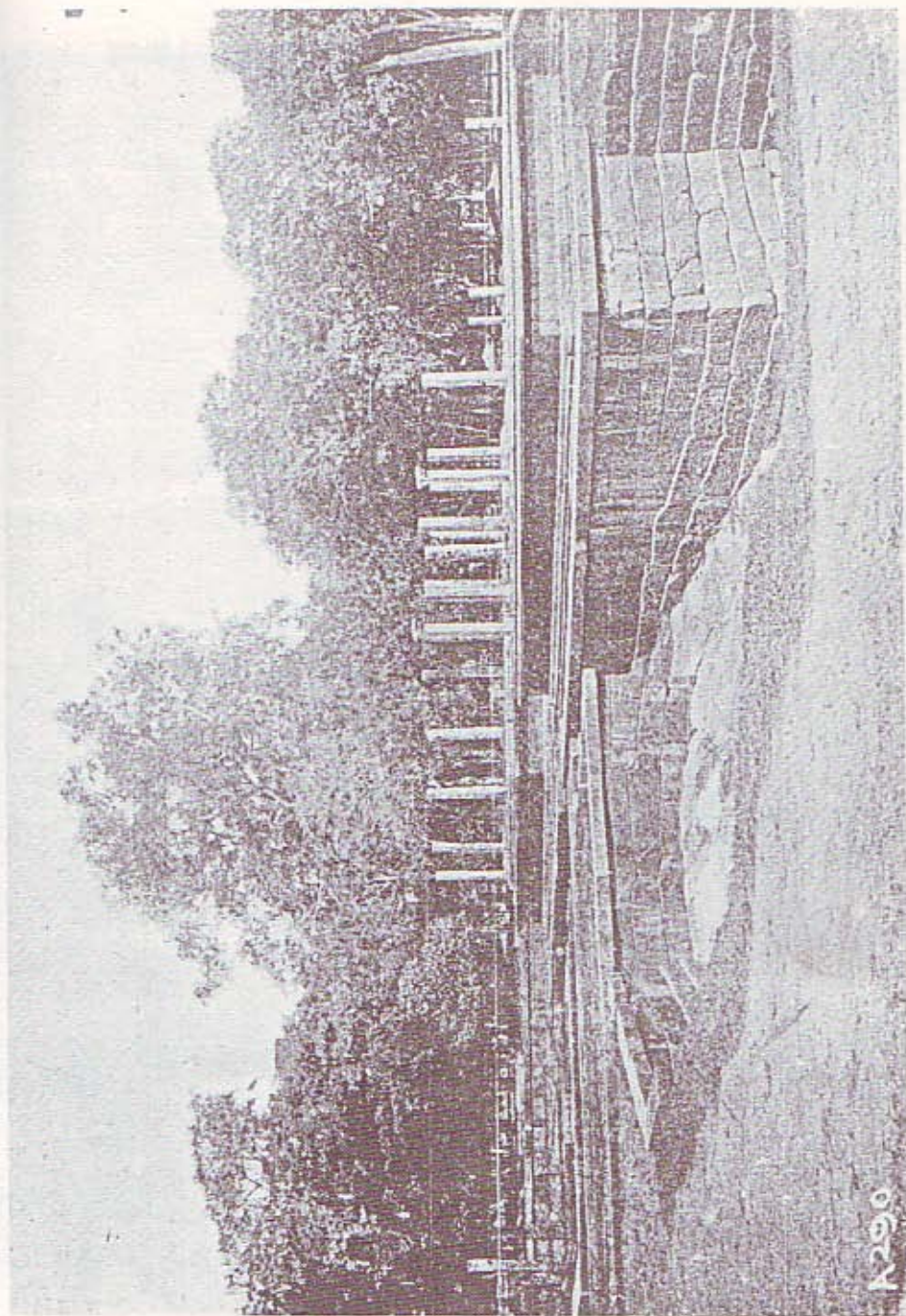
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STONE BRIDGE, MAHAKANDARAWA.

PLATE XII



Copyright, Archaeological Survey of Ceylon.
OLD ROAD MIHINTALE, VIEW FROM WEST.

PLATE XIII



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PLATE XIV

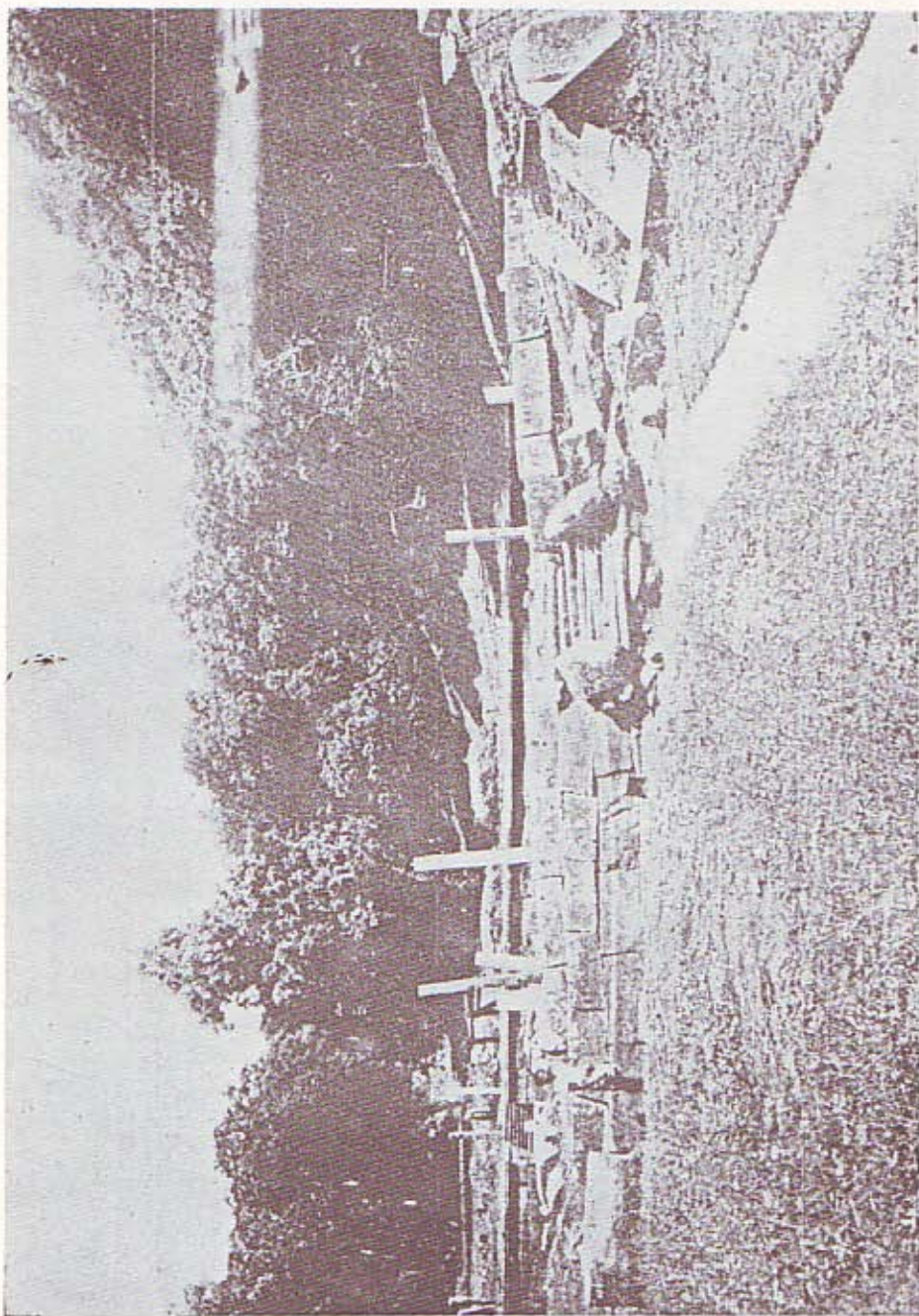


PLATE XV

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MIHINTALE.

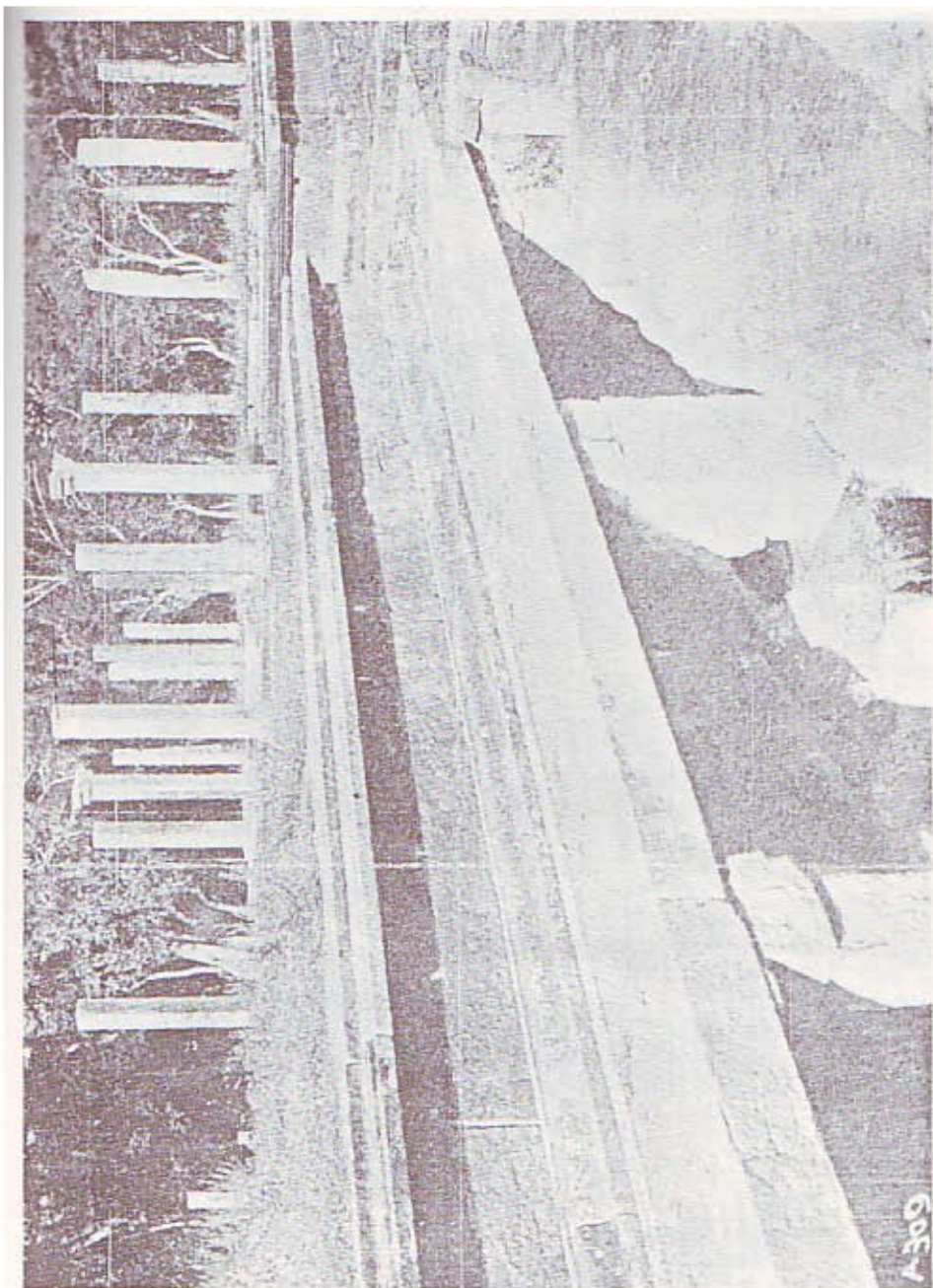


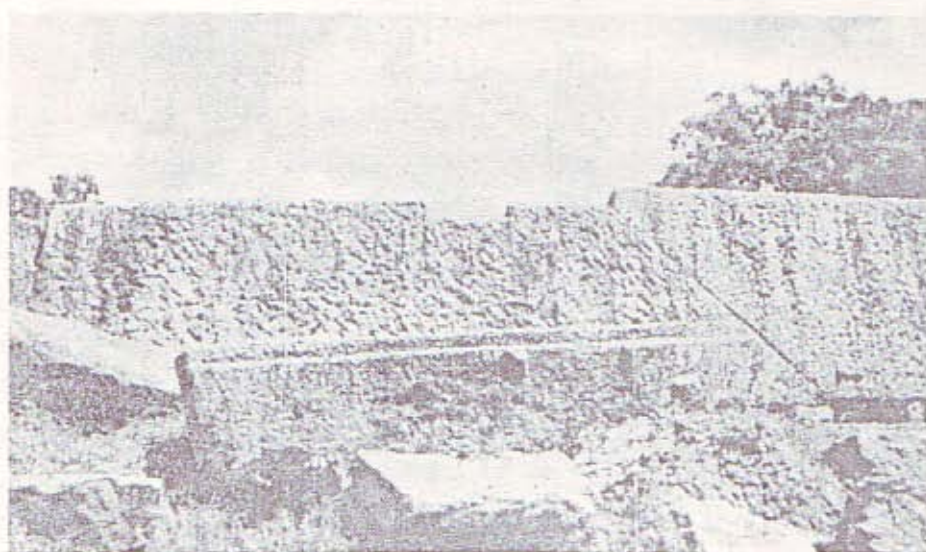
PLATE XVI

Copyright, Archaeological Survey of Ceylon,
WESTERN MONASTERIES, ANURADHAPURA.



(a)

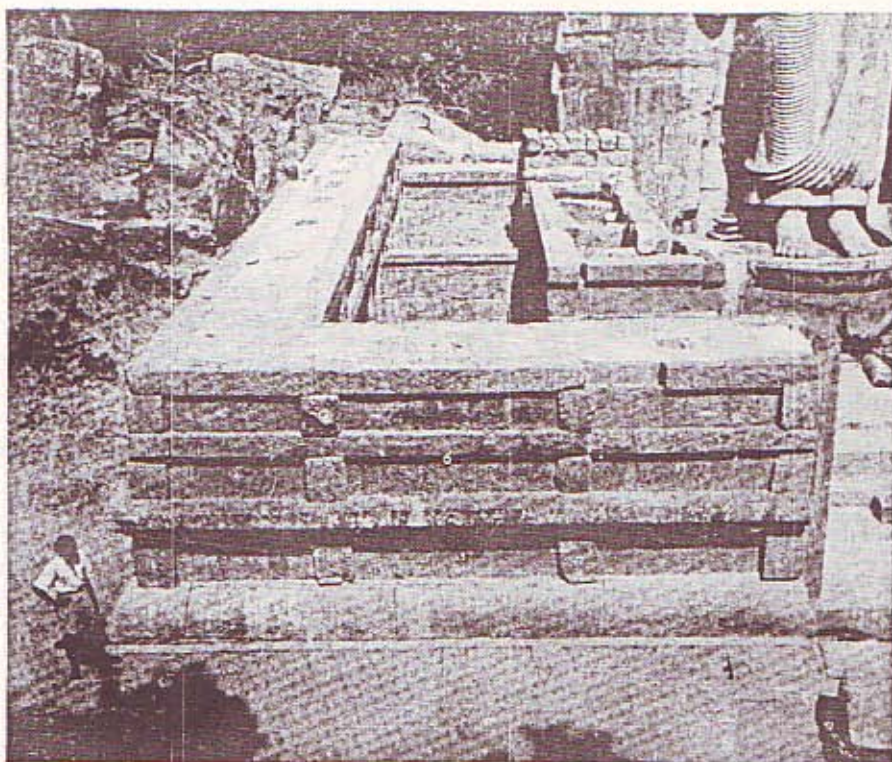
Photo by Author.



(b)

Photo by Author.

PLATE XVII



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PLATE XVIII

NOTES

1. Mahavamsa, XVII, 38.
2. See memoires of the archaeological survey of Ceylon. Vol VII - p. 29.
3. Manual of the N.C.P.,p.237.
4. Ceylon Journal of Science,Vol.11,p.152
5. (Plate 11).
6. (Plate 111).
7. (Plates V11 and V111a).
8. Mahavamsa,p.109.
9. (Plate V111b).
10. (Plates 1X to X111).
- 11 (Plates 1XV and XV).
12. Ceylon Sessional Papers. Archaeological Survey,1908,-p.12.
13. (Plate XV1).
14. (Plate XV11).
15. (Plate XV11).
16. (Plate V1a).

17. Memoires of the Archaeological Survey of Ceylon, Vol.3,pp.4 and 5

18. (Plate 1V).

19. Memoires of the Archaeological Survey of Ceylon, Vol.3,p.8.

20. (Plate V).

21. See the Techniques of Ancient sinhalese Wall Paintings by R.H.de Silva.Paranavithana Felicitation Volume 1965 Colombo.

22. (Plate V1b)

23. Mahavamsa, Ch. XXIX, 2-12.

24. Mahavamsa, Ch. XXX, 51 - 55.

25. Archaeological Survey of Ceylon, 1905.

26. Manual of the N.C.P., p. 237.

27. (Plate XVIII).

28. Parker's Ancient Ceylon, p. 379.

EXAMINATION OF STONE DECAY IN TROPICAL COUNTRIES.

By

Josef Riederer

INTRODUCTION

A considerable portion of the world's cultural heritage concentrates around its tropical belt. Monuments of highest historical importance characterize this zone and remain as convincing documents of a glorious history. In South and Central America there are the towns of the Incas like Machu Pichu, the sanctuaries of the Mayas and the gigantic structures of the actetic cultures. On the other side of the world there are the temples in Ankor Wat, in Borobudur, in Southern India and there is the almost incredible accumulation of cultural heritage in the old capitals and all over the island of Sri Lanka. But this heritage is threatened more than anywhere else by the destructive energy of the tropical climate and to all of us the image of buildings and statues overgrown by the jungle is present. More efficient than in any other climate under the tropical conditions different destructive forces work together and multiply its action against the materials of ancient structures.

To preserve the historical architecture which is exposed to a tropical environment is one of the main tasks of our time and we have to mention the different activities of the UNESCO and other international organizations to counteract this decay, but first of all we have to acknowledge the efforts of a country like Sri Lanka which succeeded by its own to organize a "Cultural Triangle Project" with the aim to investigate and to maintain its cultural property of a permanent blossom of culture over two thousands of years.

Among the activities of other countries to support these efforts for the preservation and maintenance of works of art and architecture the Rathgen Research Laboratory of Berlin concentrates on this subject since 1976, when the UNESCO demanded a survey of the state of preservation of historical monuments in Sri Lanka. Since that time the mechanism of stone decay was investigated in detail in the laboratory and this research resulted in a joint project of the Archaeological Department of Sri Lanka and the Rathgen Research Laboratory to set up the statue of a marble statue of a Bodhisattva of 12 m high at Dambegoda on the eastern side of the island. Parallel to that field work eight workshops on the preservation of

museum objects were held together with the National Museum of Sri Lanka, which was a unique chance compare the effect of peculiar climatical conditions, like the high temperature and the extreme humidity on various other inorganic and organic materials. Of a special importance for the research on the mechanisms of the decay of stone under tropical conditions was a similar project in Honduras, where big sculptures in a sanctuary of the Mayas had to be preserved. By that it was possible to compare decay mechanisms under the same climatic conditions on two very distant sites to obtain informations whether there is one general type of stone decay in the tropical belt all over the world or if there are locally different conditions, which modify this process.

The final aim of this research is the publication of a series of reports like that on the decay and preservation of historical monuments in Sri Lanka worked out for the UNESCO also on other important cultural centers to provide a reliable scientific basis for an efficient maintenance of the cultural heritage in this part of the world.

THE TYPES OF STONE USED FOR HISTORICAL MONUMENTS

Already a first survey of historical monuments in Sri Lanka revealed that the big variety of stone is a peculiar problem since it opposes a general consideration of the decay mechanism and the techniques for preservation. Almost each peculiar object or just small groups of objects have to be studied separately because of their specific problems due to the various types of stone used in the past. Even one type of stone could not be considered under one general aspect, since there are varieties, for instance in grain size, which demands a further specification.

In Sri Lanka metamorphic rocks dominate as natural building stones. The island of Sri Lanka geologically is built up from a very heterogeneous series of very old rocks which had been transformed several times in the earth's crust. The usual types of rocks of this series are gneisses, khondalites, granulites and sometimes, when the rocks were formed in a greater depth under high pressure and temperature granit-like rocks were formed. This type of metamorphic or pseudomagmatic rock normally is an ideal building stone since it is hard, homogeneous and by its structure also a very decorative material. It resists to mechanical attack, but under tropical conditions it suffers from a relatively strong chemical weathering, that is a

transformation of its minerals which gradually leads to a softening and a weakening of its structure. This type of stone, due to the geological situation in this part of the world spreads over to the southern part of India.

Connected with these hard and resistant gneisses, schists and granite like rocks are other types of stone which behave quite differently. In Sri Lanka for instance marble occurs to a great extent and because of its white colour and the splendid surface of a sculptured object this stone was preferred for statues up to gigantic sculptures of Buddhas and Bodhisattvas of up to 15 m height. This stone suffers from quite another type of decay, a loosening of the adhesion of the crystals of calcite and contrary to the slow gradual reduction of the surface of objects made of gneiss and granite, from the surface of a marble object relatively large pieces break off and relatively fast the contours are lost.

In other tropical regions like in south east Asia or in Central America volcanic rocks dominate. Here again the differences of grain size, of the mineralogical and chemical composition demands specific consideration on the weathering behaviour of each type of rock. With respect to weathering it is a characteristic feature of this rock that is rapidly attacked by chemical weathering and it is a well known phenomenon that volcanic rocks rapidly transform to a very fertile soil and exactly this happens on monuments, where the volcanic stone is rapidly covered by an intense vegetation of micro organisms up to the lower plants. This rapid transformation of volcanic rocks is due to an alteration which this type of stone suffers already shortly after its formation, when hot volcanic solutions penetrate the stone and transform silicates into clay minerals.

Sedimentary stones like sandstones and limestones from which arise the big problems of stone preservation in Europe are relatively rare in Asia and Central America. Where they occurred to a very limited extent, like coral limestones in Asian countries, their weathering rate is not extremely high so that there are little problems with this material.

To summarize, a successful preservation of a historical stone monument demands a critical analysis of the alteration of the stone. It is of a fundamental importance to find out, whether the decay is due to a chemical, physical or biological attack or by a combination of these forces in order to detect the causes of decay and

this is necessary to develop the right technique of repair and of a future preservation. The big variety of stone used for the construction of historical monuments opposes a generalized consideration of the weathering of stone, but it demands a critical study of each peculiar case.

THE PECULIAR FEATURES OF THE TROPICAL ENVIRONMENT

The tropical climate is characterized by as well a high amount of rain and a high humidity. This has other phenomena as a consequence, like a high relative humidity of the air and peculiar phenomena, like an intense condensation of humidity, which may be peculiar thread for stone objects because of a permanent moisture on the surface of an object.

Humidity is one of the main threads for stone and a comparison of the quantity of rain fall in different climatical zones reveals the extent of the problem for monuments in a tropical climate. While in arid zones of the earth the annual rainfall goes down to 10 mm and the average in moderate zones like Europe is around 900 mm/ year, the average over the whole island of Sri Lanka is around 200 mm/year (Colombo : 2300 mm/ year) and in some areas the annual rainfall goes up to more than 4000 mm (Ratnapura 3860 mm/Year, Avissawella 4008 mm/year, Watawala 5403 mm/year).

Parallel to this intense humidification of a tropical country goes the elevated temperature, which permanently is higher than 20°C and, what is a characteristic feature of a tropical climate always constant all over the year. Sri Lanka again can be representative for this situation, since in all parts the average annual temperature in the lowland and the costal region does not differ much from 27°C (Colomb 27.00 , Galle 26.6° , Batticalao 27.5° , Trincomalee 27.9° , Jaffna 27.6° , Mannar 27.9°). Certainly in the mountains the mean annual temperatures are lower, but here too the values are relatively high : Kandy 24.5°C , Watawala 21.0°C and Nuwara Eliya in 1865 m altitude still 15.3°C .

According to the high amount of rainfall and the high temperatures the relative humidity in tropical countries is extreme and condensation phenomena, which produce liquid water on the surface of materials are normal.

These peculiar conditions, a high amount of rain and at the same time a high temperature are responsible for the special atmosphere on the surface of a stone. Such a surface is first frequently hit by the rain and in this way thoroughly moistened. It has been determined experimentally that rain which hits a stone's surface under the pressure of wind is able to penetrate several centimeters along cracks and fissures or on a pore system into a stone, causing a transformation of minerals in this zone. Buildings, where the rain can penetrate along joints far deeper into the stone suffer considerably from the direct attack of the rain.

As a consequence of the high temperature rain water evaporates in great amounts from the soil, the vegetation, the lakes and the sea, which keeps the stone's surface permanently humid over long periods. This humidity is responsible for the transformation of minerals under the action of the high temperature. Here again we have learned a lot from laboratory test which prove that high amounts of water are not sufficient to provoke a considerable transformation of rock forming minerals. With increasing temperature those reactions increase considerably in intensity. They are already quite efficient, if a rock is permanently kept wet at temperatures of 30⁰ C which are normal in the tropics and they are extreme if really hot water circulates through the stone as it is the case in volcanic regions, where the stone is already altered by hydrothermal solutions before it has been used for a construction.

Finally condensation humidity is responsible for a strong decay of stone especially in the interior of temples. There the surface of the stone is cool and in an atmosphere of almost 100% of relative humidity in the air a film of liquid water is formed. Here again the transformation of minerals is accelerated under these conditions and the loss of wall paintings in cave temples or rock tombs shows evidently the intensity of these reactions. In southern Japan where there are important historical sites in those caves it is tried with a big technical effort to maintain a stable climate under these circumstances to protect surfaces from an attack by condensing water.

To summarize this point, it is important to realize that under the conditions of a tropical climate humidity comes into contact with the surface of building stones in different ways, like rain, the humidity of the air or condensing water vapour on cool surfaces. Due to the almost permanent humidity and the elevated temperatures

there is a continuous attack of the stone which causes its gradual decay.

THE EFFECT OF WATER ON STONE

If water comes into contact with stone there are different ways of attack or reaction which must be considered when methods or techniques for the protection of a monument are worked out.

Water has first a dissolving action on stone. Not only in industrial areas but also in regions with the most purest air water is acid because it reacts with the carbon dioxide of the air under formation of carbonic acid. This acid behaviour of the rain leads to a dissolution of calcite which is quite obvious on the surface of marble sculptures. The dissolution of the calcite proceeds, as it could be shown by the studies before the restoration of the Bodhisattva of Dambegoda, in two different ways. It acts parallel to the surface by gradually lowering it and it penetrates along the marked cleavage plains of the calcite. The first way of solution creates a rough surface, destroying gradually the traces of the original treatment by the sculpture. On those parts of the surface, where rain water runs off little channels are formed which deepen more rapidly, when the chemical action of the dissolution of calcite is combined with the physical action of the running water. Worse is the second way of attack of water on marble, the penetration along the cleavages of the calcite grains. Since the marble of Sri Lanka is extremely coarse grained, big grains of more than 1 cm separate, loosen from the surface and break out. By that the whole surface of an object becomes brittle and the loss of substance is considerable.

In a similar way sedimentary limestones are attacked. Since they are fine grained weathering does not proceed rapidly and where limestone has been used, like for colonial buildings in northwestern Sri Lanka, where coral stone occurs plentiful, only a slight reduction of the original surface can be observed.

Another way of reaction of water with the components of stone is the transformation of silicates to clay minerals. The metamorphic rocks which have been used abundantly in Sri Lanka and Southern India, as well as the volcanic rocks of south east Asia, Central and south America consist predominantly of quartz and silicates like the feldspars, the micas, amphiboles and pyroxens. If these silicates are in a permanent contact with water they take up gradually water into their crystal

lattice and change to clay minerals. A well known process in nature for instance is the transformation of feldspar to Kaolin, that is from a hard rock to a soft mass of clay minerals. In nature and especially under tropical conditions this reaction proceeds as an ordinary process of weathering. Under the microscope by the study of thin section this transformation becomes obvious. In fresh crystals of feldspar appear small flakes of seriate and in an advanced state of decay the whole feldspar pseudomorphically is replaced by this secondary mineral. The same with the common micas muscovite and biotite, which are transformed to other types of micas and clay minerals. This type of reaction has two consequences, first a reduction of one stable and homogenous crystal to an accumulation of tiny flakes of mica-like clay minerals which has a considerable loss of mechanical strength as consequence, second an increase of volume, which is due to the uptake of water and leads to an internal stress, weakening again the whole fabric. By that the transformation of primary silicates to secondary clay minerals is responsible for a softening of the whole stone which suffers by that by an accelerated reduction of its surface.

This transformation of silicates into clay minerals becomes very efficient if a relatively warm water circulates through the pore system and the fissures of a stone. This happens in areas of vulcanic activity, where hot solutions rise from the magmatic hearths in the earth's crust. Hot springs are an obvious phenomenon of such a vulcanic activity. These hot solutions transform the silicates with a peculiar intensity into clay minerals. By that it is almost impossible to quarry in a region of an earlier vulcanic activity, which may be extinct in our times, a stone which had not suffered this transformation. This means that the stone used in many parts of Mexico or Central America from the beginning was in a transformed state and by that peculiarly ready to be destroyed by external forces of weathering.

As already mentioned water running over the surface of a stone has not only a chemical effect by dissolving or transforming minerals but also a mechanical effect by washing off the loosened particles from the surface. It is a normal experience when observing historic structures to find the traces of running or dropping water, which may destroy sculptures or ornamental parts of the architecture so that preventive measures have to be taken to force the rinsing water into the right way.

Water does not only attack the stone by its physical and chemical effect, but

it provides also a basis for other types of attack, like the growth of micro organisms and some species of a lower vegetation.

The effect of bacteria on stone actually is intensely discussed in industrial countries since there a theory has been established that certain types of bacteria are able to transform the sulphur dioxide and the nitrous oxides from the polluted air into sulfates and nitrates which destroy by their pressure when crystallizing the stone's fabric. It is a matter of fact that this mechanism exists, but it is an open question to what an extent this production of salts contributes to the total effect of sulphate growth by the direct reaction of the air pollutant with the decayed, reactive surface of stone or the dust layer over it. For tropical countries this type of a bacterial activity certainly can be neglected, since due to the heavy rain there is no chance for the salts to be not dissolved and washed out immediately.

Lichenes have three effects on stone and by that they have attracted more the interest of specialized botanists.

First they produce organic acids which are able to react with the stone and in fact reaction products of compounds of building stones and organic acids have been identified. But compared with other types of chemical attack on stone this reaction seems to be negligible. Stone surfaces covered with lichenes never show strong traces of corrosion though under the scanning electron microscope it is quite obvious how the hyphae of fungi proceed into the interior of the stone, following small cracks and fissures.

Worse is the optical effect of lichenes on stone which spoil their surface. By that, less for the protection of the stone as for the improvement of the appearance of a sculpture or a monument there are efforts to destroy this vegetation and to remove it from the surface.

The cleaning of stone covered by algae, fungi and lichenes has developed during the last year as a special field of research since soon it had become obvious that different types of these micro organisms behave in quite another manner, when chemical solutions are applied to clean the stone. There are species which immediately are destroyed by weak organic solutions while others resist even to a treatment with concentrated products. Some species, when destroyed are washed

away by the next rain, others keep the surface black and can hardly be removed with mechanical tools. By that and this is the actual tendency one has to identify all species of lichenes covering a stone with the aim to apply specific products against each of the identified types of organisms.

On brick buildings, like on many of the dagobas of Sri Lanka a peculiar type of attack of lichenes has been observed, especially in those climatic zones, where there are longer dry periods between the rainy seasons. In the dry period the cover of lichenes contracts and rolls up, detaching from the surface of the stone a thin layer of material loosened earlier by the effect of organic solutions or the pressure of tiny roots. The dry lichenes are blown off by the wind and when the humidity is high enough a new layer of lichenes forms removing in the same way part of the surface when it dries after a certain period. Such a mechanism, which in fact is not too frequent and restricted to regions where strong humidity interchanges with dry periods, contribute considerable to the reduction of the surface of a monument.

Certainly also the growth of grass, shrub and trees is a general problem in tropical countries which hardly can be avoided. Vegetation develops so intensely in this region that no ideal has been worked out how to proceed. Chemicals of all kind have proved to be rather unefficient since they are rapidly washed out by the heavy rains. So manual removing still is the only way to keep the monuments free from vegetation. This growth of grass and little trees is an obvious proof for the intensity of weathering of stone surfaces under tropical conditions, since seeds demand a prepared substrate to grow and to develop and normally they find quite favourite conditions on buildings and historical structures.

OTHER FORCES CONTRIBUTING TO THE DECAY OF STONE

Until now we have seen that it is water which is first of all responsible by its chemical and physical action as well as by providing the basis for a growth of vegetation to the decay of stone in tropical countries. Other destructive forces, which again are connected in some cases with the action of water are less efficient in tropical countries.

There is for instance the action of salts, which plays a dominant role in stone decay in less humid and especially in arid countries. Salts have a manifold

destructive effect on stone: first they separate the mineral grains by the pressure which they exert when they crystallize from a solution and second they also exert a pressure when they change from one modification to the other. These effects become very efficient in practice since the change from one modification to the other or the solution-dissolution cycle depends from temperature and humidity of the environment. By that sometimes a small increase of temperature or a slight reduction of humidity may cause a salt to crystallize, which may happen in daily cycles.

In Sri Lanka as in other tropical countries, there are almost no problems with salt crystallization since the rain is so intense that crystallized salts are washed out. Contrary to arid zones where water evaporates from the soil and moves upward, in tropical countries the direction of the water is from the surface downward to the ground water and by that there is no problem with rising dampness in walls. Only exceptionally a salt formation was observed, first of all when improper materials like cement mortar had been used for repair.

By the fact that rain moves downwards through the soil to the ground water it does not contain any aggressive compounds. Stone objects buried in the soil over centuries in tropical countries rarely show an intense destruction of the surface.

When in Sri Lanka the head of the Bodhisattva of Maligavila or the sculptures of Potuvil were excavated, they showed a completely intact surface without any signs of corrosion or decay by solutions. The same in other countries, like in Honduras where a great number of stelae were excavated which even had the paint on the surface preserved. But immediately when exposed to weathering the surface was washed off and the decomposition of the stone proceeded rapidly. This means that a burial in the earth under tropical conditions is relatively safe and sometimes it is more reasonable to excavate a stone sculpture when a thorough protection is guaranteed.

The effect of sea water on stone objects is not too dangerous. Neither the attack of soluble minerals, the crystallization of salts or the growth of marine organisms causes a considerable damage and again it becomes obvious that a permanent exposure to water is less dangerous than continuous cycles of drying and wetting.

And seashores the effect of wind may be quite efficient in the erosion of stone surfaces and it may be considered as a peculiar effect of the tropical climate, where storms are frequent and heavy, that structures are attacked in this way. Normally there are two types of attack, first the erosion of the mortar from joints, which is quite frequent on brick buildings. Gradually the bricks, which resist more to erosion than the mortar are isolated and break out from the wall which finally collapses. In the region of Mannar a considerable number of dutch buildings is threatened by wind erosion. In Silvatturai for instance the brick walls of a colonial building which are 2 m thick are completely pierced by the heavy wind from the sea.

Another possibility of attack which is also quite frequent in coastal areas is the erosion of natural stone, when the joints for the mortar are very narrow. Temples close to Madras in Southern India built of hard magmatic rocks are blown out to an extent that preservative means had to be taken and in this case the only reasonable solution was to plant trees between the seashore and the temple to protect it from the direct attack of wind.

Insolation, that is the effect of high temperatures on the surface of stone is of minor importance in tropical countries since the destructive effect is not the high temperature but the permanent change of temperature, which in other climatological zones is due to a considerable difference between day and night. In tropical countries even the cooling of a stone's surface by rain does not change the surface temperature to such an extent that a considerable expansion and contraction of the surface occurs.

Much damage on buildings and sculptures generally is due to wrong techniques of conservation which under the influence of the tropical climate often multiplies in its efficiency. Especially the use of cement mortars for repair or covering the surface of damaged parts is the cause of heavy damage due to the difference of hardness of natural and artificial stone and frequently by the crystallization of sulphates which are normal compounds of cement. Iron dowels of ordinary steel corrode rapidly under the influence of the high humidity and the increase of volume of rusting iron breaks the stone into pieces. Most of the actual trouble on the Acropolis today is due to the use of ordinary steel for dowels in the 19th century and now, 100 years after its use, the problems occur extensively.

The same with improper materials for consolidation hydrophobing or a similar treatment of the stone. Those materials tend to fade or to change their color if their quality is insufficient or if they are used incorrectly and the damage to the stone in many cases is worse than the decay of an untreated stone.

Last not least man itself as a tourist or as a user of historic structures contributes to a permanent wear of the substance, which is not negligible over longer periods.

To summarize the causes of stone decay in tropical countries, it is obvious that humidity in its various forms is the main source of damage on stone. It is responsible for different ways of alteration, like chemical solution and alteration of minerals, physical erosion and by providing optimum conditions for the development of micro organisms and vegetation. This principal mechanism of decay is intensified or locally modified by other climatic factors and finally man itself is responsible for damage by unqualified efforts for preservation and by the permanent use of historic sites.

THE BEHAVIOUR OF THE DIFFERENT TYPES OF STONE

With the aim to elaborate the most useful techniques for the preservation of a certain monument it is necessary to consider the behaviour of the different types of stone against the influences of the various destructive agents, first of all against the attack of humidity.

The large series of magmatic and metamorphic rocks is first of all attacked by a transformation of minerals by the humidity. This process of hydration is well known and has been extensively studied, when historical structures had to be preserved. This kind of attack means a reduction of hardness and resistance of the stone, since homogeneous minerals are transformed into tiny flakes of secondary micas and clay minerals. This transformation leads also to internal stresses, since the uptake of water is connected with a considerable increase of volume. The transformation of ore minerals like hematite and magnetite also causes a breaking up of ruptures due to an increase of volume by the transformation to hydrates and when sulphides occur like pyrite or marcasite sulphates are formed and salt crystallization becomes active in various ways. By that this type of stone is transformed first of all by the chemical transformation of minerals by the

environment humidity.

Vulcanic rocks suffer more from a mechanical erosion of the surface since most types used in tropical countries for sculptures and buildings have been altered already during or shortly after their formation by hot solutions. By that this characteristic transformation of the rock forming mineral, which occurs in metamorphic and granitic rocks over long periods here exist already from the beginning. When exposed to weathering immediately erosion by running water and wind and under much exposed conditions these types of stones may suffer a rapid decomposition.

Marble and to a lesser extent the fine grained marbles are affected most by a chemical solution of the calcite grains and by a penetration of the dissolving solutions along grain boundaries which cause a separation of the grains and a rapid breakdown of the surface.

So in all cases in tropical regions stone decay by different types of attack by water and it must be the main aim of all protective means to keep the water away from stone just to prevent solution, transformation, physical erosion and biological attack on the surface.

THE TECHNIQUES OF STONE PRESERVATION

Cleaning :

The methods for cleaning stone surfaces depend from the kind of dirt which has to be removed. Stone covered with soil or soot can be cleaned by permanent rinsing with water over a period of some days to one or two weeks. Normally most of the surface layers are removed in this way and it is not necessary to add detergents. Alkaline or acid compounds, though commercially supplied for the purpose of stone cleaning should not be used, since they bring components into the stone which may cause the formation of salts or other reaction products with negative effects on the stone.

The cleaning time may be shortened, if water is applied under pressure.

Special devices for cleaning have been developed and it is just a matter of the condition of the surface of a stone, if a certain pressure can be applied.

Most useful for the local removal of stains or other kinds of material from a stone are pulp or pasts, which either can be prepared by one's own or which are available commercially. Among the most common ways for preparing such a pulp is the italian altapulgus technique, which uses a special clay, but any other absorbant powder can be used which does not contain components which may react with the minerals of the stone. Normally the clays just are used with water and detergents which soften the layer of dirt until it is removed by water. The commercial products contain either acid or alkaline compounds and it depends for the type of rock which product is used. All these materials are very reactive and after a very short time of some minutes the treated surface is clean so that the paste has to be removed immediately to prevent an attack of the stone.

Of peculiar interest for the preservation of stone in tropical countries is the removal of the layer of micro organisms, which cover the stone by a more or less dense and resistant crust. Experiments with the removal of those layers from the vulcanic rocks used at Honduras show that it depends much from the type of organisms which product shall be used and still there are some types of lichenes which prove to be very resistant.

The chemicals for the removal of these micro organisms are various and it is more or less a matter of experimenting on the site which method provides the most convincing results. The following materials have been tried in practice to clean the stone from surface layers of micro organisms:

Alkyl-aryl-trimethyl ammonium chloride

Alkyl-dimethyl-benzyl ammonium (Preventol R 50)

Benzylalkonium chloride (Alkyl-dimethyl-benzyl ammonium chloride)

3-(4 bromine, 3 chlorophenyl)-1-methoxy-1-methyl urea (Chlorobromuron)

3-cyclohexyl-6-dimethylamino-1-methyl-1,3,5 triazine -2,4 (1H,3H)dione 3-(3,4 dichlorophenyl)-1,1 dimethylurea (Karmek)

5,5-dichloro-2,2 dihydroxidiphenylmethan (Dichlorphen)

Di-isobutyl-cresoxyethoxyethyl-1-methyl-benzyl-ammonium chloride, monohydr.

Di-isobutylphenoxyethoxyethyl-dimethyl-benzyl-ammonium chloride, monohydr.
 Disodium octaborate hexahydrate Dodecylamine salicylate
 Sodium-Dimethyl-carbamate with 2 mercaptobenzotriazole
 Sodium-pentachlorophenolate(Preventol PN)
 2-terbutylamine-4-ethylamine-6 methyl-S-triazine (Terbutrin)
 1-(5-terbutyl-1,3,4-thiadazol-2-yl)1,3 dimethylurea (Tebuthiuron)
 1,2,4-triazol-3 ylamine (Aminotriazole)
 Tributyltin ethane sulphonate
 Tri-n-butyltin oxide with quarternary ammonium salts or alkylamine salts
 3-(3 trifluorometil-fenil) 1,1-dimetil - urea (Fluometuron, Lito 3)
 Zincsilicofluoride

Other commercial products mentioned in literature: Clorox and Borax,
 Peptide, Santobrite. Thaltex, Thiomerol

ADHESIVES FOR STONE REPAIR

During the last years two types of adhesives have proved to be successful first the polyester-resins, second the epoxy-resins. Both types are supplied commercially for the purpose of stone repair. Since besides their use for the restoration of stone they are used in modern building techniques commercial products of a high quality and a high reliability are available. The adhesives are produced as two component material in different variation and it depends from the type of repair work, if a type is chosen which hardens rapidly or if one prefers a longer time for consolidation. As well there are types of a different viscosity so that very liquid types can be used to fill tiny open spaces or that it can be used on vertical parts of structure without running down.

By that connecting broken pieces of stone is not at all a technical problem. Besides the adhesives materials for dowels, normally stainless steel, is available in a high quality and in all dimensions required for the purpose of stone repair.

Consolidation

A few years ago the materials used for the consolidation of a fragile stone or for the protection of a decayed surface were manifold and a matter of intense discussion about their efficiency, their durability and their behaviour over long periods. Meanwhile only three types of materials are considered for practical purposes, first the acrylic resins, second the epoxi resins and third ethyl silicates.

Solutions of acrylic resins today are almost generally applied for consolidation and surface protection since they distinguish themselves by a certain number of advantages. They are resistant against weathering over relatively long periods, they do not change their color and are stable even under an intense exposure to light, they have a relatively good penetration into stone of an average porosity, they can be prepared as mixtures with hydrophobing products and they can be applied without difficulties or technical efforts. Experience with this type of consolidant, especially with the extensively used Paraloid goes back over more than 30 years and since the experiences with the use of acrylic resins on other fields of conservation of works of art generally are quite convincing, products based on this material promise a successful application for stone conservation.

The epoxi-resins are in some of their mechanical properties even superior to the acrylic resins but normally they darken considerably after a relatively short time. This is the reason why those who plead for their use recommend a use on darker or more intensely coloured types of stone, where the change of colour does not become too obvious.

Ethyl silicate has proved to be an optimum material for porous siliceous rocks, first of all of sandstones, which are abundant in central Europe. Also for the deeply decayed volcanic rocks of Central America ethyl silicates provided the best result. Their advantage is the almost extreme penetration into a stone due to their high fluidity. Besides that a thorough consolidation, a long resistance against weathering, a perfect stability against radiation, the possibility to respect the treatment when ever it seems to be necessary and here again the possibility to mix the consolidant with the hydrophobing material are advantages which support a use in stone conservation. Experience with this material goes back to 1965 and except from faulty applications there are no negative results. Ethyl silicates are provided as a

one component and as a two component system, both with or without a hydrophobing compound so that different types of products are available for peculiar applications.

It is not possible to judge if acrylic resins, epoxi resins or ethyl silicates are the right material for a certain purpose. It always depends from a series of tests on the site, supported by accelerated weathering tests in the laboratory, which product provides the best results. In the course of time it becomes clear, which material is best in a certain region for a certain type of stone.

HYDROPHOBING

The main procedure in the course of the treatment of a stone object exposed to a tropical climate is to hydrophobe its surface to prevent any further attack by humidity. Like with stone consolidants the number of types of chemical materials has diminished considerably during the last years since increasing experience led to a preference of just two groups.

The first group are the silico-organic materials, that are the silicones, siliconates and silanes, which are in practical use since 30 years. The silanes developed gradually to a big variety of types which are commonly used today in practice and it is more or less a matter of experience or of testing which commercial product is acceptable. But in general silanes have a very high resistance against weathering and whenever their protective properties decrease in the course of time, then a repeated treatment is possible without any problems.

A second material is in use since several years to protect the surface of stone objects against humidity, the perfluoropolyethers. Apart from experiences on objects there exist extensive series of accelerated weathering tests, which certainly prove a high efficiency. By that actually there exist two groups of hydrophobing materials which protect stone over some decades against the attack of humidity in any form. By means of these materials it is possible to keep the most efficient danger, that is humidity, away from stone and to keep it safe over long periods.

Constructional mean of protection

Frequently it is not considered that it is easier to keep the destructive forces away from an object by any type of construction than by a permanent repetition of procedures of restoration. Just the example of south indian temples on the seashore, which are protected against the attack of wind erosion by planting trees between the sea and the buildings is convincing that this way of protecting a historical monument is a reasonable idea. The same in Japan, where numerous sculptures, which are cut into vertical cliffs of the mountains are protected by little roofs or small buildings in the traditional style against rain or the water running down on the cliff. In Honduras, the famous Maya stelae at Copan are protected by a little roof of straw just on four wooden pillars and since that time the rain has no more a chance to wash the surface of the sculptures away. In Sri Lanka around the large Buddha from Aukana a brick structure has been erected to keep weathering away from this unique monument and also for the restored large Bodhisattva at Dambegoda the possibility to set up a protective roof is in discussion.

Whenever restorations on stone structure are done, than it is the first step to detect the destructive forces and before beginning with the application of chemical products for a protection of the surface it is necessary to consider those constructional possibilities to reduce or to turn of completely the main aggressive influences.

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ILLUSTRATIONS

- 1. The intense vegetation in tropical countries rapidly overgrows historical sites**
- 2. On brick building like the dagobas at Sri Lanka plants develop and transform stone and mortar to soil.**
- 3. The huge pyramids of the Mayas at Copan/Honduras are destroyed by the roots of giant trees.**
- 4. The black stains on the surface of the rock sculptures at Budurugallagala / Sri Lanka are caused by micro organisms.**
- 5. Lichines cover the surface of guard stones in Sri Lanka.**
- 6. Humidity gradually transforms the rock to clay minerals which are responsible for a loss of the surface.**
- 7. Condensation humidity of a sculpture of a rock tomb at Fukuoka/Japan leads to an attack of the surface of the stone.**
- 8. Wind blows out the soft bricks between a hard cement mortar.**
- 9. The destruction of the surface of a South Indian stone temple is due to wind erosion.**
- 10. Small roofs over ancient sculptures in Japan are an efficient protection against weathering.**





Fig. 2



Fig. 3



Fig. 4



Fig. 5

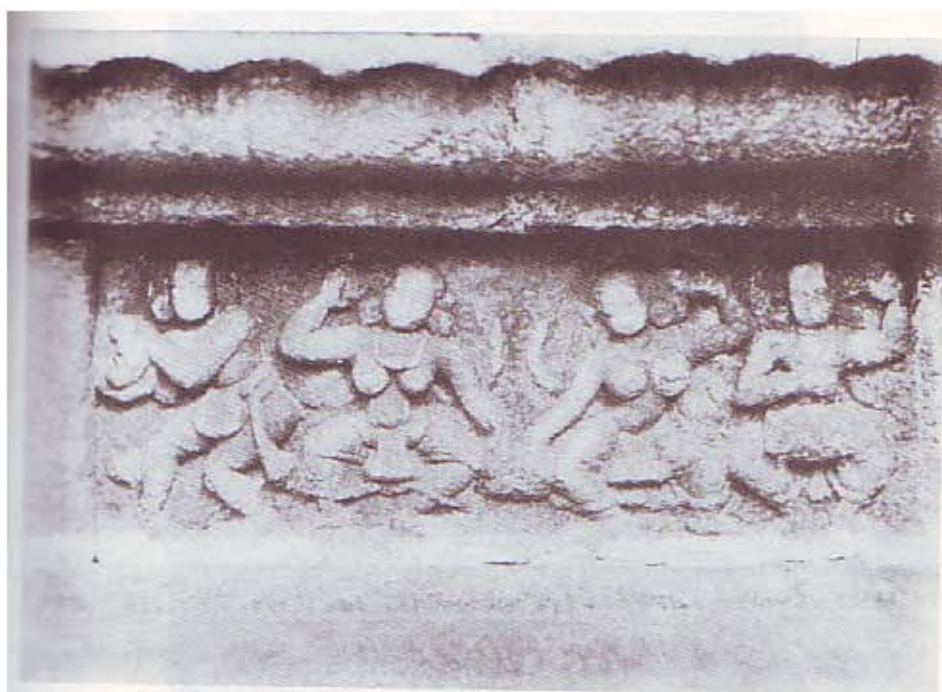


Fig. 6



Fig. 7



Fig. 8



Fig. 9



Fig.10

SALAPATARA (STONE PAVEMENT) INSCRIPTIONS OF THE ABHAYAGIRI STUPA AND THE JETAVANA STUPA.

By
M. Rohanadeera.

The writer was invited by Dr. S.B. Hettiarachchi, the Archaeological Director, of the Abhayagiri Vihara Project, UNESCO Cultural Triangle, to supervise some research programmes initiated by the project. One such programme was to compile an anthology of inscriptions related to the Abhayagiri Vihara. During the occasional visits to the site for this purpose, his attention was drawn to some scriblings found here and there on stone slabs placed in the salapatara maluva, the stone pavement. The final year students reading for special degree course in Archaeology, University of Sri Jayawardhanapura, were at the time undergoing their field training at the site and some of them, under the instruction of the Director, prepared estampages of such scriblings numbering about 40. Majority of them was not in a satisfactory state of preservation' due to being exposed to the wheather and being walked on by the devotees through centuries. However with much efforts the writer was able to deciphern more than half of them. The list of the Abhayagiri salapatara inscription is given at the end.

One day when he was discussing the problems faced in reading these inscriptions with Mr. M.H.Sirisoma, the Deputy Commissioner of Archaeology who himself is a trained epigraphist. He explained that similar writings have been discovered elsewhere, for example at Yatala Vehera in Tissamaharama, some stone slabs bearing short inscriptions were noticed during the excavations in the *Salapatara maluva* there. One such document, in neat shallow letters of pre Christian era reads, as *MANIKARA SUCHILAHA*, meaning of Suchila, the gem cutter. Moreover the generous Deputy Commissiner made access to the writer more than hundred of such short writings discovered from the salapatara of the Jetavana Stupa in Anuradhapura. Being exactly similar and contemporery to those found at the *Abhayagiri salapatara* the writer made efforts to read them and was successful so far in deciphering about thirty of them. The information furnished by these salapatara inscriptions of both the Abhayagiri Stupa and the Jetavana Stupa forms the subject matter of this paper and both lists are given at the end of this paper.

The common purpose of these inscriptions has been to record the donations

made by the members of the public of different social status, for the building of the salapatara, the stone pavement around the two stupas. *Salapatara kama*, in the stone paving work, *salapatara kama*, for the stone paving work are often found in the Jetavana document, but not in any of the documents so far discovered at the Abhayagiri, stupa. In not less than three documents from the Jetavana stupa, occurs the phrase '*dena vehera salapatara kama*' for the purpose of stone paving work at the Dena vehera (J 21) Here dena stands for Jetavana and vehera for Vihara. It is not certain whether '*denavehera*' in this instance means the religious establishment by that name or the Jetavana stupa as in the present day sense of the word *vehera*. Any way this is an undeniable evidence that the colossal stupa situated in the vicinity to the east of *Mahathupa*, *Ruvanvali saya* is the ancient Jetavana stupa and not the Abhayagiri as villagers would call it even today.

Among the Abhayagiri salapatara inscriptions there is one inscription with 8 letters of pre Christian era probably belonging to the earliest stage of the stupa; accurate reading is impossible (A1) . Another inscription probably belonging to 1st century A.D. reads as '*vetenadaha ramana pahane*', the beautiful stone of *vetenada*(A2). All the other inscriptions of Abhayagiri salapatara can on paleographical grounds, be attributed to the 10th Century A.D. Among the inscriptions of the Jetavana salapatara there are short records (J1 J2) attributable to 4th Century A.D. the initial stage of the stupa. Only one can be read as '*nilaya*', (J2) meaning 'of Nila'. All other documents of the Jetavana salapatara on paleographical grounds, can easily fall into the 9th to 10th centuries A.D. being identical in most cases with the Abhayagiri salapatara inscriptions.

A couple of Tamil inscriptions have been found among the salapatara inscriptions of Jetavana. These are written in Pallava grantha script used in Sri Lanka in the 9th and 10th centuries. Only one of them has so far been deciphered. The writer wishes to express his gratitude to Dr. M. H. Peter Silva, his Guru in epigraphy, the retired Senior Lecturer in Sinhala, University of Ceylon, Peradeniya, for deciphering and translating the inscription.

Two word '*pahana*' is commonly used in both places to denote the slab of stone, a unit of the salapatara, the stone pavement. It is generally used at the end of the sentence or the phrase, mostly in the nominative case, such as *pahani*, *pahanay*, *pahanek*. The word is used with the numerical adjectives, eg: *de pahanek* , *ata*

pahanek, tudus pahanek, ek pahanek.,

The word '*adapahana*' is also found at both places. It was always found on the slabs of smaller size, relatively half the size of an average slab. The word *ada*, therefore undoubtedly mean "half. (J10, J14).

An average inscription contains the name of the doner, the amount he donated, the number of stones so placed on his or her account and finally his aspiration for the next birth. Let us have a glance on a few specimen, from Abhayagiri salapatara.

'sala bo ambun akak di tabu pahanay' (A8)

'The stone that the wife of sala bo (sila Bodhi) placed having donated one aka'.

'mihind upasakayan de akak di ebbu pahan dekeka' (A12)

(These are) two stones that the devotee mihindu (Mahinda) caused to have pressed, having offered two akas.

'Taniyama hun malanuvan tathagata bhadrayan massak di ebbu totuvay buhunaniyan dakana' (A13)

'The stone¹ that Tathagata Bhadra, the younger brother who was at taniyama caused to have pressed having donated on massa to be viewed by the sister.'

'..... aba himiyan tubu pahanay me pidu pelen bud wemwa' (A11)

The stone that Aba (Abhya) placed, by the result of this offering may I become Buddha.

In the first instance we see that the wife of slabo has paid one aka for one stone. In the second instance we note that the *Mihind uapasaka* had to pay two akas for two stone slabs. This indicates that an average size stone appear to have been estimated at one *aka*. In the third, we learn that *Tathagata Bhadra* has paid one massa for one stone. Does this mean that aka and massa in the tenth Century A.D. were equal in value?

However with these instances it will be apparent that the stones ready for

fixing on the salapatara at Abhayagiri stupa would have been priced according to their size. The devotee would have paid the amount and got his or her name and amount paid, inscribed on the stone. Thereafter the mason, in the donors presence would have paved the stone.

At the Jetavana stupa the participation process of the salapatara work appear to be rather different from that of the Abhayagiri. At the Jetavana the donors had to make their contribution for the general purpose of funding the *salapatarakama*, the stone paving project, and not to pay some amount for a stone or stones as at Abhayagiri. In several instances it is precisely mentioned '*dena vehera salapatara kamata dun ran dasa kalandek*' (J21) the kalandas of gold given for the work of the stone paving at the Jetavana vihara. In many other places the inscriptions reveal the amount of gold contributed for the purpose of funding the salapatara kama in general. '*salapatara kamata dun ran*' (J13) etc. the gold given for the purpose of the work of stone paving. Some donors announce only that they laid stones. For example we find at the Jetavana '*dala tabavu ada pahani*'; (J16) the half stone that dala (datha) caused to have laid; *sa himiya tabavu pahanay*; the stone that lord sa caused to have placed. *salapatara kama pahan tabvu me pinin bud wemwa*; (J23) May I become Buddha by this merit accrued by laying stones at the salapatara. *himiya tabavu satalos pahanek*; (J24) seventeen stones that the lord caused to have laid. These instances clearly indicate that the practice of participating in the salapatara work by placing stones also prevailed at the Jetavana. But none of the inscriptions of the Jetavana informs, as to how much money that a donor had to pay for a stone. At the Jetavana the managers of the salapatara work seem to have been more concerned about increasing the fund, whereas the Abhayagiri managers were more concerned about increasing the number of stones to be laid in the salapatara.

ABHAYAGIRI SALAPATARA INSCRIPTIONS

- A1. Five letters of prechristian era, accurate reading impossible.
- A2. VETENADAHA RAMANE PAHANE,
The attractive stone of *Vetenda*. attributable to 1st circa A.D.
- A3. Ten letters of 3rd circa, Accurate reading is impossible
- A4. DATUGE PAHANI.
The stone of Datu (Datta) 10th century
- A5. DALA TUBU PAHANI
The stone that Dala (Datha) placed.
- A6. DEVA TIBU PAHANI
The stone that Deva (Deva) placed.
- A7. AGBOYAL HIMINYAN TABU PAHANI
The stone that lord Agobyal (Aggabodhi) placed.
- A8. SALABO AMBUN AKAK DI TABU PAHANAY
The stone that the wife of Salabo (Sila Bodhi) placed having donated one *aka*.
- A9. BO KIRI MANIYAN OBA LU PAHANAY.
The stone that the mother of Bo kiri (Bodhi Giri) pressed.
- A10. KUBAL RAD DAHA PATAK DI TABAVU PAHANI
The stone that kubal rad caused to have placed having donated ten patas.
- A11.ABA HIMIYAN TUBU PAHANAY.
ME PIDU PELEN BUD WEMVA
The stone that lord aba (Abhaya) placed, by the result of this offering may I become Buddha.

A12. MIHIND UPASAKAYAN DE AKAK DI EBBU PAHAN DEKEKA.

Two stones that the devotee *minindu* (Mahinda) caused to have placed, having donated two *akas*.

**A13. TANIYAME HUN MALANUVAN TATHAGATA BHADRAYAN
MASSAK DI EBBU TOTUVAY BUHNANIYAN DAK
NA,**

(A sign resembling a signature, most probably) The stone that Tathagata Bhadra, the younger brother who was at Taniyama caused to have pressed having donate one *massa*.

**A14. KALINGAMBUVA AKAK DI EBBUYE E
K PAHANEK.**

The Kaliga wife having donated one aka caused to have pressed one stone.

**A15. KALINGU NA HUMBU
VA TAMAN NAMIN ATA
PAHANAK TABA
.....MASSAK**

The Kalinga wife having placed eight stones in her name .. one *massa*.

THE JETAVANA SALAPATARA INSCRIPTIONS.

J 1. Two line inscription, fourth century A.D. letters, not readable.

J 2. Three letters, nilaya, of Nila, fourth century A.D. letters.

J 3. DEVAGE PAHANAY,
the stone (slab) of deva, tenth century A.D.

J 4. SA HIMIYA TABVU PAHANAY,
the stone that lord *sa* caused to have placed. 10th circa.

J 5. AGBOY TABAVU PAHANI,
the stone that *Agbo* (Agga Bodhi) caused to have placed.

J 6. SANGU TABU PAHANI,
the stone that Sangu (Sangha) placed.

J 7. KOTTI HAMBUVAGE PAHANAY,
the stone of lord's wife kotti.

J 8. BATA KITI,
Bhartr (bandara) Kirti. (see S. Paranavitana, Sigiri Graffiti, Vol. I, Introduction, ccxiii)

J 9. AGBOY TABAVU SATAK PAHANAY.
Seven stones that Agboy (Agga Bodhi) caused to have placed.

J10. MHATALAVA DALUN TABAVU ADA PAHANI,
the half stone that dala (datha) of *mahatala* caused to have placed.

J11. DEVAN SENU SALAPATARA KAMAT DUN...,
... that *senu* (sena) of *deva* (Deva) gave for the work of stone paving.

J 12. SALAYA SALAPATARA KAMAT DUN MASSA,
the massa that salaya gave for the stone paving work.

J 13.SALAPATARA KA
MAT, DUN RAN TUDUSEK ME
HI PELEN BUD WEMVA,
fourteen gold that gave for the stone paving work, By this result may I
become Buddha.

J 14. SANGAHA PRIVENA
MAHEND VAT HIMI
TABA ADHA PAHANEK,
A half stone that *Mahend vat himi* (mahendra upadhyaya swami) at sangha
pirivena caused to have placed.

J 15. DALA HAMINDU TA
BAVU ADHA PAHA
NEKI ME PININ SA
SARA ...
A half stone that lord dala (datha) caused to have placed by this merit the
sansara...

J 16. DALA TABA
VU ADA PAHANEK
A half stone that *Dala* (datha) caused to have placed.

J 17.VASA
HABUVA SA
TARAK MADE
RAN KALANDEK.
The wife of the lord of the clan... four kalandas of *mada ran*.

J 18. TABA VU PAHANA
YI UN SASARA DI.

The stone that.. caused to have placed, he in the samsara.

J 19. SAMANAL BATA² HIMI
YAN TABAVU ADA PAHANI.

The half that samanala bata caused to have placed.

J 20. RAK UPASAKAYAN
SALAPATARA KAMAT
DUN DASAKEK.

Ten akas that *Rak* (Rakkha Raksha) devotee gave, for the stone paving work.

J21. KEL VALA BUDA DENA
VEHERA SALAPATARAM KAMAT DUN
RAN DAS KALANDE
KKEL VALAYAHA.
DENA VEHERA SA
LAPARA² KAMATA
YITTIYA ATULU
VA DUN RAN SAT
KALANDEK.

Ten kalandas of gold that *Buda* (Buddha) of kelvala gave for the stone paving work at the Jetavana Vihara (stupa) kelvalas (are) Seven kalandas of gold given with the obligation⁴ for the work of stone paving at the Jetavana Vihara (stupa).

J 22.

...VADA UN
VAT HAMBUVAN
ATA PAHAPA.

The eight stones of the lord's wife who was at.....

J23. SA LAYAGE KUBU
LIMU SLALPATA

R KAMA PAHAN
TABAVU ME PININ
BUD WEMVA.

I am Kubuli of Salaya, by this merit of causing stones to have placed in the work of stone paving may I become Buddha.

J 24.

HIMIYA
TABAVU
SATALOS
PAHANЕК

Fourteen stones that lord caused to have placed.

J 25. NAHUN KALA PIM
SALAPATARA KAMA
T DUN RAM⁶ KALANDEK.

The meritorious act ..nahu did, one kalanda of gold given for the stone paving work.

J 26. BUDA SALAPATARA
KAMAT DUN DE A
KEK

Two akas that Buda gave for the stone paving work.

J 27. SANGU SALAPATARA KAMAT
DUN TUN KALAND DE AKEK.

Three kalandas and two akas that sangu (sangha) gave for the stone paving work.

J 28. MAN SALAPAT
TAR KAMAT DU
N RAN KALAND

The kalanda of gold that *mani*
gave for the stone paving work.

J 29 . MADIYANA

SATIYA

SALAP

TAR KAMAT

DUN RAN KA

LANDEK

One kalada of gold that satiya of Madiyana gave for the stone paving work.

J 30. ANDUNVAN DALA LANGA UN

PUTANUVAN KASUB HI

MIYA OVNAT PINAT TABU

KOTUVA DUN RAN PAS KALND

Five kalandas of gold that his son lord kasub (Kassapa) gave from the treasure left for their meritorious deeds.

J31. A Tamil inscription written in Pallava Grantha Script of 10th century AD. The text together with the translation was prepared by Dr. M.H. Peter Silva retired Senior Lecture in Sinhala, University of Ceylon Peradeniya.

CUDINAKARI

NDRA SIRUWADDNANA

ADHIKARIKA

RENDRA RATINAJA

YA WALLA

PA RAIRA ILA

KANA PANNISI

LA TALAYA PA

THARAYINA

The stone slab that Narendra Ratna Jayawallabha Rayara; Sri wardhana Adikari the Lord of Cudi Nakara, caused to have inscribed was Laid.

NOTES.

1. Totuway is a very rare word. In the context it cannot mean any thing other than the slab of stone on which it was inscribed. Prof. Wimal G. Balagalle suggests the word may be derived from strataka, the past participle of the stem str to spread. If that is the case the etymology can be as follows. Strataka, tthatakas totu. This way the word can mean flat stone, which can well fit in the context.

2. For sigiri poets by the name samanala bata see S. Paranavitana, Sigiri graffiti, Vol. 1, appendix A, p. ccxviii.

3. The akasa 'ta' seems to have slipped by the hand of the scribe.

4. The letter me seems to have been inserted later.

5. Note instead of N in pim and ram.

**POPULAR PARTICIPATION IN BUILDING THE SALAPATARA
(THE STONE PAVEMENT) AROUND THE ABHAYAGIRI STUPA
AND THE JETAVANA STUPA AS REVEALED BY THE
INSCRIPTIONS SALAPATARA**

By

M. Rohanadeera

Inscriptions found on the stone pavements of the Abhayagiriya & the Jetavana furnish valuable information about the participation of the public in these two massive projects i.e. making the salapatara around the two colossal stupas, the Abhayagiri and the Jetavana. The chronicles would normally like us to believe that the kings alone were responsible for such gigantic projects, which involved massive funds and a labour force. While it may be true that the contemporary rulers would have initiated and directed such religious projects, it is evident from the documents that people from various walks of life, have also contributed their share, voluntarily in money, and labour, although the chroniclers seem to have given the full credit to the rulers ignoring the services rendered by the public.

The *Culavamsa* gives the credit to Sena III (938-946 A.D.) for donating 40000 *kahapanas* for the making of the Abhayagiri salapatara, the stone pavement. Though we are not in a position to estimate the cost of sealing an area of 587 feet square (First Report, Abhayagiri excavations 1981-1982/pl. with slabs of stones in the tenth century A.D., it can be safely argued that 40000 *kahapanas* were not sufficient to meet the full expenses and hence the contribution from the public was sought as evident from our inscriptions.

All these inscriptions except for 4 or 5 which belong to the early Christian era, can be attributed, on paleographical grounds, to the tenth century A.D., This corresponds to the time of Sena III, 938-946. Large number of inscriptions falling into this period, roughly the latter part of the tenth century, are at our disposal. Among them are long records such as the Mihintala Tablets of Mahinda IV(956-972) and Sigiri Graffiti. The *aksaras* of these inscriptions are well represented in our documents. Of special significance are of specimens demonstrating the forms of a,ma,ra,and ka.(EZ.1,p.163).

As such, it can be surmized that the salapatara of the Abhayagiri was initiated

during the time of Sena III, (938-946 A.D), and was completed during the time of successive kings, Udaya IV(946-954,) Sena IV,(954-956), Mahinda IV,(956-972), Sena V (972-982) and Mahinda V(982-1029). Parakramabahu I, 1153-1186 also would have repaired and perhaps added on to the Salapatara Jetavana salapatara too would have been done during this same period. Apart from the ruling kings, we observed, earlier, that members of the public also participated in the process of making the salapatara.

A personage called '*vat hambuvan*' figures in one of the inscriptions from Jetavana salapatara. The document is fragmentary, first five letters of the remaining portion are not clear and the rest reads as *desa vada un vat hambuvan ata pahani*," the eight stones of the *vat hambu* who resided at, The inscription is carefully engraved between the horizontal lines of even space on the smooth surface, whereas the neighbouring inscriptions are not so refinely done. Even the aksaras appear to have been designed by a trained hand. The honorific adjective *vada un* points to the fact that the person concerned is of the highest rank, i.e. royal rank, for the verbal forms such as *vada un*, *vada siti*, *wada un seka*, etc. are normally associated with either clergy or the members of the royal family.

The term *vat hambuvan* occurs in other contemporary inscriptions too. For example the Rambava inscription of the first year of Mahinda IV (956 A.D)., only ten years after Sena 111, as we noted earlier, initiated Abhayagiri salapatara, by donating 40000 *kahapanas*, has a phrase *kalingu rad piri vat hambuvan*. (EZ.,11,p.68.). Paronavitana having restored the reading to be '*kalingu rad vasa vat hambuvan*', interprets it as the queen of the Kalinga Raja Vamsa, i.e. the Kalinga queen, whom according to *Culavamsa*, Mahinda IV invited from kalinga royal family. (Ceylon and Malaysia. p 27.).

Paronavitana derrived the meaning 'queen' from the term *vat hambu*. He seems to have taken *hambu* as a varient of '*himambu*', to mean lord's wife. (Sigiri graffiti 11,p.470). The term *hambu* easily can be derrived from *himi ambu*, through a process of shortening. *himi ambu* > *himambu* > *hamanbu* > *hambu*, thus meaning lord's wife. In this way *vat hambu* stands for *vat himi ambu*. *Vat himi* is the derivative of *vastu svami*, meaning lord of the land, the king. Thus '*kalingu rad vasa vat hambu*' in the *Rambava* inscription being identified as the kalinga qeen of Mahinda 1V by Paronavitana appears to be historically authentic.

We observed earlier that the '*vat hambu*' figuring in the Jetavana salapatara inscription should be a person of royal rank. Salapatara inscriptions as we noted earlier belong to the same period as *Rambava* inscription of Mahinda IV. '*Vat hambuvan*' in our inscription, although is not qualified as '*kalingu rad vasa*', therefore, can be identified as the kalinga queen of Mahinda IV.

Another inscription from Abhayagiri salapatara has the phrase '*kalingu na hambuva taman namin ata pahanak taba* (A 15), the wife of the Kalinga lord having placed eight stones in her name. Referring to a phrase '*Kalingu kula kot*' pinnacle of the Kalinga family, occurring in the Polonnaruva pillar inscription of Mahinda IV, Pranavitana suggests, that the phrase could qualify Mahinda IV, himself. In the same way if '*kalingu na*', the Kalinga lord in the Abhayagiri document can be identified with Mahinda IV, then the donor '*Kalingu na vat hambu*' may refer to his queen married from the kalinga royal family. We saw earlier that '*vada un vat hambu*', in the Jetavana inscription was responsible for eight stones for the Jetavana salapatara and that she could be the kalinga queen of Mahinda IV. It is possible that she, in order to keep balance in her patronage would have donated the same number of stones, i.e., eight in number for the Abhayagiri salapatara also. On the other hand the '*kalingu na hambuva*', the wife of the kalinga Natha, could well be a wife of a relative of the kalinga Mahesi, for this marriage of Mahinda IV, which was of high political significance would necessarily have brought to the country a retinue of family members of the kalinga queen, and they were held in high esteem as '*Kalingu na*', of Kalinga lords. Their wives also would have been called '*kalingu hambu*'. One more inscription from Abhayagiri salapatara has '*kalingambuva akak di ebbuye ek pahanek*', the kalinga wife having donated one aka caused to have paved one stone (A14). In this instance '*Kalinga mbuva*', the Kalinga wife could also be a relative of Kalinga queen.

The term '*himiya*' is often found associated with the names of donors at both places, Abhayagiri and Jetavana. For example we find in Abhayagiri inscriptions phrases *agboyal himiya* (A 7), *aba himiyan* (A 11) whereas in those at Jetavana phrases like *dala hamindu* (J 15) and *kasub himiya* (J 30). This title is very common among the Sigiri graffiti authors. Parana vitana has translated it as lord. According to him, the title, most probably, was applied to those who, like the barons of feudal Europe, were entitled to the overlordship of villages. (Sigiri graffiti, Vol, 11, ccxiii) A personage called '*samanala bata*' is found at Jetavana, '*bata again*' is a common

title with Sigiri authors. Says Paranavitana, "we are not certain of the precise distinction between *himi* and *bata*; the latter as it is always followed by the verbal form *mi* (I am), has it's final vowel changed i.e.g. *Sang batimi* in No.357. This tends to confuse the term with it's feminine form.. *bata* or *bati* in masculine names is most probably equivalent to Skt. *bhartr* and is akin to modern *Bandara* and *Banda*." (Sigiri Graffiti, 11, ccxiii). The very name *samanala bata* is found at four places in Sigiri graffiti, (Sigiri 11, Appendix A). Paranavitana takes *samanala* from *Saman*.

As we noted earlier, we meet with female donors at both places. The wives of lords such as '*Kotti hambuva*' (J 7) '*kalingambuva*' (A14) are found among them. There are also female donors probably of a lesser social status than of *hambu*, wife of lords, denoted only by the term *ambuva*, wife e.g. '*Salabo ambun*', (A 8),

There are donors who preferred to be introduced as *upasakas*, devotees or pious people. Thus we meet *Mihind uapasakayan* placing two stones by, paying two akas at The Abhayagiri salapatara (A12), and '*Rak (Rakkha) upasakayan*' donating ten akas for the work of salapatara at Jetavana. (J 20).

Many donors names appear without any adjectives. Most of them do not even mention the amount they donated. Few examples are "*datuge pahani*", the stone of datu (A 4) "*dala tubu pahani*", the stone that dala placed, (A 5) "*devage pahanay*", the stone of Dava, (J 3) and "*sangu tabu pahanay*", the stone that Sangu laid, (J 6.)

It should be noted that in the above instances the past participles are not causative like *tabbu*, *tabavu* or *abbu*, and more over the donors have not indicated any amount they paid. Do these examples indicate that the donors did not pay any money but they prepared and placed the stone themselves, thus participating in the salapatara making, by donating only their labour.

Buddhist monks also appear among the donors. There is a donor by the name of '*Tathagata Bhadra*', who calls himself the younger brother and wishes that the stone he laid there, by paying one massa, be seen by the sister. (A 13) This personage most probably could be a Buddhist monk. In the Jetavana salapatara we meet a donor called "*sangaha pirivena mehend vat himi*", mahendra Upadhyaya svami at Sangha pirivena, who undoubtedly was an elderly monk.

THE CURRENCY INVOLVED IN THE SALAPATARA MAKING

The information furnished by the inscriptions about the coins and currency in vogue during the tenth century in Anuradhapura, would certainly enhance our knowledge about the subject. In these documents we come across with '*massa*, *aka* and '*kalanda*'. '*Kalanda*' has been the standard coinage frequently mentioned in the Jetavana inscriptions. Salapatara '*kamat dun ran kalandek*', (J 25), one kalanda of gold given for the stone paving, '*salapatara kamat dun ran dasa kalandek*' (J 13), ten kalandas of gold given for the stone paving, "*Salapatara kamat dun ran tudusek*" (J 13), fourteen gold given for the stone paving, are examples. It should be noted that in the third instance the name of the currency is not mentioned, but taken together with the other instances at the Jetavana it is possible to reckon that also as kalanda.

In another document from the Jetavana we find '*salapatara kamat dun tun kaland deakak*', three kalandas and two akas given for the salapatara. here also it is implied that two '*kalandas*' and two akas are gold. That '*kalanda*' is mentioned together with the '*aka*' suggests, that the '*aka*' is a fractional unit of the kalanda.

Kalanda and aka are frequently found in many other contemporary documents. For example in the slab inscription of Mahida IV, 956-972 A.D. "One '*kalanda*' and four '*akas*' of gold should be given to the monk who looks after the Nikaya. (EZ.,I,p107) Although '*kalanda*' is frequently used in the Jetavana and many other contemporary documents, strangely enough the word is not found in any of the inscriptions of Abhayagiriya so far deciphered.

The currency involved in the Abhayagiri salapatara making was always '*massak*, *akak*, *de akak*' etc. The standard unit appears to be aka. Whether they are gold silver or copper is not mentioned. According to *Culavmsa* Sena III, 938-946 A.D. has donated 40000 *kahapanas* for the stone paving of the Abhayagiri stupa, (CV,51,33). The relation between the '*kahapana*' or '*kahavanu*' in the chronicle and the '*aka*' or '*massa*' in the salapatara inscriptions is not clear.

Prof. Paranavitana has pointed out that a gold coinage, with the kalanda as the standard and fractional pieces of one fourth known as '*pala*' and eighths called '*aka*', was in circulation during the last two or three centuries of the Anuradhapura

period. (UCHC.,P.363.) We have seen '*kalandas*' and '*akas*' at both places but not '*palas*'. With regard to '*massa*' in inscriptions and the '*kahapana*' in the chronicle we have no clue to ascertain as to how they were related to '*kalanda*' and '*aka*'.

Literary sources of the Polonnaruva period furnish evidence on the coinage current during the period. Though our documents are one or two centuries earlier than the polonnaru evidence, we may not be too far from the truth if we rely on the latter to ascertain the coinage current in the last century of the Anuradhapura period.

According to the '*Mulsikagatapadaya*' the '*kahavanuva*' or the '*kahapana*' current during the period was equal to 8 '*akas*'. '*Abhidhammappadipika*' the famous glossary of the early Polonnaruva period says that one '*aka*' is equal to two and a half '*masak*' or '*massa*', and 8 '*akas*' are equal to one '*kalanda*'. (*Abidharama padipika* 47) In this, way twenty '*massas*' is equal to one '*kalanda*' as well as to one '*kahavana*' or '*kahapana*'. Now we can arrange the coinage in the ascending order as follows.: '*Massa*, *aka*, *kalanada* or *kahapana*'. Thus *kalanda* is synonymous with *kahapana*. One *kahapana* is equal to 20 *massas* as well as to 8 '*akas*'. In the same way one *kalanda* is equal to 8 '*akas*' and one '*aka*' is equal to two and a half '*massas*' and thus, one '*kalanda*' is also equal to 20 '*massa*'. We can now calculate that 40000 *kahapana* donated by Sena III (938-946 A.D.) for the stone paving at the Abhayagiri is 40000 in '*kalandas*', 320000 in '*akas*' and 800,000 in '*massas*'.

SOME TRACES OF ANURADHAPURA CULTURE IN THE DVARAVATI KINGDOM IN ANCIENT THAILAND

By

M. Rohanadeera

Cultural relations that existed between Sri Lanka and Thailand atleast from 13th century onward, have been discovered with the help of literary and archaeological evidence. Beyond that nothing is known due, mainly to absence and silence of vaild evidence. Archaeologists and art historians, who were engaged in Southeast Asian studies during the last hundred years, have brought to light, an ancient Buddhist civilization that existed in Thailand from, about seventh century to 11th century A.D., and that was called Dvaravati civilazation.¹ It's political history is still in darkness. Only a vague picture of it's religious life has been potrayed with the help of inscriptions in Pallava Grantha characters, ranging from 7th-11th centuries and many artefacts including beautiful Buddha statues of high easthetic qualities. French scholars like George Coedes and Pierre Dupont have stressed that some of the Buddha statues found in Dvaravati sites, have very close resemblance to Anuradhapura Buddha images.² A.B. Griswold has gone to the extent of suggesting that some of the Dvaravati bronze Buddha statuettes were direct imports from Anuradhapura.³ It is therefore necessary to examine whether any definite traces of Anuradhapura culture are left in Dvaravati.

The corresponding period of Sri Lankan history marks the zenith of what may be called Sinahala Theravada Buddhism. Literature, painting sculpture and architecture flourished during this 7th - 11th century A.D., producing some of the masterpieces in their respective feilds. The Three major Buddhist centres, Mahavihara, Abhayagiri and Jetavana flourished side by side competing with each other in the fields of art and letters. They were in their full glory by the beginning of the eleventh century, when Anuradhapura fell into the hands of invading Cholas. While Mahavihara was reputed as the guardian of the orthodox Theravada doctrine, Abhayagiri, on the other hand, owing to its readiness to absorb fresh views from out side and to entertain secular aspirations of it's adherents, had developed a new school of thought, resulting in a combination of Theravada and Mahayana doctrines. This new 'Dharma of the Sthavira school of the Mahayana sect,⁴ as Hsuan Tsan heard of it, gave rise to inovative trends in interpreting the Dharma and Vinaya, and enhancing literature, art, sculpture and architecture.

Abhayagiriya had come more forward being famous as an international Buddhist centre which attracted Buddhist travellers from China and South east Asia who took the traditional southern sea route to India. On the other hand great Mahayana teachers on their way to eastern lands, stayed at Abhayagiri for some time, before they reached their destinations. Besides, scholarly monks mostly, Abhayagiri monks seem to have travelled to lands in South east Asia, during this time for the propagation of Srilankan Buddhism.⁵

These travellers had easy access to Dvaravati both from sea and land. The southern sea route, entering the archipelago through the Malakka straits passing Sumatra and Java branched off across the Siamese gulf took them to the seaports on the southern shore of Dvaravati. Avoiding this long sea route some travellers took ships to sea ports on the west coast of Malay peninsula such as Kedah, 'trang' and 'Takua pa' and travel through the land to the ports on the eastern coast, like Patani, Ligore and Jaiya, and took ships to Dvaravati ports. Another popular land route had been from Martaban through the three Pagoda pass to Mae nam Valley.⁶ Traveller from and to Sri Lanka seem to have taken both these routes.

Under the circumstances it is natural that Anuradhapura Buddhist culture reach Dvaravati and left its traces on Dvaravati culture.

The word Anuradhapura occurs in an inscription in a cave on the Phra Phuttabat (vara Buddhapada) hill, in the Saraburi province, in central Thailand. This, written in Mon(Burmese) language has been attributed to 7th century A.D. and is considered to be one of the earliest inscriptions found in Thailand. It has three lines which read as follows. ⁷ (plate)

1. Kamun Anuradhapura ko aktam Kunadari janajih
2. Ranaleha komnah danpa aptanaya sinadha
3. hannah toyalapadaya vo a.

Following meaning has been rendered,

The Governor of Anuradhapura and his wife together with all the people of

the city, crossed the cultivable land with singing and dancing. After the people chanted together 'God bless our victorious Lord' all entered into this cave.

According to the former editor, Burma Research Society, Nai Pan Hla, "this city of Anuradhapura existed near Lopburi in those days. It most probably duplicated the name of the great city of Anuradhapura in Ceylon. The sense of the text significantly points to a local city in old Siam."⁸ Naming a local city after Anuradhapura points to the fact, that by the seventh century in central Thailand i.e., Dvaravati, Anuradhapura was held in high esteem.

The hill which has the cave bearing the said inscription is called Phra Buddha pada hill, because it also has a large footprint of the Buddha. It is believed that the original footprint there was on the stone in the shape of a large human foot print carved during the Dvaravati period, which corresponds to the latter part of the Anuradhapura period.⁹ In the royal chronicle of Ayodhya it is said that in the 18th century, siamese pilgrims who came to Lanka to worship foot print on mount Samanala, were told by the Sri Lankans, that they need not come to Lanka for the worship of footprint of the Master, for they had the other foot print on Saccabaddhagiri in their country. Being informed of this by the pilgrims king Sonthom made inquiries about the place and identified this hill as the Saccabaddhagiri; the original foot print he covered with a bronze sheet carved with 108 marks. Even if we doubt the truth of this story, the fact that the original footprint there, belong to Dvaravati period, indicates that the footprint worship was known in Dvaravati.

Another pair of footprints of the Lord Buddha was discovered in 1986, at an ancient vihara complex called Wat Sa Morakot, (The temple of emerald pond) in Dong Si Maha Bo area in Prachinburi, 150 meters to the east of Bangkok. Prachinburi is generally considered as a flourishing centre of Dvaravati.

This pair of footprints, nearly two meters long, with the impressions of natural traits of human soles like marks of the heels and slender toes of uneven length, was carved in dent on the natural laterite floor. In the middle of each foot a Dharmacakra was carved not in dent like the rest of the foot but the rim and the spokes in low relief. There is a circle carved around the pair of foot prints.¹⁰ The whole thing looks so natural as if an unusually huge human being having alighted there on the wet

floor, left the impress of his soles and later the spot became dried. There is a deep hole between the two wheels and at the mouth of the hole is a swastika like mark carved in deep. It is generally believed that this hole and the swastika mark may be a device made to fix a pole supporting an umbrella over the footprints.

Commenting on the footprints, Prof. Prince Subhadradis Piskul, the renowned scholar on art history of Thailand, has suggested that the footprint worship prevalent in Anuradhapura, would have been known in Dvaravati and the Prachinburi footprints would reflect that awareness.¹¹

The writer has pointed out elsewhere that there prevailed two types of footprint worship during the Anuradhapura period. One was the worship of Buddha pada, as the "uddesika cetiya", the image or the representation or the Buddha. Second was the worship of Buddha pada lanchana, the imprints of the Buddha's feet, as 'paribhagika cetiya', the place that was sanctified by receiving bodily contact of the master.¹² The Buddha pada in the former practice was commonly used to represent the Master in the scenes of Buddha's life depicted in bas-relief at Amaravati and Nagarjunakonda. The Sri Lankan sculptor seems to have singled out the symbol alone and carved it together with Dharmacakra and other auspicious marks such as Swastika and conch in low relief, on isolate rectangular slabs of stone. These slabs found in numbers at ancient sites throughout the Island, seem to have been worshiped in place of Buddha during earliest and pre christian era until the art of carving of the Buddha image was known. The pair of footprints at Prachinburi does not correspond to this first type for it is carved inward as an imprint of the feet of the Master in other word pada lanchana, and therefore it would correspond to the second type of footprint worship, namely the worship of padalanchana the worship of the spot that received the contact of the Masters body, the paribhagika cetiya, in that sense similar to the worship of the sacred Bodhi tree.

That the second type of foot print worship' other than that of the footprint on Adam's peak prevailed in Anuradhapura was revealed, for the first time, by Prof. S. Paranavitana in his paper, Pada Lanchana at Anuradhapura, Published in the University of Ceylon review. Commenting on a reference made in the Culavamsa, chapter 54, v.44, that, "Mahinda IV, (956-972 A.D.) restored the beautiful temple of the four cetiyas in padalanchana, which was burnt down by the troops of the Cola king" Paranavitana argued that padalanchana in this context was not the famous

padalanchana on the peak of mount Samanala but some other place.

Padalanchana in this context has been identified by him as the area to the east of Thuparama in Anuradhapura, on the basis of the evidence from the Mahavamsa, Mahabodhivamsa and the Mahabodhivamsa getapadaya. In this padalanchana area, he points out that there were four sila stupas built over the footprints left at the spots from which the four buddhas, Kakusanda, Konagamana, Kasyapa and Gautama of this Bhadra Kalpa, rose to the air for their return journey to India, after the visits they were believed to have paid to Sri Lanka. "The ancient belief thus seems, to have been that an indelible impress of a Buddha's foot, would remain at a spot from which he rose to the air or to which he alighted. In these actions it is natural that greater pressure would have been exerted on the ground than in normal walking."¹³ Says Paranavitana. We noted earlier that the Prachinburi footprints were so naturalistic that it looked as if a huge human being had left the mark having pressed his feet on the spot. It is therefore reasonable to believe that the footprints at Prachinburi and Saraburi would correspond to the footprints of padalanchana in Anuradhapura. Fa-hien who stayed at Abhayagiriya for three years has recorded that he was told by the Abhayagiri inmates that the stupa was built over the footprint of the Buddha. According to Paranavitana Vattagamini Abhaya built a stone stupa probably over the footprint and it became the core of the colossal stupa.¹⁴ In the padalanchana at Anuradhapura, it is mentioned that the stone stupas were built over the footprints of the four Buddhas thus making footprints the foundation deposits of cetiyas. It is also recorded that there were Chzzes, houses built over the cetiyas.

In this connection it should be mentioned that some archaeologists who examined the architectural features of the site at Prachinburi have conjectured that the footprint there would have been a foundation deposit of a stupa and that stupa would have been associated with a cetiya ghara, a hall.¹⁵ Under the circumstances it is reasonable to believe that the foot print at Prachinburi as well as at Saraburi, both belonging to Dvaravati period, could be regarded as reflections of the footprint worship that prevailed in Anuradhapura. We are in no way to grasp any idea about the appearance of the kind of footprints that would have been inside the stone stupas at the padalanchana area or in the Abhayagiri stupa, as none of these monuments can be opened up. As such we have to depend on the Prachinburi footprint as the only specimen at our disposal even for the purpose of understanding the appearance of Anuradhapura footprints.

The area around Wat Sa Morqkot where the footprint was discovered, is generally called Dong Si Maha Bo, meaning Siri Maha Bo forest, because there is a big old Bodhi tree in the vicinity of Sa Morakot. This Bo tree is considered the most sacred in Thailand. It is deeply rooted in the cultural life of the people in the eastern provinces of Thailand. During the ordination ceremonies in the area, it is considered compulsory that the novice is accompanied in a big procession to the Bo tree and made him to pay homage to the Bo tree by circumambulating three times around it. On the Visakha full moon day people even from distant area flock together in thousands to perform the vaisakha puja torch lighting festival the tradition of which is coming down from unknown days.¹⁶

Sri Maha Bodhi, Sirimaha Bo are the terms by which the sacred Bodhi tree in Anuradhapura is referred to in both literary and the folk traditions, in Sri Lanka. The fact that the old sacred Bo tree in Prachinburi is referred to as Si Maha Bo, the Thai Pronunciation of Siri Maha Bodhi, points to the close connection of it with the sacred Bo tree in Anuradhapura. Infact it is the unanimous belief in Thailand that this old Bo tree was grown from a sapling taken from the Anuradhapura Bo tree. At the entrance to the Bo tree, one can see even today, a name board having picture depicting the scene of a Bo sapling being carried in a ship and a sentence below it announcing the arrival of Si Maha Bo from Lanka. Under the circumstances one can reasonably argue that the sacred Bodhi tree and the festival and rituals connected within have some bearing on the sacred Bodhi tree and the culture connected with it in Anuradhapura.

On the pile of the debris that buried the pair of footprints mentioned above there had been earlier discovered an inscription engraved on a slab of green sand stone 177 cm. high, 40 cm. wide, and 28 cm. thick. It was first published in *Boran Kadi, Dong si Maha Bod*, 1967, by the Faculty of Archaeology, Silpakone University. Next, Prof. Cham Thong Khamwan published in the *Prachum Silacaruk*. Again previous reading was revised by Col. Yam Praphrthong and published in the *Caruk Nai Pradesh Thai, Volume 1*, in 1986, the official publication of the Fine Art (Archaeology) Department, Thailand. All the three publications are in Thai Language, hence were beyond the access of non Thai readers. The present writer however had to study Thai characters in order to understand the text of the inscription.

The inscription contains 27 lines in so-called Grantha script which is not far different from the Sinhala script of 7th and 8th centuries A.D. The first three lines and the last ten are in old Khmer language while line 4-16 contain three Pali stanzas in the Vasanta tilaka metre. The first three lines say that the inscription was installed by a person called Buddhāsiri in the year 683 in Saka era, which corresponds to 761 in Christian era.

Certain lines, phrases, words and some aksaras were not satisfactorily deciphered and interpreted due to their fragmentary nature. However the present writer after an exhaustive examination was successful in restoring the lines to almost what actually were on the stone. His exercise in this regard formed a separate paper which was published in the Journal of the Siam Society, Vol. 76, 1988, under the title "The Noen Sa Bua Inscription of Dong Si Maha Bo, Prachinburi."¹⁷ Hence for the present purpose only the final results given below would be sufficient.

The plate and the Eye copy of the inscription¹⁸

The reading proposed in the Caruk Nai Pradesh Thai, 19 the official publication: Line by line:

4. Sri yo sabba loka mohito ka-
5. runadhivaso/ mokham karo *nirama*
6. lam varapunacando/noyyoda (*mo na*)
7. *vikulam* sakalam vibuddho/*lokuttaro*
8. namatthi tam sirasa munendam//
9. sopanamalamamalam tirana-
10. layassa / samsarasagarasamuttaranaya
11. setum / sambbaratirayyapicajatta khema ma(ggam)
12. dhammam namassata sada munina pasattham //
13. deyyam dadapyamapi yattha pasanna
14. citta / datva nara phalamulam rattanam
15. saranti / tam sabbada dasa balenapi suppasattham /
16. sangham namassata sada mitta punnakhetam //

The final text given in the official publication :²⁰

Yo sabba loka mohito - Karunadivaso
Mokkham Karosi *amalam* - vara punna cando
neyyo damo navikulam - sakalam vibuddho
Lokuttaro namatha tam - sirasa munendam.

Sopanamalamamalam - tiranalayassa
Samsara sagara samuttaranaya setum
Sambodha tiramapicuttara khomemaggam
Dhammam namassatha sada munina pasattham.

Deyyam dadampyampi yattha pasanna citta
Datva nara phalamulam ratanam saranti
Tam sabbada dasa balenapi suppasattham
Sangham namassatha sadamita punnakhettham.

The places subjected to revision by the writer are given in italics in both versions.

Reading restored by the writer; places revised in both versions are given in italics, and the reasons for such correction are given in details in his article referred to above.

4. Sri yo sabba lokamohito Ka -
5. karunadhivaso / *mokhakaro (raviku)* -
6. lambara puna can d / noyyoda (*dhim su*)-
7. vi (*pu*) lam sakalam vibuddho / *lokuttamam*
8. namatthi tam sirasa munindam //
9. sopanamalamamalem ti (*dasa*)
10. layassa / samsara sagara samuttaranaya
11. setum / *sabbaga bhayya vivajjita* khema maggam /
12. dhammam namassata sada munina pasattham //
13. deyyam dadapyamapi yatthapasanna

14. citta / datva nara phalamularattara m
15. labhanti / ta m sabbada dasa balenapi suppasattham /
16. sangham namassata sada mitta punna khetam /

Final version restored by the writer

1. Yo sabbalokamahito karunadhivaso
Mokkhakaro ravikulambara punna cando
Neyyodadhim suvipulam sakalam vibuddho
Lokuttamam namatha tam sirasa munindam
2. Sopanamalamalam tidasalayassa
Samasarasagara samuttaranaya setum
Sabbagat bhaya vivajjita khema maggam
Dhammam namassatha sad a munina pasattham
3. Deyyam tadappamapi yettha pasanna citta
Datvanar a phalamularataram labhanti
Tam sabbada dasabalenapi suppasattham
Sangham namassatha sadamita punnakhetam

Translation rendered by the writer.²¹

1. Pay homage, with (bowing) head, to that great Sage; the highest of the world revered by the entire world ; (the sage) who is an abode of kindness, a mine of emancipation; the full moon in the sky of the solar clan; and, who has understood the entire vast ocean of knowledge.
2. Pay homage, always, to the Doctrine, preached by the Sage; (the Doctrine)-which is the stainless flight of steps to the abode of Tidas heaven (ta vatim sa); the bridge to cross the ocean of Samsara, and which is the path of safety devoid of fears of all evil.
3. Pay homage, always to the Community - (the Community)-which is an

unmeasurable field of merit, to which having offered even a little that should be offered with delighted mind, human beings obtain very great benefit and which has been well praised by the ten-powered one.

After restoration of the three stanzas, one fine evening when the writer was reciting them in the sweet Wasanta Tilaka metre, it suddenly dawned on him, that he had read them in the *Telakatahagatha*. his memory was correct, they form part of the opening verses of the *Telakatahagatha*, in which they run as follows.²²

1. Lankissaro jayatu varana rajagami,
Bhoginda bhoga rucirayata pina bahu,
Sadhupacara nirato guna sannivaso,
Dhamme thito vigata kodha madavalepo.
2. Yo sabba loka mahito karunadhivaso,
Mokkhakaro ravikulambara punna cando,
Neyyodadhim suvipulam sakalam vibuddho,
Lokuttamam namatha tam sirasa minindam.
3. Sopanamalamalam tidasalayassa,
Samsara sagara samuttaranaya setum,
Sabbagati bhaya vivajjita khema maggam,
Dhammam namassatha sada munina panitam.
4. Deyyam tad appam api yattha pasanna citta,
Datva nara phalamularataram labhante,
Tam sabbada dasabalenapi suppasattham,
Sangham namassatha sada mita pinnakhetam.
5. Tejo balena mahata ratanattayssa,
Lokattayam samadhigacchati yena mokkham,
Rakkha na catthica sama ratanattayassa,
Tasma sada bhajatha tam ratanattayam bho.

In comparison it will be clear that stanzas 2,3 and 4 of the *Telakatahagatha* are identical word for word with the three stanzas of the *Noen Sa Bua inscription* at Wat Sa Morokot in Prachinburi Thailand.

The authenticity date and the content of the *Telakatahagatha*, the significance of its appearance in Prachinburi have been discussed in detail by the writer, in another separate paper, under the title *New evidence on cultural relations between Sri Lanka and the Dvaravati Kingdom in Thailand*, which he presented at the Eleventh Conference of IAHA, International Association of Historians of Asia, Colombo 1-5 August 1988.

For the purpose of present theme we can conclude that the presence of three stanzas of the *Telakatahagatha*, essentially a Sri Lankan text, in an inscription, dated 761 A.D., in Prachinburi, in eastern Thailand, is the first concrete evidence so far discovered, that the Anuradhapura culture had reached Dvaravati kingdom as far back as 8th century A.D.

It should be noted that at the end of the inscription cited above, in line 18, there is the phrase *vara pada kamrateng* 'which could mean' 'Sacred feet of the Lord' while in line 26, '*vara pada pratishtha*' meaning 'established the sacred feet. This hints at the possibility of the inscription having some connection with the pair of footprints. It is also noteworthy that the inscription was found right on the mound of the debris under which the footprints were discovered. There is no other personage mentioned in connection with the responsibility for the establishment of the footprints. As such we are compelled to believe that Buddha Siri who was the Author of the inscription could be responsible for the carving of the pair of footprints too. It has been customary those days that the pilgrims coming from Anuradhapura to this land would bring along with them religious souvenirs, and among them Buddha Statuettes, corporal relics of the master and banyan saplings from Anuradhapura sacred tree were essential items. As such Buddha Siri who would have brought the knowledge of the *Telakatahagatha* and the practice of footprint worship to Prachinburi, also would have brought the banyan sapling and planted it in Prachinburi.

As to who this Buddha Siri was cannot be ascertained in the absence of precise evidence. But that he should be either a person of Dvaravati, most probably a

Buddhist monk who visited Anuradhapura, perhaps stayed there for some time to be familiar with the cultural life there, or a Sri Lankan monk who frequently visited Prachinburi and engaged in propagating Sri Lankan Buddhism there is nothing much to be debated. In fact it has been suggested that the Sri Lankan monks, especially Abhayagiri monks during this period were present on the lands of this region propagating Sri Lankan Buddhism. The inscription, on the Ratubaka plateau in central Java, discovered by Dr. J.G.de Casparis²³ lends support to such a suggestion.

The inscription dated 792 A.D., just 31 years after Prachinburi inscription of 761 A.D., informs of the establishment of a vihara called Abhayagiri by Samaratunga, Sailendra king of Java, having translated the phrase there 'Abhayagiri viharah karitah sinhalanam' as 'this Abhayagiri vihar of the Sinhalese ascetics, was established'²⁴ Dr. de Casparis, remarks that the mention of Sinhalese monks here gives no indication that they were in Java at the time.²⁵

On the other hand Prof. Paranavitana, translating the same phrase as 'the Abhayagiri vihara was built for the Sinhalese monks.'

Which appears to be more appropriate in the context, that the Abhayagiri vihara in Java was built for the benefit of the Sinhalese monks.²⁶ Dr. de Casparis also does not exclude the possibility that the Javanese monastery was built for Sinhalese monks and that the Sinhalese Bhikkhus went to Java in the latter half of the 8th century.²⁷

It may not be out of context here if we raised the question whether the same people who introduced the Bodhi tree, footprint whorship and *Telakatahagatha* in Prachinburi, be it Buddhāsiri or his associates appeared on the Ratubaka Plateau after thirty one years. Secondly whether these two Buddhist centres with traces of Anuradhapura culture being situated in the same region with easy access to each other on the traditional southern sea route across the Siamese gulf, did maintain intimate relations during the Dvaravati period.

NOTES

1. H. G. Quaritch Wales, *Dvaravati, The earliest Kingdom of Siam*. London. 1960, alone is sufficient for one to understand Dvarati.
2. P. Dupont, *L'archaeologie Mon du Dvaravati*, Paris, 1957.
3. A.B. Griswold, Imported images and the nature of copying in the Art of Siam, *Essays offered to H.G. Luce*, Vol.II, pp.41-58.
4. Samuel Beal, *Buddhist records of the eastern world*, Vol.11, p.247.
5. For further information, see, S. Paranavitana, *Ceylon and Malaysia*, Colombo, 1966, pp.178-183; R.A.L.H. Gunawardhana, *Rob and Plough*, University of Arisona Press, 1979, pp.277-281.
6. Dorothy h. Fickle, The Indianization of Southeast Asia, The artistic Heritage of Thailand, *Sawaddhi Magazine*, Bangkok, p.27. For sea routes see, map on page p.26.
7. Caruk Nai Pradesh Thai, Vol.II, p.46.
8. The Siam society News Letter, 1989, March, Vol.5, No.1, p.2.
9. Sriakra Vallibhittama, *Muang Boran Journal*, Vol.15, No.1, 1989, p.64.
10. Phiraphon Phisanuphong, The Lord Buddha's Footprints at Sa Morakot, *Muang Boran Journal*, Vol.12, No.3, June-September, 1986, p.38.
11. Professor H.S.H. Subhadradis Diskul, A Pair of the Lord Buddha's Foot prints at Sa Morakot, op.cit. p.31.
12. M. Rohanadeera, The Worship of Buddhapada and Buddhapada Lanchana in ancient Sri Lanka: their conceptual difference, Paper presented at the second South Asian Arhcaeological congress, Colombo, 1-10, December, 1987.
13. Prof. S. Paranavitana, *Padalanchana at Anuradhapura*, University of Ceylon Review, pp.56-61.

14. Parānavatana, *op.cit.* p.61.

15. No Na Paknam, The Chaitya Site at Sa Morakot, in Prachinburi, Muang Boran, *Journal*, Vol.12, No.3, 1986, pp.44-45.

16. Srisakra Vallibhottama, Si Maha Bo, *op.cit.* pp.59,64.

17. Mendis Rohanadeera, The Noen Sa Bua Inscription of Dong Si Maha Bo, Prachinburi, the *Journal of the Siam Society*, Vol. 76, 1988, pp.89-99. Also see, the same author, The Telakatahagatha in a Thailand inscription of 761 A.D. *Vidyodaya Journal of Social science*, Vol.1/1, 1987, pp.59-73.

18. The plate is reproduced from Caruk Nai Pradesh Thai, VI.I, 1986, p.180.

19. *op.cit.* p.182.

20. *op.cit.* p.185.

21. The writer is indebted to Dr.L.P.N.Perera, Prof. of Pali, the present Vice chancellor, Sri Jayawardhanapura University, for his assistance in this translation.

22. The complete poem of one hundred stanzas edited by Mudlier, Edmond R. Goonaratne, with an introduction appears in the *Journal of the Pali Text society*, 1884, pp.49-68.

23. Dr.J.G.de Casparis, New Evidence on Cultural Relations between Java and Ceylong, *Artibus Asia*, Vol.XXIV, pp.241-248.

24. *ibid.* p.245.

25. *ibid.* p.246.

26. Senarat Parānavatana, Ceylon and Malaysia, Colombo, 1966, p.189.

27. de Casparis, *op.cit.* p.247.

PICTURES FOR DEMONSTRATION

1. Map of trade routes in Indian ocean.
2. Plate of the inscription in the cave on Phra Buddhapada hill in Sara buri in Thailand.
3. Excavation site at Wat Sa Morakot, Dong Si Maha Bo, Prachinburi.
4. Pair of footprints at Wat Sa Morakot.
5. A moonstone at the ancient site in the vicinity of Sa Morakot.
6. A scene of a procession of ordination ceremony at the Si Maha Bo tree.
7. Plate of the Noen Sa Bua inscription at Wat Sa Morakot.
8. An Eye copy of the inscription.

THE URN BURIAL SITE OF POMPARIPPU OF SRI LANKA - A STUDY

By

S. K. Sitramplam

Though the term Megalithic is generally associated with the tradition of erecting stone monuments over the remains of the dead, however, the custom of burying the dead in urns with or without lithic appendages is also part of the Megalithic cultural tradition by virtue of possessing common traits. In Peninsular India and Sri Lanka Iron and Black and Redware occur in direct association with the Megaliths and hence the term Iron Age is often used to denote the Megaliths as well. The island of Sri Lanka, perhaps, marks the southernmost boundary of this distribution of iron and Megaliths (Kennedy, K.A.R. 1975:1). Hence, the Megaliths of Sri Lanka are even regarded as an overflow from South India (Paranavitana, S. 1967:8). Interestingly the Protohistory of this region as well dawned with this cultural complex and the duration of this Megalithic phase may be bracketed to a time scale of 1000 B.C. 100 A.D. Nay, even the experimentation in the early state formation especially between the regions of the far south of the Peninsular India and Sri Lanka situated on both the sides of the Palkstraits have many common features (Maloney, C.T.1968). It is a truism to say that for its size Sri Lanka possesses much material on pre-history (Allchin, B.1958). Unfortunately the very same interest shown in the study of our historical past has not been forthcoming with regard to Protohistory. Thus Begley (1981 : 53) observed that 'the evidence available for the study of the succeeding periods, covering some five millennia is qualitatively and quantitatively of a limited character, conditioned by the nature of the island's history, historical records and the orientation of archaeological work'. Nevertheless our study of the urn burials at Pomparippu is mainly based on the published materials of this site, besides the study of the material relating to the Megalithic culture of Sri Lanka both published and unpublished but housed in the Museums of Colombo and Anuradhapura.

Pomparippu is on the 21st mile post of Puttalam-Mannar road and it is 89 Kilometers south of Mannar and 32 Kilometers north of Puttalam. It lies on the southern outskirts of Wilpattu National Park and about 6 1/2 kilometres from the west coast at a conveniently navigable point and therefore easily approachable from the sea (Begley, V. 1981:56). The habitation site of this burials is still elusive, although it has been suggested that it may lie towards the east of the burials

(Begley, V. 1981:57). Ecologically this site is in the Dry Zone lowland tropical region of Sri Lanka which receives an annual rainfall of 25" - 30" during the northwestern monsoon only. The nature of the soil which is classed as latasol is also chemically infertile but favours the growth of shrub jungle only. Thus the very nature of the region in fact later led the early colonists to move inland in search of a more fertile red soil region. This is quite evident not only from the study of the Pali chronicles with regard to early settlements but also from the concentration of Megalithic sites dotted with Brahmi inscriptions in comparison to these sites on the latasol soil region.

On receiving information from R. L. Brohier about this site Hocart (1924-25:50-51) excavated one urn in the year 1924. Later after a lapse of a quarter of a century it was again excavated by the Department of Archaeology (Paranavitana, S. 1956 : 13-15, Deraniyagala, P. E. P. 1957, 1958). The Ceylon Daily News dated 21st of June 1956 reported this discovery under the heading of Pre-Vijayan human bones found. Further details of the materials excavated were published in 1968 (Godakumbura, C. E. 1968). This site was again reinspected by Prof. K. de B Codrington in 1964 and one grave was excavated then (Godakumbura, C.E. 1967 : 94). Vimala Begley of the Pennsylvania Museum who explored this site in 1967 later excavated it in 1970 (Begley, V. 1967 : 21-29 ; 1981 : 51-95). This excavation report, perhaps is more informative than the previous reports on this site. The principal findings from the excavations cited above are set out in the Appendix (i - xiii).

The following details about the nature of the burials have emerged from these small scale excavations. This site which covered an area of 3-4 acres would have accommodated about 8,000 burials of an estimated population of 12,000 people (Begley, V. 1981:57). However the survey of the site by the author shows that it may be more extensive than what Begley reported. Burials in urns seem to have been the common practice, although instances are not wanting for the burials without the large urns as well (Begley, V. 1981 : 69). Normally the urns were interred at a depth of 1/2 - 1 meter from the surface of the ground (Begley, V. 1981:69-75). These were placed in individual pits or more frequently several of them in a single pit. These pits were sealed with limestone boulders or tumulus. Frequently human remains of more than one individual were placed in a single urn. There is also evidence for the post cremation burials of children. Sometimes adults and children were also buried

in a single urn. The bones were disarticulated before burials and the skeletons are incomplete. The bones and grave goods were normally placed at the bottom of the urns (Begley, V. 1981:Fig. 13). There were also subsidiary pots placed around the urns, probably these were containers of food and drink for the use of the dead whose bones were interred in the urns (Paranavitana, S. 1956 : 14). Finally these urns were either covered by small capstones fitted into the mouth of the urns or large basins (Deraniyagala, P. E. P. 1958:16, Plate vii, Begley, V. 1981: 69-75).

The urns are generally coarse, underfired and unpolished and made of coarse gritty clay. None of the urns were recovered intact in the course of excavations. Only the body and the lower portions were recovered (Deraniyagala, P. E. P. 1958 : 12) and in some cases only the upper portions (Deraniyagala, P. E. P. 1958:16, Begley 1981 Fig. 28). The urns are usually 0.66m. to 1.22m. in height with a diameter of more than 40 cm at the mouth and 40-90 cm at the belly portion. They are either flat/conical/rounded or pointed bases (Deraniyagala, P.E.P. 1958:12, Godakumbura 1968:132). Deraniyagala (1958:16) while referring to the upper portions of the urns added that as one of them, possessed a thick reverted lip with finger impressions it is quite probable that others also possessed similar lips. Similar decorations have been noticed in 1970 (Begley, V. 1981 : Fig. 28). The lids used as covers to these urns are usually flat or conical ones (Begley, V. 1981:Fig.27).

The urns of Pomparippu recall similar ones occurring in Madura, Tinnevely and Ramanathapuram districts of Tamil Nadu centering round Vaigai - Tamraparni basins, the home of the Pandyan dynasty (Sitrapalam, S.K. 1980: 299; Seneviratne, S. 1984: 269). Tantalisingly enough in this area also one could see the concentration of urn/pit/extended burials, a reflection no doubt of the geo-physical make up of the region. The presence of urn burials in the north western Sri Lanka besides Pomparippu at Tekkam and Karambankulam (pers. comm. Sarath Wattala) pit burials at Makewita (Sitrapalam, S. K. 1980: 100), pit/urn burials at Mamaduwa (Sitrapalam, S. K. 1980:136-138), and the extended burials at Mantai (Shanmuganathan, S. 1960) Anaikkoddai and Karainagar (Sitrapalam, S. K. 1983; Ragupathy, P. 1987) is again a pointer to the prevalence of a similar burial tradition between the far south of Peninsular India and the north and the north western coast of Sri Lanka. This similarity could also be ascribed to the influence of the geophysical makeup of these two regions and this similarity no doubt was the

primary factor associated with the community movement in those early days (Fig. 1).

Although typological parallels to the urns at Pomparippu may be found at Amirthamangalam (Banerjee, N.R. et.al 1966 : Pl. II & IV), Porkalam (Thapar, B. K. 1952:3-18), Wynad (Commiade 1930 : 183-186) Perumal malai (Gururaja Rao, B. K. 1972:81), more specifically they are closely related to the urns at Korkai, Kayal (Caldwell, R. 1877 a: 80-83, 1877b: 279 -80) and Adichchanallur (Rea, A. 1915). At Adichchanallur Rea had noted various forms of the burial urns. All of them not only had thickened rounded rims but also different profiles as well. Instances are not wanting in some cases for a circular raised band around the upper part with finger tip designs adorning the neck portion of the urn. This band as in Pomparippu terminated in two reverse curves. These urns were also of varying sizes. The height ranged from 0.66m. to 0.91m. and the circumference from 1.6m. to 2.24m. These urns were invariably covered by flat/conicallids. It is also of interest to note that at Korkai Caldwell noted small stones about the size of a coconut being heaped round the mouth of the urn. Even the presence of tumulus at Pomparippu parallels those of Korkai. Many more parallels can be had from the other urn burial sites in Tinnevely district (Gururaja Rao, B. K. 1972:iv).

Besides depositing the human bones in large urns, the burial of these remains in small urns accompanied by dishes and bowls which served as containers of food/drink and the grave goods also seem to have been in vogue in Pomparippu and in other burial sites of Sri Lanka. Burial A excavated by Begley (1981 : 69) belongs to this category. So are the burials at Mukkarugoda (Godakumbura, C. E. 1965:90), Asmadala (Godakumbura, C. E. 1970:64). The evidence for the presence of Black and Redware in four sites in the Kelani Valley (Seneviratne, S. 1984: 262) shows that it may also contain similar burials as that of Makewita. For, this region is mentioned in the Pali chronicles as the seat of an ancient kingdom of Kalyani. (M.V.1) The cairns/stone circles at Mamaduwa (Sitrapalam, S. K. 1980: 136-138) may contain either pit/urn burials. Urns placed in cists covered by stone slabs also have been reported from Pinwewa (Godakumbura, C. E. 1967:105, 1968:104, Silva, R. H. de 1970:78). The cist burials at Diwulwewa furnish evidence for the burials of cremated bones. (Sitrapalam, S. K. 1980:155-198)..

Besides the urns, bowls, dishes and pots of varying forms are the other types found in this site. These were made out of the locally available clay and are

simple without any sophistication of technique. Even the coarse and gritty particles of sand are visible on the surface. With regard to this pottery Begley (1967 : 28) observed that it is cruder than the Indian but since the Indian complex certainly represents several phases, it would be necessary to compare in detail the Pomparippu material with that from Indian sites in order to narrow down the dates and area of immediate contact. Moreover the Black and Redware looks more of a dull Black and Grey to Black and terracotta Red colour. Black and Redware is limited to bowls and dishes only and does not have the range of shapes common in other South Indian Megalithic sites. The Redware is actually a dull terracotta redware. All Blackware is rare but confined to a few Jars, terminals and ringstands. No burnishing or other surface treatment is noticeable in the pottery (Begley, V. 1981:85). Even at Anuradhapura the pottery of the pure Megalithic phase (3A) is technologically inferior to the succeeding phases (Deraniyagala, S. 1972b:121). These archaic/primitive features are also noticeable from the pottery at Adichchanallur region (Banerjee, N. R. et.al. 1953:11, Soundararajan, K.V. 1963:13,19). Moreover the pottery at Pomparippu does not represent several phases of development either like its Indian counterparts or like the pottery of the other habitational sites such as Kantarodai, Anuradhapura and Tissamaharama. Even the number of pots buried in the urns is comparatively less in comparison to India (Deraniyagala, P. E. P 1957, 1958, Begley, V. 1981 : Table 2). Begley (1981:81) however contends that the excavated pottery does not represent the entire range of pottery manufactured during this period. The choice of pottery to be deposited was determined by their functional role and the spatial limitations to be utilised as burial pottery. More intensive and extensive work, perhaps, at this site may reveal many more details about this pottery and other finds of this site.

The presence of a pottery tradition similar to that of Pomparippu is also evident from other burial and habitational sites (Sitrapalam, S. K. 1980 Fig. 1) such as Diwulwewa (Sitrapalam, S. K. 1980 : 190-195), Anaikkoddai and Karainager (Ragupathy, P. 1987 and Sitrapalam, S. K. 1983), Pinwewa (Godakumbura, C. E. 1968 :104), Gurugalhinna (Sitrapalam, S. K. 1980 :Fig. 38), Asmadala (Godakumbura, C. E. 1970), Mukkarugoda (Godakumbura, C. E. 1965 :90) Makewita (Sitrapalam, S. K. 1980:246). Kollankanatta (Deraniyagala 1972a : 1:17), Tissamaharama (Parker, H. 1885), Kantarodai (Begley, V. 1983) and Anuradhapura (Deraniyagala, S. 1972b). As regards the potentiality of the site of Kollankanatta (locality iii), Deraniyagala equates this with Kudiramalai (Brohier,

R. L. 1929) and confirmed the pattern of this site with that of Pomparippu. He further thinks that this would have functioned as a subsidiary port to Mantai.

The pottery forms of Pomparippu have their nearest parallels from the Megalithic context of Peninsular India (Begley, A. 1981:85-93). So are the specimens found at Anuradhapura in the pure Megalithic context (3A) (Deraniyagala, S. 1972b. 106-122). However at Anuradhapura the pure Megalithic layer of 3A was succeeded by layer 3B which contained the artefacts of Megalithic and the early historic layer of 4. Nevertheless the continuation of artefact types from 3A to 4 are very marked. With regard to Kantarodai where the lower two phases of the Megalithic phase have been succeeded by early historic phase, Begley (1973: 191-196) observed that certain ceramic types, especially the Black and Redware, parallel those of the Iron Age of South India and possibilities are great that settlers in both areas were of common origin or at least in very close contact. The potentiality of Tissamaharama as a Megalithic habitation site was revealed by Parker's (1885 : 1-97) excavation which yielded a cultural deposit of 18 ft. (5.49m.). So is Mantai, where the Trench A (Core I) showed evidence for layer of Black and Redware about 4 ft. (1.30m.) below the water level (Carswell, J. And Prickett, M. 1984:58, 62) with a cultural deposit of the site running to 10 meters.

Finally it should be added that the urn burial tradition did not die off with Pomparippu. Parker (1985 : 69) reported a long wide mouthed chatty (basin) containing a number of calcined pieces of bones with a small earthen ware lamp inverted over this. This was found about 2 meters above the lowest pottery layer. Similarly a cinereal urn without any metal objects but containing charcoal and sealed by a stone slab and a tumulus has been reported by Nevill (1887 : 129-130) from Malikapitti, Batticaloa district. Could also the small urns containing human/animal bones but without any metal objects found at Mukkarugoda (Godakumbura, C. E. 1965:90) be classifiable under the above category? However the continuation of the tradition of cremated bones being buried in earthen vessels in the central portion of Sri Lanka as far as the 19th century is vouchsafed by Davy (1986 :290-91). Even the tradition of erecting a herostone, one of the symbols associated with the memory of the dead seems to have been in vogue in Ancient and Medieval times. This is confirmed by the discovery of a hero stone depicting a battle scene, from Wilpattu National Park where the urn burials of Pomparippu too lie. On stylistic grounds this has been dated to the 10th century A.D. (Uduvara, J.

1962:7). A battle scene of a similar nature has been reported from Dambadeniya (Paranavitana, S.1960 : 796).

Pottery at Pomparippu can be divided into three groups namely bowls, dishes and pots. Our study of the specimens housed both in the Museums of Anuradhapura and Colombo further shows that the bowls could be divided into three major groups. They are mainly vertical, converging and flaring sided bowls with varying bases. However the commonest type seems to be the converging sided deep bowls with rounded/sagging bases (Deraniyagala, P.E.P 1958 : 13-1-3; Begley, V. 1981:86 - 1A-IC). These bowls have parallels in both burial sites such as Diwulwewa, Makewita, Pinwewa and Gurugalhinna and habitational sites such as Anuradhapura, Kantarodai and Tissamaharama (Sitrapalam, S. K. 1980:257-259 Figs.24,25,30, 38). Sizewise also these may be classified into two. The normal type on an average has a diameter of 10cm. and above at the mouth and with the height measuring half of the width. (2) The smaller variety is of more or less half the size of the above group. This is the commonest type in Diwulwewa. The former has many parallels from South Indian sites such as Adichchanallur (Rea, 1915: 22-27; 30-38, Pl. VI Nos. 4,15 and 28-35) where these are commonly described as Kinnams, Arikamedu (Wheeler, R. E. M. 1946:56 Fig. 16-Type 9 and its variants), Brahmagiri (Wheeler, R. E. M. 1948 Fig. 9 type C 3a, C 3b, and C 7 and Fig. 24 - T 85-587), Sanur (Banerjee, N.R. et. al. 1959 Fig. 4 - T 37-39, 41-42 and 44), Amirthamangalam (Banerjee, N. R. et.al. 1966 Fig. 3 Nos. 1, 2, 7 and 8) Porkalam (Thapar, B. K. 1952:10-Nos 1-2), Machad (Mehta et al 1978. Fig. 4-Nos 1-3, 5 and 6). The latter group has specific parallels at Adichchanallur where they are commonly described as Maikinnams (Rea, A. 1915 : 30, 31, 34 and 35 - Nos. 212-218, Nos. 264-271, Nos. 364 - 65, Nos. 455-462 and Plate VII. 9) and Amirthamangalam (Banerjee, N.R. et al 1966 Fig. 3 Nos. 5 and 6).

The dishes are also either straight/converging or flaring sided but making an angle with the base. These too have varying bases such as convex exaggerated convex / flattish/ flat. (Deraniyagala, P. E. P. 1958 : 13,4 Godakumbura, C. E. 1968 : 135-10, 139 - 19, Begley, V. 1981 : 86 -2a - 3c). The commonest occurrence is the convex based dishes which have parallels in other burial/habitation sites in Sri Lanka as well (Sitrapalam, S. K. 1980: 259-262). Outside Sri Lanka these have parallels in Adichchanallur (Rea, A. 1915 Pl. viii No. 16), Arikamedu (Wheeler R. E. M. 1946 fig. 15 types 7-8L), Brahmagiri (Wheeler, R. E. M. 1948 Fig. 10, C 13, 13a, 13b, C15, C17 and Fig. 14 P 13, 13a), Maski (Thapar, B. K. 1957 Figs. 22-29, 9a, 9c - 9d), Sanur

(Banerjee, N. R. et al 1959. Fig. 2 Nos. 1-3,) Tirukkampuliyur (Mahalingam, T. V. 1970 fig. 6a - T19 and 31 and fig. 6b-T 31a). The dishes with exaggerated convex base is relatively more typical of the Iron Age and may have been an earlier form of dish (Begley, V. 1981 : 86). Closest parallels can be had from Arikamedu (Wheeler, R. E. M. 1946 Figs. 15 and 16, type 8m and its variants), Brahmagiri (Wheeler, R. E. M. 1948, Figs. 10 and 14-C13, and P13) and Sanur (Banerjee, N. R. et al 1959 Fig. 2 types 1 and 2). Dishes with flattish bases occur at Arikamedu (Wheeler, R. E. M. 1946 Fig. 14 No. 4), Maski (Thapar, B.K. 1957 Fig. 22-9b) and Piklihal (Allchin, F.R. 1960. Pl. 36 - type 4). Dishes with flat bases occur at Adichchanallur (Rea, A. 1915, Pl. viii, No. 11) and Arikamedu (Wheeler, R. E. M. 1946, Fig. 14, Nos. 2-3F, 5 and Fig. 15 Nos. 6 - 6F).

The pots may also be classified into varying forms. Type 1. Squat, low neck, wide mouthed shallow pots with a convex base (Deraniyagala, P. E. P. 1958 : 13-6-7, Godakumbura, C. E. 1968: 136-18). This has parallels in Arikamedu (Wheeler, R.E.M. 1946 Fig. 19) Tirukkampuliyur (Mahalingam, T. V. 1970 fig. 6T1) and Brahmagiri (Wheeler, R. E. M. 1948 Fig. 29T 171-173). A variant of this form occurs in Pomparippu (Godakumbura, C. E. 1968:136 -17), Begley, V. (1981:88 Fig. 23 6a - 6c). Type 2. Concave low/narrow necked jars with a bulging body (Deraniyagala, P.E.P. 1958 : 13-5, 10). These have parallels in Chingleput district of Tamil Nadu (Banerjee N. R. 1956 Fig. 2) and Maski (Thapar, B. K. 1957 Figs 20 and 15). A variant of this a jar with an egg shaped body (Deraniyagala, P.E.P. 1958:13-9) has parallels at Sanur (Banerjee, N. R. et al 1959 Fig. 7 Nos. 78, 79 and 83). Type 3. Concave short lips and bulging in the lower half of the body (Begley, V. 1981:90, Fig. 24-7a-7c). This has parallels in Adichchanallur (Rea, A. 1915 Pl. VI, Nos. 17,22,29 and 30), Brahmagiri (Wheeler, R. E. M. 1948 Figs. 11 and 15 P 20 a - d) and Maski (Thapar, B.K. 1957 fig. 17 -B (ii) 5B (ii) 6 and B(ii), 7 and Figs. 21 and 25). A variant of this form also occurs at Pomparippu (Begley, V. 1981: 91 - Fig. 25).

Type 4 Pots with a constricted neck flaring mouth and a bulging body (Godakumbura, C. E. 1968:134-8, 135-13, 147). These have parallels at Adichchanallur (Rea, A. 1915 Pl. vii No. 19) and Arikamedu (Wheeler, R. E. M. 1946 : Fig. 24-44). A variant of this form (Godakumbura, C.E. 1968: 135-12, 136-16) has parallels at Adichchanallur (Rea, A. 1915 Pl. vii Nos. 27 and 37), Machnad and Pazhayalur (Mehta et al 1978, Fig. 5 Nos. 18-20) and Porkalam (Thapar, B. K. 1952

Fig. 2 No.13). Type 5 Pots with a long neck and a bulging body (Deraniyagala, P.E.P. 1958: 13-8, Godakumbura, C.E. 1968: 135-11, 136-15) have parallels in Amirthamangalam (Banerjee, N.R. et al 1966 Fig. 3 Nos. 16,23,24) and Tirukkampuliyur (Mahalingam, T.V. 1970 Fig. 6a-T16). Type 6 A jar with a concave neck and having a ridge on the body (Begley, V. 1981:91 - Fig. 26). Similar specimens occur at Diwulwewa and Makewita (Sitrapalam, S. K. 1980 : Figs. 25,38). Gururaja Rao (1972 Figs. 12 and 4) in fact has illustrated similar forms as well. A variant of this form is found at Adichchanallur (Rea, A. 1915 Pl. vii : 24).

Type 7 Saucer covers (Begley, V. 1981: 88 Fig. 21-4a-4b). Similar forms could be found at Arikamedu (Wheeler, R. E. M. 1946 Fig. 23 Nos. T-32-34), Amirthamangalam (Banerjee, N.R. et al 1966 Fig. 3 No. 12), Tirukkampuliyur (Mahalingam, T. V. 1970 Fig. 6C - T59, 60, 60A-60C), Maski (Thapar, B. K. 1957 : Fig.22. Nos. 10 and 29) and Brahmagiri (Wheeler, R.E.M. 1948, Fig. 14 - P.14, P14a and 14b). Type 8 Finials from Pomparippu (Godakumbura, C. E. 1968 : 134-7) are very much similar to those forms at Adichchanallur (Rea, A. 1915 Pl. viii, No. 30). Type 9 Hollow pottery stand (Godakumbura, C. E. 1968 : 134-9) is similar to the specimens from Adichchanallur (Rea, A. 1915, Pl. viii No.28) and Alagarai (Mahalingam, T.V. 1970 Fig. 18 T.45). Type 10 Ring stand with concave sides (Godakumbura, C. E. 1968 134-6, Begley 1981 :88-Fig. 22) offers a close similarity to those at Adichchanallur (Rea, A 1915, Pl. viii Nos. 4,7,10,13 16,21,23,26 and 27), Porkalam (Thapar, B. K. 1952 Fig. 2), Sanur (Banerjee, N. R. et al 1959 Fig.3 Nos. 14-17 and 20-23) and Maski (Thapar, B. K. 1957:Fig.15).

Graffiti marks Nos. 1,2,3 (Deraniyagala, P. E. P. 1958: 13-1,2,3) are normally found in the Megalithic pottery of Peninsular India. Graffiti 3 is associated with two symbols and these have parallels in the Lal's illustration of the graffiti marks (Lal, B. B. 1960 Pl. xxxii : No.5). No. 4 (Deraniyagala, P. E. P 1958 : 13-4) appears in the form of an English alphabet Z. A somewhat similar symbol occurs in Anuradhapura (Deraniyagala, S. 1972b : 123) and Alagarai in Tamil Nadu (Mahalingam, T.V. 1970 Fig. 28, 48) where also graffiti has a Z mark but with a vertical line intersecting its extreme arms. No.5 (Deraniyagala, P. E. P. 1958 : 13-5) looks like a Brahmi letter ma. Sometimes this is also taken to be a symbolic representation of fish. In Sri Lanka it is to a common occurrence in both burial and habitation sites of the Megalithic culture and also it occurs with variations as a non Brahmi symbol in the Brahmi inscriptions of Sri Lanka (Paranavitana, S. 1970

: xxvi 7, 16a, 16b, 16c and 22). It is also found with and without any enclosures in Sri Lankan Megalithic pottery as well as in Harappan and the Megalithic pottery of India (Lal, B. B. 1960, Pl. xii Nos. 1-3) No. 6 (Deraniyagala, P. E. P. 1958 : 13-6,8; Godakumbura, C. E. 1968: 135-11,12,13 and 14 and 136-17) seems to be a one and the same symbol with variations. This looks like more of an ideogram. It may even represent a Mother Goddess with outstretched arms and legs. This offers a parallel to the incomplete non-Brahmi symbols found in the Brahmi inscriptions of Sri Lanka. (Paranavitana, S. 1970: xxvi - 40, 41).

No. 7 (Deraniyagala, P. E. P. 1958: 13-10) represents a tree on a platform which indicates the cult of tree worship in Sri Lanka as confirmed by the Pali chronicles (M.V.X : 89-90). A similar symbol occurs at Anuradhapura (Deraniyagala, S. 1972b : 123) and in the non-Brahmi symbol group (Paranavitana, S. 1970 : xxvi - 42). No. 8 (Godakumbura, C. E. 1968 : 136 - 15,16) appears in the form of two compartments. At Anuradhapura however, more than two compartments are depicted as a graffiti mark on the pottery (Deraniyagala, S. 1972b : 123 Nos. 36, 37 and 38). This has parallels in the pottery of Indian Chalcolithic culture as well (Lal, B.B. 1960 Pl. xxxiii, No. 12). No. 9 (Begley, V. 1981 : 90 Fig. 24) has a close parallel in the symbol illustrated by Theobald (1890 Pl. xi Nos. 275 and 276) in his study of Punchmarked coins. Paranavitana (1936 : 11) came across a similar form depicted on a thick rim of an earthen vessel which he identified as a double vajra or trisula in relief. Tantalisingly enough a similar form with little variation occurs as a graffiti symbol in the excavated pottery at Anuradhapura (Deraniyagala, S. 1972b: 123. 6). Could this be an early form of Sula/Trisula. It is also of interest to note that a bronze trisula has been found at Kantarodai in the 1970 excavations (pers. comm. Selvaratnam, T.P.) Nos. 10,11 and 12 (Begley, V. 1981 : 91 Fig. 25-8b, 8c and 8d) look like one and the same symbol. 8b looks more like parts of a horse bit. This suggestion is strengthened by 8c. 8c, however, has parallels in Adichchanallur (Rea, A. 1915 Pl. IV). The only difference is that unlike Adichchanallur here it occurs as a graffiti symbol only. 8d also may belong to this group.

There is also evidence for the association of tank and rice, two other important adjuncts of the megalithic culture, besides the burials and the habitation sites, with the people of Pomparippu. What is said of Anuradhapura where 'stratigraphic and faunal evidence at Gedige indicates that artificial reservoirs of

water existed from the period represented by stratum 2 onwards' (Deraniyagala, S. 1972b :159) is equally true of Pomparippu as well. Although one cannot be certain about the date of the surrounding tanks, however, Nicholas (1960 :44) is of the view that these are mostly of Pre-Christian date. The evidence for rice cultivation has come from Pomparippu. (per. comm. Silva, R. H. de) The common use of rice is also evident from the use of rice husk as a tempering material for making the urns as the cross-section of some of the urns reveals. Similarly Anuradhapura, Tissamaharama and Kantarodai have shown evidence for rice cultivation (Sitrapalam, S. K. 1980 : 207-209).

Skeletal material of both birds and animals have been found at Pomparippu (Deraniyagala, P. E. P. 1958, Begley , V. 1981), Anuradhapura (Deraniyagala, S. 1972b) Tissamaharama (Parker 1885) and Kantarodai (pers. comm. Selvaratnam, T.P.). Besides these, the use of marine resources for food is also evident from Anaikkoddai and Karainagar (Ragupathy, P. 1987). However the most important evidence is the presence of cattle bones at Anaikkoddai, Anuradhapura and Kantarodai. Bones of a horse also have been found at Anuradhapura (Deraniyagala, S. 1972b). Cattle, the Horse and the Buffalo would have been useful for purposes of transport and farming. What is described as a part of a tool by Begley (1981 :77 Fig. 16b) could well be a portion of a plough coulter. For, plough coulters have been found at Pinwewa and Diwulwewa (Sitrapalam, S. K. 1980 : 210). Being closer to the coast the people of Pomparippu would have utilised the marine resources for food as in the case of Anaikkoddai and Karainagar. The occurrence of animal bones and stone tools at Pomparippu (Begley, V. 1981) and in the Megalithic context of other sites of Sri Lanka (Solheim II W.G. and Deraniyagala, S. 1972; Deraniyagala, S. 1980) shows that hunting was also part of the daily pursuit of the people. The chank and pearl oysters which abound in the area of north and north western Sri Lanka respectively as in the case of the Pandyan coast of Tamil Nadu seem to have been exploited by the people (Maloney, C.T. 1968: 6-22). Moreover Black and Redware sherds have been found associated with oyster shells at the estuary of Moderagam Aru. (Seneviratna, s. 1984:278). The Pali chronicles too mention this region as a source of Pearls (M.V. vii : 49-50; M.V. xi 14-15,22). Nicholas (1963:89) is of the view that Tambapanni on the banks of Aruvi Aru/Malwattu Oya and Magana at the mouth of Moderagam Aru and Uruvela at the mouth of Kala Oya are pearling ports. To these may be added Mantai and Kudiramalai, for at Mantai mother of Pearl was found on the trench which yielded

Black and Redware (Carswell, J. and Prickett, M. 1984 Table 2). While referring to Mantai, Maloney (1968:16) observed that 'it seems that the earliest focus of the Pandyas was in the Tambaraparani delta, where pearls were fished for a market. For Ceylon, the first settlement was at Mantai, the port in the north west not far from the oyster beds'. Romila Thapar (1975 : 1-47) would prefer to associate this region as dotted with market towns supplying pearls, ivory, tortoise shells and precious stones, as early as the 7th century BC.

The discovery of a patch of textile sticking to a bronze rod at Pomparippu (Begley, V. 1981: Table 2) recalls evidence of a similar nature from Adichchanallur (Rea, A. 1915). It is also of interest to note that when Vijaya met Kuveni, the Yaksha princess was found engaged in spinning cloth (M.V. vii:11) in the very same region of Pomparippu. The use of mica at Pomparippu (Deraniyagala, P. E. P. 1958: 30-31, Begley, V. 1981 Table 2), Pinwewa (Silva, R. H. de 1970), Diwulwewa (Sitrapalam, S.K. 1980), and Mantai (Shanmuganathan, S. 1960) has a parallel in Adichchanallur (Rea, A. 1915, 4,5). Many forms of beads such as obsidian (Paranavitana, S. 1956 : 14), Carnelian (Deraniyagala, P.E.P. 1958 : 17) and paste beads (Begley, V. 1981 Table 2) at Pomparippu have their parallels in Kantarodai (pers. comm. Selvaratnam, T.P.), Anuradhapura (Deraniyagala 1972b) and Diwulwewa (Sitrapalam, S. K. 1980). The carnelian beads were common in the Megalithic sites of India. As the raw material for making this variety of beads was not available in Sri Lanka it is very likely that this was imported from India. (Seneviratne, S. 1984 : 277).

Of the metal objects, it is copper/Bronze objects which dominate at Pomparippu. This is something unusual in the Megalithic Iron Age context of South India. Copper rods, and bangles with bud shaped ends (one of three coiled metallic wire and other with five/six coils) have been recovered in 1956/57 excavations (Deraniyagala, P. E. P. 1958:15 Fig. 6). All in all, fourteen items of bronze were recovered in the 1970 excavations. These include copper rods, pins, copper beads which formed part of a double string necklace, portions of rings, bangles with bud shaped ends and finally portions of a bell (Begley, V. 1981 : Table 2). Quite interestingly a bell with a handle topped by Trisula (Begley, V. 1967 : 28) seem to have been recovered in the 1956/57 excavations. Unfortunately this has neither been illustrated nor described in any of the reports published so far. Copper objects figure from other Megalithic sites of Sri Lanka as well (Sitrapalam, S. K 1980 : 211-212).

Coming to Indian parallels copper rods have been found at Adichchanallur (Rea, A. 1915: 13, No. 121), Brahmagiri (Wheeler, R. E. M. 1948 Fig. 41 Nos. 1-2), Maski (Thapar, B.K. 1957 Fig. 34 No.1) and Tirukkampuliyur (Mahalingam, T.V. 1970 : 52). Similarly copper pins have been reported from Adichchanallur (Rea, A. 1915:13 No.119). So are the copper beads which formed part of a double string necklace and have a parallel in Adichchanallur (Rea, A. 1915 : 13 No. 122). Most interestingly bangles with thickened/bud shaped ends have their nearest parallels from Adichchanallur (Rea, A. 1915 : 13 No. 120, Pl. 11).

The iron objects from Pomparippu are scanty atypical of the Megalithic complex of South India, although more evidence for this has come from other Megalithic sites of Sri Lanka (Sitrapalam, S. K. 1980 : 212-214). Only iron nails were reported in 1956/57 excavations (Deraniyagala, P. E. P. 1958 : 15 Fig. 6). Begley (1981 : 77 Fig. 16) reported only three iron objects. As alluded to earlier what is mentioned as part of a tool is in fact a plough coulter. The other tool which is mentioned a spearhead is the weapon of Skanda. Similarly a spear blade reported from Pinwewa (Gadakumbura, C. E. 1968 : 104) though not illustrated in the report may be of this category. A spearhead from Kantarodai may also be added to this list (pers. comm. Selvaratnam, T. P.) Adichchanallur (Rea, A 1915) also has shown evidence for the presence of these cult objects. Tantalisingly enough the Spear/Vel is depicted in the graffiti symbols at Anuradhapura (Deraniyagala, S. 1972b : 123 No. 23).

With regard to the origin of the Pomparippu settlement Paranavitana (1956 :14) assigned a date of two/three centuries before the Christian era. Senaratne, (1969 : 28-29) 3rd century BC and Deraniyagala (1958:17) 2nd century A.D. However, Romila Thapar would prefer a date of 7th century BC and Seneviratna (1984 : 287) 7/6th century BC. Before one assigns a date for these burials one has to take into consideration the following factors. As far as Pomparippu is concerned so far No. C14 dates are available. This is also the case with regard to the Pandyan coast as well, where also besides the limited work done at this area, except for Korakai where two carbon dates are available (785 BC and 805 BC), no dating is available for Adichchanallur. The crude/primitive features of the pottery types at Pomparippu recalls the presence of similar features at Adichchanallur as well. Significantly enough, besides Soundararajan (1963 : 13, 19), Banerjee (1953 : 11) opined that the Adichchanallur pottery exhibits primitive

features in comparison to other Megalithic pottery types from Pudukkottai and Northern Tamil Nadu. Finally the urn and the cairn burials are found mentioned in the earliest layer of the Sangam literature (Srinivasan, K.R. 1946). This, even takes back the origin of the urn burial tradition much earlier compared to the other forms of burials associated with the Megalithic culture. In the light of the above factors it is quite logical to assign a date of the beginning of the 1st millennium BC, if not earlier for this urn burial tradition. The C14 date of 1000 BC for Kantarodai (Deraniyagala, S. 1985) is a pointer in this direction. Even the beginnings of the Megalithic settlement at Anuradhapura which has been assigned a date of 400 BC (Deraniyagala, S. 1972b) may be pushed back as that of Kantarodai by future work.

Commenting on the authors of the Megalithic culture of South India Kennedy (1975 : 78-80) however, opined that the living people of Peninsular India constitute a biological continuum with their Megalithic antecedents as represented by a broad range of phenotypic characteristics. With regard to Pomparippu (Lukacs, J. R. and Kennedy, K. A. R. 1981:97-142) the following conclusions have emerged: (1) The analysis of the skeletal series suggests that the Iron Age people of Pomparippu possessed the same biological features which may indicate to us their probable affinities to the neighbouring populations. (2) There is no evidence of the introduction of new and strikingly different anatomical traits into this part of this world nor for that matter into the western coast of Sri Lanka. Similarly the study of the skeletal material from Mantai (Chanmugam, P. K and Jayawardana, F. L. M.1954: 65-68) showed that this is similar to the modern South Indian type. The extended burials at Anaikkoddai exhibit similar characteristics of a burial tradition of Mantai. The presence of a Bronze seal at this burial which has been read as 'Koveta'/Kovetan/Koventa/Koventam (Indrapala, K. 1981 : Ragupathy, P. 1981) is also noteworthy. The prevalence of the name Kudiramalai (horse mountain) for Kollan Kanatta near Pomparippu the presence of a graffiti symbol of a horse bit at Pomparippu the discovery of horse bones at Anuradhapura, and finally the references in the Pali chronicles which refer to the early Dravidians who are said to have infiltrated into the country as horse dealers (Paranavitana, S. 1967 : 10-11) are other matters which deserve serious consideration, besides the geophysical similarity and the close proximity of these regions of Tamil Nadu and Sri Lanka. Probably in the light of some of the factors delineated above Paranavitana (1967:9) opined that the authors of the Megalithic culture of Sri Lanka were Dravidians.

It is now relevant also to take note of the 'existence of some level of biological affinity between the Late Stone Age people of Bellan Bandi Palassa and the Iron Age people of Pomparippu (Lukacs et al 1981: 106-7). This is confirmed by the presence of Late Stone Age tools from Pomparippu (Begley, V. 1981 : Table 2) and in other sites of eastern and south eastern Sri Lanka in the Megalithic/Early Historic contexts (Solheim II H.G. and Deraniyagala, S. 1972 : 19-27, 31, Deraniyagala, S. 1980:201). This physical and cultural interaction between the earliest Late Stone Age people and the succeeding Iron Age people is reflected in the Vijaya-Kuveni episode and the encounters of Pandukabhaya with the yaksas mentioned in the Mahavamsa (M.V : vi, vii, x). Similarly Late Stone Age tools also occur in the Chalcolithic / Megalithic contexts of India as well. Moreover the Late Stone Age tools of Sri Lanka offer a close technical and cultural similarity to those of the Pandyan coast (Zeuner, F. E. and Allchin, F. R. 1956 :4-20, Allchin, B 1958, 1966). This similarity in fact led Kennedy (1975 :24) to assert that 'the island maintained close cultural affinities with the Late Stone Age culture of the mainland, a situation that appears to have persisted into the Iron Age'. Nevertheless culturally the Late Stone Age people were not equipped enough to imbibe the elements associated with the Megalithic culture and to develop it into their own either in India or in Sri Lanka.

At this juncture, the study of the Pali chronicles especially the Mahavamsa from the point of view of an early colonisation becomes imperative. Incidentally the early settlement zones mentioned in the Pali chronicles coincide with the Megalithic settlements (Sitampalam, S. K. 1980:Fig.50). One should also mention here that the excavations at Pomparippu do not furnish any evidence for the presence of cultural elements associated with North India. (Begley, V. 1981 : 54). Commenting on the legends associated with the foundation of the earliest settlements by the North Indian colonists led by Prince Vijaya, Mendis (1965 : 275) and Senaratne, (1965) dismissed the legend of Vijaya as furnishing neither historical nor archaeological data. Mendis (1965 : 267) however asserted that 'The chronicles mention certain ancient villages of Ceylon. According to one tradition their foundation is traced to the followers of Vijaya. According to another they are traced to the brothers of Bhaddakaccana, the queen of Panduvasudeva (who succeeded Vijaya)' and finally he ended up by saying 'that the conclusion to be drawn from the references to the villages seem to be that their names were anterior to those of the

so-called founders which differ in the two legends and that it is the villages that seem to have given names to the so called founders'. Quite interestingly many of these villages were in the kingdoms of Nagadipa and Kalyani which antedated the arrival of Prince Vijaya (M.V:1). Therefore it is very likely that even the names given for these villages in the Pali chronicles need not have been the original names of the villages as well.

Mahavamsa says that Prince Vijaya landed in the region called Tambapanni (M.V. vi:47) and later the whole island was called as Tambapanni (M.V. vii : 41-42). The word Tambapanni is in fact the Pali rendering of Sanskrit Tamraparni a river in the Tinnevely district of Tamil Nadu. This means the red/copper coloured region/plain. Even the word Pomparippu also means the same (Modder, F. 1908). Significantly enough the urn burials at Pomparippu (which are genetically related to those of Adichchanallur in the Tamraparni basin) are also located in the region where Prince Vijaya is supposed to have landed. Incidentally Tambarattha which means the red/copper coloured region is the name which denoted the Pandyan country in the early Pali texts (Venkatasami, S.1950:63). Seneviratne (1984:275-276) has drawn our attention to the prevalence of the place names with 'Tamba' prefixes in the north western region of Sri Lanka. However, the occurrence of this name 'Tamba' as an initial word of places in the South eastern region of Sri Lanka (Ancient Rohana kingdom associated with the founding of villages by one of Vijaya's companions) has been noted by Parker (1885 : 18). Parker finally adds that the name Tambapanni is anterior to Vijaya, although the author of Mahvamsa later gave a fanciful derivation for this earliest name of the Island. (M.V. vii:40-42). In this context it is worth probing the references to the Pandyas in the Pali chronicles of Sri Lanka where they are always referred to as Pandus. Could then, the references in these sources to the Pandu Princess of Vijaya and the names of some of the legendary kings of the Proto-historic period with Pandu prefixes such as Panduvasudeva, Pandukabhaya be taken as indicating the Pandyan presence in Sri Lanka during Proto-historic times? It is also very likely that the cultural infiltration from North India of Pre-Buddhist and Buddhist times has paved the way for the creation of myths regarding the early colonization of the island from North India.

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FIGURE I

APPENDIX I

Deraniyagala, P.E.P. 1958 : 12

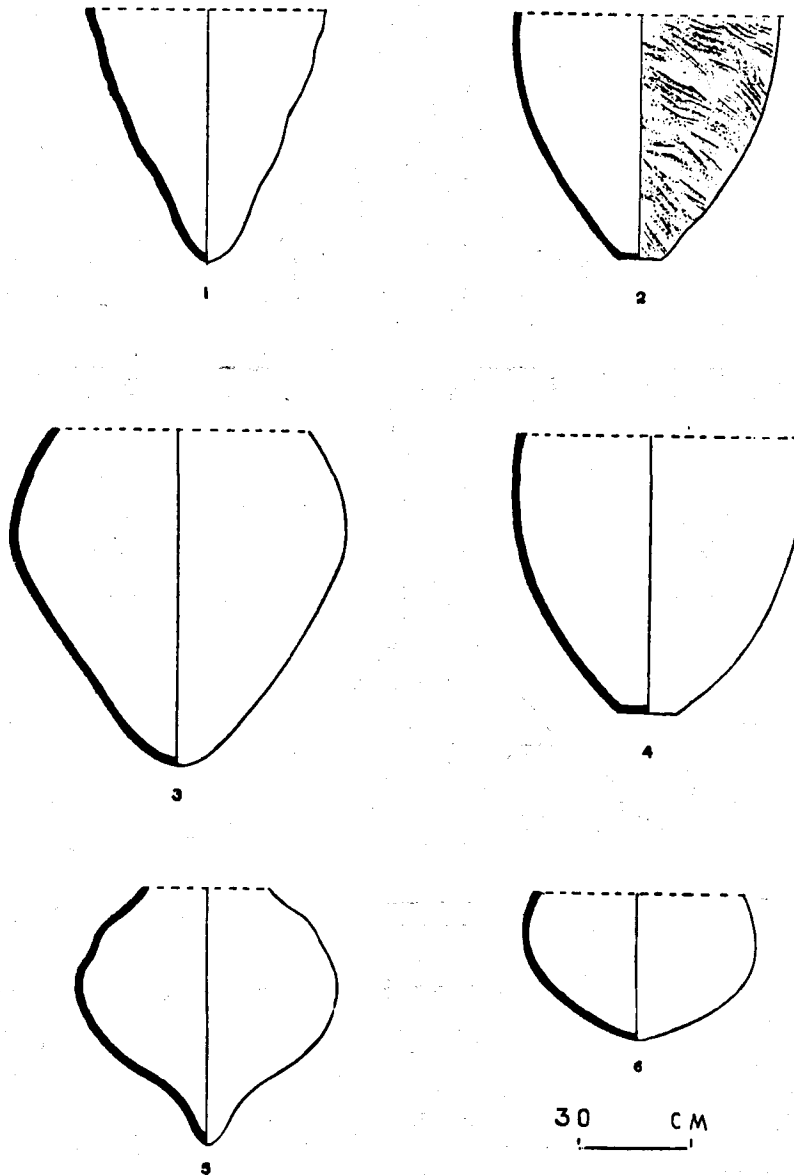


Fig 3. Drawings made both at Pomparippu and from the specimens brought to Colombo of six or more or less major types of urns.

APPENDIX II

Deraniyagala, P.E.P. 1958 : 13

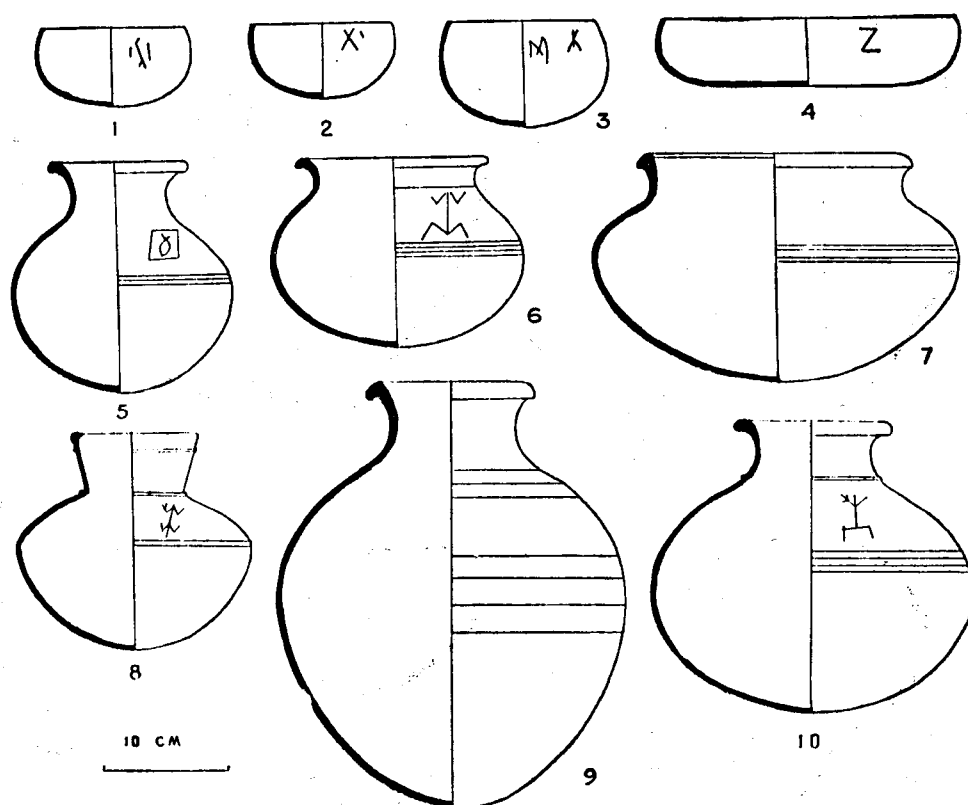


Fig. 4. Types of some of the vessels contained in the urns at Pomparippu, note the potters marks on 1, 2, 3, 4, 5, 6, 8, 10.

APPENDIX III

Deraniyagala, P.E.P. 1958 : 15

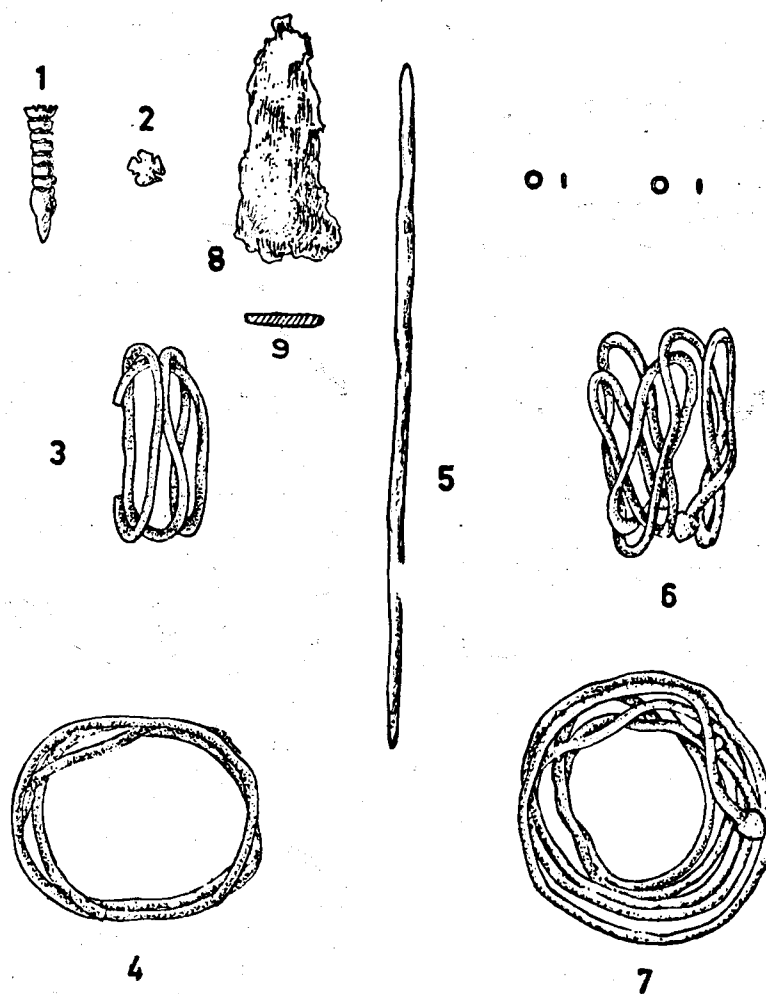


Fig. 6. Objects recovered from some urns at Pomparippu. Bronze objects are 1 to 7, Iron 8, 9, and two beads. All reduced to about three fourths of their actual size.

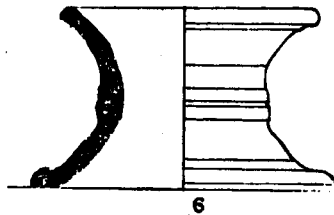
Figs. 1 and 2, Elevation and plan of bronze object ; 3 and 4, Elevation and plan of bronze bangle ; 5 Bronze rod ; 6 and 7, Elevation and plan of bronze bangle ; 8 and 9, Piece of iron knife blade. Elevation and section ; 10, Beads, in plan and section.

APPENDIX IV

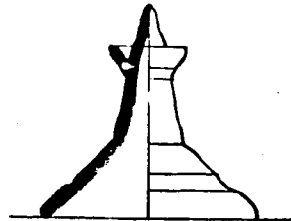
Godakumbura, C.E. 1968 : 134

8 වන සැටපුව
PLAN 8

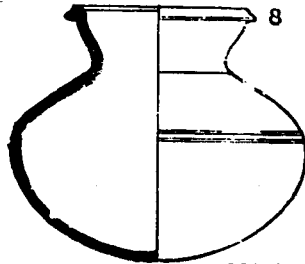
NOS. 6 to 9 } HALF SIZE OF ORIGINAL



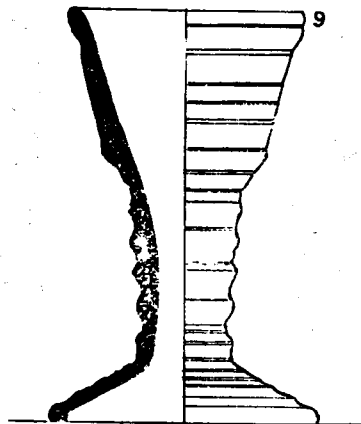
6



7



8



9

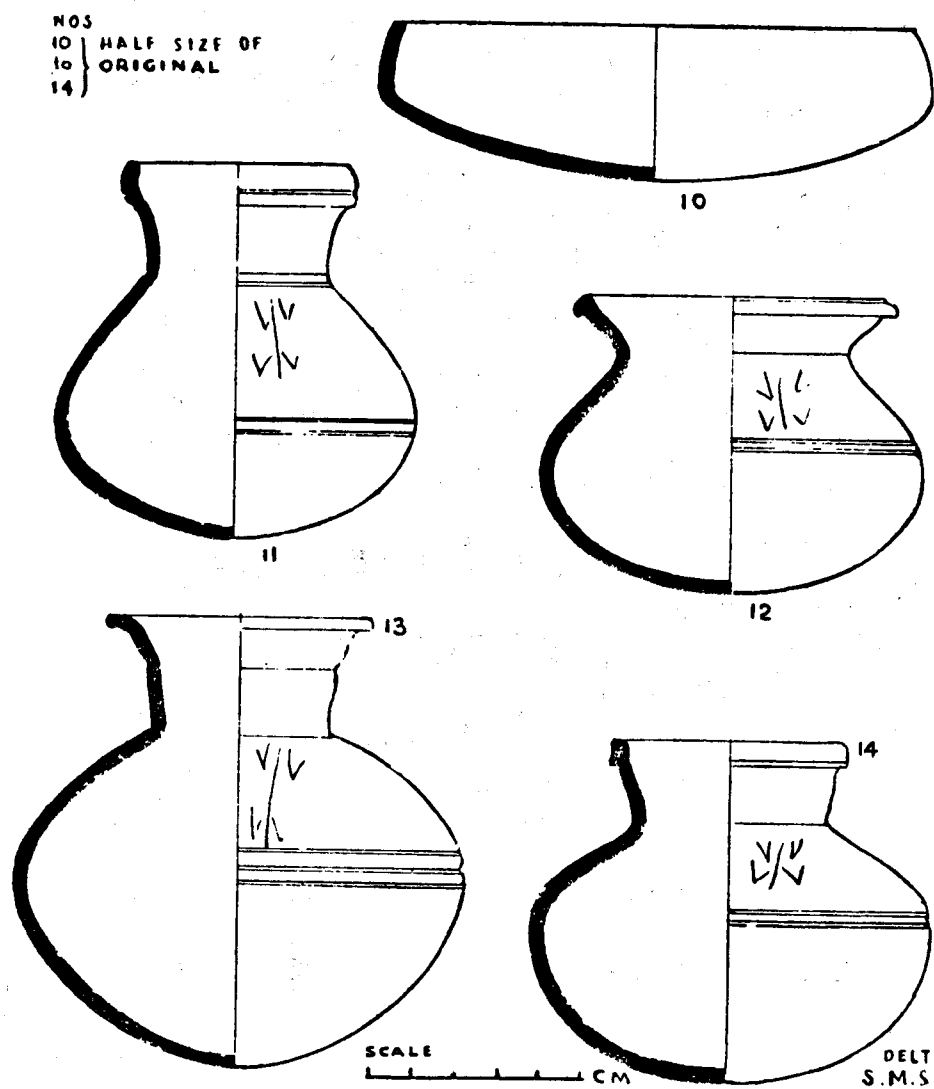
SCALE
1 CM

DELT
S.M.S

පොම්පරිප්පුවෙන් ලැබුණු භූමිකා බදුන්
Burial-urns from Pomparippu

APPENDIX V

Godakumbura, C.E. 1968 : 135

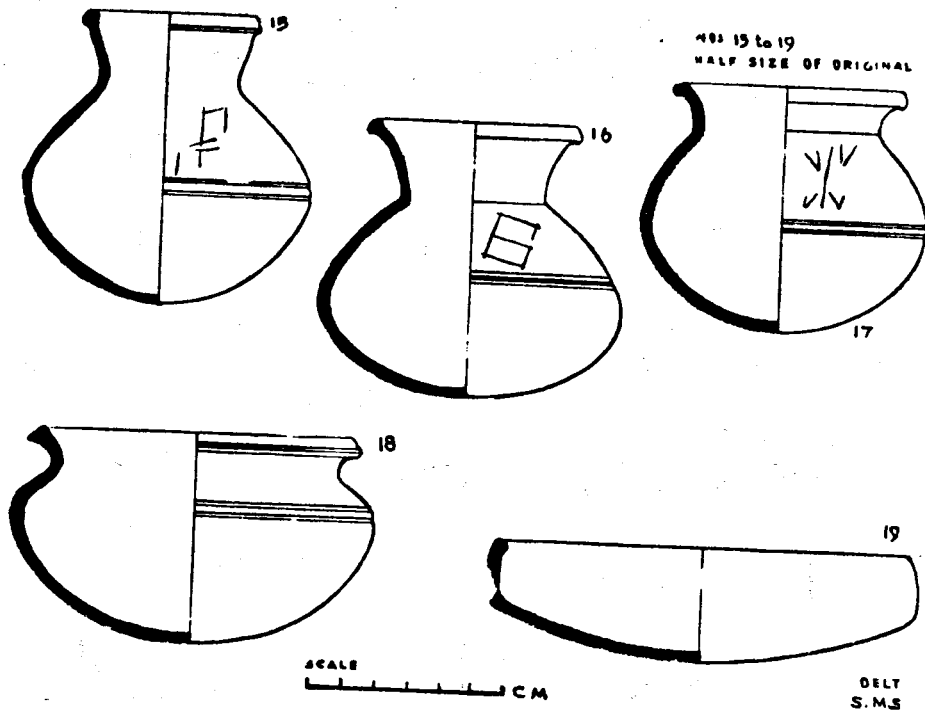


පොම්පරිප්පුවෙන් ලැබුණු ආභරණ බඳුන්
Burial-urns from Pomparippu

APPENDIX VI

Godakumbura, C.E. 1968 : 136

10 වන සැලසුම
PLAN 10



පොම්පරිප්පුවෙන් ලැබුණු ආදාන බදුන්
Burial-urns from Pomparippu

APPENDIX VII

Begley, V. 1981 : 77

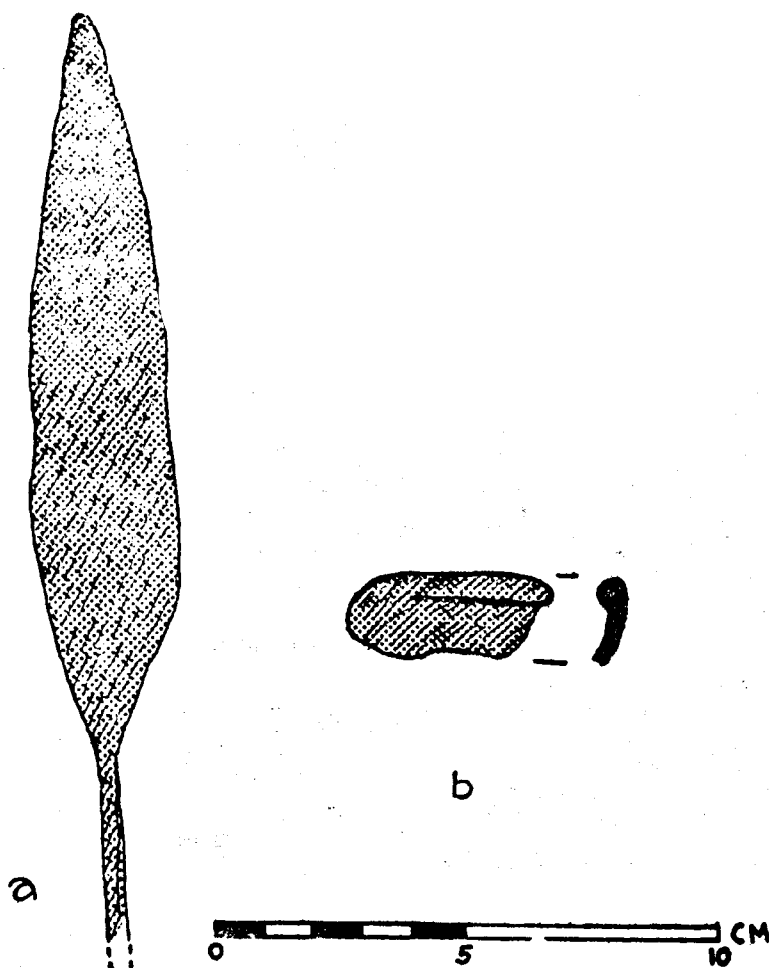


Fig. 16

a. Iron blade. Burial I, Trench 71/56, lot 6.

b. Unidentified iron tool. Trench 64/118, lot 23.

APPENDIX VIII

Begley, V. 1981 : 79

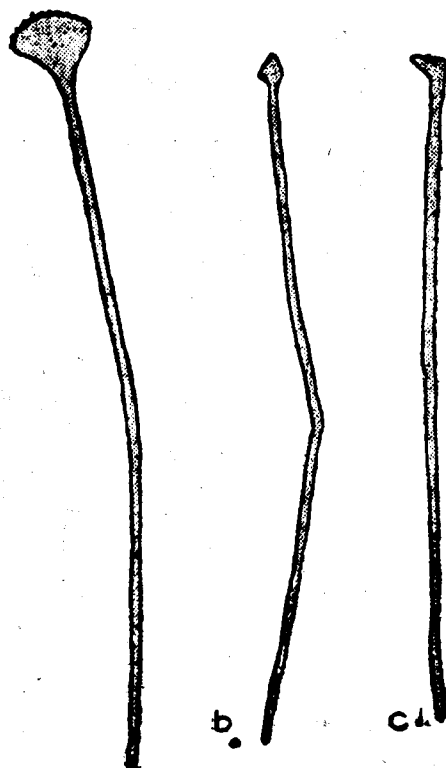
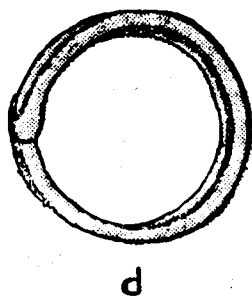


Fig. 17

- a. Copper pin. Burial L, Trench 64/118, lot 19.
- b. Copper rod. Burial M, Trench 64/118, lot 18.
- c. Copper pin or rod. Burial E, Trench 35/40, lot 14.
- d. Copper spiral bracelet. Burial G, Trench 35/40, lot 19.



APPENDIX IX

Begley, V. 1981 : 86

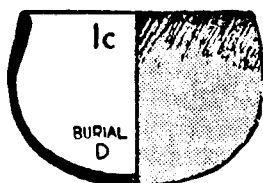
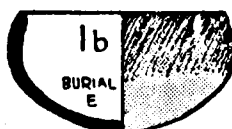
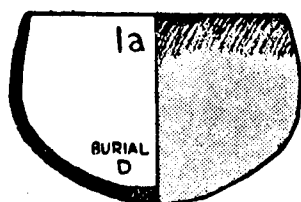


Fig. 18
Pottery Type 1

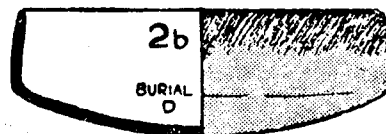
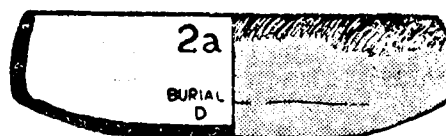


Fig. 19
Pottery Type 2

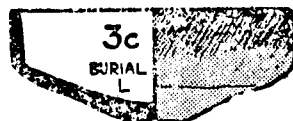
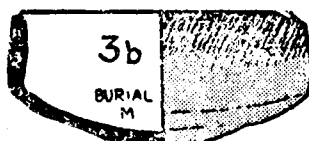
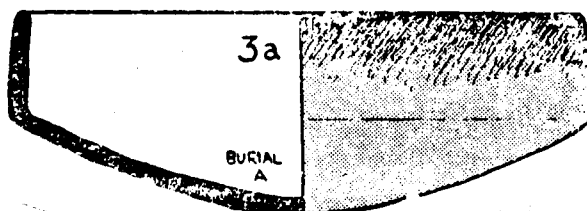


Fig. 20
Pottery Type 3

APPENDIX X

Begley, V. 1981 : 88

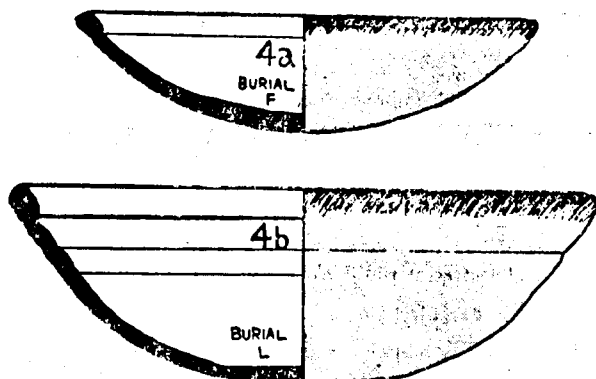


Fig. 21
Pottery Type 4

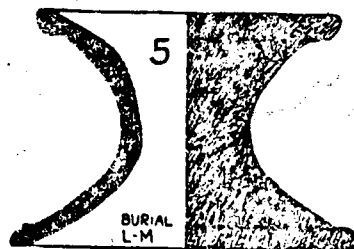


Fig. 22
Pottery Type 5

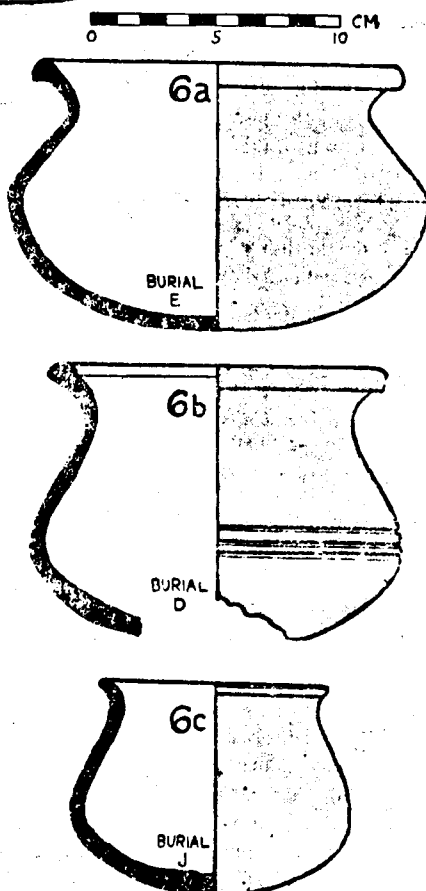


Fig. 23
Pottery Type 6

APPENDIX XI

Begley, V. 1981 : 90

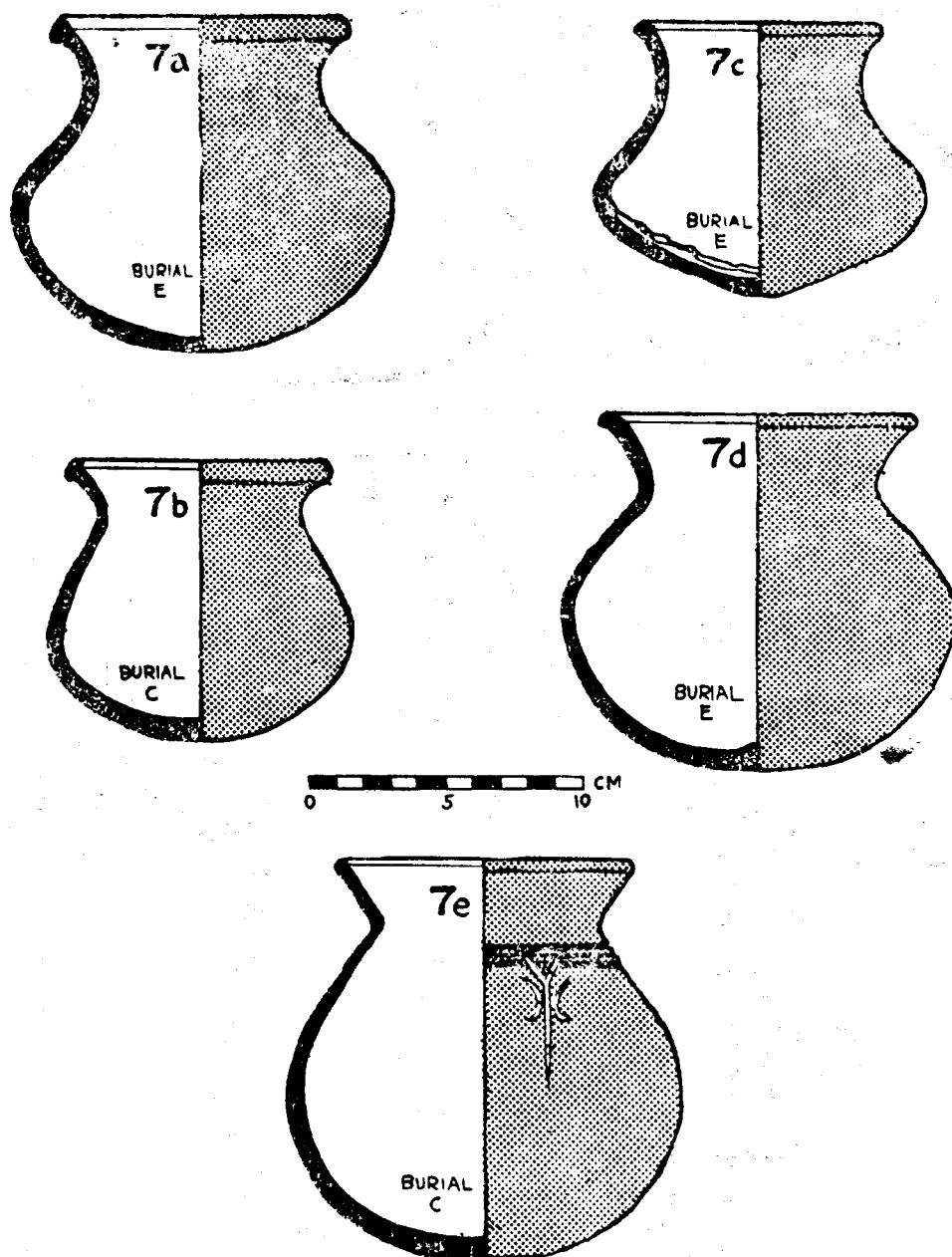
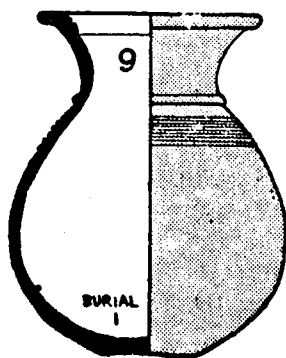
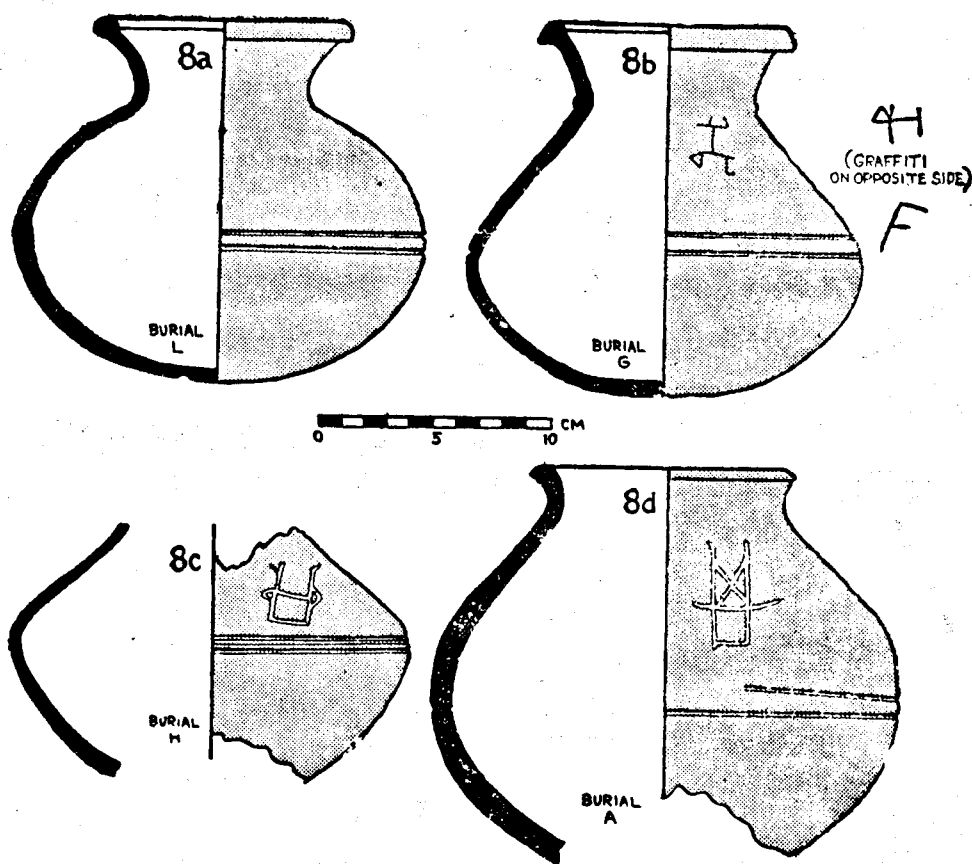


Fig. 24
Pottery Type 7

APPENDIX XII

Begley, V. 1981 : 91



APPENDIX XIII

Begley, V. 1981 : 93

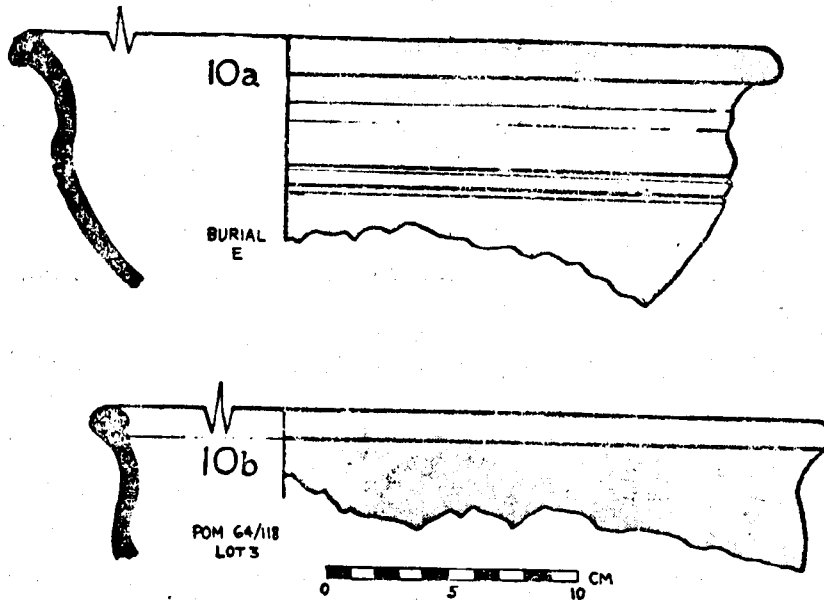


Fig. 27
Pottery Type 10

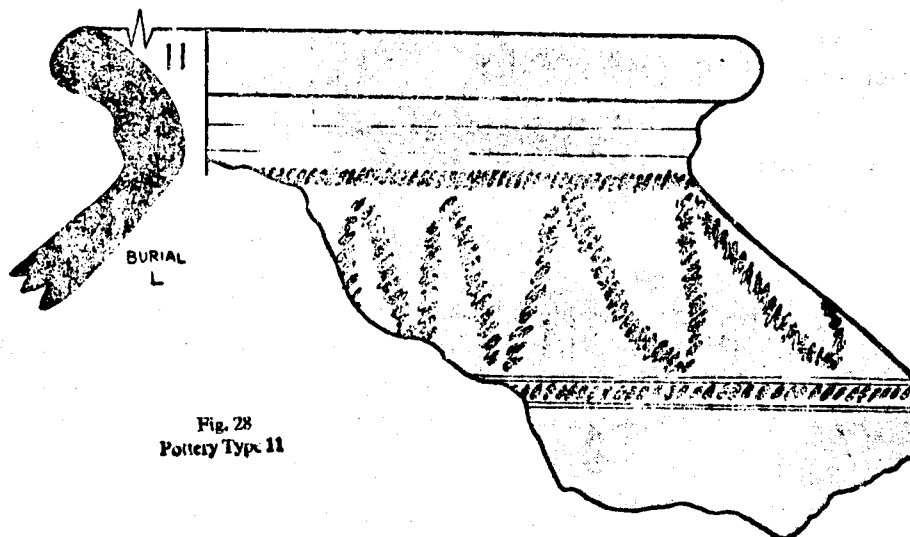


Fig. 28
Pottery Type 11

THE BAN KAO CULTURE OF THAILAND AND MALASIA A REAPPRAISAL

By
Per Sorensen

I. INTRODUCTION.

The Ban Kao culture is a Neolithic culture, so far known mainly from an area comprising the Kanchanaburi Province of Western Central Thailand, continuing through Peninsular Thailand well into North Malasia.

The culture is known from a small number of open air settlements, and from burials, found in the settlements or in caves in the limestone hills of the area.

Best known of the sites of the culture is the Bang Site, located in the village of Ban Kao on the left bank of Maenam Kwae Noi (River Kwai)¹. FIG.1

The Bang Site and the near by two smaller sites Lue Site I and II were excavated in 1961-62 by the Thai-Danish Prehistoric Expedition 1960-62² FIG.2 A total of 44 burials and approximately one million finds were uncovered during the excavations.³

From the point of view that the grave goods - particularly the pottery - found with one skeleton represents a rather contemporary unit, a study of the burial pottery disclosed that the burials were divisible into three distinctive chronological groups:

1. a Neolithic early subgroup;⁴ FIG.3
2. a Neolithic late subgroup; FIG. 4, and
3. a distinctive Metal Age group.

It could further be shown that the two Neolithic groups were related, the late obviously developed out of the early, while both appeared totally unrelated to the Metal Age group.

It was then in (1967) further assumed, on the basis of the (scarce) available

comparative material that the finds of this Neolithic culture.

a. had no origin in any known precedent or near-contemporaneous local culture;

b. was closely related to some finds from a locality in South Thailand, and to several cave finds from North Malasia;

c. had none, or only very general or superficial similarities to other known Neolithic finds in Thailand or elsewhere in the Southeast Asian Mainland or Island world;

d. shared a number of pottery details with certain Chinese lungshanoid local cultures, bordering to South China, and besides had rice reaping knives of Chinese type, and other cultural and spiritual elements in common with China that it was concluded, this Neolithic culture in Thailand and Malaysia had an origin in China;

e. from one c-14 date was estimated to have arrived at this site before or about 1800 B.C., and from another to have been still existing in the Ban Kao area about or after 1360 B.C.

f. finally physical anthropological studies of the skeletons indicated a possible genetic link to the present population.⁵

II. REVIEWS AND CRITICISM

It goes without saying that this, the first monographic work on a prehistoric culture from Thailand², based on the biggest material then excavated under controlled condition, using the most modern technique applicable in what was then a distant and remote up-country village, still could not escape being subject to some criticism.

In fact, the criticism started even before the publication, on the basis of data presented in some preliminary articles. A main reason for this criticism may be seen in the fact that other researchers, then active especially in Northeast Thailand, could not make their own discoveries and preliminary results fit in with those from Ban Kao.⁶

Obviously at these early days of prehistoric research in Thailand, the impact

of differences in the environmental location of the sites were underestimated. Particularly when finds from the Khorat Plateau were compared to those from the relatively more narrow valleys of the western mountain areas, and further more not taking in consideration that these two areas were separated from each other by the wide alluvial plain of the Maenam Chao Phraya basin, the lower part of which even about 2000 B.C. would have been a very humid backland swamp area.⁷

Criticism or divergent interpretations in connection with reviewing of the publication, and a later computerised of the burials, were published by K. C. Chang (1968), R. H. Parker (1968), W. G. Solheim II (1969), G. de G. Sieveking (1974), D. T. Bayard & R. H. Parker (1976), and W. K. Macdonald (1978).⁸

Chang, finding the derivation of the Ban Kao culture from some lungshanoid culture in South China too drastic in consideration of the limited comparative material both in South China and within Thailand itself, still agrees that the Ban Kao culture is a Neolithic culture, distinct from the Sa-huynh pottery complex, as defined by Solheim.⁹ Instead he suggests to further investigate the possibilities of a local origin from some unspecified early corded-ware culture, like the hypothesized Sheng-wen horizon in China.¹⁰ In South China this corded-ware pottery tradition represents the oldest stylistic horizon, chronologically placed between the pre-ceramic pebble-tool cultures and the Lungshan Culture.

Chang further admits that the corded-ware, in his own very comprehensive definition,¹¹ is not very well represented in the Ban Kao material, but still may be a sub-stratum to this. Consequently he considers the lungshanoid elements as the results of contacts or diffusion.

COMMENTS :

The term corded-ware culture *per se* is a very unfortunate term. Cord marks, either a single, simple string imprint, or from cord wound around a paddle leaving parallel lines or patterns, when beaten in criss-cross, can be found both in the Yang Shao and the Lungshan culture potteries of China, just as it is abundant on specific Ban Kao pottery types, more restricted in extension on other types. Yet none of these three cultures are classified as cord-marked pottery cultures, because they have other, more prominent markers also. However, as long as the hypothesized

Sheng-wen cannot be proven to be ancestor of the Yang Shao culture or the lungshanoid local cultures outside the nuclear area of Central China, this author still finds it difficult to think in terms of local origins. This becomes even more obvious when the Chung-yuan Yang Shao culture, particularly the finds from Li-chia-ts'un, with its hollow-legged tripods are considered. Chang describes this site as the earliest phase of Yang Shao,¹² but also takes it as evidence and "substantiation of this hypothetical horizon."¹³ What this author also finds interesting about the site in question is its proximity to Szechwan, and area to which reference has been made in other contexts of possible influences or cultural contacts between South China and Mainland Southeast Asia.¹⁴

However, before totally dismissing the suggestion of a local origin of the Ban Kao culture, two aspects should be borne in mind: 1. Chang clearly states that the corded-ware horizon chronologically is between the pebble tool cultures and the lungshanoid cultures, and 2. That cord-marked pottery, claimed to represent a corded-ware beginnings, in Thailand and elsewhere in South east Asia is generally claimed to belong within the later pebble tool culture horizons.

This is the case with Tam Phii, Mae Hongson, Thailand, where Gorman dates Layer 2 with cord-marked sherds (331 tiny sherds of a total weight of 680 gr.) and burnished sherds (95 even smaller sherds weighing only 140 gr.) to 5672 +/- 300 B.C.¹⁵ The problem is, however, if the sherds originate from layer 2 or layer 1. The sherds clearly are from different vessels, but their weight is not enough to make up for one vessel, even a small one.

The caves in the hills surrounding the Ban Kao plain itself also have pebble tools, mixed with sherds in the upper levels. The sherds are by the excavator, Surin Pookajorn, first mentioned as "Hoabinhian pottery", but later on referred to as Ban Kao culture pottery, based on chemical analysis of some sherds from the caves, and some from Bang site. It is, however, interesting to observe that the sherds are not claimed to belong to the Ban Kao culture on typological or other classificatory evidence. The chemical correspondences could merely be a question of utilisation of the same source of raw material by two different populations, although this is perhaps not the most likely explanation. Probably the sherds are like at Tam Phii insignificant cord-marked sherds, which could either belong to a some "cord-marked pottery", or be traded-in Ban Kao culture pottery. The C-14 dates

from the so-called Late Hoabinhian levels certainly are in favour of the latter explanation, as the dates from Tam Khao Thalu are 2570 $\pm$ 430 B.C. to 1470 $\pm$ 380 B.C., and from Tam Heap 2400 $\pm$ 400 B.C. to 1250 $\pm$ 370 B.C., all of which show considerable overlapping with Bang Site datings.¹⁶ But unfortunately this problem cannot be solved at the time of writing.

Similarly, at Laang Spean, Battambang Province, Cambodia¹⁷ simple cord-marked sherds in small number are present in cultural level II, excavation layer 4, dated to 4290 $\pm$ 70 B.C.

Cultural level III, excavation layer 3, is dated about 2050 $\pm$ 90 B.C. Pottery here is more evolved and elaborate, with pricked areas and smooth-band decoration. This detail makes it resemble the near contemporary elaborate pottery from Khok Panom Di, now an inland site but then a coastal or back-swamp site approximately 70 km. northeast of Bangkok.¹⁸

Also Gua Kechil, Pahang, Malasia, just south of its border with Thailand¹⁹ had a cultural stage I with Hoabinhian pebble tools and cord-marked pottery, a stage II also with Hoabinhian and "diversification of ceramic forms and modes of surface treatment", and Gua Kechil III, described as "typical Malayan Neolithic", by which is probably understood Ban Kao culture pottery and a "continuation of cord-impressed tradition with further elaboration of form and decoration". The latter could as well indicate cord-marked pottery of Ban Kao culture type.²⁰ A bone collagen date of 2800 $\pm$ 800 B.C. marks the transition from stage II to stage III. This indicates that the transition into full Neolithic probably took place about or after 2050 B.C., leaving an undated sample of cord-marked pottery earlier than this.²¹

From the examples given above, all from fairly recent excavations, it becomes obvious that there may or may not exist a cord-marked pottery horizon prior to or contemporary with the Ban Kao culture. Such a horizon may be related to late Hoabinhian pebble tool levels or separate from such in cave sites, particularly to layers datable at or later than 5000 B.C., probably much later.

It should further be noticed that there nowhere in Southeast Asia is evidence that the Ban Kao culture populations lived in anything but open air settlements.

They did, however, use caves or rockshelters extensively for burial purposes, apparently more in the subphases later than Bang site early subphase. An explanation of this could be the observed overlapping between Hoabinhian settling in caves and the Ban Kao early subphase, e.g. in Ban Kao itself.

Finally it should be observed that nowhere are pebble tools reported from Ban Kao culture settlements.

Considering the above discussed evidence this author finds it difficult to substantiate the origin of the Ban Kao culture from a local corded-ware pottery culture or any other local culture, as suggested by K.-C. Chang. But this author could see ultimate origins in e.g. the Li-chia-ts'un phase of the Yang Shao culture, as above mentioned, well aware of the chronological distances between the two cultures and the existing obvious differences, such as the flat-bottomed pottery in the latter context.

OTHER CRITICISM AND COMMENTS TO THESE

Solheim, in his review,²² particularly focussed on the problem, whether horizontal stratigraphy exist at the site. By simplifying the excavators precisely recorded and published geographical extension of the individual skeletons, Solheim thought he could find horizontal stratigraphy in the burials of the earliest of the 7 subphases, which he divided the burials into, but not in any of the subsequent phases.

Solheim was first repudiated by this author,²³ and later on by W. K. Macdonald, whose computerized study of the burials and their contents confirmed all the excavators published conclusions on the burials, and their sub-division.²⁴

Solheim, further considered the early subphase, which he established as late Neolithic or Chalcolithic, and like Parker and Bayard, all other burials as belonging to the Iron Age.

It seems, as if their chronological interpretation has been invalidated by three facts:

- a. All existing C-14 dates from Bang Site are in internal harmony;
- b. They are all within the time bracket 1770 B.C. to 1300 B.C. (uncalibrated), and
- c. These datings are supported by the chronological evidence from Kampong Jenderam Hilir and Gua Cha, as above mentioned.

Besides it has been criticised first and foremost by Parker, Solheim, Parker and Bayard, and Macdonald,²⁵ that levelling was to an "arbitrary fixed datum point", instead of the surface, with figures given below surface.

None of the critics on this point apparently ever bothered to visit the site and watch the conditions themselves. Considering the flooding of the area during the rainy season between the trial excavation and the main excavation in 1961, and the resulting outwash of surface soil, the excavator would have been in major difficulty with the coordination of levelled finds from the two excavation seasons, had he followed that practice.²⁶ Similarly, problems would certainly have arisen with the depth of grave below the surface in those parts of the excavated area, where the surface was topped by a termite ant hill, or those areas which had to be cleared of banana plants, leaving shallow holes in the surface. And when finally no natural or depositional stratigraphy was visible, in fact the soil was in the process of lateritizing, being already pisolithic, and besides penetrated by termites nests and fortified galleries. However, hopefully all these misunderstandings will be clarified in the forthcoming volume on the settlement finds.

Sieveking, who in the 1950's had been excavating the Gua Cha rockshelter with Hoabinhian layers underlying and clearly separated from many burials belonging to the Ban Kao culture,²⁷ and who, during a visit to Copenhagen, had seen the burial pottery and other finds, while they were in the process of restoration, agreed with this author in all major aspects of the interpretations and conclusions. Unfortunately, in his review, he obviously misquoted and misunderstood several points, as correctly pointed out by Bayard and Parker.²⁸

In resume it can be said that Parker, Bayard and Macdonald consider the graves as Iron Age, i.e. 500 B.C. or later, and to be intrusive in an earlier settlement; Solheim partly considers this to be correct, but refers one group of burials to be Late Neolithic. Chang and Sieveking agrees to the Neolithic dating of the graves

and their contexts.

One major reason for these differences in evaluation of the published data, interpretation and conclusion on the graves, their cultural relationship and origin, and their dating, was given above (this ms. p.3). Another reason is of course that the settlement finds unfortunately still remain unpublished. However, this work is now ongoing, and can hopefully be accomplished soon.

III. THE SETTLEMENT FINDS.

With the settlement finds now catalogued, the more detailed analysis of the approximately 1,000,000 finds from the three sites in Ban Kao has begun.

As usual in Asian contexts, the majority of finds are made up by pottery, both as complete or fragmentary vessels, but of course mainly as sherds. However, a good deal of the sherds were in state which allowed reconstruction to complete vessels or areas of vessels, which could be further reconstructed in drawings.

Besides of the 26 types already recognized in the burial pottery, it is now possible to separate out another 15 main types with several variations. Some of these types are clearly within a group to be labelled "house-hold wares". Interestingly enough, a majority of these types are from the Bang Site, while four of the new types are specific to Lue site I. These show close resemblances to types well known e.g. from Gua Cha and other sites in Thailand and Malaysia. This may indicate a dating of Lue Site I in the proximity of the dating of the corresponding horizon at Gua Cha, i.e. about 1100/1000 B.C.

It is also possible to separate out 26 new variations of the original types, known from the burials. Of these 13 are exclusive to Lue Site I. This relates the site closely to the Bang Site, and thus the Ban Kao culture, showing also the continuation of the culture locally.

Most important, however, is the fact, that all types, recognized in the burials, with the exception of types 17 and 26 are certified in the settlement finds from Bang Site. Accordingly it is possible to totally reject Parker's argument that the burials

are later (Iron Age) intrusions into an earlier settlement.²⁹

This becomes even more evident, once the number of sherds excavated in each 15 cm. layer, are registered on 8 reconstructed section maps, 4 in each direction across the excavation. For the sake of uniformity the sherd frequencies are given by percentage. In this context only 3 such sections are illustrated (FIG.5-7). The relative distribution, it can be observed, is rather homogeneous throughout. When at the same time the burials are located in the appropriate sections, two observations become evident:

- a. that the burials are in the lower parts of the deposit, or underneath it; and
- b. the early subphase burials are constantly at a lower level than the late subphase burials.

Further analysis, to be presented in the final, forthcoming publication of the settlement finds, confirm the overlapping of burials referred to the early subphase with those of the late subphase.³⁰

When finally the C-14 dates are entered it is most interesting to notice that 5 of the 8 C-14 dates, covering the time span from 1300 +/- 120 B.C. to 1360 +/- 140 B.C., and that 4 of these³¹ all were collected about level 205 b.d., the fifth³² about level 220. Two other dates³³ date level 220 to 235 between 1490 B.C. +/- 120 and 1570 B.C. +/- 120. Finally the date 1770 B.C. +/- 140³⁴ is the earliest and may antedate the settling of the site. However, this seems rather unlikely from its location, which rather indicates the first time of settling.

The presence of the slightly damaged rice reaping knife of Chinese type with perforations for hafting, made of slate, a similar one made of milk-white quartz, and hundreds of similar knives and other tools for cutting and scrapping and sawing purposes, made from the big shells of fresh water bivalve mussels, still existing in the bottom of the river, point to that rice agriculture may have been practised. It is, however, impossible to state anything about the nature of the rice agriculture, whether it was cultivated wild rice or domesticated rice, whether it was dry rice or wet rice, whether it was paddy or glutinous rice. Yet the period of settling, particularly the dates applicable to the late subphase, i.e. approximately after 1,500

B.C. fit perfectly well with other known dates on early rice cultivation from Southeast Asia.³⁵

Analysis of the approximately 90,000 animal bones from the excavations unfortunately still do not allow any conclusions on the economy of the culture. However, the many bones from pigs, and the fact that an almost complete pig skull was found in one burial, and that pigs hides were used to wrap up the bodies before interment, more than indicates that pigs were at least in part domesticated.

Besides both bones of bovine, buffalo, wild game, birds and reptiles, as well as a large and varied, probably highly specialised collection of plain or barbed arrowheads and spearheads, made of animal bones, and bones of many and different kinds and sizes of fishes, together with the presence of U-shaped fish hooks with inside barb point to the economy being supplied with hunting. The presence of fragments or near complete shields both of turtle and tortoise further indicate contact with the sea. From the modern maps the sea may appear quite remote, but obviously by the time settling the shore may have been rather much closer to the present city of Kanchanaburi, and thus within fairly easy reach from the site (FIG).

Summing-up, it may be concluded, that all major conclusions, drawn from the study of the burials and their contents, have been confirmed, both by the study of the settlement pottery, and as well from the recent study of other major settlement find groups, as *e.g.* the enormous quantities of burnt clay, and other find groups.

Besides it seems now obvious that the Ban Kao culture population was engaged in rice cultivation and pig raising, and with their diet supplied by hunting and fishing, including connections to the sea shore or may be beyond.³⁶

IV. CULTURAL RELATIONS IN THAILAND

The Ban Kao culture is, as stated initially, well-established in the Kanchanaburi Province, and now very well represented southwards through Peninsular Thailand into North Malaysia.³⁷ The culture seems at the same time apparently to exclude other cultures from the area.

Outside the Ban Kao culture area are different well-established cultures recognized in Northeast Thailand, and patterns of divergent cultures emerge in the eastern part of the Central Basin of the Maenam Chao Phraya and the southeastern coastal area. Particularly the latter seems to be extremely important, both from an environmental location point of view, a cultural point of view, and here especially from its obviously very different burial practice and probably religious aspects, compared to those prevailing in the Ban Kao culture. In the following we shall accordingly briefly describe the major characteristics of the chronological data of the three areas of interest.

The Khorat Plateau of Northeast Thailand is today probably the best surveyed and studied area in Thailand. With four major excavations of three sites, and a good number of other sites test-excavated, Bayard³⁸ had a good basis for proposing a fourfold cultural frame, named General Period A to D.

General Period A is the initial settlement phase with an agricultural base, absence of metallurgy, and burials showing beginnings of social ranking. Chronologically it is supposed to start in the middle of the fourth millenium and lasted until c.2000/1500 B.C.

General period B is characterized by the advent of bronze metallurgy and a growing social ranking in the community, reflected in the quality and quantity of grave goods. Chronologically it follows A, lasting to about 500/300 B.C.

General Period C saw the introduction of iron, and the development of centralised societies. It follows B at 500/300 B.C. and last till about A.D.500. Higham more than indicates that during this period several sites become depopulated followed by intrusive settlements. "Those who intruded were responsible for the now famous Ban Chiang painted pottery".³⁹

General period D is the period of the regional states, beginning in the second half of the first millennium.

What interest in this context is of course the periods A and B. The description of period A covers Ban Kao culture in general, the Bang site and the Malaysian

Jenderam Hilir site in particular. But from the chronological frames both of the latter sites fit in better with the General Period B.

The chronological basis for the dates of General Period A and B is the excavations at Non Nok Tha, Ban Chiang and Ban Na Di.⁴⁰ FIG. 8. Of these the datings of Non Nok Tha and Ban Chiang can at best be described as rather controversial, and accordingly they have been subject to extensive discussions and interpretations. From Bayard's own provenance study of the charcoal samples dated, it does, however, become obvious that

FSU 340 pre- dates the site by 2485 +/- 130 B.C.⁴¹

GX 1612 is Early Period 1 at 800 +/- 130 B.C.

FSU 342 is Early Period 3 at 1105 +/- 130 B.C.

Y 2485 Is Mid Period 5 at 1220 +/- 120 B.C.

With the date of Early Period 1 later than that of Early Period 3, and the latter later than the Mid Period 5, which supposedly is the youngest of the three dates, it seems difficult to accept anyone of these dates, unless they can be supported by external evidence.

Ban Chiang is the other site, which has caused some confusion, especially about the discussion of the early bronze. Higham⁴² has compiled a list of the dates from Early Period III, in which the earliest evidence of bronze occurs, and through the Middle Period. Following extended discussions on reliability of charcoal from burial contexts or associated with burials, compared to that collected from hearts or other secure origin, it is still interesting to observe that all dates listed are in the time bracket between 1320 B.C. and 140 B.C., and especially that the earliest burial furnished with a bronze weapon (burial 76) dates as late as 530 +/- 240 B.C. The spread of the dates is as follows:

Middle Period VII 570 B.C., 350 B.C.

Middle Period VI 1170 B.C.

M.P. VI/E.P. V 830 B.C.

Early Period V 1320 B.C., 1320 B.C., 1290 B.C., 1180 B.C., 1090 B.C.,
1000 B.C., 880 B.C., 830 B.C., 140 B.C.,

Early Period IV 1290 B.C., 1050 B.C., 850 B.C., 650 B.C., 650 B.C.

Early Period III 530 B.C.

Early Period II 1170 B.C.

From this it may, however, as well be argued that Early Period II without bronze exist after 1200 B.C., Early Period IV with bronzes blossom between 1000 B.C. and 800 B.C., and the Middle Period VII exist between 600 B.C. and 300 B.C.

Apparently confusion is not much less at Bang Chiang than at Non Nok Tha. As a matter of fact the whole problem may be limited to the simple question: What are the C-14 dates dating? The question is extremely difficult to answer on the basis of the published available data. However, when the data and the dates are combined also with those of some of the apparently more reliable minor excavations, such the excavations at Non Nong Chik,⁴³ and Non Pa Kluay,⁴⁴ a picture emerges of a dating of Non Nok Tha Middle Period 4-8 datable between c. 900 B.C. and 300 B.C. This would of course invalidate the Non Nok Tha dating of Y 2485 to 1220 B.C., but lend some credibility to the dating of FSU 342 to 1105 B.C., and thus the early beginning of bronze metallurgy, and support the three EP IV dates from Ban Chiang, centering around 1180 B.C. and 1000 B.C. However, any other combination of dates and data on the evidence published from these sites may be as valid. The reason for this probably is that the archaeologists still prefer to evaluate the finds and thus the development and the evolution within a given well-defined area in the light of the development established at one major site. Fortunately Higham has increasingly sub-divided sites in "basins", i.e. along rivers/river systems of more limited extension, certainly realising that communication was probably primarily along rivers.

Parallels to this can *e.g.* be found in Vietnam, where there is certain noticeable differences between the pottery of the Phung Nguyen culture along the Song Da (Red River) and along the Song Ma in Thanh Hoa Province.

The Phung Nguyen culture is a good parallel, also because it chronologically coincides with Early Period III and IV in Ban Chiang, with which it also shares many cultural and artifactual details. It has indications of bronze working at its latest stage. Bronze, however, becomes first really noticeable in the succeeding Dong Dau phase, dated about and after 1360 B.C. and particularly in the Go Mun phase at and after 800 B.C.⁴⁵ If these dates are taken into consideration for Northeast Thailand

but this author still hesitates this, because it involves movement across mountain ranges it might be possible to argue for the 12th century B.C. beginning, and 9th century B.C. full blossom of bronze metallurgy in Northeast Thailand.

A more recent observation of ethnographic character by this author may illustrate this. There are f.ex. noticeable differences in the design of ox carts between Chiang Mai, Lampoon and f.i. Phrae. The reason probably is that ox carts were primarily used for very local transportation, not to cross from one basin to another. They serve more or less the same functions, the basic construction principle is the same, but obviously people liked to shape them a little bit different everywhere.

The above discussion focussed on the chronology of the sites in Northeast Thailand, in an attempt to locate those sites and phases, which could perhaps offer finds of a comparable nature, but the apparent chronological confusion makes it difficult. However, if a comparison is made between the potteries of the Ban Kao early and late subphases and that of the early levels from Non Nok Tha and Bang Chiang, it becomes obvious that similarities can be seen at such general levels as the ubiquitous rounded bottom of the vessels, the frequent use of funnel-necks *et-cetera*. But none of the really distinctive features of the Ban Kao culture pottery are observed. And other inventory groups from the northeastern sites except for the spectacular bronzes and moulds remain largely unknown or undocumented so far. Yet it may be concluded, that similarities are by far much fewer than differences, as could be expected.

In the eastern margin of the Maenam Chao Phraya basin is a group of sites emerging, forming like the Ban Kao culture sites with a Neolithic aspect, as they seemingly are devoid of metals. It is Sab Champa,⁴⁶ which remains undated in absolute terms, but which shares a couple of details in inland. Gradual shifts between salt water environment, fresh water environment, perhaps under riverine bar conditions or as a backland swamp or mangrove raised the surrounding land, and settlement may have started between 4710-3960 B.C., where soil samples for pollen analysis show a sharp increase of charcoal, followed by a rise in grass pollens as could have been expected, also if the charcoal were from an ordinary forest fire. When settling at Khok Phanom Di itself took place between 2000 B.C. and 1400 B.C., it was still part of a coastal barrier with access to the mangrove fringed shore.⁵⁰

The diet of the population is of course strongly influenced by the maritime neighbourhood, as could be verified both from faunistic remains and on two occasions from partially digested remains still *in situ* in stomach area of a skeleton, and one sample of faecal remains. They contain fish bone and occasional rice chaff. Rice husk was found in the excavation, and particularly as temper in approximately 1% of the pottery. Mammal bones were rare at the site.

About 150 burials were excavated all supine with the head towards the east. Some were sprinkled with red ochre, some obviously wrapped in some bark-cloth material. In the lowest burial zone, A, were 104 skeletons in a 3 m deep occupational deposit in a complicated system of ashy lenses, postholes, pottery and animal remains. The earliest 6 skeletons were isolated from each other and devoid of grave goods. The remaining 98 were set out in rows or superimposed upon each other in what may be interpreted as ancestral groups. These came to an end in the overlying Zone B, which was characterized by some extremely elaborate and sophisticated ritual structures with outstandingly rich graves. The Zone B soil had a sandy matrix with some ash lenses and minor shell accumulations, the Zone C soil was darker, without burials, but rich in animal bones, pottery and tools for pottery manufacturing. Stone adzes, fish-hooks and spearheads of bone, and cutting implements made from shell bear some likeness to the Ban Kao culture. But the pottery, both the extremely elaborately shaped and decorated burial pottery and the much simpler household wares are different. That contact with this culture perhaps rather than with this specific site existed to the Ban Kao culture area in Kanchanaburi is clearly shown by the joined area of sherds, mentioned above from Tam Kaew, Amphoe Sai Yok. Burial gifts apparently varied with age and status, but what is of importance in this context, besides of the contemporaneity of the site with the Bang Site early and partly late subphases, is the fact that it was devoid of bronze throughout.

V. CONCLUSIONS

It will have been noticed that so far there has been no mentioning of North Thailand, except for the early finds from Tam Phii. The reason is the simple that the area, inspite of some recent research by Marielle Santoni, CNRS, Paris, is still insufficiently known during the period, with which this paper has been concerned.

Further to the south in the same mountain range, the Ban Kao culture is distributed from the Kanchanaburi Province and southwards through Peninsular Thailand into North Malaysia. Datable from c. 1800 B.C., through 1300 B.C., the origin of this culture is still debatable, but in all other aspects of this culture it has become evident, both through the internal studies of the finds from the "old" sites in Thailand, and from new material from Thailand and Malaysia that all criticism brought out against previous interpretations by this author, may now be considered irrelevant at the best.

The Ban Kao culture, been most likely an agriculture-based rather sedentary culture, alone for this reason cannot be claimed to totally different from other, more or less contemporary cultures in Thailand. It does have some similarities to the new coastal culture in the southeast, but particularly the pottery and the burial rites distinguish them sharply from each other. However, contacts between them seemingly exist.

It is more difficult to verify anything but the most general resemblances between the Ban Kao culture and the sites on the eastern margin of the Maenam Chao Phraya basin, and between the latter and the Ban Kao culture and the Non Nok Tha/Ban Chiang sequences of cultures in Northeast Thailand. The latter area in many respects clearly exhibit cultural resemblances to the Phung Nguyen, Dong Dau, Go Mun sequence established in Vietnam. However, the debatable and still very controversial datings of the northeastern sites, both internally and externally, makes any comparisons difficult. A good example of this are the clay stamps/rollers, known from the late phase in Ban Chiang, but more or less from the early beginnings of the Phung Nguyen culture c. 2000 B.C.

With at least four contemporary, geographically different and rather distinct cultures in Thailand during the second millennium B.C., the archaeological research has moved fast ahead during the past 30 years. It more or less started with the Ban Kao culture, the research into which is hopefully going to continue for yet another many years.

1. Longitude 99.20 East, latitude 13.57 North.

2. P.Sorensen, Ban Kao, Neolithic settlements in the Kanchanaburi Province. Part One: The Archaeological Material from the Burials. Archaeological Excavations in Thailand, Vol.II. Munksgaard. Copenhagen 1967.

3. Sorensen, 1.c. ref.2, p. 15.

4. At the time of writing it was not possible to be more specific, whether this Neolithic culture represented an Early, Middle or Late phase of the Neolithic.

6. Solheim II, W.G., Early Bronze in Northeast Thailand. Current Anthropology, Vol.9.1, 1968, p.59. Note particularly the statement p.61, and the effects of introducing the "unlikely" C-14 date, Gak 959 from layer 21 into the scheme Table 1.

7. Sorensen, P., On the Problem of Early Rice in Southeast Asia. Rice Societies Asian Problems and prospects. (ed. I. Neriund, S. Cederroth & I. Gerdin). Studies on Asian Topics, No.10., 1986, p.267. Curzon Press.

Higham, C., The Archaeology of Mainland Southeast Asia, p.65. Cambridge World Archaeology. Cambridge University Press, 1989.

8. Chang, K.C.: American Anthropologist, Vol.70, pp.1027-28, 1968.

Parker, R.H.: The Journal of the Polynesian Society, Vol. 77, p.307, 1968.

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Bayard, D.T. & R. H. Parker, Commentary. Interpretation of Sai-Yok and Ban Kao. Asian Perspectives, Vol.XIX.2, 1976, pp.289.

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9. Solheim II, W.G. (ed), Sa-huy'nh Pottery Relationships in Southeast Asia. Asian Perspectives, Vol. III.2, 1961.

10. Chang, K.-C., The Archaeology of Ancient China. Yale University Press, New Haven and London 1968, p.88.
11. Chang, 1.c., p.77.
12. Chang, 1.c., p.111-12.
13. Chang, 1.c., p.78.
14. Sorensen, P., Prehistoric Iron Implements from Thailand. Asian Perspectives, Vol. XVI.2, 1973, p.134. See especially. pp 168-69.
15. Gorman, C.F., Excavations at spirit Cave, North Thailand. Asian Perspectives, Vol.XIII, p.79, 1970. Gorman mentions (p.96) that the pottery is limited to the surface of Layer 2. This author agrees with Marschall's analysis and conclusions that the sherds belong to Layer 1, and accordingly are dissociated from the pebble tools. Marschall, W., On the Stone Age of Indonesia. Review article. Tribus, Nr. 23, 1974, p.71.
17. Mourer, R. & C., The Prehistoric Industry of Laang Spean, Province of Battambang, Cambodia. Archaeology and Physical Anthropology in Oceania. Vol. 5.2, p.148, 1970. *ibid.*, Prehistoric research in Cambodia during the last Ten Years. Asian Perspectives, Vol. XIV, p.35, 1974. Mourer, R., Laang Spean and the Prehistory of Cambodia. Modern Quaternary Research in Southeast Asia, Vol. 3, 1977, p.2. (ed, G. J. Barstra, W. A. Gasparie & I. C. Glover)
18. Higham, 1.c. ref. 7, p.65.
19. Dunn, F. L., Excavations at Gua Kechil, Pahang. Journal of the Malayan Branch of the Royal Asiatic Society, Vol.37.2, p.87, 1964. *ibid.*, Radiocarbon dating of the Malayan Neolithic. Proceeding of the Prehistoric Society, (NS), Vol.XXXII, p.352, 1966.
20. Dunn, 1.c. 1964. The sherds shown on p1.IV and V, and some of those from P1. III, are abundant in the Bang Site settlement sherd collections A majority of them will be preferable to the very common household wares such as Types 16, 20, 22 and 25 with sub-variations (Sorensen, 1.c., ref. 2, P1. 109-19).
21. Leong Sau Heng, A Tripod Pottery Complex in Peninsular Malaysia. Paper read to the first conference of the Association of Southeast Asian Archaeologists in Western Europe, London 1986. In her paper Dr. Leong described the site of Kampong Jenderam Hilir, Selangor, Malaysia, which is a settlement site, closely related to the Bang Site both considering location and contents of pottery, etc. A charcoal sample was dated to 1890 +/- 60 b.c., which is in accordance with the Bang Site early

subphase. Two seed samples were dated 2520 +/- 50 and 2530 +/- 50. However, Dr. Ian C. Glover, Institute of Archaeology, London, informed this author, their dating is mid 2nd Millenium (pers. comm.). The latter date also harmonizes better with the transition between the Hoabinhian level at Gua Cha, Kelantan, and the Ban Kao culture levels (typologically a later variation than the Bang Site late subphase), which Adi Haja Taha (pers. comm.) informed this author is dated to 1070 +/- 230 B.C.

22. Solheim, l.c.ref. 8.

23. Sorensen, l.c. ref.14, p. 167.

24. Macdonald, l.c. ref. 8.

25. L.c.,ref.8.

26. To illustrate the erosional force of the river by that time it may be mentioned that the whole camp site of the excavation team was washed away during the following rainy season.

27. Sieveking, G. de G., Excavations at Gua Cha, Kelantan, 1954. Part I. Federation Museums Journal, Vol.I and II (N.S.), pp. 75, 1954-55.

28. L.c., ref. 8, 1976.

29. The analysis of the settlement pottery sherds and vessels was done by Mrs. Anna Lindebo Leth for the Mag.art.degree, Aarhus University, Denmark. Her study was based on her examinations of the Danish share of the finds, and the cataloguing of the Thai share by this author. I herewith gratefully acknowledge her permission to quote from her thesis.

30. This, as well as the previously mentioned analysis was made independently by Anna Lindebo Leth, as part of the ref. 29 mentioned thesis.

31. K.842, K.1087, K.1090, K.1091.

32. K.1092.

33. K.1088, K.1089.

34. K. 838.

35. Sorensen, 1.c., ref. 7. Higham, 1.c., ref.7. Glover, Ian C., Prehistoric Plant Remains from Southeast Asia, with Special Reference to Rice. South Asian Archaeology 1977, p.7. Naples 1979 (ed. M.Taddei).

36. It is in this connection extremely interesting that the Thai-Danish Prehistoric Expedition 1960-62, during the surveying in the Kanchanaburi Province in 1960, in Tam Kaew, Sai-Yok Sub-District, found 3 fitting sherds, which are an area of a vessel, decorated similarly to the sophisticated pottery from Khok Phanom Di, Chaechoengsao Province, Thailand (Higham, 1.c.,ref.7, pp.65). Unfortunately this author missed mentioning the find in the recent publication of the finds from the surveying.

Sorensen, P., Catalogue of the surface finds collected in 1960 during the reconnaissance in the Kanchanaburi Province by the Thai-Danish Prehistoric Expedition. Archaeological Excavations in Thailand. Surface finds and minor excavations. Scandinavian Institute of Asian Studies. Occasional Papers No.1. Curzon Press, London, 1987, p.1, and Fig. 2, p.2.

37. It will lead too far, here to mention all the sites in question. Two sites, however, deserves mention: the Nong Chae Sao site, Amphoe Chom Bung, Radburi Province, where postholes from a house, having had rounded gables, a detail well known among certain Thai tribes. Buried underneath the house were two skeletons with burial pottery, resembling mainly that of Lue Site I and the Ongbah cave pottery. (see Sorensen,p., The Neolithic Cultures of Thailand (and North Malaysia) and their Lungshanoid Relationship. Early Chinese Art and its Possible Influences in the Pacific Basin. Vol.2. 1972, p. 459, and p. 468 Fig. 1, p. 469 Fig. 2. The other important new find is that from the Lang Rongrien rockshelter, Krabi. Douglas D. Anderson, Excavations of a Pleistocene Rockshelter in Krabi, and the Prehistory of Southern Thailand. Prehistoric Studies: The Stone and Metal Ages in Thailand (ed. P.Chareonwongsa and B.Bronson). Papers in Thai Antiquity, Vol.1, 1988, p.43.

38. Bayard, D. T., A tentative regional phase chronology for Northeast Thailand. Southeast Asian Archaeology at the XV Pacific Science Congress. Otago University Studies in Prehistoric Archaeology, Vol.16,1984, p.161.

39. Higham, C. F. W., The Ban Chiang culture in wider perspective. Proceedings of the British Academy, Vol. LXIX, 1983, p.229.

40. Bayard, D. T.,Excavation at Non Nok Tha, Northeastern Thailand, 1968. Asian Perspectives, Vol. XIII, 1970, p. 109. *ibid.*, The Chronology of prehistoric metallurgy in Northeast Thailand: Silabhum or Samrddhabhum. in R. B. Smith and W. Watson (ed.), Early South East Asia, pp. 15, Oxford University Press, 1979.

ibid., Provenance Data on Non Nok Tha Radiocarbon dates from the 1966 and 1968 Excavations. Unpublished paper handed to members of the Research Conference on Early Southeast Asia, Bangkok and Nakhon Pathom, 1985.

ibid., Chronology, evolution, and diffusion in the later Southeast Asian cultural sequence: some comments on Higham's recent revision. Indo-Pacific Prehistory Association, Bulletin, Vol.7, p. 118, 1987.

Gorman, C. and P. Chareonwongsa, Ban Chiang: A Mosaic of impressions from the first two years. Expedition, Vol.18.4, 1976, pp.14. Pennsylvania University Museum, Philadelphia.

White, J.C., The Ban Chiang Tradition: Artists and Innovators in Prehistoric Northeast Thailand. Discovery of a Lost Bronze Age. Ban Chiang. University Museum, Pennsylvania 1982, p.12.

ibid., Ban Chiang and charcoal in hypothetical hindsight. Indo-Pacific Prehistory Association. Bulletin, Vol.8, p.54, 1988.

Higham, C.F.W., 1.c., ref. 7 and 39. ibid., Chronology, evolution and diffusion in the later Southeast Asian cultural Sequence: Further Comments. Indo-Pacific Prehistory Association. Bulletin, Vol.7, p.141, 1987.

ibid., The social and chronological contexts of early bronze working in Southeast Asia. Ancient Chinese and Southeast Asian Bronze Age Cultures (ed. N. Barnard). In Press.

ibid., Ban Chiang and charcoal in hypothetical hindsight: A comment. Indo-Pacific Prehistory Association. Bulletin, Vol. 8, p.75, 1988.

Higham, C. F. W. and A. Kijngam, Prehistoric investigations in Northeast Thailand. British Archaeological Reports (International Series) No.231,(Vol.1-3). Oxford 1984.

41. Similarly, during the excavation of Lue Site I, Ban Kao, a big lump of charcoal was found in a horizontal position about 1 m below the cultural deposit. It was probably embedded during the deposition of the upper sediments of the plain. K-1474 is dated 2420 +/- 100 B.C., and may be claimed to "pre-date" the site. This, of course, is totally irrelevant, as the site most likely is to be dated about or after 1300 B.C.

42. Higham, 1.c., ref. 40 (In press). The list is compiled on the basis of the evaluation of the dates in Joyce White's thesis, which regrettably is not accessible to this author.

43. Higham, 1.c., ref. 7, p. 118 and 1.c. and ref. 40 (In Press).

44. Wilen, R., Excavation and site survey in the Huay Sai Khao Basin, northeastern Thailand. Indo-Pacific Prehistory Association.

Bulletin. No.7. p.94., 1987.

45. Kohl, G. and H. Quitta, Berlin Radiocarbon Dates V. Radiocarbon, Vol.20, No.3, p.386, 1978, and personal information during a visit to Vietnam in February 1980.

46. Maleipan, V., The Excavation at Sab Champa. In Early South East Asia (ed. R. B. Smith and W. Watson). Oxford University Press, 1979, p.337.

47. Watson, W., Kok Chareon and the Early Metal Age of Central Thailand. In Early South East Asia (ed. R. B. Smith and W. Watson). Oxford University Press, 1979, p.53.

ibid.,Pre-Han Communication from West China to Thailand.

Research Conferance on Early South East Asia, Bangkok and Nakhon Pathom, 1985, p.309.

48. Watson, l.c., ref. 47, 1979, p. 53.

49. Watson, l.c., ref. 47, 1985, p. 311.

50. Higham, l.c., ref. 7, 1989, p.65.

CAPTIONS TO ILLUSTRATIONS:

FIG. 1. Location of the Kanchanaburi Province (striated) and the Ban Kao site in Thailand.

FIG. 2. Plan and mid-line section of the Bang Site Excavation in Ban Kao.. Striated areas show location of the Burials.

FIG 3. Main types of the burial pottery from the Neolithic Early subphase.

FIG 4. Main types of the burial pottery from the Neolithic Late subphase.

FIG 5. Relative frequency of sherds in the Bang Site settlement compared to the present surphase. Inserted are the burials from squares F.3 to F.b, and C-14 dates.

FIG 6. Relative frequency of sherds in the Bang Site settlement compared to the present surface. Inserted are the burials from square H.3 to E.3, and the C-14 dates.

FIG 7. Relative frequency of sherds in the Bang Site settlement compared to the recent surface. Inserted are the burials from squares G.a to C.a, and the C-14 dates.

FIG 8. Map of Thailand indicating the most important of the sites, mentioned in the text.

FIG 9. General view of the Bang Site excavation.

FIG.10. Burials B.1 and B.2, both belonging to the Neolithic Late subphase.

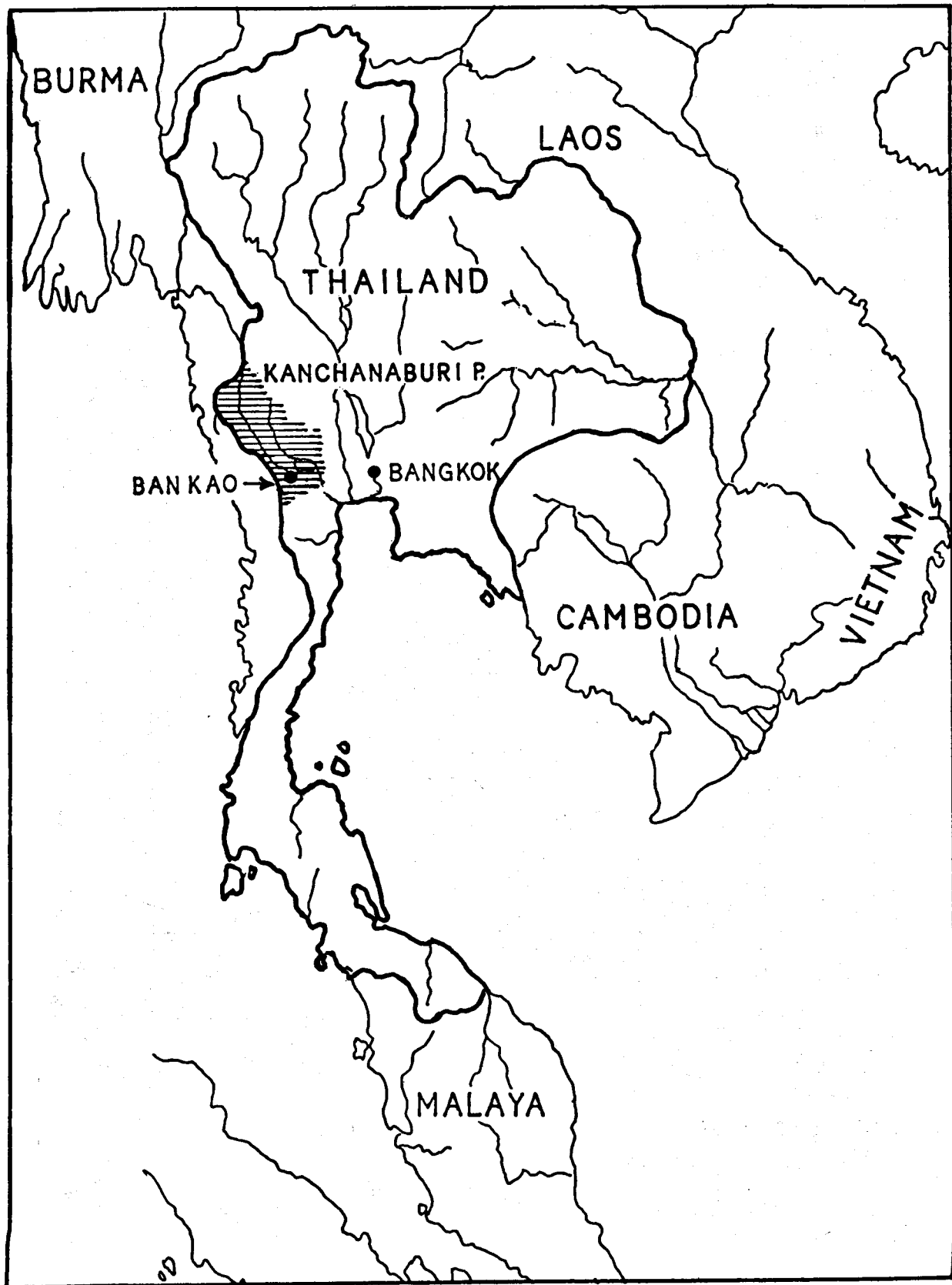


Fig. 1

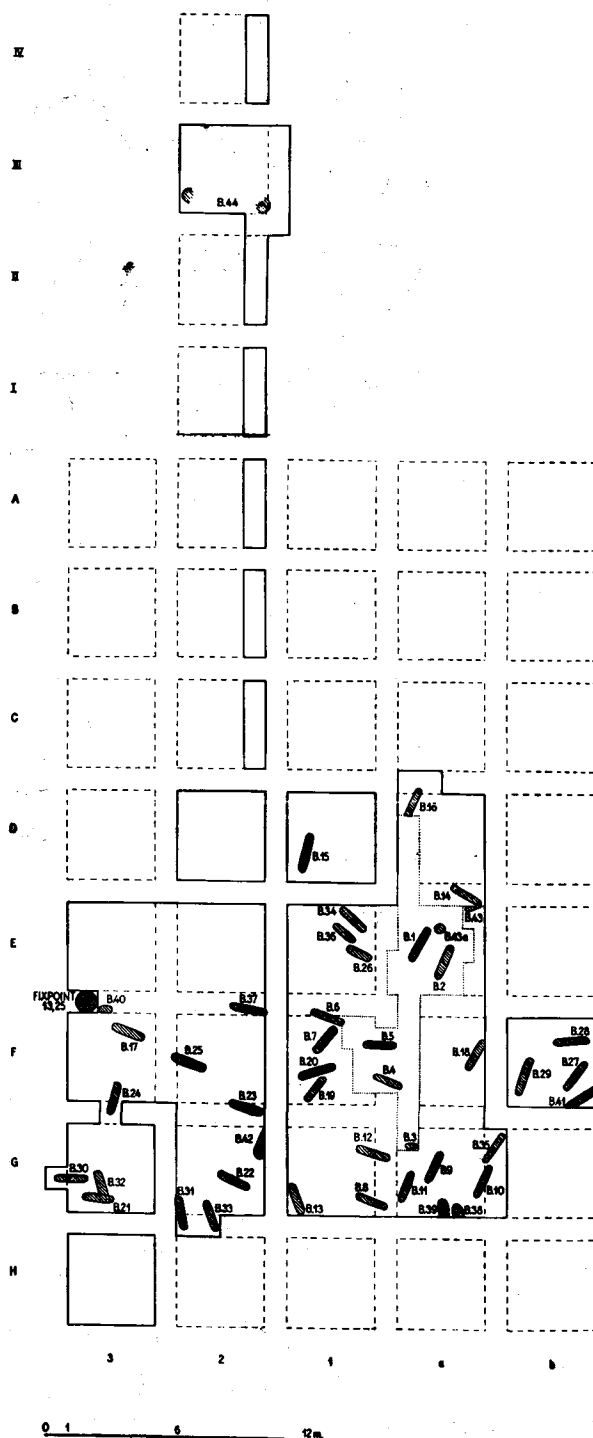
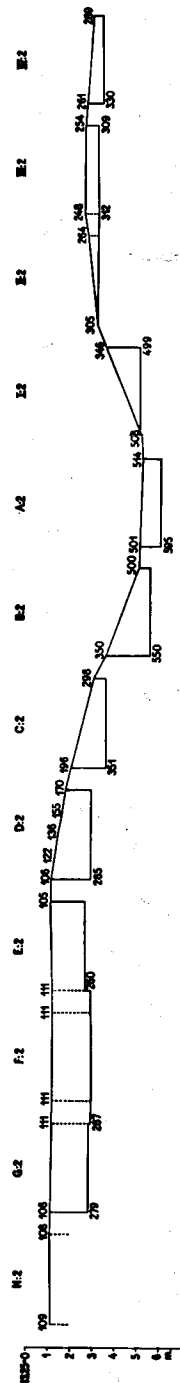


Fig. 2



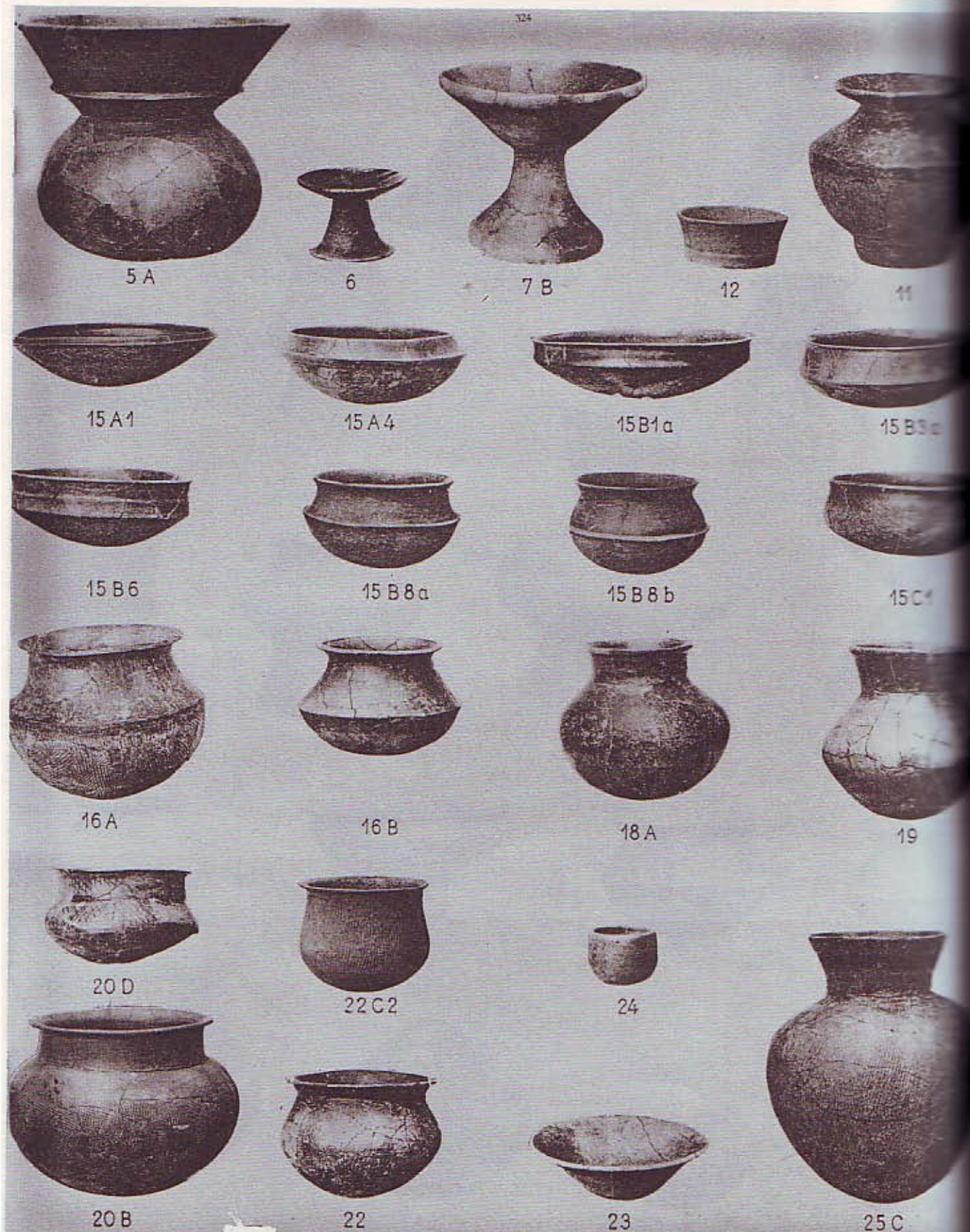
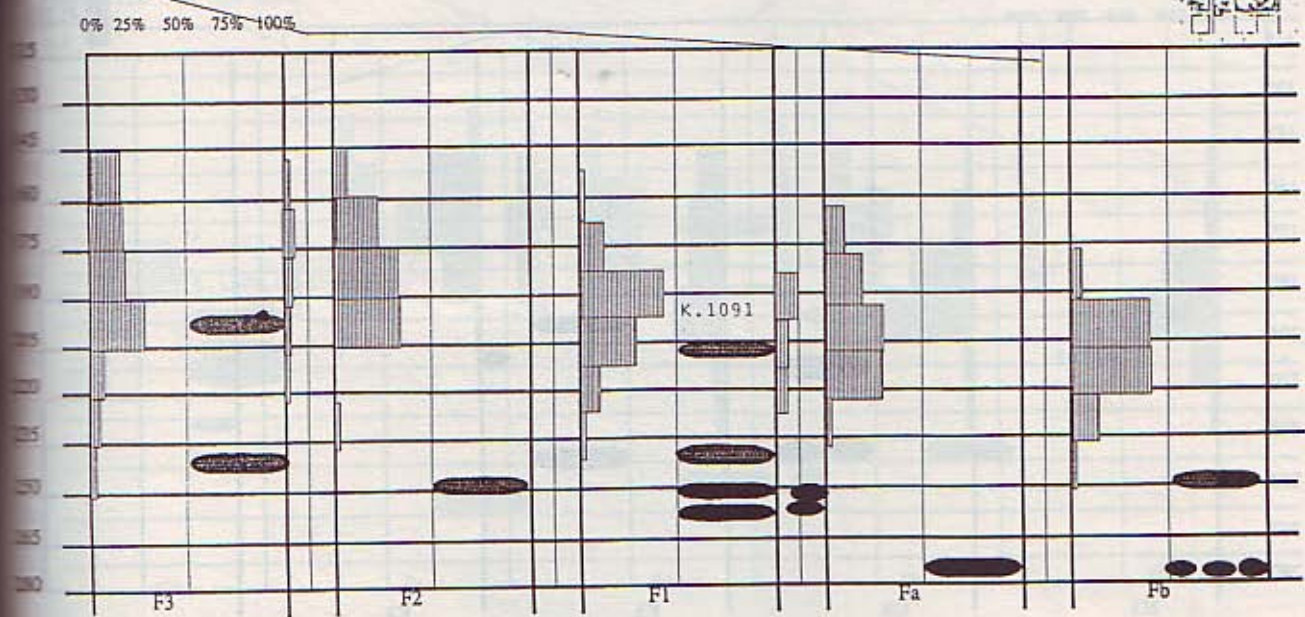


Fig. 4

G SITE (B.K. I)
 Relative frequency of sherds with burials.

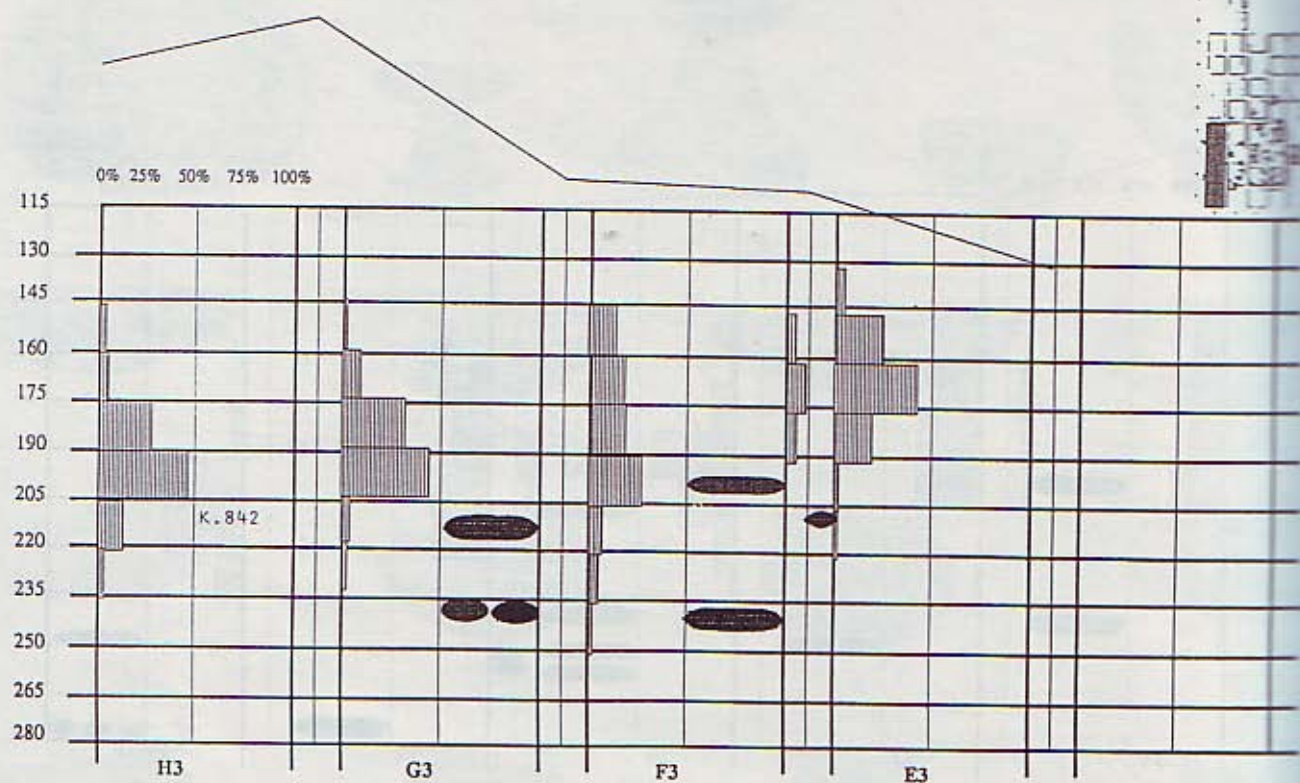


K.1091 : 1310 +/- 120 B.C.

Fig. 5

BANG SITE (B.K. I)

Relative frequency of sherds with burials.

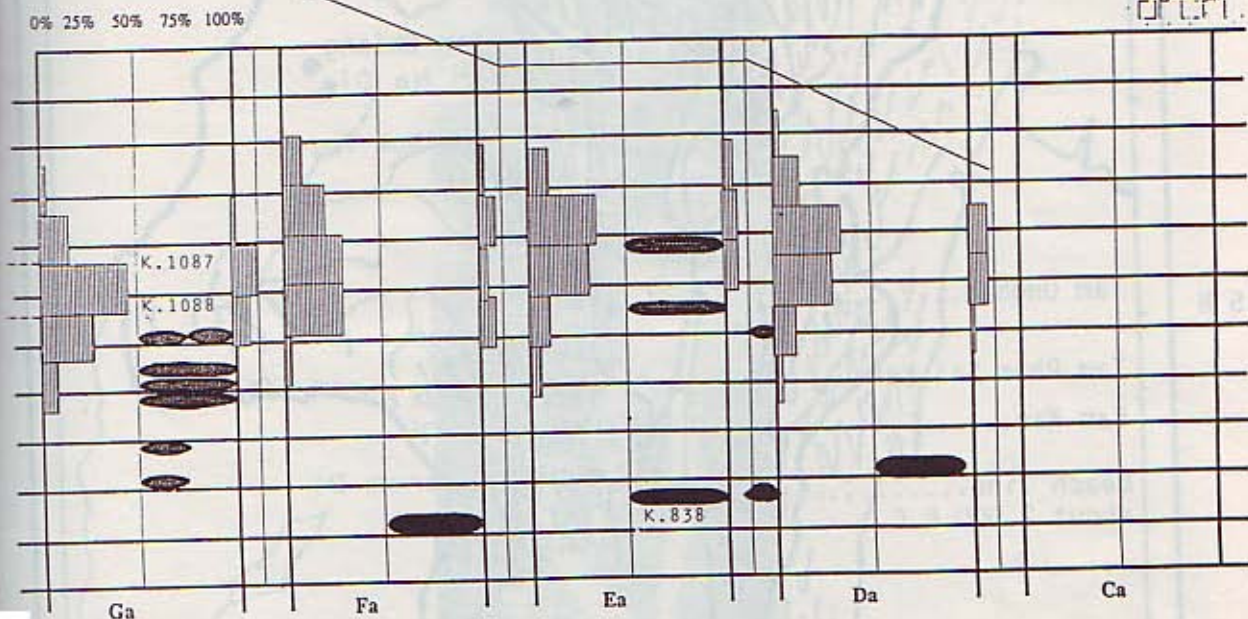


K. 842 : 1360 +/- 140 B.C.

Fig. 6

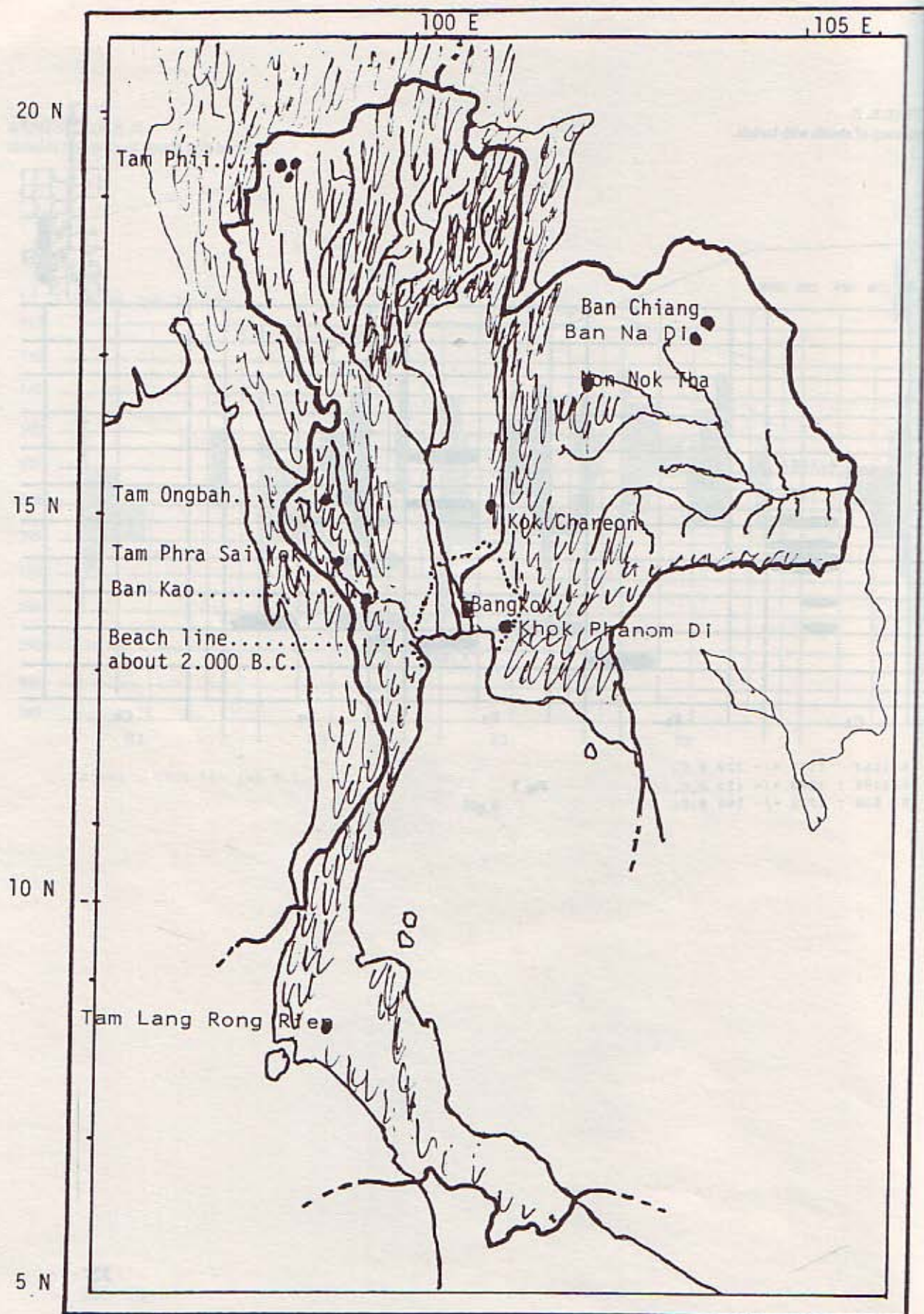
...SITE (B.K. I)

...frequency of sherds with burials.



K.1087 : 1330 $\pm$ 120 B.C.
 K.1088 : 1570 $\pm$ 120 B.C.
 K. 838 : 1770 $\pm$ 140 B.C.

Fig. 7



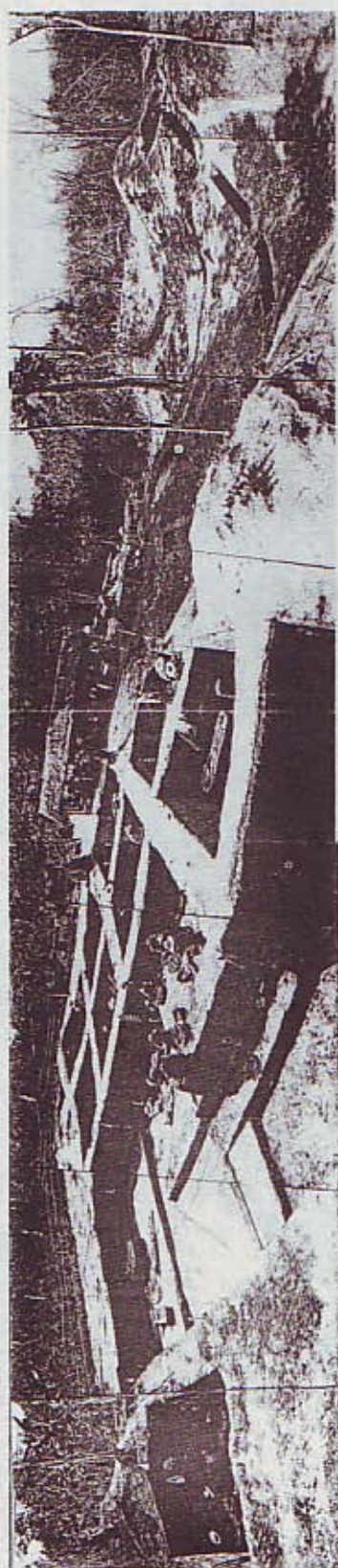






Fig.1



Fig. 2

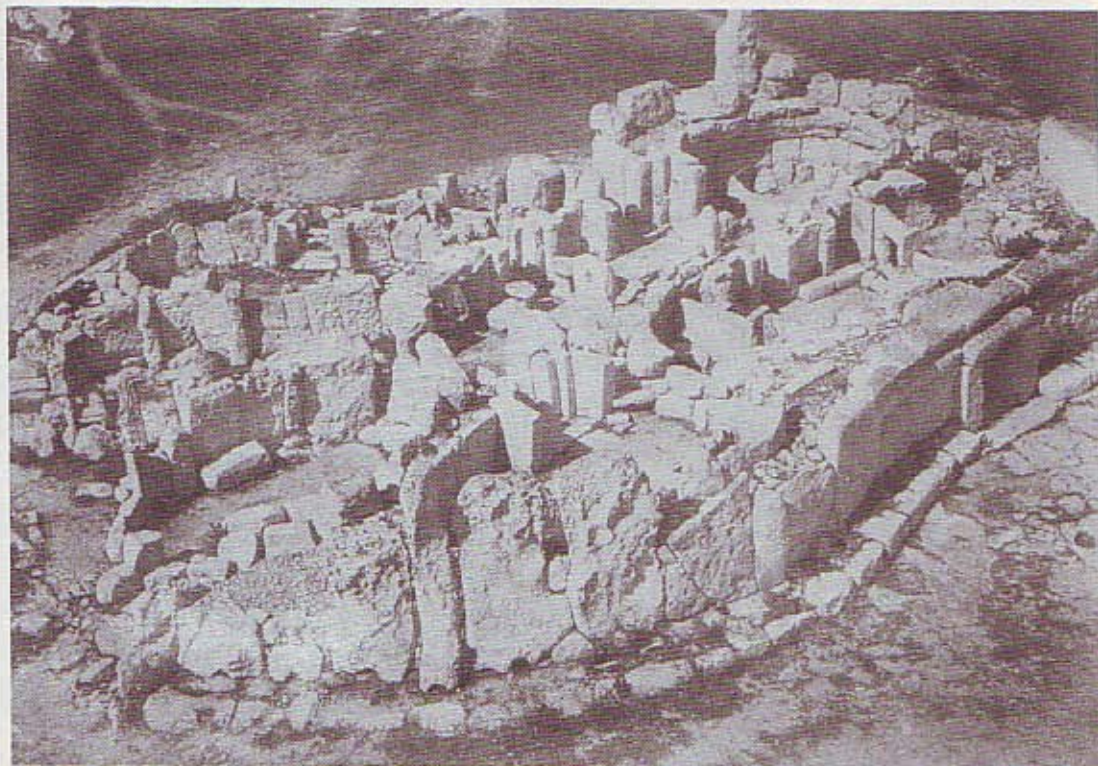


Fig. 3



Fig. 4



Fig. 8



Fig. 9



Fig. 12



Fig. 13



Fig.14

THE DESSAU BAUHAUS

By

H. Stelzer

On August 6th this year the Bauhaus Archive Berlin (West) opened its exhibition "Experiment Bauhsus" in the Bauhaus of Dessau. With its more than 300 exhibits the collection offers an insight into the progressive objectives and achievements of the Bauhaus, which acted as a new type of art school for useful construction work and a new design in Weimar, Dessau and Berlin from 1919 to 1933. Its directors were Walter Gropius (1919-28), Hannes Meyer (1928-30) and Ludwig Mies van der Rohe (1930-33).

The world-wide reputation of the Bauhaus and its effect lasting up to now are based upon its revolutionary educational programme for the training of architects, designers and artists as well as on its outstanding achievement in these fields. A pioneering accomplishment was the transition from individual craft production to industrial design.

The most important evidence of the work done in this art school is the preserved and meanwhile restored Bauhaus building in Dessau. (Fig.1/2) Its construction was started in autumn 1925, commissioned by the town of Dessau, and completed within one year, so that it could open to use in December 1926.

Both from the historical and from the artistic point of view the Dessau Bauhaus is today considered to be one of the outstanding monuments of modern building, of contemporary architecture in our century. Thus the capital of the former province of Anhalt-Dessau possesses a building which has not lost its modernity even now and which has influenced contemporary architecture all over the world. "Hard to believe that Pius (Walter Gropius) build this at a time when motor-cars still looked as if they had a lot of trouble to get going"¹ These were the words of the German-American architect Konrad Wachsmann when he first visited the Bauhaus in Dessau on the occasion of the Einstein celebrations in the GDR in 1979. This comparison, this image, makes one actually aware to what extent architecture had a determining influence on modern developments of that time.

The small province of Anhalt-Dessau had already once before obtained a reputation in the field of architecture. From 1769 to 1773 a country house was built at Worlitz according to plans designed by F.W. von Erdmannsdorff, the earliest neo-classical building on the European continent. It is regarded as the "original cell of neo-classicism"². The then ruler of the province, the hereditary Prince Franz and his architect Erdmannsdorff, who were both deeply interested in architecture and visual art, used their understanding of the beginning economic and social rise in the middle and in the second half of the 18th century, gained when travelling in Italy, Holland, England and France, as well as their knowledge of Roman antiquity, Italian Renaissance, French architecture and English country seats influenced by Palladio to re-shape the province of Anhalt-Dessau and to implement a comprehensive cultural and social reformatory work.

The over 200-year classical country house of Worlitz, together with its park, and the merely 62-year old Bauhaus are both legally protected historic monuments both included in the List of Monuments of the GDR as buildings of national importance and international artistic value.

ON THE CONSERVATION OF MONUMENTS IN THE GDR

The Central List of Monuments of the GDR comprises 399 items, altogether about 48,000 monuments and sites are included and protected by law. "Monuments" according to the spirit of the law (Denkmalpflegegesetz of 19 June, 1975) are concrete testimonies of political, cultural and economic development which, because of their historic, artistic and scientific importance, have to be preserved in the interest of the socialist society. There is no time boundary between completed developments and those in progress. That is why the Denkmalpflegegesetz also allows to place under protection buildings and sites which have only just been established. Thus e.g. outstanding buildings from the recent development of the country could be legally protected. It was therefore beyond question to give the Dessau Bauhaus the highest possible status of protection in 1975 after it had already been included in the list of monuments of the region of Halle. The Institute für Denkmalpflege, Dept. of Halle, had based its professional expertise for the inclusion of the Bauhaus into the Central List of Monuments on the following criteria:

- * After the Weimar period (1919-25) the Bauhaus exerted a world-wide

influence on architecture and fine art from its seat in Dessau. Also the methods of industrial construction using standardized construction elements, first introduced in the GDR in 1956, have been stimulated by Bauhaus models (estate of Dessau-Torten).³

* The Dessau of 1926 is considered to be a structure "most completely reflecting the creative principles of functionalism"⁴ - its role in the history of art as one of the outstanding monuments of modern architecture is stated.

THE BAUHAUS BUILDING

The shape of the Bauhaus is characterised by a functional structure comprising individual interconnecting wings of clear geometrical design. Their structure, volume and functional assignment were determined by the organisation of educational work.

The "... possibility of varying the sequences of rooms according to potentially necessary changes in organisation by means of meaningful axis divisions " (Gropius) ensures an optimum correlation between rooms and functions (Fig.9,10)

The whole building complex consists of three parts which were used in the following way:

* the wing used for technical instruction (technische Lehranstalten)

It comprised rooms for teaching and administration, staff rooms, the library, the physics lab and modelling rooms on four floors (basement, raised ground floor and two upper floors); from the two upper floors a two-storey bridge supported by four pillars extends over a street.....to the workshop wing. This bridge contained and still contains office rooms. On its upper floor the architectural department and W. Gropius' offices were located.

* the workshop building with a stage workshop, printing office, dyeing room, packing and storage rooms, caretaker's flat and boiler room in the basement; with a carpenter's workshop and exhibition area, large vestibule with staircase on the raised ground floor; a weaving workshop and rooms for basic training and

lectures on the first upper floor and workshops for wall painting and metal work as well as two lecture rooms on the second upper floor. From the raised ground floor of the vestibule one could, and can, enter a one-storey connecting structure containing the assembly hall and the stage, which may also be opened to the adjacent refectory. Refectory, stage, assembly hall and vestibule may all be converted into one big room, The third section of the building is:

*the "studio house" containing, on the same level with the refectory, the kitchen with its adjoining rooms. The four upper floors of the studio house consist of 28 studio-apartments for students.

The built-on area of the Bauhaus covers some $2,630\text{m}^2$, its building cubic content amounting to $32,450\text{m}^3$. The Bauhaus in Dessau was erected as a reinforced concrete skeleton structure. The ceilings are stone-iron ceilings built on girders, the walls were built of brick. All windows (profile ledges) were fitted with crystal mirror glass. The three upper floors of the crystal wing, with the exception of the South facade, were completely glazed with a curtain wall. The external surfaces of the walls were plastered and painted with Keim's mineral paint.⁵

The coloured interior decoration, the lighting appliances, the tubular steel furniture in the assembly hall, the refectory and the studios as well as other pieces of furnishing were produced in the workshops of the Bauhaus or else on Bauhaus designs (M. Breuer, tubular steel furniture).

As a building complex of this kind the Bauhaus of Dessau marks the beginning of a world-wide development. In the same way as the worlitz country house was said to be the "original cell of neo-classicism" for the European continent, the Bauhaus may be regarded as the "original cell of modern architecture", whose strength of artistic architectural expression has rarely been achieved since.

RECONSTRUCTION AND CONSERVATION

The Bauhaus was used in the way envisaged by its builders for less than six years only. On the initiative of the Fascist Party fraction the local of Dessau Council decided to stop all training activities in the Bauhaus on 1 October, 1932. The

institution moved to Berlin, to be completely dissolved a few months later in April, 1933.

Even the existence of the Bauhaus building itself seemed to be in danger. Its demolition was seriously considered by the same authorities who had closed it down. Yet fortunately it did not come to that.

A few years later the Bauhaus also survived the bombing of Dessau during the Second World War without great damage. Some minor destructions of the upper floor of the former Technische Lehranstalten were removed in 1948. However, a substantial damage caused by the war was the destruction of the curtain walls in the workshop building. Compared to relatively small damage on the rest of the facades, the destroyed glass facade of the workshop building impaired the general view considerably.

The construction system of the Bauhaus itself, however, remained almost intact which proved to be an important prerequisite for :

- * first quick and effective measures to secure and partially reconstruct the building to make it available for use in a town whose centre had almost completely been destroyed, as well as for
- * later comprehensive conservation and preservation work for the full restoration of the Bauhaus of Dessau to its original state.

When repairs were first started to remove the damage caused by the war a reconstruction of the curtain walls was not yet possible. Therefore the decision was made in favour of an outer wall built of brick with small windows as a temporary solution. The Bauhaus was not a beauty any more, but it was usable.(Fig. 3)

In the late 50s a first aesthetic correction was made in accordance with the taste and the possibilities of the time. The ceiling panels were fitted with parapet bands fixed with mortar, which in turn carried window bands. (Fig 4)

When in 1974 it was suggested to include the Dessau Bauhaus in the Central

List of Monuments the Town Council of Dessau very soon decided to start its comprehensive reconstruction. The necessary reconstruction work was to be carried out in accordance with the principles of monument conservation. At the same time the suggestion was made to replace the first temporary repairs done immediately after the war by proper conservation procedures. These were to be implemented step by step and were initiated by a project worked out by the Department of Education, the then user of the Bauhaus. This project envisaged the removal of hygienic shortcomings, technical defects in construction on the interior, the improvement of the furnishings and other things.

Work on the exterior was confined to roof reconstruction and to repairing the temporary facade of the workshop building. The second project, launched later when the suggestion made by the Institut für Denkmalpflege (Department of Halle) had been confirmed, contained the above mentioned objective of a step-by-step reconstruction of the whole premises with a view to regaining the original artistic effect.

By 1976, the year of the 50th anniversary of the Bauhaus, the following restoration or reconstruction work had been completed:

RECONSTRUCTION WORK ON THE EXTERIOR

This was the beginning of restoration work. Besides the repairs done on the facade for maintaining the value of the building (plaster, windows, entrance areas), including its original colour pattern, much attention was turned to the workshop wing. Here the curtain wall was to be restored. The Bauhaus had only been built some 50 years before. Those were not only 50 years of building history but also 50 years of development of technological standards, technical regulations and standardization etc.

Conservation measures have of course always to be brought in line with the valid system of regulations. Compromises, which have to be made time and again, are better known to the persons in charge in cases of classical monuments from earlier time, such as fortresses from the Middle Ages, baroque castles, Romanesque or Gothic sacred buildings, town palaces, etc. In the case of a recent monument, just 50 years old, this seemed to be more difficult.

Dr. Hans Beyer who as Chief Curator of the Insitut fur Denkmalpflege, Department of Halle, was then in charge of the reconstruction work demanded for the reconstruction of the famous glass facades also the reconstruction of the details. That meant using the same profiles in the window construction, the choice of material (light metal or iron) seeming to be of less importance, and the same proportions of glazing, the same "transparent" glass, the dazzling white of the plaster surfaces, etc. The problem arising from this is obvious: Since the workshop wing was planned not only for exhibition purposes but also for training the valid regulations should have been complied with by using thermo-panes. This, however would have implied:

- * enlargement of the dainty window frames,
- * change of the original size of the window panes and their "transparency,"
- * change of all proportions and distortion of the original architectural impression.

The decision was therefore made against the existing standards and in favour of the methods of conservation.

We know of changes and additions made to monuments from the recent history of architecture. If, as in the case of the splendid sanatorium Paimio in Finland (1929-33), this was done by the architect himself, Alver Aalto, it is the decision of the architect-author rather than that of the curator - or let's say at best the result of a discussion among the two.

As regards the Dessau Bauhaus the priority was clearly that of conservation. Thus it was not the point what Walter Gropius would have done in the same situation. The only idea was to restore his architectural achievement of 1926 to its full effect without any compromise, in this way also establishing the functional conditions as they used to be. Work was carried out in this way.

Of course there are certain problems for the use today due to this consistent approach. Single glazing for instance is in accordance with conditions of room temperature no longer suitable for all the present forms of use - e.g., full air-conditioning which would be necessary for exhibition rooms with extremely valuable art material is simply not feasible. Here only partial solutions can be helpful.

RECONSTRUCTION WORK ON THE INTERIOR

The objective of this work was to re establish the original sequence of rooms: vestibule - assembly hall - stage - refectory in the section between workshop wing and studio building. On the ground floor of the workshop wing an exhibition room was re-established, next to the vestibule. Restoration of the assembly hall and the refectory became possible when the school which had been using these rooms as a gymnasium and as class-room was moved into a new building. Of course - and this was made clear during the restoration work of 1975/76 the interior and the exterior of the Bauhaus form an integrated whole. This called for the removal of all later additions and changes, especially on the interior so that "the whole inner body can function again in the way it represents itself on the exterior; the mutual integration of the interior and exterior spaces has to be re-established"³ The original colour scheme was nearly restored, based upon documentation and findings and even more on the questioning of a former Bauhaus student living in Dessau (Fig. 5,6).

Lighting appliances no longer in existence were reconstructed. The same goes for the seating in the refectory which was constructed according to the original designs of Marcel Breuer (Fig. 7,8,). As regards the furnishing, besides maintaining and copying existing items some of it had and has to be newly designed.

THE PRESENT USE OF THE BAUHAUS

The Bauhaus building, damaged by bombs in the Second World War, was reopened in December 4, 1976 on completion of comprehensive repairs and restoration work.

Two years ago (1986) the 60th anniversary of the Dessau Bauhaus was celebrated. It had been founded on December 4, 1926 as a college of design. On January 1st 1987, following the celebrations, the Minister of Building and Construction Industry of the GDR opened the Bauhaus of Dessau as an interdisciplinary experimental research and post-graduate training centre for architects, town planners, designers and artists.

Since that time numerous seminars, workshop weeks and meetings with international participation have taken place at the Bauhaus. Students of

architecture, design and fine art from colleges in Berlin, Halle, Dresden and Weimar have attended a special course completing their training.

Apart from a permanent exhibition "Bauhaus 1919-1933" showing part of the scientific collection meanwhile comprising a total of 6,000 exhibits four to five special exhibitions are shown every year, including the above mentioned exhibition of the Bauhaus Archive Berlin (West).

New Bauhaus journals are again published in a series. The "Bauhaus people" of our time were given the chance of a new start of Bauhaus activities. They have accepted this challenge long ago under the new director Prof. Dr. R. Kuhn.

We architects in the field of conservation are happy about this new function, since it provides an almost ideal correspondence between the original and contemporary use. The Bauhaus today is used virtually in the same way as originally intended. This makes it easier to implement the conservation objectives in the service of the original. "The space offer of the Bauhaus is, in the best sense of the word, open for the new tasks and stimuli which are required to increase performance and promote design in town development and architecture as well as in the design of products and in the shaping of the environment of our country."⁶

In the past years conservation efforts focused on the step-by-step restoration of what was still left in the interior rooms. These projects have been completed with the exception of a few rooms in the wing of the Technische Lehranstalten. At present of the furnishings (fitted furniture) are being restored.

In co operation with the "Bauhaus people" we have dealt furthermore with

- * investigations to reveal missing findings concerning the original colour scheme in some interior spaces
- * the working out of colour concepts
- * the reconstruction of door mountings, light appliances and furniture.

The reconstruction of the director's office is among the next tasks already planned.

We curators have got the "Charter of Venice", the "Declaration of Rostock and Dresden" the "Charter for the Conservation of Historic Towns and Urban Areas" - we keep up a continuous exchange of experience on an international level.

Within the range of tasks facing the conservationist monuments from recent history of architecture have come to play a more and more important role. Are the same criteria valid for the methods of their conservation as those we have been applying - always related to the specific case - in projects of monuments conservation from past centuries? I would say - yes, they are. Handling the original in the proper way seems to be essential in this context. With utmost care we have to decide what the familiar demand for preserving historically grown states means to us and what we are allowed to add, responding to the requirements of contemporary design. These decisions call for a preliminary especially thorough and comprehensive analysis of all conditions, something that should actually always be done.

It is understandable that we wish to experience a classic item of modern architecture as unadulterated as possible, may be this is also due to the short space of time elapsed. Changes introduced in the meantime for whatever reasons, can considerably impair our artistic pleasure. Since, however, changes may be constituent parts of an historic evidence these decisions have to be made with particular care and thoroughness.

Taking into account its present adequate excellent use, which had been aimed at from the start, the decision in the case of the Dessau Bauhaus was made to preserve and to restore the monument as far as possible, allowing only for partial reconstruction, where this was justified by repairs of damage caused by the War. We are therefore today confronted with an architectural monument that has been restored according to the principles of conservation in such a way as to resemble Gropius' original building to the greatest possible extent. This makes it interesting and important to us. Thus we ourselves as well as future generations of architects, specialists in the construction industry and artists are and will be able to learn from the creative Bauhaus spirit and from the quality of its design.

Even today the words from Walter Gropius' inauguration speech continue to be put into practice:

"This building has been established above all for young people, for young people talented in visual art who are to give a face to our new world."⁷

We as conservation specialist have a special responsibility to the unique evidence testifying to the past and to the people who are in need both of the architectural heritage and of the attractively designed new buildings of our time in order to shape their life style in an undisturbed environment.

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Fig. 11 Studio house, 1988 (photo by Thi Fagemaier)

All photographs without indications are by K. Geipl, Institut für Denkmalpflege, Department of Halle.

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Fig. 1

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Opening of "Die Volkshochschule", photo by Wolfgang von der Linde, 1965, Y&P, 5-10



Fig. 2



Fig. 3

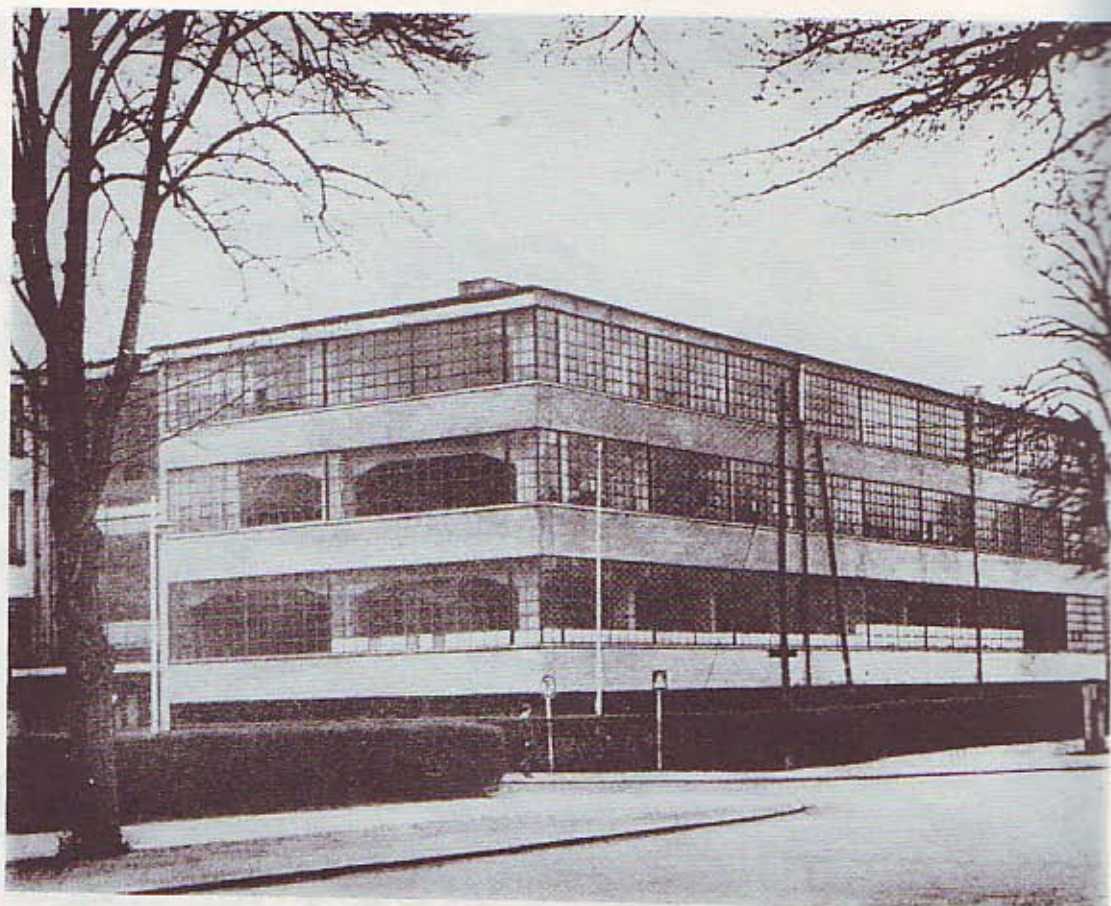


Fig. 4



Fig. 5



Fig. 6

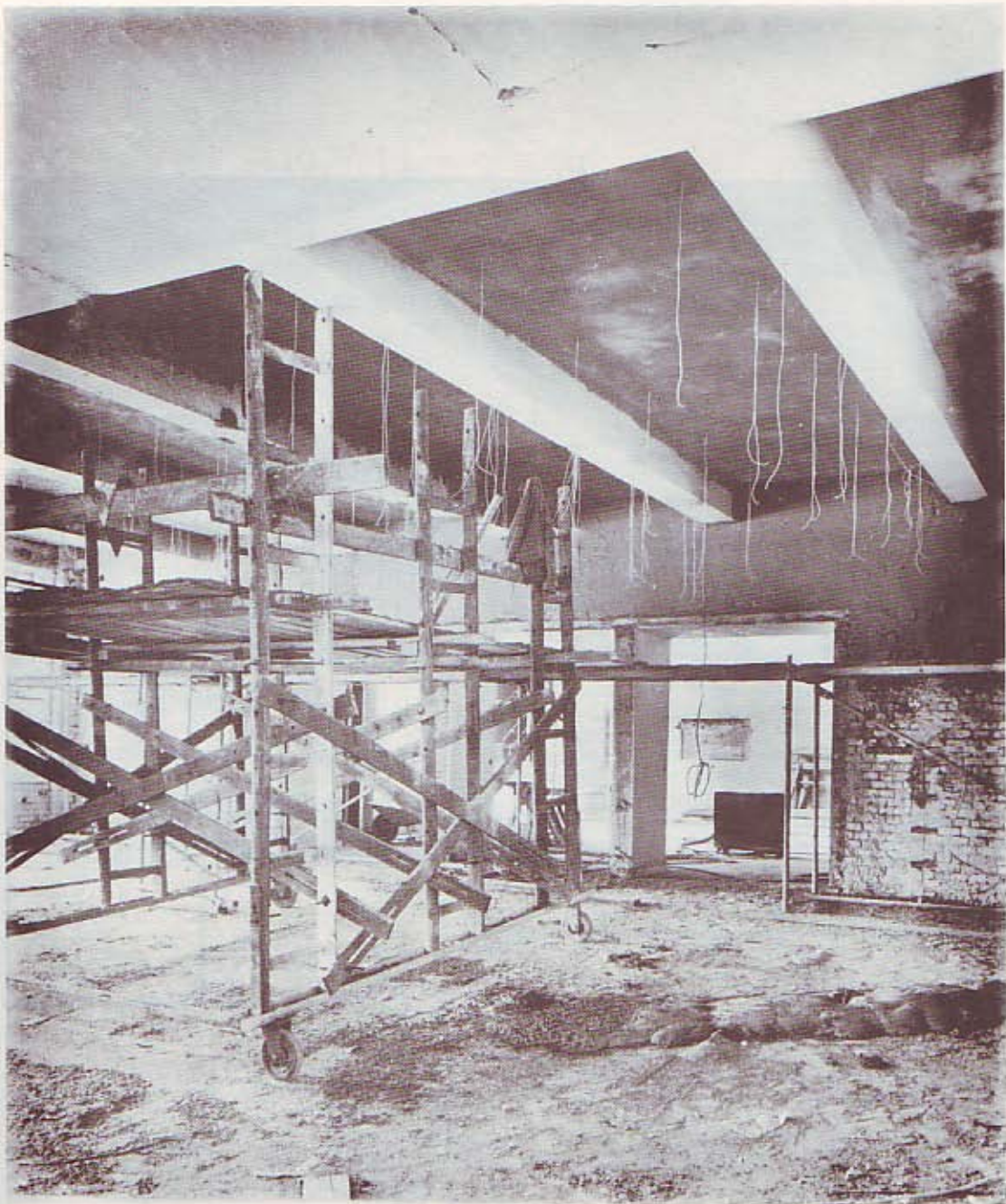


Fig. 7

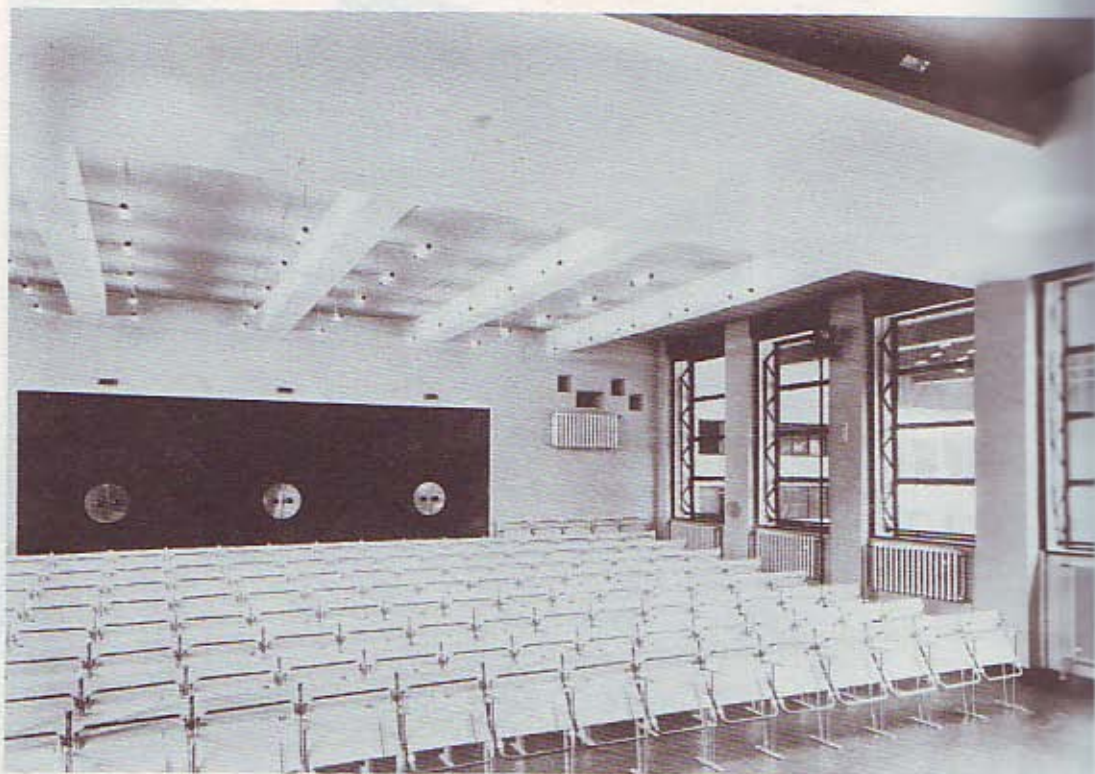


Fig. 8

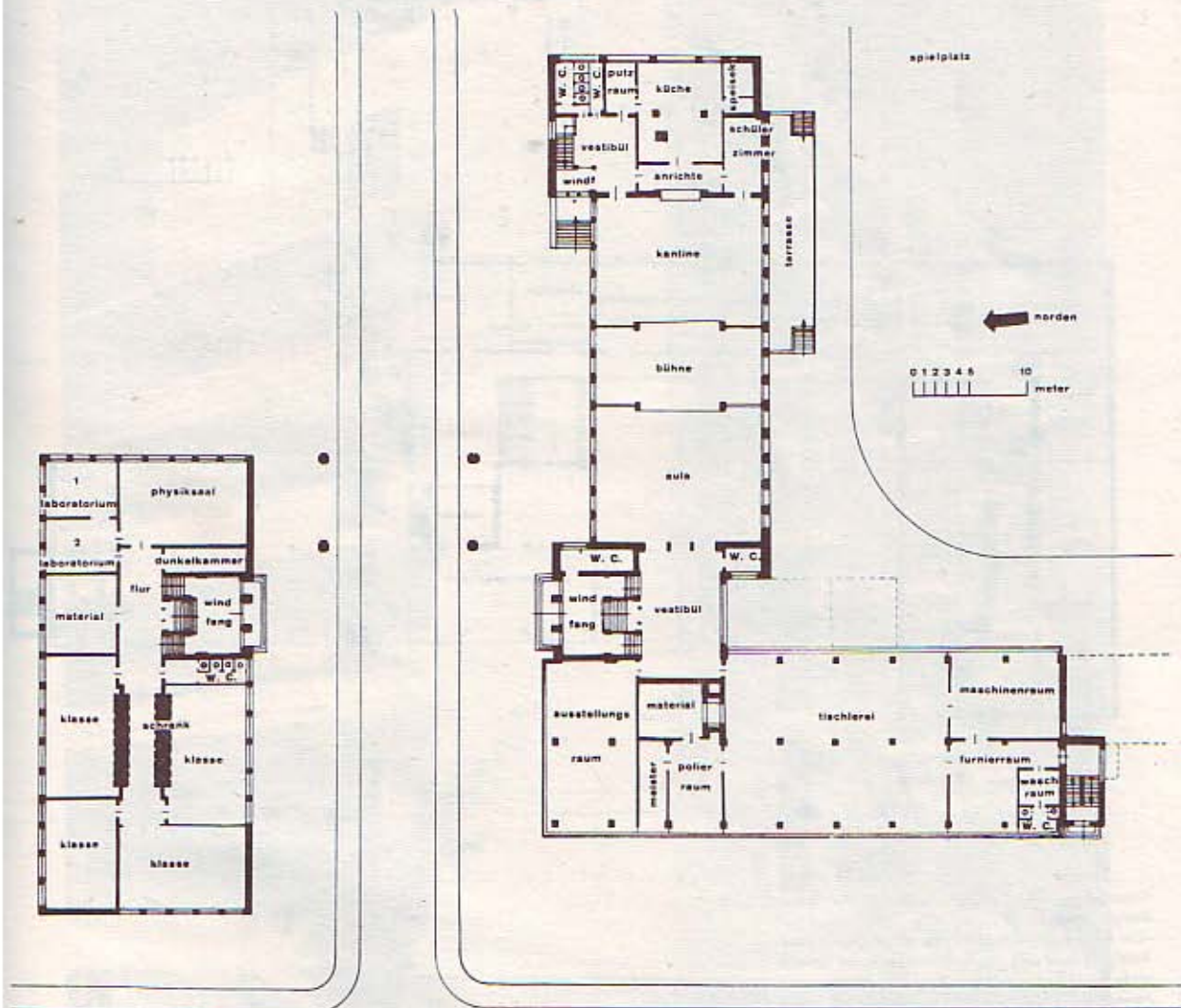
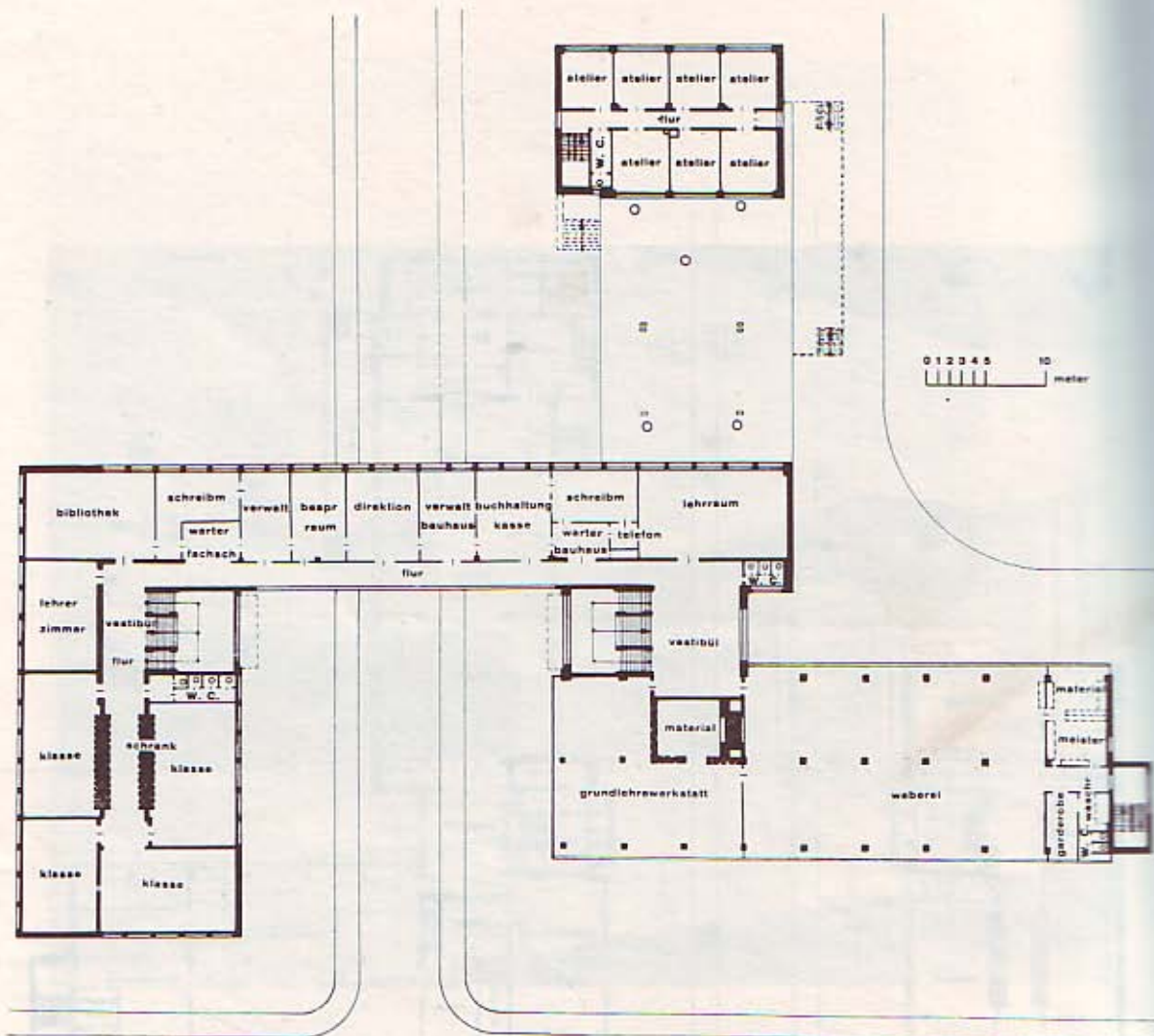


Fig. 9



Gropius: Bauhaus-Gebäude, Grundriß des ersten Obergeschosses.

•Ziel für die Organisation eines guten Grundrisses: Richtige Ausnutzung der Sonnenlage, kurze zeitsparende Verkehrswege, klare Trennung der einzelnen Abteilungen des Organismus, Variationsmöglichkeit der Raumfolgen für etwa notwendig werdende Organisationsveränderungen mit Hilfe sinnreicher Achsen- teilung. . . Entscheidend für die Beurteilung eines Bauwerks bleibt die Feststellung, ob der Architekt und Ingenieur mit einem geringsten Aufwand an Zeit und Material ein Instrument geschaffen hat, das funktioniert, d. h. das dem geforderten Lebenszweck vollendet dient, wobei diesem Lebenszweck sowohl seelische wie materielle Forderungen zugrunde liegen können. (Gropius, „Bauhausbauten Dessau“, Band 12 der „Bauhausbücher“.)



Fig. 11

MONUMENT PRESERVATION AS AN INTERNATIONAL OBLIGATION

**By
H.Stelzer**

It was in the mid 60s when a well-known painter in Halle, Karl Erich Muller- incidentally he has already visited Sri Lanka - learned about my work in the Institute of Monument Preservation. Teasing me in a friendly way, he said, "Oh yes, that's where the people are sitting at their desks dangling their watch chains from morning to evening. Of course, he was even then aware of the tasks and aims of preservators and of their readiness to work. Today many people in many countries have a fair knowledge about monument conservation, knowing what preservators do all day long and often well into the night. That is why one might feel a bit selfconscious when one is asked to speak about the work of monument conservation. One hesitates to mention well-known facts, but nevertheless we specialists in monument conservation continue doing this, first because we like speaking about our commitment and second because we keep on looking for allies wherever we happen to be who could help us fulfil our task. And this is of course especially true of countries rich in monuments.

Without a division of labour organised on a national level and sustained internationally by a continuous exchange of experience a lot of projects would not be feasible, International cooperation among the preservators in the countries of our globe has not existed for a long time yet. Its history only started in the second half of our century. The history of monument preservation itself can - with the exception of a few important individual activities in antiquity and the Middle Ages -also only be traced back for some 200 years. In recent times we have learned and still continue to learn how to conserve and to restore the structural witnesses of history, culture, art and technology and how they can be made available for their traditional or some new use by making adequate methodological dicisions and by applying qualified economic and practical measures.

The less than 200 year old history of monument preservation has seen extraordinary developments. Just think of the term "monument" as it is used today. It has a much wider scope internationally now than it used to have in the 19th century. Unlike in that century, monument preservation is also no longer restricted

to the European countries, in particular to the Mediterranean countries, to France, Germany and England. The registration, preservation, maintenance and exploration of the natural heritage has become a world-wide concern and an international task on all five continents.

Considering the cultural heritage of man with special reference to monuments and sites, the area of South and South East Asia covers a substantial stock of such items of cultural heritage. UNESCO under its programme of identifying specific monuments and sites of world heritage that require international assistance has already initiated action to conserve such monuments and sites in this region, and these include approximately 7 out of 32 international campaigns.

Today we consider monuments and sites to be authentic documents of the historic, artistic and scientific development of all nations. As material witnesses they constitute a particularly effective, irreplaceable part of the cultural heritage, which-in all countries-is of great influence for the further development of the given national culture. This in turn is a unique and indispensable factor in the further cultural development of the countries themselves and of the world as a whole. Besides, we are now fully aware of the role monuments play in the acquisition of historic knowledge and the development of an historical consciousness, patriotic feelings and love of one's native country. There is no doubt that monuments are also of importance for the aesthetic education, in conveying moral concepts and, not least, in educating people in the spirit of friendship among nations and respect for the cultural values of other peoples.

In shaping international cooperation in the field of culture-and in particular in that of monument conservation-organisations like UNESCO (the United Nations Educational, Scientific and Cultural Organisation) and also non-governmental organisations (NGO) such as ICOMOS (International Council on Monuments and Sites-established in Warsaw in 1965 with its seat in Paris) and ICCROM (International Centre for Conservation in Rome) have played an important role. This will also be so in the future. It was only with the establishment of UNESCO in November 1946, with the increasing number of its member countries and its growing international influence that international cooperation in field of culture and consequently also in the field of monument preservation took shape.

The International Council of Museums ICOM, established soon after the foundation of UNESCO, was the first institution to be concerned with the movable artistic property and with museums.

With the aid of UNESCO the International Centre for Conservation (today ICCROM) was founded in Rome in 1959, which above all runs international qualification courses in the field of monument conservation. As a logical consequence of the foundation of ICOM (1946) and ICCROM (1959) the International Council on Monuments and Sites (ICOMOS) was then established in 1965. ICOMOS is particularly engaged in shaping international cooperation in the field of monument conservation, taking responsibility as an international specialist organisation in a variety of ways in the registration, preservation, maintenance and exploration of the cultural heritage on our globe. This work is sustained by the 3,500 members working in more than 60 national Committees and in 15 International Specialized committees as well as in the administrative bodies (Bureau, Executive and Consultative Committees). As a non-governmental organisation ICOMOS is part of the UN system. It is officially acknowledged by the Economic and Social Council of the United Nations Organisation (UN).

Apart from the main objectives of ICOMOS, including to bring together conservation specialists from all over the world and serving as a platform for their dialogue and exchange of experience on specialised issues; to organise international training programmes for these specialists on a world-wide scale; to gather and assess information and to make it available to the international community (Documentation Centre, periodical ICOMOS Information...) one of the main tasks is its cooperation with UNESCO. In this context we can mention international conventions and recommendations on the protection, maintenance and utilisation of monuments, worked out, adopted and implemented over the last years.

Meanwhile quite a number of such important international working instruments of UNESCO and ICOMOS have come into existence, dealing with the natural and cultural heritage. ICOMOS was not yet involved in drawing up the first one, namely the Convention on the Protection of Cultural Property in the Event of Armed Conflict (The Hague, May 1954) Linked with the foundation of ICOMOS is the drawing up and adoption of the Venice Charter which has become the basic doctrine of ICOMOS for the preservation and restoration of monuments and sites.

Of great significance is the UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage of 1972. This was followed by the UNESCO recommendation Concerning the Preservation and Present Role of Historic Sites of 1976 (the so-called Nairobi Recommendation). In addition to the UNESCO documents mentioned, there are further international working documents drawn up by ICOMOS and adopted by the General Assembly of the world organisation, such as: the Charter of Cultural Tourism of 1976;

- the Florence Charter of 1982 dealing with the preservation, maintenance and protection of historical gardens and parks; and

- the charter on the Conservation of historic Towns and Urban Sites which was adopted only recently on the occasion of the VIIIth GA of ICOMOS in Washington in 1987.

Further recommendations of this kind are under way. They deal with issues like the protection of the archaeological heritage, rural settlements as well as with specialist and technical questions of training in the fields of restoration and conservation. The IXth ICOMOS General Assembly to be held in Lausanne this year in October is expected to adopt the Charter for the Protection and Management of the Archaeological heritage.

So far a brief survey of some important ICOMOS topics and tasks which determine present international work in the field of monument conservation in an essential way.

Finally, the most important task of ICOMOS should be explained: cooperation with UNESCO. UNESCO is the main partner of ICOMOS in implementing its objectives. This contribution only allows to deal with one very important key issue : work with the World Heritage Convention of 1975. Further tasks include e.g. the management of the Documentation Centre, the delegation of experts in the framework of missions, the technical support given to international heritage campaigns, cooperation in:

- the implementation of medium-term plans of UNESCO;

-the organisation of the World Decade of Cultural Development (1988-1997). as well as the holding of the International Monument Day and of International conferences and other events.

Of exceptional importance, however, is the afore mentioned main task of ICOMOS: to support the implementation of the World Heritage Convention of 1972. For this purpose ICOMOS cooperates very closely with the UNESCO World Heritage Committee, its Bureau and Secretariat. The point in question is to work on the List of the World Cultural and Natural Heritage of Mankind-the World Heritage List-and also to draw up the List of World Heritage in Danger.

One of the ICOMOS materials states : "As early as the 3rd century BC the Greeks had a list of important buildings which they considered to be accomplished works of art - they became known as the Seven Wonders of the World. Earthquakes, fires, theft, neglect, surrender and destruction during wars resulted in their almost complete annihilation. Only one of the wonders has been preserved: the Cheops pyramid in Egypt. One has to regret the loss of the other six wonders. In our century one cannot, however, accept the disappearance of important masterpieces-monuments and sites."

In order to give special protection to outstanding examples of human heritage and to preserve them for future generations the General Conference of UNESCO adopted the Convention Concerning the Protection of the World Natural and Cultural Heritage on November 16, 1972. One of the main aims of this convention is to draw up the World Heritage List and the List of World Heritage in Danger.

In what way then are outstanding properties of the cultural nad natural heritage included in this list? The implementation of the "Convention 72" is essentially a matter of the states which ratified it, i.e. of the member states of the convention. The convention therefore only came into force in 1975, after 20 countries-the minimum number-had ratified it. while in May 1987 there were only 95 states which had ratified the convention, this number had increased to 106 by the beginning of 1989.

Thereby these countries accept principles like: registration and protection

of the world heritage properties located on their territory are first of all a matter of the given states themselves. That state is obliged to do everything within its capability in order to protect and preserve this heritage, before requesting international support. Furthermore these countries agree to make the protection, management and exploration of their cultural heritage a constituent part of their cultural policy. From the point of view of UNESCO this also means including monuments into all planning considerations and into the development of social life.

The countries likewise promise not to permit any activities impairing or damaging their natural and cultural heritage directly or indirectly. They commit themselves to provide legal, scientific, technical, administrative and financial prerequisites for the protection and maintenance of monuments and sites. The implementation and observance of the paragraphs of Convention 72 is arranged for and controlled by an intergovernmental committee, the World Heritage Commission consisting of government representatives from 21 countries. It is elected at the General Assembly of UNESCO which is convened every two years.

Point I-definition of the cultural and natural heritage (Article 1 of the Convention, Part II, No. 7 of 28 June 1989)-states:

"monuments : architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science;

-groups of buildings: groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the point of view of history, art or science;

-sites: works of man or the combined works of nature and of man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological points of view."

In order to have an objective basis for applications to include the whole variety of unique witnesses of world culture in the World Heritage List, UNESCO and

ICOMOS have worked out criteria to be applied in this procedure. A monument, group of buildings or a site has to meet the following criteria: requirements regarding authenticity, design, materials, the workmanship applied;

A monument must be the result of a unique artistic achievement, a masterpiece of the creative genius;

It must be the starting point for a development with great influence as a model over a span of time or within a cultural area of the world on: developments in architecture, town planning, monumental art and landscaping; or it must bear a unique or at least exceptional testimony to a civilization which has disappeared or it must be an outstanding example of a type of building or architectural ensemble which illustrates a significant stage in history; or it must be an outstanding example of a traditional human settlement which is representative of a culture and which has become vulnerable under the impact of irreversible change; or is directly or tangibly associated with events, ideas or beliefs of outstanding universal interest.

These criteria are not static or rigid. In a way they accompany the world heritage, ensuring its protection.

There are similar criteria applicable to the natural heritage. They were drawn up by IUCN (International Union for the Conservation of Nature and Natural Resources) and are checked for their application by it.

On behalf of UNESCO, ICOMOS and IUCN process expertises on the nomination proposals of monuments and sites submitted by the countries for inclusion in the World Heritage List. These expertises have the character of recommendations. They are submitted to the Bureau of the World Heritage Committee in June/July of each year. The Bureau of the World Heritage Committee examines the recommendations and forwards the list of nominations together with its own recommendations to the World Heritage Committee. The Committee holds its sessions every year in December. Experience shows that apart from a large number of other obligations, it has to deal with 20 to 60 nominations for the World Heritage List, depending on the number of member states. In 1988 the meeting of the World Heritage Committee took place in the young capital of

Brazil, Brasilia, itself a property on the World Heritage List.

The World Heritage Committee decides on the inscription or non-inscription of properties in the World Heritage List, or else on their deference. In 1987, for example, 41 applications out of 61 were accepted, 4 rejected and 16 deferred. The accepted properties include e.g. Brasilia, the Great Wall in China, the Acropolis in Athens, the Danube bank with its castle in Budapest, Venice, Mexico City, Lubeck (FRG), the Cathedral in Pisa, the town of Bath in England and others.

Theoretically a member state should be able to enter a monument or a site on the World Heritage List within a period of a little more than one year from the time of application. The condition for this is to hand in a complete documentation for nomination observing the criteria for acception.

In February of each year the ICOMOS Bureau meets for a first examination of the new nominations-the detailed processing of the recommendation by experts has to be completed by the end of May at the latest, since, as was mentioned before, the Bureau of the World Heritage Committee has its session already in June.

Apart from these tasks ICOMOS has a number of further obligations within the "Convention 72". They serve as a support for the countries in drawing up their lists of recommendations (the tentative list) and their lists of nomination, in holding workshop weeks-as e.g. for the Asian countries in December 1987.

Furthermore ICOMOS takes on monitoring tasks and does research into special topics required by the state parties.

Cooperating with the World Heritage Committee of UNESCO, ICOMOS, IUCN and ICCROM make a considerable contribution towards cooperation among the peoples and states on the issue of the natural and cultural heritage, which we consider a constituent part of the heritage of mankind. Here we can see the outstanding importance of monument conservation as an international task. And we wish that this should imply an adequate understanding and perception in handling both big and small monuments in their given environment.

Over 200 years of monument conservation and 25 years of its internationally organised management have not been able completely to exclude any endangerment of monument substance. Wars, earthquakes and other natural catastrophies have often resulted in destruction of monuments. But ignorance and incompetence too can inflict damage upon the cultural heritage. Neglect, often brought about by wrong handling of the original-e.g. by overdoing restoration or by insufficient and unreasonable maintenance of ideal and material monumental values - may result in a destruction of original substance, the unique testimony to history.

Thus the future qualitative improvement of national and international cooperation continues to be an objective of high responsibility and a rich and important field of activity.

Since December 1989 the World Heritage List described above has included a total 323 monuments and sites of the cultural and natural heritage of the world, located in almost 70 different countries.

1. THE PRE HISTORIC MEGALITHIC TEMPLES OF THE MALTESE ISLANDS: AN ARCHITECTURAL INTERPRETATION OF STRUCTURES, BUILDING TECHNIQUES, MATERIALS.

By

Gennaro Tampone,

Joann Cassar,

and

Sergio Vannucci

PREFACE

Within the two main islands of the Maltese archipelago, Malta and GOZO, which have a total surface area of approximately 300 sq. Km., are to be found a large number of extraordinary structures (23 known to date) built during the period 5000 to 2500 BC., which period of pre history within the Mediterranean region falls between the Neolithic and the Bronze Ages. These buildings undoubtedly had both a social and a symbolic function; their original association with worship, which is indubitable, is contended by some scholars; the widespread hypothesis of a monotheistic fertility goddess is definitely limited. The considerable importance of these temples lies in the fact that with their construction, apparently for the first time, were planned and constructed true architectural units, which had form, real distributive attributes and above all a load-bearing structure planned as a whole, made up of parts related to each other, each contributing towards the general stability.

The form, structure and mode of construction found here knows no predecessor, and no similar contemporaneous constructions are known : it is a definite, but at the same time very significant, phenomenon.

All being built within a period of little more than 2,500 years, even the very first constructions manifest characteristics which are not only specific but also, amazingly, consistent within certain limits.

One of the greatest problems has been posed by the dating of these temples, which has given rise to both dubious and controversial answers; however, scholars currently appear to have reached universal agreement, though not without some

dissent on the part of a few. Initially, more recent dates were attributed to these constructions, on the basis of typological and constructional comparisons with other structures from the Mediterranean and from Mesopotamia, and with the Nuraghi of Sardinia, the Sesi of Pantelleria, the Navetas and the Talayots of the Balearic Islands. Absolute dates, based on the analysis of organic remains from archaeological excavations, calibrated and later recalibrated by means of dendrochronology, pollen analysis, C14, etc., have greatly moved back the dates during which the temples were in use, when compared to the previously accepted dates, definitively disrupting the "orientalistic" theories which had placed their origin in Mesopotamia.

Five of these constructions are still architecturally meaningful, despite the changes and disturbances they have undergone. These temples are those of Ggantija (GOZO) , the most important and one of the oldest and better preserved complexes; the neighbouring complexes of Mnajdra and the larger agglomeration of Hagar Qim; Tarxien, a unitary complex of vast proportions, and Ta' Hagarat which stands out due to its great antiquity. Only Tarxien (1913) and Ta' Hagarat were ever "cleared".

Ggantija, Hagar Qim and Mnajdra (in part) were studied by A. Mayr (1901). Tarxien and Ta' Hagarat were discovered and excavated by T. Zammit (1929) who also carried important "restoration" works. Hagar Qim and Tarxien were also studied by the architect/restorer C. Ceschi (1939) who alone, and with the utmost competence, studied the temples from an architectural point of view, utilising information he had gathered personally.

The organisation of archaeological data was the work of J. D. Evans, which resulted in his monumental work on the prehistoric antiquities of Malta, while it was C. Renfrew who established absolute dates based on radiocarbon dating.

CONSTRUCTION CHARACTERISTICS

In the older temples (Ggantija and Ta' Hagarat), the walls are built in a cyclopic fashion, whereas the more recent examples (Hagar Qim, Tarxien and Mnajdra) are built of well-dressed blocks of stone arranged in courses. The walls are generally

curved, which contributes towards the general stability. Nothing is known of the roofing, and to date there have been only hypotheses, amongst which are those of the architect, C.Ceschi who suggested their being roofed over with stone slabs, which hypothesis is the most noteworthy and the best documented.

Within this remarkable context, the temples of Ggantija and Hagar Qim undoubtedly occupy a prominent position: the first because of its great antiquity and the prominence of its remains which permit the effortless comprehension of the ancient form in its entirety; the second for its well-preserved condition which allows the recognition of the mode of evolution of this ancient method of construction, and which also documents within the same architectural complex, the additions and transformations carried out from the Ggantija phase through to the so-called Tarxien phase.

AIMS OF THE RESEARCH

The original construction of the walls, the structural technique and the question of the roofing of these temple complexes have so far not been adequately studied. Consequently, the aims of the current research include the study of the arrangement, plans, structural systems in relation to the phases of construction, distribution of forces, use of materials, quarrying techniques, and the transport and dressing of the materials.

The tremendous interest that these buildings elicit calls for a detailed study of those aspects which are more architectural in character, which provide an essential basis for the establishment and achievement of effective criteria for the choice of restoration methods suitable for the techniques, materials and structures present. The structural system is being studied not only directly, but also by evaluating the physical processes of deterioration and the structural failures, as well as by an assessment of the restoration works carried out in the past.

From the five better preserved temples, the more important sites of Ggantija and Hagar Qim have been studied in greater detail.

Accurate surveys and systematic studies have involved the North-East section

of the West temple, i.e. the oldest part, of the Hagar Qim temple complex, and the North-West part of the Southern temple of Ggantija. These studies have been concerned with the evaluation of the system of erection of the walls, the changes they have undergone, the phases of construction, the efficacy of the building system and the structural technique and the processes of deterioration.

RESEARCH IMPLEMENTS

To achieve these aims, besides the utilisation of measured drawings, stone samples were also taken, both from the surface and by core-drilling, from the different materials present, representing their various states of conservation, the different deterioration processes in action, and the effects of exposure. These are being analysed mineralogically and petrographically (in thin section), whilst the principal physical parameters associated with water absorption, both superficially and by total immersion, are also being determined, and quarry samples are being used to evaluate different conservation treatments (consolidation and surface protection) utilising different modes of impregnation and/or application together with relative tests.

MATERIALS

The geology of the Maltese archipelago is very simple, the three islands (Malta, Gozo, Comino) consisting of the following layers of sedimentary rocks, from bottom to top:

- Lower Coralline Limestone
- Globigerina Limestone
- Blue Clay (clastic formation with a prevalence of marly clay) -Greensand -Upper Coralline Limestone

The age of the whole series lies between the upper Oligocene and the upper Miocene.

The material used in construction and for decorative purposes in Maltese architecture, even to the present day, is the Globigerina Limestone. This is a typical

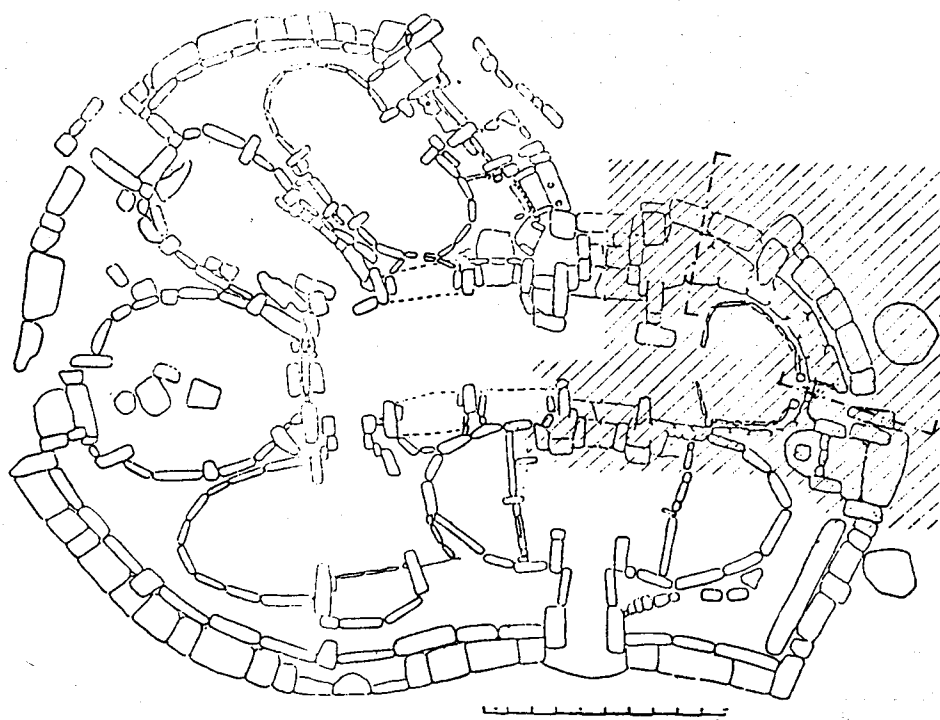


Fig. 5

Fig. 1. Complesso templare di Hagar Qa. Rappresentazione in sezione orizzontale del campione di studio nel terrapiù orientale del complesso riferita alla pianta (in chiaro, Evans, 1971) generale.

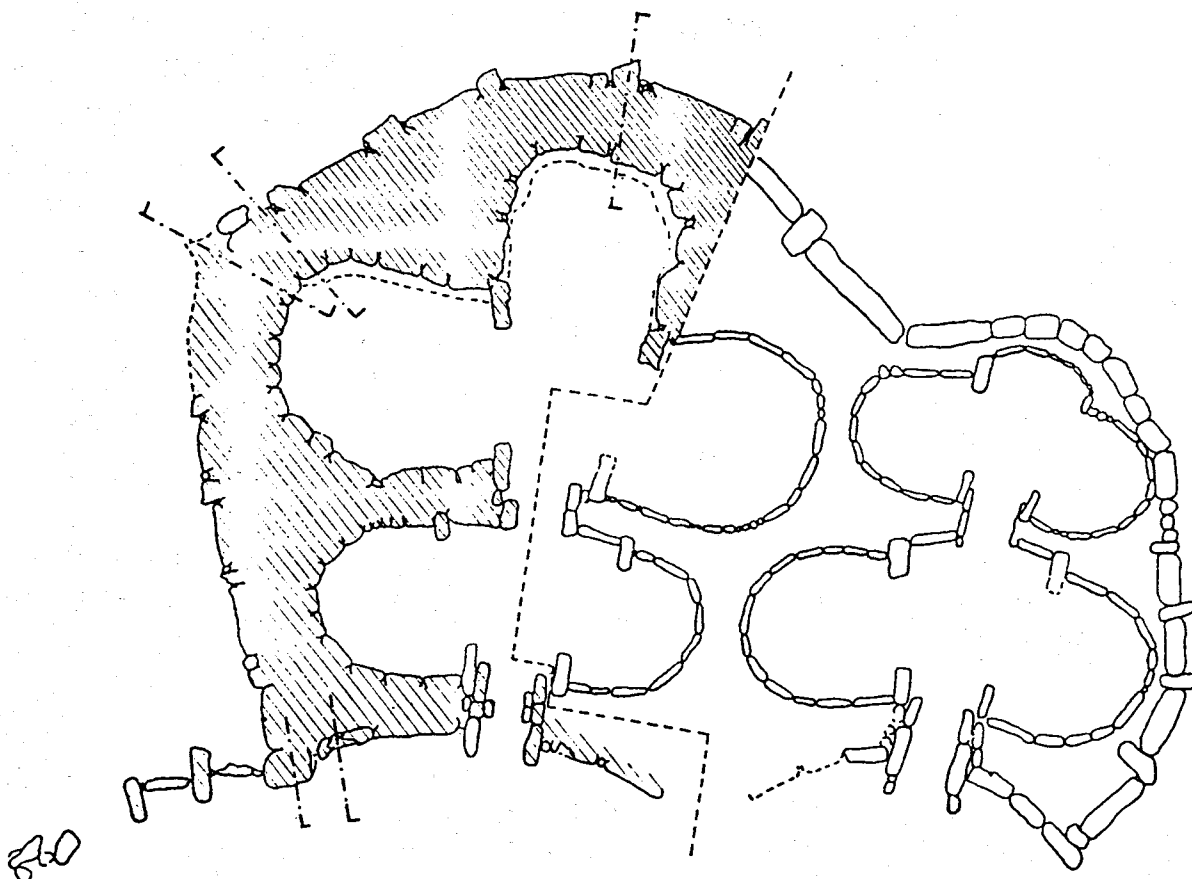


Fig. 6

"soft limestone" and it is interesting to note that it is virtually identical to the "pietra di Lecce" and to that from other quarries found in the Mediterranean basin.

The criteria which guided the builders in their choice of materials were the local availability and the ease of dressing of the limestone blocks to be found at the surface. It can also be assumed that the choice of the location of the buildings was strictly limited to those areas where the geomorphological and stratigraphic conditions allowed the extraction of large blocks.

The only building material employed in the Hagar Qim complex is the Globigerina Limestone, utilised not only for the construction of the walls (as slabs, blocks and uprights of considerable size), but also as the finishing material, seen in vertical panels in the internal apses and the thresholds of the entrances.

In the Ggantija temple complex, the Coralline Limestone is the material generally used for the uprights, slabs, blocks built in to courses on the facade and in the "cyclopic" walls of the internal rooms; the Globigerina Limestone is used as the finishing material, due to its greater ease of dressing.

Within the Coralline Limestone are to be found various lithofacies, the commonest of which is a very compact limestone which often shows intense karsism. This diffuse karsism can be interpreted in various ways, the most convincing explanation being that which associates this phenomenon, typical of limestone country, with exposure, winds and marine aerosol, which greatly accentuate the effects of deterioration. The lithotypes have a high percentage porosity, often reaching values of approximately 40% of the surface, and hence resulting in mediocre mechanical characteristics.

ARCHITECTURAL CHARACTERISTICS

Plan

The external planimetric arrangement adopted in the temples of Ggantija and Ta' Hagra, and later repeated almost without any substantial alteration throughout the entire temple-building period, is that of the ogive, becoming narrower towards the

base (i.e., the facade). The latter is never straight, but rather consists of the arch of a curve of large radius. The two temple complexes of Ggantija thus consist of two simple, identical forms, representing interpenetrating ogives, which correspond to two different phases of construction, of which the second, more irregular in shape, belongs to the so-called North temple. This penetrates the northern side of the Southern temple, which was built first. The overlapping of the two structures is apparent on the outside wall at the back, where the convex ogive shape becomes concave, and on the facade, which is double, there being one for each building.

Throughout the whole perimeter, except for the facade, a base order can be recognised, consisting of alternating radial and tangential blocks. The radial blocks are not present in the concave walls, but exclusively in the convex ones; this general rule is followed in all the architecture of the Maltese temple period. The tangential blocks are generally not rectangular, but almost always consist of a large central element which is elongated vertically, and which connects with the radial blocks not only at its vertical sides, but also by means of other carefully dressed smaller blocks.

The part of the building lying above this simple organisation, which lends stability to the building, consists of sizeable well-shaped blocks roughly laid as courses (externally), whilst occasionally giving the walls a "cyclopic" appearance (internally).

The external form is thus determined by the alternation of projecting uprights and of receding panels which, lacking lintels, (and hence one is here not dealing with trilithic arrangements) carry the overlying courses and give a regular appearance to the whole building. The external wall is therefore, that which, more than any other, not only at Ggantija but for all the temple period, is the most genuine, except for some gaps in the north temple, a few recognisable restorations and some visible but correct reintegrations (the latter found especially in the southern wall of the southern temple).

The shape of the facade is concave, being elongated at either end (a configuration which is found in almost all the constructions of the temple period), and delimits, at least at Ggantija, a large forecourt which ends towards the east at a wall (dated to the same Ggantija period) that supports the crag. This would have served the purpose of delimiting a form of sacred area which had an external zone

linked to the internal, somewhat limited spaces, which probably had restricted access. It is to be noted that the curved surface has, once again, significant advantages as regards stability.

The internal areas are delimited by rational sub divisions (walls and passages), which serve a structural role as well as dividing the internal space into smaller areas which could be more easily roofed over, whatever the means. The intermediate passageways played an important part by acting as focal points or shoulders, resulting in the concentration and subsequent support of the walls, and thus acting as a central element within the entire structure . This important function explains the accuracy with which they were built, each carefully constructed with separate hollows to receive the different blocks, and consisting of multiple assemblages of two or three layers superimposed horizontally and vertically. Here the trilithon system of construction is employed, which is similar to the dolmen, but which is elaborated to include variations both in appearance and also in strength.

Consistent with the external form, the internal spaces are also delimited by curved walls, both in plan and also in elevation, forming apses.

A bare longitudinal axis forms a passageway which penetrates the interior, and which terminates in a large, deep apse in the southern temple; in the north temple this appears as a small niche. Symmetrical to this axis, two on each side, are located other apses.

The Hagar Qim complex displays all the characteristic elements of the preceding temple : an ogive planimetric form, an elementary order composed of radial blocks and tangential slabs placed alternately, a concave facade acting as a sacred boundary and also as a technical necessity to allow greater stability, internal spaces defined by rational subdivisions (walls and passages) which also have a structural role.

The differences concern the complex internal planimetric arrangement; in this temple one can no longer recognise datable buildings with certainty, but rather an evolution from an older nucleus, that on the east to the right, which was enlarged by the creation of other telescopic passageways and internal rooms, that give the

building a very different plan. The temple also has more than one entrance, these also being based on the double and triple trilithon.

As regards the construction of the walls, the "cyclopic" aspect is here no longer to be found, except in the outer apses of the eastern temple; the walls of the internal rooms are built of well-dressed blocks laid in courses, which progressively project outwards, giving the appearance of a false vault, which leads one to imagine these spaces being roofed over with large stone blocks placed lengthways or horizontally.

The thickness of the walls is less than those of the preceding temple complex, as are also smaller the areas of the internal rooms; in this way the free spaces are reduced and here it is more reasonable to assume the presence of a complete stone covering of this temple complex.

SYSTEM OF CONSTRUCTION

The transport of the blocks was, at least in some instances, brought about by the use of sphere-shaped stone rollers, as can clearly be seen from the large numbers of rollers found near the buildings. On the other hand, nothing is known about the raising of the blocks and their being placed in position.

The walls rest on solid rock, purposely flattened and shaped, or else on horizontally placed blocks, or otherwise on carefully positioned layers of stone of modest dimensions. The stability of the blocks or the uprights is ensured by the presence of notches carved in the underlying blocks or even in the lateral ones, and by means of secondary restraining blocks.

The external radial blocks, which are of remarkable size, penetrate within the walls. After taking into consideration the averaging out due to the differences in the heights of the blocks and slabs, and the absence of lintels, the upper part of this walling system, which is supported by the underlying basic arrangement, can be considered to consist of blocks which now appear quite irregular in shape and which are approximately arranged in courses, gradually inclining towards the interior of the enclosed space.

The internal walls all consist of relatively small blocks which are built as drystone walling, and which are stabilised by the insertion of small stones acting as wedges. Here one cannot recognise, except randomly or in isolated areas, a regular arrangement as courses.

In the internal apses, the walls also generally slope inwards and thus form a partial exedra. This has been referred to as a "false vault" recalling other forms of construction such as the "trulli" of the Puglia region in Italy.

As regards the Ggantija complex, note must be made of the absence of a precise arrangement in rows, which is typical of the "tholos" constructions, in which the curvature and the shape of the vault are obtained by means of the progressive protrusion of the curved courses.

In the exterior of the temple of Hagar Qim, there are no substantial differences from the Ggantija complex, and it in fact demonstrates all the characteristics referred to so far. The main difference consists in the use of large stone blocks, which are accurately cut, and which are arranged as courses projecting towards the interior; the upper courses, as already stated, gradually overhang the lower ones, give the impression of a "false vault".

Site inspections have determined that, contrary to previous assertions, the walls of Ggantija are, for their entire height, made up of very large stones, interspersed with large spaces, together with stone slabs of remarkable size (some more than 2m. long at their longest edge) placed horizontally and acting as beams connecting the internal and external walls. The internal blocks and the above-mentioned slabs are in an advanced state of deterioration due to adverse environmental conditions and in particular to the action of rain water. As it is hardly possible that the upper parts of the walls, consisting of large stone blocks, and hence of considerable weight, rest on a mere facing, and on an infill of soil, or soil and pebbles, it can be concluded that the walls, for their entire height, are made up of large boulders and slabs, perhaps also with the addition of smaller stones.

The dressing of the stone blocks, both those made of Coralline Limestone and those of Globigerina Limestone, was generally quite precise, as can be seen in some

of the surviving blocks both at Ggantija and also at Hagar Qim.

The arrangement of the blocks is now described in further detail. As already mentioned, the basal horizontal blocks, especially those in the internal passageways, contain grooves which are wide enough to allow the insertion of smaller stone elements which would guarantee the stabilisation of the vertical elements.

There are often also on the lateral walls cavities capable of receiving other dressed blocks, thus creating a system of precise multiple connections. In the intermediate passages, the upright slabs, which, resting on their individual bases, are held in place by T-shaped threshold blocks, also carry horizontal slabs, which lie upon appropriate mouldings (clearly visible at Tarxien). Thus a box-like structure of great stability is created. However, the trilithons are practically never simple, but on the contrary are generally double or triple, with multiple arrangements, and project telescopically from the exterior to the interior. The vertical blocks, even though showing some signs of being shaped, strangely enough do not generally fit one another perfectly and thus each single simple element works independently of the others.

As regards the sequence of construction, it can be postulated that some elements, such as the radial blocks, the vertical uprights of the passageways and the elements at the corners of the facade, were erected first, following a sketch drawn on the ground, and these then aided the construction of the general alignment and also of the foci on which the walls rest. After their being erected, this was followed by the blocking of the foot, or rather the base, of these elements, and this was followed by the building of the walls using boulders of considerable size on which the horizontal connecting slabs rested.

There is absolutely no documentary evidence of the means used to raise the blocks and to position the slabs used as roofing.

STRUCTURAL ORGANISATION

The insight involved in preparing bases for the vertical blocks, each having suitable contact surfaces, showed the evident intention of assuring the stability of the same

blocks besides also a symmetrical distribution of forces. In the parts which are explicitly and structurally more elaborate, as in the internal passages for example, the system is completed with the adoption of bases significantly wider than the surfaces in contact with the vertical elements, so as to allow the insertion of somewhat smaller blocks to buttress and block any possible outward rotation of the higher elements (typical and clear examples can be found at Hagar Qim and at Tarxien).

As regards the stability of the basic arrangement, the radial blocks function as connections between the tangential blocks, which otherwise would be linked only along their edges (as actually happens only in the more evolved phases of the temple architecture) and also, for more precise structural reasons, to build up multiple systems each of which, composed of three vertical elements, is stabilised by the neighbouring ones.

The eminently structural function of the radial blocks is moreover shown by their absence in the concave walls where they are not needed as the stability here relies on mutually opposing forces; concave walls here refer not only to the facades, but also to the internal walls and also, for Ggantija, to the external wall which unites the two temples.

HYPOTHESIS FOR THE ROOFING

In outlining the problems concerning the roofing of the temples, some basic details must be remembered : the inclination towards the interior of the external and internal walls, the both formal and structural analogies with the model found at Ta'Hagrat (on the basis of the analogies with the temple of Ggantija and that of Ta'Hagrat, it can be assumed to be a construction of the same phase), and the universal employment of the trilithon system.

Various hypotheses have been considered, the main ones being:

- there was no roofing,
- the roofing was made of wooden elements and other foliage,
- the roofing was made of stone slabs.

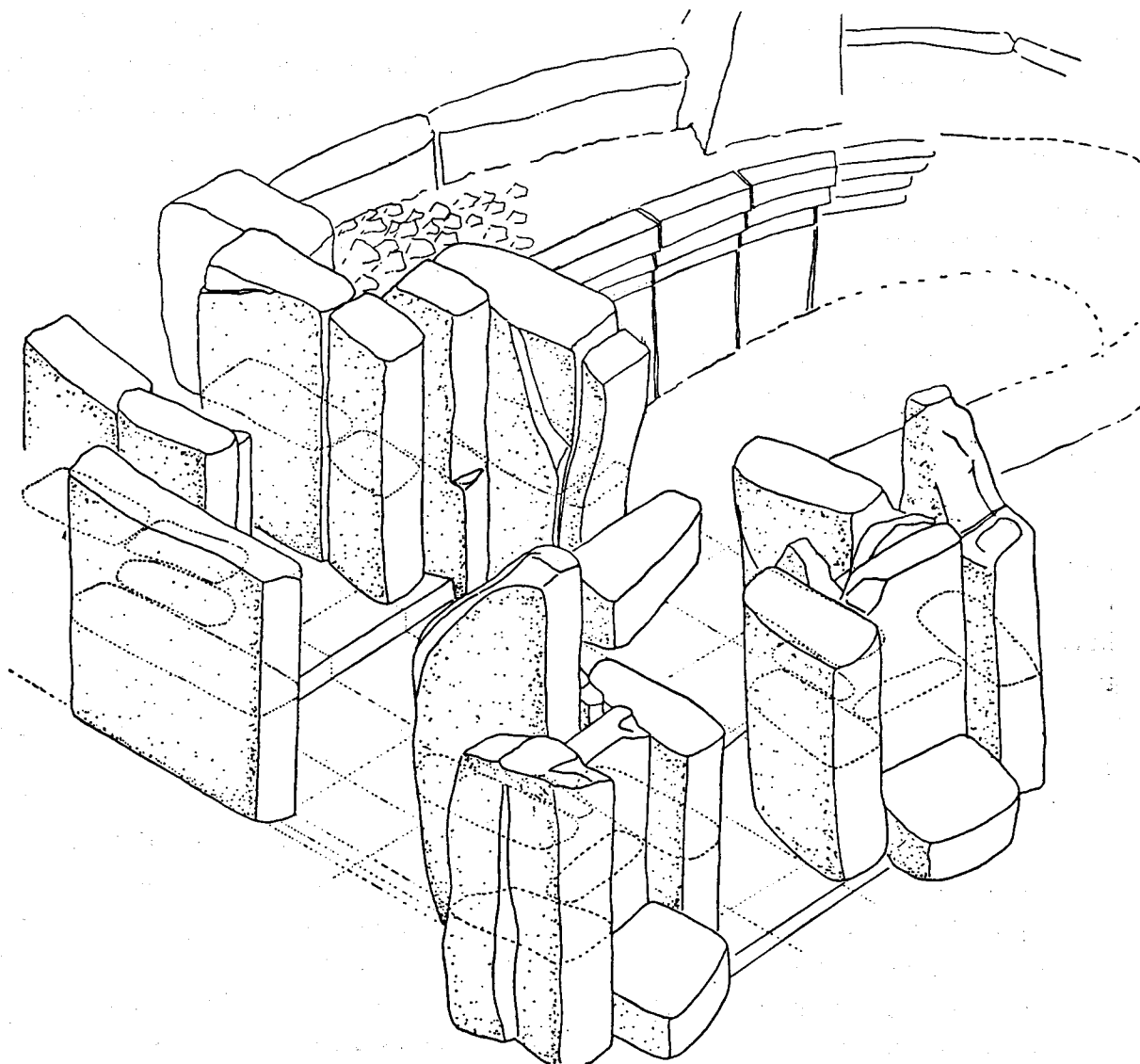


Fig. 7

Ceschi (1938), and also implicitly Evans, interpreted the inclination of the external walls towards the interior as a sure indication of the presence of a "false vault", achieved by means of the progressive projection of boulders up to a certain height, with the aim of decreasing the unconfined space and thus allowing the use of roofing slabs of not very great length, which would therefore be safer.

In the absence of more direct evidence, this is the most plausible version, even from the iconographic point of view (consistency with the other parts of the walls as well as the analogy with the Ta' Hagraat model). The hypothesis of the roof being made of stone slabs, besides being documented philologically, is also plausible from a purely technical and constructional point of view. The following considerations demonstrate this: compare the supposed slabs to rectangular beams 5m. long, 60 cm. wide and 80 cm. high, with a specific gravity of about 2400 kg/m^3 ,

the flexural stress, maximum at the center, is: $= 5.62 \text{ kg/cm}^2$;

the shear stress, maximum in the end section, is: $T = 0.9 \text{ kg/cm}^2$;

the weight is: 5760kg;

the unit load on the walls is; 1 kg/cm^2

The values thus determined are insignificant with respect to those normally accepted as safe for materials of this kind, and even if the uncertain resistance of the stone to traction is taken into consideration, the choice of size must certainly have been influenced by practical considerations, such as the necessity of keeping the weight of each slab which had to be transported, raised and positioned at a height of 6-7m. as low as possible. The specification which could be reduced to achieve this aim without reducing the strength was in fact the width of the supporting element, i.e. the base of the beams.

The total loss of these slabs can be explained by the deterioration of the mechanical characteristics of the material following even slow static and dynamic structural changes, occurring over a long period of time.

The use of slabs for the roofs, placed flat or on edge, is furthermore documented very frequently in all the temple architecture, the evidence being mainly that of the trilithon system. Principally from a constructional and structural

point of view, this combined sort of roofing, i.e., walls progressively inclining towards the interior unquestionably connected with the presence of stone slabs, is the most appropriate system to be attributed to builders who constantly associated their walling with the trilithon.

An additional fundamental analogy, both formal and structural, can be found in the projection towards the interior of the uprights forming several of the passageways (at Ggantija as also at Hagar Qim) which arrangement makes the whole more stable when completed by the addition of the overlying slabs.

CAPTIONS

Fig. 1 Aerial view of the Tarxien complex.

Fig. 2 Aerial view of the Ggantija complex

Fig. 3 Aerial view of the Hagar Qim complex

Fig. 4 aerial view of the Mnajdra complex

Fig. 5 Hagar Qim temple complex. Horizontal section of the sample area studied, within the Eastern temple of the complex, referred to the plan (lighter areas, Evans, 1972).

Fig. 6 Ggantija temple complex. Horizontal section of the south, west and north parts of the Southern temple of the complex, referred to the plan (lighter areas, Evans, 1972).

Fig. 7 Axonometric projection of the second and third doorway of Hagar Qim. The use of the triple trilithon doorway is to be found in all the Maltese temple complexes.

Fig. 8 Hagar Qim Temple Interior.

Fig. 9 Hagar Qim Temple Interior.

The Hagar Qim complex from the outside; to the left the facade.

Fig. 10 Axonometric projection of the second and third doorway of the Hagar Qim complex, including a hypothesis of the original situation and the roofing.

Fig. 11 Ggantija Temple, Facade of the earlier, building Kinematic movements of the blocks.

Fig. 12 Interior of the Hagar Qim temple after a rainfall

Fig. 13 Beraking of a block at Hagar Qim temple caused by mechanical stresses originated by unaccurate anastylosis.

Fig. 14 Further damage of a broken Block in the Hagar Qim temple caused by insertion of metallic bar

2. THE PREHISTORIC MEGALITHIC TEMPLES OF THE MALTESE ISLANDS: THE DETERIORATION AND CRITERIA FOR CONSERVATION

BY

Gennaro Tampone,

Joann Cassar,

and

Sergio Vannucci

DETERIORATION

STRUCTURAL DETERIORATION

The temple complexes of Ggantija and Hagar Qim both show general structural failure, wherein both ancient and more modern stages can be recognised, some of which are still active. The consequences of this structural failure include the loss of the roofing, even in the internal passages; the loss of the upper parts of the walls; the reduction in size of the majority of the uprights in the internal passages or their fracture; the inward rotation of some of the vertical slabs; splitting of the horizontal slabs in the upper parts of the walls; the gradual collapse of the vertical elements of the facing; the "scaling" and the consequent loss of material from the internal slabs; the collapse of a few essential sections (such as the two almost symmetrical extremities of the facades of both buildings, North and South, of the Ggantija complex). At a later stage, in the case of Ggantija, this failure can also explain the collapse of the central portion of the facade common to both temples and the still active structural damage occurring on the left side of the facade of the Southern temple, and also on the initial section of the south-west wall, starting from the point of contact with the facade. The causes seem to be the progressive crushing of the boulders, together with the fracture, crumbling and disintegration of the material, resulting in a pronounced rotation towards the exterior.

The Hagar Qim temple complex shows the presence of ancient and extensive structural failure which appears to have had more serious consequences than that at Ggantija (loss of the roofing and the upper parts of the walls, collapse of several of the walls); besides, there is also active fissuring taking place (splitting of the

blocks laid in courses and of the internal slabs, besides crushing and ensuing loss of material) due mainly to a defect in the reconstruction of some of the courses, occurring for the most part in the south-eastern section, which appears to have been restored some time before 1939.

DETERIORATION OF MATERIALS.

The extent of the deterioration varies notably according to exposure, and is always greatest in south-facing surfaces.

The colossal construction of Ggantija is literally "flaking away": the Coralline Limestone blocks, considered to be very durable, are in reality progressively losing sizeable fragments which results in the loss of all detail and which has already made some of the essential features unrecognisable. This is also valid for the areas built in Globigerina Limestone as also for all the other temples. This aspect of the deterioration has been studied in detail from the geometrico-dimensional point of view in some parts of Hagar Qim.

FORMER RESTORATION WORKS AND THEIR EFFECTS.

Broken blocks, or ones on the point of breaking, were often repaired with metal dowels, generally cemented in place; at Tarxien, dowels with copper wire wound around were also used, whilst at Hagar Qim simple rods were employed to mend small stone blocks in the North-West section and also to repair and reinforce (1949) the lintel of the main entrance. The use of these dowels both at Tarxien and on the smaller blocks at Hagar Qim have had disastrous consequences: it has been observed that besides their being totally ineffective, these dowels have also brought about the formation of characteristic cracks which radiate outwards from them, causing the cement sheath to break, besides the formation of metallic corrosion products which increase in volume, causing the detachment of fragments of the blocks.

Structural failure can be blamed not only on the composition and the physico-mechanical characteristics of the Globigerina Limestone (porosity between 32 - 40%, imbibition capacity between 30 - 37% by volume), but also on

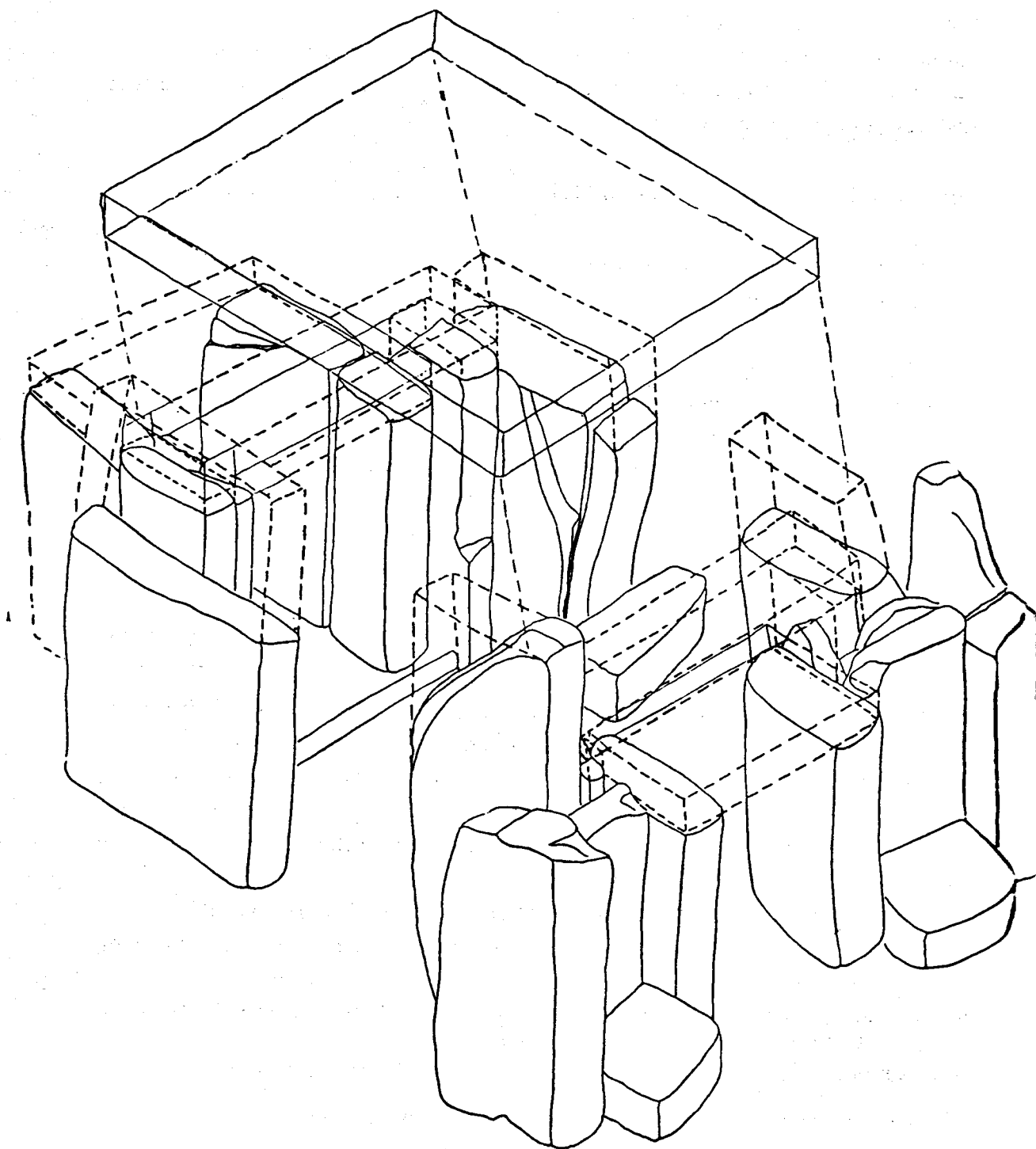


Fig. 10

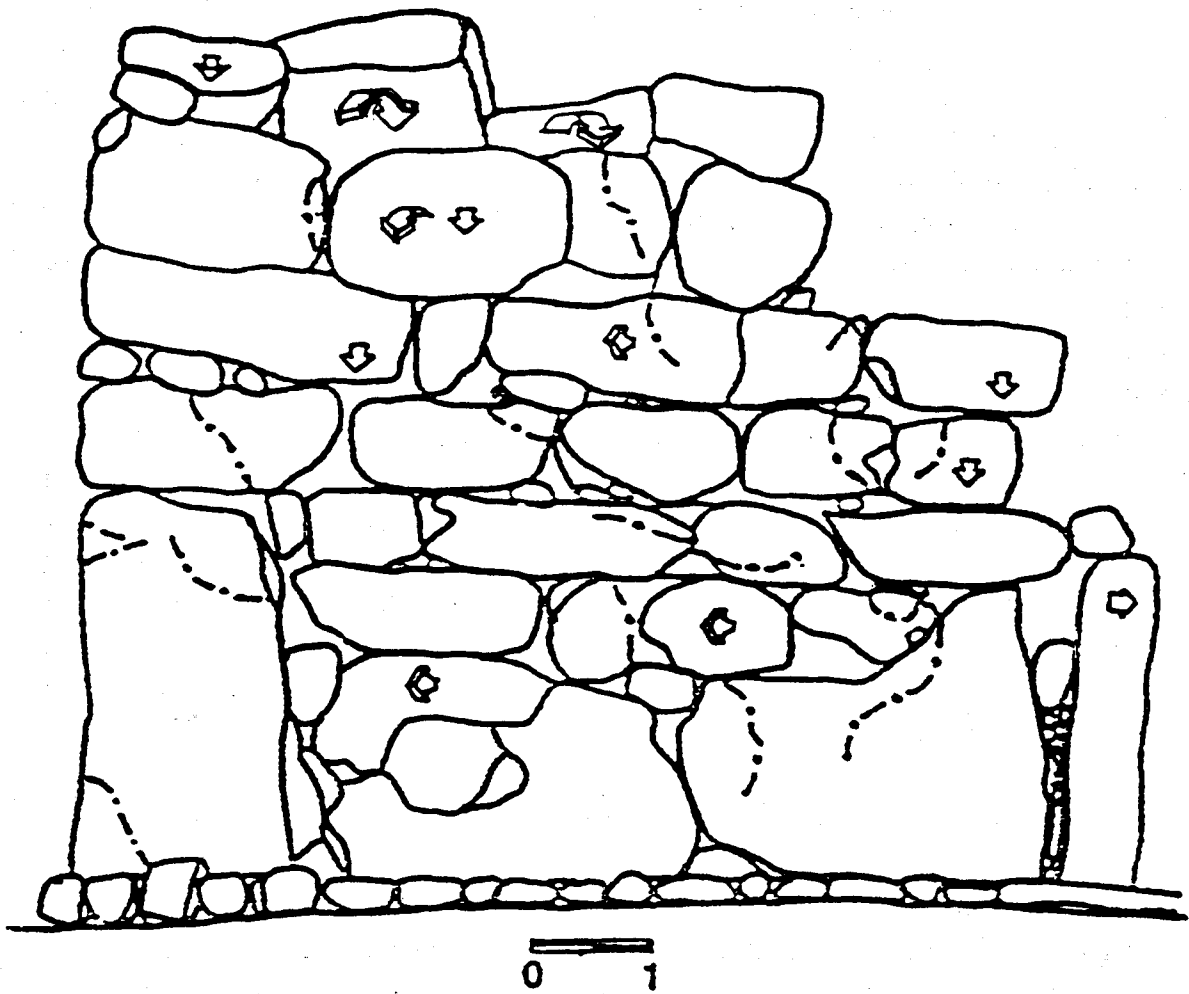


Fig. 11

thermo-hygrometric differences, as well as the differences in dilation and thermal conductivity between stone and metal (the heads of the rods were always left exposed) and, in the case of Hagar Qim, the marine environment with its high humidity and aggressive aerosol. A large quantity of condensed water was in fact here observed in the early hours of the morning. Following rainfall, the problems become more aggravated, as both temple complexes (and indeed all the others) have no system whatsoever for the collection and disposal of rain-water, resulting in some of this water being absorbed by the blocks. Besides, the eventual splitting of the external edges of the cracks allows further water entry. The rigidity of the mortar used, which eventually and inevitably breaks, causing a further loss of fragments, is also to be numbered amongst the not unimportant causes of deterioration.

In the past, several ill-advised operations to reallocate blocks in position were carried out (Ggantija north temple), even on large sections (external parts of Hagar Qim), where the purpose and position of blocks could apparently be determined with a degree of certainty; at times entire courses were "reconstructed". Frequently no documentation - criteria used to recognise the various elements, their actual position, probable dating, etc. - was kept of these largely subjective works: the strongest criticism can be levied at the fact that insufficient care was taken to understand to original method of construction of the walls, a consideration which is indispensable when even limited anastylosis is being undertaken.

In the Maltese temples, where, even when the materials used were very minimally dressed, it is obvious that the connections between the individual blocks and their contact surfaces were always very accurate and carefully executed, the exact opposite was done in modern times; when replacing stone elements in situ, stability was sought by using small stones used as wedges, a fact which resulted in a concentration of the pressures on small areas, moreover with very small surfaces, causing the irreparable fracture of the surviving blocks and also of those blocks which were replaced so thoughtlessly. This situation can be seen in the inner right apse of Hagar Qim, especially in the south-eastern wall, where there is reasonably extensive fracturing in action, resulting in serious subsequent consequences; each block is undergoing translation, rotation, loss of continuity and deformations due to the compression, flexion, torsion and point-loading that each block exerts and is exerted upon.

Amongst the most prominent operations of attempted anastylosis, must be mentioned the reconstruction of the upper part of the facade and of the multiple trilithon at the entrance, involving the repositioning of a slab measuring 2.7m x 2.85m as the lintel.

The steps undertaken were the following:

1- repair of the lintel, which was lying on the ground, by Ashby (between 1908 and 1911);

2- anastylosis of the facade, including the repositioning of the lintel and masonry forming the two upper courses (1949) and reinforcement of some blocks on the facade using "artificial stone", directed by Baldacchino;

3- reinforcement of the lintel with sealed bronze rods (1957-58);

4- coating of the jambs of the main entrance with "artificial stone" (1984)

The reconstructed facade today appears inconsistent in form, incorrect, misleading and above all precarious as regards the stability of the lintel.

Similar situations at Hagar Qim are to be found in the internal niches located in the large space to the left of the inner right apse: here Ashby in 1910 erected columns made of well-squared Globigerina Limestone blocks to support the covering slabs, which were also repaired. The new elements appear correct, identifiable, reversible, and as they are made of the same materials used in the rest of the construction, they are in harmony with it, although they were unable to prevent further deterioration of these slabs. They themselves have in fact undergone serious deterioration; the progressive reduction in thickness of the vertical stones used as additional support has, because of excessive overloading, resulted in the formation of characteristic cracks caused by crushing forces, as well as fissures passing straight through the block having subvertical surfaces of the customary type, permanent deformations due to equatorial dilations and loss of material, etc. Besides, dynamic pressures are produced by visitors who often venture onto the covering slabs of the niches.

The restoration works carried out in 1931 on a tangential slab at Ggantija, which was found to be rotating outwards, using double -T shaped metallic joists, each about 18 cm. wide, has proved to be totally useless. The bases of the supports, which are in contact with the ground, are laminating to a great extent, showing also an increase in volume; in some parts the sections have become much reduced in size. The small pieces of limestone used to connect the sections to the tangential block are, for the most part, missing; these were subsequently repaired using a mortar, which later broke. As these sections are not adjustable, subsequent movements of the block have caused one of the elements to become detached from the stone.

The restoration works which are less acceptable due to their being deceiving as well as damaging, include the placing of a concrete capping, consisting of cement and limestone fragments, on the blocks which lacked their upper portion or those which were found to be greatly damaged. Besides the problems caused by the flow over the vertical surfaces of water collected at the top of the capping, which is very dense, and the problems caused by the physical and rheological differences between the concrete and the stone, one of the major problems is the arbitrary manner in which the height of the blocks was determined, as many of the blocks, especially those of the internal passageways, appear to have been reduced in size, even in antiquity, by successive splitting and shaping. The appearance of these restored blocks attempts to imitate that of the natural megaliths: the effect is one of extreme falsehood.

PROBLEMS OF RESTORATION.

On the basis of the investigations carried out to date, the objectives concerning the Maltese temples include the careful conservation of both the sites and the buildings, upholding the form that has been passed down to us, whilst scrupulously conserving the materials and the construction techniques, besides also increasing as much as possible the information available, and producing adequate and extensive documentation on these prodigious constructions.

Their conservation gives rise to a complex series of problems in which the architectural point of view is certainly of paramount importance, when considering the upkeep and management of the sites, their consolidation, protection, and their

being managed as museums. Much can be done with suitable and correct consolidation treatments, superficial protection, repair, etc.

Finally, it is of fundamental importance that this exceptional cultural resource is well-managed economically, with a carefully observed and effective programme of strict surveillance and maintenance.

For the ultimate consolidation of the Ggantija and Hagar Qim temple complexes, based on the critical analysis of the techniques of restoration already experimented with in the past, the critical formulation of both old and new hypotheses for their consolidation, which arises from the current research in progress, can now be tackled.

With reference to the facade of the southern temple of Ggantija, which shows active and alarming structural failure, including the excessive projection of the upper courses which is causing the flaking and fracture of the underlying blocks and hence decreasing the resistance of the entire facade, it is necessary to erect scaffolding which will act both as a temporary support and also as a platform for ensuing inspections and surveys.

The scaffolding must fulfil the following requirements:

- it must be as "unobtrusive" as possible, to allow surveys at close quarters, and must consist, for example, of zinc-plated steel (to prevent rust stains);
- it must be placed as far away as possible from the main body of the structure, except for the elements which are strictly supportive in nature;
- it must be equipped with elements capable of distributing the tension generated in contact with the stone and regulating devices linked to a displacement recording station.

In order to make a careful choice of one or more adequate and suitable systems of consolidation for these ancient constructions, it is necessary to carry out further careful inspections of the interior of the megalithic walls to examine all the

elements which make up the framework, i.e. the internal pilasters, connecting beams, horizontal blocks and supports and their state of conservation; a knowledge of these factors is indispensable for the work to succeed.

The constant exposure to insolation and the aggression of marine aerosol gives rise to the additional problem of the superficial protection of the monoliths; this equally important consideration, which results in an alarming rate of deterioration, must await the results of current laboratory tests, as well as those of consolidation trials, carried out in situ on one of the smaller blocks of the Hagar Qim complex; if these investigations give satisfactory results, by preventing the absorption of interstitial condensation inside the individual blocks, this method could be adopted for all the temple complexes.

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**SIVA AND KUMARA WORSHIP IN ANCIENT SRI LANKA:
SOME POSSIBLE LINKS WITH LATER SRI LANKAN HINDUISM**

By
A. Veluppillai

It has become fashionable among some scholars in Sri Lanka to-day to rush to the conclusion that everything Buddhist should have had something to do with the Sinhala people and that everything Hindu should have had something to do with the Tamil people. Though this association was largely true during later times, there is reason to hope that religious ties and ethnic ties didn't correspond to each other nicely at least during the ancient times.

It is well-known that Mahavamsa claims Sri Lanka as the Sacred land of the Buddhists. There is a Tamil work called Tirumantiram¹ (which is dated variously between the third century A.D. and the eighth century A.D.) which claims Sri Lanka as the land of Siva. According to verse number 2747, the designation 'Siva Bhumi' can be applied in a special way to the land between Chidambaram to Podiyil Hills in Tamilnadu and in a general way to the land between Meru Mountain and Sri Lanka. It is difficult to accept that Saivism was in a flourishing state in Sri Lanka at any time for more than a thousand years after the spread of Buddhism and till the Cola occupation of the country. Though Mahavamsa wants us to believe that Buddhism was immediately accepted by the whole country, once it was introduced in Anuradhapura, it is quite likely that it took some time to spread to all sections of the people throughout the country. Fortunately, we have more than one thousand and two hundred Brahmi inscriptions² to supplement information about the ancient History of Sri Lanka.

Tamilnadu probably cherished a historical memory of Sri Lanka as a Sivabhumi at one period of its history. From the seventh to the ninth century A.D., when the Saiva revival movement was a dominant force in Tamilnadu, Ravana the mythic Saivite King of Sri Lanka occupies a predominant place in the Bakthi poetry.³ Even Mandotari, the queen of Ravana was praised for her devotion to Lord Siva.⁴

The ancient Brahmi inscriptions of Sri Lanka deal mostly with donations of caves and beds in rocks to Buddhist priests. Information gathered from the cave

inscriptions generally point to a period of transition where elements from previous Hindu society survived. None of these inscriptions refer to Siva or Kumara worship. But there is overwhelming evidence in personal names which just cannot be ignored. It is interesting to note that the Buddhists almost gave up these names in later periods to dissociate themselves from Saiva connections.

First, let us take up the word Siva. Its feminine form of Siva is also recorded in the cave inscriptions. The occurrence of this name was widespread in the Island. The thickest cluster of Siva names occur in the Kataragama area of Magam Pattu in Hambantota district within an area of about one hundred square miles. Nine inscriptions there refer to Siva. Of those nine inscriptions seven were found in the single mountain range of Situlpavuva. Most probably, Kataragama area was a predominant Saiva area at one time. Sivanubhthiya, 'one who has experienced Siva' is one of the personal names found in a record at Situlpavuva. Probably, there were Saiva Mystics in that area.

Eleven inscriptions from Anuradhapura District has Siva as a personal name. Those inscriptions are found in widely scattered places. As Anuradhapura District is the largest district in size and as the capital city of the country was located there, the number eleven is not very large for the heartland of ancient Sri Lanka. There were six inscriptions with the personal name Siva in Kurunegala district. Kurunegala district is comparable to Anuradhapura district in size as well as in the provenance of a large number of ancient Brahmi inscriptions. So, here too, special explanation is unnecessary.

There were five inscriptions with the personal name Siva in each of the districts of Amparai, Polonnaruwa, Matale and Kegalle. The Kumbukkan Oya and the Yala forest sanctuary separate Kataragama area from Amparai district. Bambaragas-talava, lying very close to the southern border of Amparai had a Brahmi record with the personal name Siva. The name Sivabhuti 'one who originated or emanated from Siva', was a personal name occurring in Rajagala, close to the border of Batticaloa district. The well-known Uncreated Sivalinga temple at Kokkaddicholai lies quite close to that hill. Polonnaruwa district and Matale district are situated on the border of Amparai district. Kurunegala district lies between Matale and Kegalle districts. It is in Yatahalena Vihara of Kegalle district where two generations of a family share the personal name of Siva. Another inscription

from the same site refers to Sivanakar, 'City of Siva'.

Siva occurs as a personal name in three records of Moneragala district and in two records in each of the districts of Badulla, Ratnapura and Puttalam. Moneragala district lies at the northern border of Kataragama area. Badulla and Moneragala districts make up the Uva Province. Ratnapura district lies adjoining both these districts. Siva is mentioned as the name of a king in Badulla district. Another inscription from that district records the fact that three generations in a family kept up the personal name of Siva. The name, Sivabhuti, occurs in two records at Piccandiyava and in one record at Mullegama, both places situated in close proximity. The Munnisvaram Siva temple at Chilaw, with as preserved legends, claiming antiquity, is located in the Puttalam district.

Vavuniya district and Kandy district had one inscription each with the personal name of Siva. The number of Brahmi inscriptions in these two districts is not very large. As Brahmi inscriptions were not available in some districts in the North and the South of the Island and as such ancient Brahmi records are few in some other districts, it should not be concluded that personal names of Siva didn't exist in those districts. It is quite possible that such names existed in large numbers but there was no occasion or opportunity to record them. What had been recorded is sufficient for conjecture of a Saivite population in ancient Sri Lanka. The status of Saivism, before the introduction of Buddhism, was probably in a flourishing condition, to merit the name of Sivabhumi for Sri Lanka. The wide prevalence of Siva worship at Kataragama area or Katiramalai was probably the reason for the founding of Katiramalai and Katiramalai Siva temple in Chunnakam in Jaffna during the Medieval times.⁵

Though there is some novelty about the association of Siva with Kataragama area, there is nothing strange about the association of Kumara worship with the same site. Kataragama in Sinhala and Kajaragama in Pali, this site and shrine had been frequently mentioned in Sinhala and Pali works. Katirkamam, the Tamil rendering of the word, had not been attested before Arunakirinatar in the fifteenth century A.D. But there is some evidence to conjecture that Katirkamam was known to the Tamils for at least a thousand years before that date. Kumara is equivalent to Muruka in Tamil. It is now generally recognised that Muruka was an ancient Tamil deity. The Tamil Sangam literature is replete with references to Muruka worship.

Of ancient Tamil literature, Tirumurukarruppatai, and idyll included in the Pattuppattu collection, gives a comprehensive account of different kinds of worship offered to Muruka, also identified with Skanda and Karttegeya, in six different pataivitu or camp-sites.⁶ As Muruka was a war-god, his important shrines were called camp-sites. Of the six shrines, there is no controversy about the identification of three of them with famous Skanda temples of Tamilnadu. There is some controversy about the fourth shrine on whether it should be identified with one in Tamilnadu or in Karnataka. These four are big temples today. The last shrine in Tirumurukarruppatai is identified with Palamutircolai at Alagarmalai, close to Madurai. The fifth shrine, read as KunraKaccirukuti, 'hamlet among the hills' or as Kunmitoratal, 'dancing in every hill', is found to be difficult of identifications.

Those who read the names of the fifth shrine as 'dancing in every hill' interpret it to include all hills where Muruka shrines are found. But this interpretation is evidently unsatisfactory as all hills scattered over a wide territory cannot be expected to form one shrine. One other suggestion tried to identify this shrine with Tiruppati Hills on the one time northern border of Tamilnadu. As there is a famous Visnu temple in those hills and as there is no positive evidence for the existence of a Muruka temple at any time in those hills, this suggestion did not find favour with scholars. An attempt to identify 'dancing in every hill' with Katirkamam was first made about a century ago.⁷ There are many hills in Katirkamam area. The antiquity of Katirkamam temple remains unchallenged. Tirumurukarruppatai does not specify that all the shrines were situated within the borders of Tamilnadu.

It is interesting to note that worship to Muruka was offered by all rational beings from gods to demons in different shrines, according to that text. The worship offered in the fifth and the sixth shrines was manifestly different from the worship offered in the other four shrines. These four shrines have developed into four large temples. Even according to the text, the worship offered in the last two shrines was in the nature of folk religion. The Veddhas or hunters were said to be worshipping in the last two shrines. Both Katirkamam and Palamutircolai still preserve the jungle atmosphere. Building wise, both still remain as small shrines. Palmutircolai is now under the control of Brahmin priests. So, five out of six shrines mentioned in the text are now administered according to Kumaratantra text. The Veddah connection with Katirkamam has continued unchanged. The present day Kapurala priests of Katirkamam are considered descendants of original Veddah priests. The

worship offered in that temple also has preserved many primitive features. They were not modified to suit Kumaratantra.

A resonable doubt arises whether Nakkirar, the author of Tirumurukarruppatai was aware of the Tamil name of Katirkamam and composed his poem to suit the more popular meaning of the suffix - Kamam. The Sanskrit word-grama becomes-gama in Sinhala and Pali and -Kamam in Sri Lanka Tamil. In general usage, the word kamam denotes love and lust. According to Naccinarkkiniyar, the commentator of the text, Muruka was dancing in the hills, with women, physically touching them. Besides those women, there were female devotees also, witnessing the Kuravai dance. According to the Tamil Kantapuranam text, Muruka who was returning as a hero, married Devayanai, the daughter of Indra, according to Vedic rites at TirupparanKunram and married Valli in Gandharva manner at Vallimalai in Tamilnadu. According to legends preserved among the Veddahs and the Sinhala people, Muruka married Valli in a Gandharva manner at Kataragama and fixed his permanent abode there.

Whether Katirkamam can be called a pataivitu or camp-site of Muruka was another matter to be investigated. According to Katiravetpillai,⁸ Katirkamam was Emakutam referred to in Emakutappatalam in Kantapuranam. Muruka is said to have encamped at Emakutam 'Golden Mount' before his final assault on the Asura stronghold of Mahendrapuri, situated across the Ocean. If this identification were accepted, Katirkamam can be considered to have references in Tamil literature, though under different names.

A study of personal names in ancient Brahmi inscriptions should be made to trace Muruka worship in Sri Lanka. The Veddahs call their deity Kumara/Kumara and not Muruka. A Brahmi inscription from Avagatiyava, near Akasacetiya, close to Kataragama mentions Kumara as a personal name. Two other inscriptions from the Kataragama area also have the same personal name. One of these incriptions refers to two generations in one family having that name. An Inscription from an area, close to the source of Menik Ganga, from Monaragala district also has this name. An inscription from Lunuvaranagala on the border between Batticaloa and Polonnaruwa districts also has this name. This name also occurs in an inscription from Kuttikulama in Anuradhapura district and from Vessagiri, close to Anuradhapura city. The Royal Road that connected Magama of Ruhunu to

Anuradhapura of Rajarata might have been the route through which Kumara of Katirkamam spread his sway to Anuradhapura. In this connection, it is very interesting to note that two of the most ancient Tamil inscriptions from Anuradhapura mention Kumara kanam.⁹ The group administering Muruka temple is called Kumara kanam.

Three inscriptions from Puttalam district can be noted in this connection. One inscription from Piccandiyava mentions Kumara. According to Professor Paranavitana, the personal name Guda should be considered a derivative of Guha, a name of Skanda.¹⁰ The Brahmi inscriptions from Puttalam district mention this name. There might have been Tiruccendur Muruka temple influence, coming from Tamilnadu. The sea joins Tiruccendur and Puttalam.

Two Brahmi inscriptions from Vavuniya district and one Brahmi inscription from Kurunegala district mention the personal name of Visakha. According to Sanskritic Puranic sources, visakha nakshatra is the birth nakshatra of Karttigeya. So, Kumara is also known as Visakha. According to Tirumurukarruppatai, Brahmins were worshipping Muruka at Tiruverakam or Cuvamimalai of Colamantalam. The name of Visakha might have come to North Sri Lanka though Brahmin influence from Tiruverakam. In this connection, it is interesting to note that the Brahmi inscriptions from Vavuniya have expressly referred to those having the name of Visakha as Tamils.¹¹

Nakkirar has mentioned velan with vel or spear in his hand as the priest offering worship to Muruka in the fifth shrine, now being identified with Katirkamam. Though quite a number of references to vel and velan occur in classical Sangam Literature, Nakkirar has made special mention of this worship by velan in this context alone. Three Brahmi inscriptions mention the personal name of vela. Two of them are located in Amparai district and one of them is located in the adjoining Matale district. One of the sites in Amparai district is quite close to Tirukkivil, the leading Muruka shrine in the East of Sri Lanka where pride of place of worship is offered to the spear. The temple itself is known as Cittira Velayuta Cuvami temple.

One word in Sri Lanka Brahmi inscriptions has been read as vel and vel by different scholars. What had been read as velu by Paranavitana had been read as vel by us.¹² There were many chieftains, referred as vel in singular and velir in plural

in Sangam Literature. The word vel denotes Muruka and Cupid. It is quite possible that the bearer of vel became vel. Let us look into the usage of this word in Sri Lanka Brahmi inscriptions. Three inscriptions mention this word in the Kataragama area of Hambantota district. Two inscriptions from Amparai District have also used this word. One of the sites is Mullukkolutumalai, adjacent to karaitivu, a thickly populated Tamil village where was born Mayilvakanan who later became the great scholar, Swami Vipulananda. Like word Kumara, vel also seems to have travelled along the Royal Road from Anuradhapura to Magama. This word occurs in Brahmi inscriptions of Moneragala, Matale, Polonnaruwa districts. In Vavuniya district also, two inscriptions mention vel. Outside the region above referred to, two inscriptions from Kegalle district also refer to vel.

According to Kathiravetpillai, Katirkamam is as much important to Muruka worshippers as Chidambaram to Saiva worshippers.¹³ There is no doubt that Katirkamam has exerted a very strong influence on the religious life of Sri Lanka. This shrine is very popular with Sinhala Buddhists and many Buddhist viharas have shrines for Kataragama deity. Many Hindu shrines have sprung up in modern times in different parts of the Island for the worship of the same deity. This paper will restrict its attention to well-known Muruga temples which have been in existence at least for some centuries.

Two books on the Hindu temples of Eastern Sri Lanka have been recently published.¹⁴ V.C. Kandiah, the author of the book on the Hindu temples of Batticaloa, includes Amparai district within Batticaloa because these two districts together constitute the Batticaloa cultural region for the Tamils there. Tirukkovil was the temple par excellence for the Hindus of Batticaloa region. Some Tamil inscriptions of the fourteenth century and later have been discovered. According to de Queyroz, this temple was one of the Hindu temples, destroyed by the Portuguese. The spear represented Muruka in the temple. Prominent temples in Batticaloa region were known as Tiru Patai Kovil, Except for the Uncreated Sivalinga temple of Kokkaddiccolai, all the other Tiru Patai Kovils were Muruga temples. As in Tirukkovil, the spear is venerated in sanctum sanctorum of Cittira Velayuta cuvami kovil of Periya Poraitivu, another Tiru Patai Kovil. The original site of this temple was said to be Vellaveli, a corrupt form of Velayutarveli where it suffered destruction at the hands of the Europeans.

Quite close to the temple mentioned above, there is the well-known Kandaswamy temple of Mandur. In many ways, it is a replica of the Kataragama temple. As in Kataragama, the deity remains covered and unseen by the public. This temple is also called 'Little Katirkamam'. The Kandaswamy temple at Sittandi, considered only three centuries old, is also considered a Tiru Patai kovil. This temple, originally a Cittira Velayuta Cuvami Temple, like Tirukkivil and Poraitivu temple, underwent metamorphosis into a Kandaswamy temple recently. There is a strong belief that Muruka who stays in Sittandi temple leaves for Kataragama when festival starts there and returns to Sittandi on the completion of the festival at Kataragama.

Muruka on Okanda hill is considered the Border Guard of the south of Batticaloa region. Though some people consider this a Tiru Patai kovil, its past history is not clear. This shrine lies in thick dense Jungle on the way to Kataragama. The hill and the streams attracted the devotees for a long time. A thatched cottage went by the name of Kovil for a long time. Stone temple was built only a century ago. The spear represents Muruka in this temple. There is a shrine for Valli but not for Devayanai.

The northern border of Batticaloa is again considered guarded by Cittira Velayuta Cuvami temple at Verugal. Verugal Ganga, branch of Mahaweli Ganga divides Trincomalee district and Batticaloa district.

Katiraveli, reminding Katirkamam, lies on the Batticaloa side and the Muruka temple is on the Trincomalee side of the border. In this temple, there seems to be a synthesis of the temples of Tirukkivil and Mandur. Though the spear occupies the sanctum sanctorum, Katirkama cuvami also occupies a prominent position in the temple. To the latter, worship is offered to him as at Kataragama. As Katirkamam is situated on the banks of Menik Ganga, this temple is also situated on the banks of a river. Devotees who go to the temple get cured of all kinds of illnesses. Even other kinds of sufferings are said to disappear for pilgrims to this temple. Besides retaining the name 'Little Katirkamam' as Mandur Kandaswamy temple, this temple is also called the 'Second Katirkamam'. This is also a Tiru Patai Kovil.

Thus it seems reasonable to assume that all prominent Muruka temples of Batticaloa region only point to northward spread of Katirkamam worship. In

Trincomalee district and the Northern region, there seems to be a blend of this spread and Tamilnadu influences. The icons of Villunri Kandaswamy temple in Trincomalee town are said to have been brought from Tiruverakam of South India. As Maviddapuram Kandaswamy temple in Jaffna district is claimed to have been founded by a Cola princess, the influence of Tiruverakam may have to be traced there. The Katirkamam deity had been assigned a separate shrine in the Adi Konesvara temple at Tampalakamam in Trincomalee district.

There was another element of Katirkamam worship that should be noted. It was its close association with the Veddah community living on the hills. The Veddahs call him Kumara. It is interesting to note that the leading Muruka shrines in Batticaloa region preserve memories of Veddah association. The Muruka temples at Tirukkivil and Verugal are claimed to have originated when Veddahs worshipped Muruga in the form of spears. Mandur Muruka temple has a shrine for Kumaratampiran where Veddah type of worship is offered even today. Most probably, the origin of this Muruka temple has to be traced to the Kumaratampiran temple of the Veddahs. The Sittandi Kandaswamy temple is said to have been worshipped by the Veddahs till three centuries ago. A Kumarattan shrine is attached to this temple where some aspects of folk religion are practiced even today. Quite close to Mamankam Pillaiyar Temple in Batticaloa town, there is a Kumarattan temple, of the Veddahs, which still receive some worship even though the Veddahs had left the area long ago.

The Katirkamam worship still remains dynamic in the Batticaloa region up to Verugal temple. Tondamanaru Sannidhi temple in Jaffna district can be explained by referring to Muruka temples in Batticaloa region. Muruka in this Jaffna district temple stays by the river bank as at Katirkamam and at Verugal. There is a shrine for Valli but not for Devayanai as at Okanda hill and at Tanta male. The Vinayaka temple is also called Manikkappillaiyar kovil, reminding its association with Menik Ganga. In the Batticaloa region also, there are a number of shrines dedicated to Manikkappillaiyar. The priests of the Sannidhi temple are said to be of fishermen caste and mantras are not used in worship. As at Kataragama, the priest covers his mouth with a white cloth. Food offerings to the deity are made on banyan leaves and these food offerings are claimed to have medicinal value. Considering the great popularity of the temple, it is remarkable for its small size. As at Sittandi in Batticaloa district, Muruga is said to be travelling to Katirkamam on festival day

there and then to return to Sannidhi on the completion of the festival there. It seems that the Sannidhi temple at Tondamanaru is only an extension of Katirkamam worship. In this connection, it is worth remembering that pilgrims from South India and Jaffna district are said to have assembled in this temple before starting on their trek to Katirkamam along the sea coast and then return to Sannidhi before making their departure to their homes.

Between Verugal on the southern border of Trincomalee district and Sannidhi temple in Jaffna district, there were two links in the chain, not well known. There is a Cittira Velayuta Cuvami temple at Kumarapuram in Mullaitivu district. The name of the deity as well as the shrine are highly suggestive, reminding us of Cittira Velayuta Cuvami temples in Batticaloa and Kumarattan worship of the Veddahs. The other link is Kumarapuram in the northern coast line of Trincomalee district. This side is now called Kumpurupiddi. According to tradition, the spear was placed on Velappamalai. A copper icon of Kumara had been unearthed and now located in the local Kannaki temple and worshipped. The latter temple does not exist now. It is not known whether the Veddahs were associated with Kumarapuram and Kumarapuram.

Saint Arunakirinatar of the fifteenth century has composed devotional poetry on Katirkamam Murugan. He has referred to Muruka in Tirukonamalai. It is not clear whether he was referring to Kumarapuram or Verugal or some other temple adjoining Konesvaram. He has also referred to the Lord of Yalppanayan pattinam. This most probably refers to Muruka in Sannidhi temple.¹⁵ The Sanskrit name, Sannidhi, 'sacred presence' probably needs some explanation. As in Katirkamam, so in Sannidhi mystics congregate in large numbers. Indians other than Tamils also used to be there as mystics. Even Europeans such as the German Swami and the son of Lord Soulbury lived there as mystics for quite sometime. Those mystics must have been responsible for the name of Sannidhi (Canniti, in Tamil).

The Modern Kandaswamy temple at Nallur in Jaffna district also exhibits Katirkamam influence.¹⁶ Sapumal Kumarayya who conquered the Jaffna kingdom on behalf of Parakramabahu VI is generally credited with the founding of the temple in the fifteenth century A.D. This temple was completely demolished by the Portuguese when they conquered the Jaffna Kingdom in the early seventeenth century. About one and a half centuries later, the temple was rebuilt at the present

site. Detail about the original temple were most probably not available when it was rebuilt. In the rebuilt temple, the spear represented Muruga in sanctum sanctorum as in most of the temples in Sri Lanka which sprang up under the influence of Katirkamam. Arumuka Navalar, who spearheaded the Saiva revival movement in the nineteenth century was very critical of this temple for not following the Kamaratantra.¹⁷

NOTES

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4. Saint Manikkavacakar praises Ravana's queen. A. Velupillai - Tiruvacakar and Sri Lankan Buddhism, Dr. James T. Rutnam, Memorial Lecture-I, Evelyn Rutnam Institute, Jaffna, 1989.
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15. A. Sanmugadas & Manonmani Sanmugadas - Arrankareyan, Varavollai Publication - 3, Jaffna, 1989, pp. 121 - 123.

16. A. Velupillai - Foreword to Arrankareyan, Same as Note No. 15.

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**SOME NEW FINDINGS FROM A CRITICAL STUDY OF THE
THREE EARLIEST TAMIL INSCRIPTIONS DISCOVERED
IN SRI LANKA**

By

A. Veluppillai

1. INTRODUCTION: BACKGROUND

As we are approaching the second century of archaeology in Sri Lanka, it is worthwhile looking back at the achievements of the last century. From the point of view of the study of Tamil inscriptions, progress was rather slow. During the last quarter century, considerable work has been done.¹ The Archaeological Department helped the author of this paper and some others by supplying estampages of inscriptions or their photographs.

All the three inscriptions were discovered almost a century ago in the ancient capital city of Anuradhapura.² As no one in Sri Lanka could decipher Tamil inscriptions at that time, the estampages were sent to H. Krishna Sastri, the Chief Epigraphist for India. The Tamil texts of these estampages were published in the last few pages of the fourth volume of South Indian Inscriptions.³ Some years earlier, Krishna Sastri made some observations on these records in Madras Epigraphical Report.⁴

Seventy five years after their discovery, these three inscriptions were first edited by K. Indrapala in a Tamil journal.⁵ Indrapala made use of the estampages of the first two inscriptions only to vaguely talk about dating on palaeographic considerations. Indrapala has made use of the estampage of the third Tamil inscription in making an important correction in the published Tamil text and in adding ten more lines of writing, left out of the hitherto published text. Indrapala edited the first two inscriptions in English also.⁶

Even though the ruins in the north of Anuradhapura were even then identified with 'Tamil ruins' or 'Hindu ruins' due to the distinctive character of some of the remains, Krishna Sastri concluded that the first two inscriptions were Buddhist epigraphs. The last inscription which is very fragmentary from the point of view of

decipherment is clearly a Buddhist Tamil epigraph. Krishna Sastri, whose background knowledge of Sri Lanka History is poor, identified Siri Sangabodhi, the ruler mentioned in the first two Tamil inscriptions, with Agrabodhi III (629 - 639). He also made a loose statement that on palaeographical considerations, the date of the seventh century was acceptable. According to him, the expression 'Kumarakanattuppurur' occurring in the first two inscriptions is a place-name.

Indrapala who edited these three Tamil inscriptions twenty two years ago published his papers in Tamil Language. Even though he has edited the first two inscriptions in English also, he has not published the photographic plates of the inscriptions anywhere. He has made some substantial contributions to the study of the third inscription. He was able to find the name Sri Senavarma in line 25 of the record. Unfortunately there were five rulers with the name Sena, in the ninth and tenth centuries of the Christian era, reigning in Anuradhapura. According to Indrapala, it is difficult to pinpoint any one of them as the ruler referred to in the record. Makkotaippalli was the name of the Buddhist vihare, established in Anuradhapura. Makkotai was a personal name of a Kerala ruler as well as a place-name denoting a one-time capital city of Kerala. Indrapala correctly identifies *nanku nattar* as a subsidiary of the well-known mercantile corporation of the Five Hundred of the Thousand Directions. He also points out the existence of a Tamil verse in *venpa* metre within this record and mentions that Makkotai was praised in the record.

Indrapala has made some contributions to the study of the first two inscriptions also. These two records don't mention the name of the ruler. They just give the consecration title of Siri Sangabodhi. Indrapala was able to show that there were many other rulers with the title Siri Sangabodhi. There were three rulers with this title in the ninth and the tenth centuries A.D. Of them, Mahinda IV (956 - 972 A.D.) alone was referred to as a maharaja in an inscription from Vessagiri. The two Tamil inscriptions refer to 'marayar'. As the title of maharaja was loosely applied to various Sinhalese rulers from very ancient times, Indrapala was not willing to conclude that the Siri Sangabodhi marayar was Mahinda IV. He also points out that the Hindu Ruins were dated to belong to the ninth and tenth century A.D. Indrapala was also able to point out that the technical term, 'Kumara kanam' occurring in both records referred to a committee administering Hindu temples. He also correctly explains the expression *ila kkacu* occurring in both records as referring to Sri Lanka

gold coins. From the existence of a personal name in one of the records, he deduces that traders called cettis were living in Sri Lanka at that time.

2. NEW FINDINGS

Anuradhapura area had a Tamil settlement in the North in the period of these inscriptions. Both the Tamil Hindus and the Tamil Buddhists lived close together. Anuradhapura was the capital of Sinhalese kings till the end of the tenth century. This area had some Dravidian influence from Pre-Historic times, as indicated by the discovery of megalithic burial sites, closely associated with the Dravidian Culture. But more positive evidence is needed to trace continuity from the Pre-Historic megalithic culture to the Tamil ruins of the ninth and the tenth centuries A.D. Considerable number of Sri Lankan Tamils might have settled in the capital city for various reasons. South Indians also might have migrated for trade and other purposes. It is also important to note the existence of the Tamil settlement in the north of the city, as indicating the direction of the arrival of the Tamils in that city.

A study of the personal names of the donors of the gifts in the first two inscriptions leads to the surmise of Pallava connection. The term Cekkilan occurs in personal names of both records. 'Cekkilan' is a family name. Cekkilan is the name of a family among the mudaliyars of Tondaimandalam who had four distinguished families. Close contact existed between Sri Lanka and the Pallava Empire. The donors in the inscriptions could have been either migrants or descendants of migrants who came to Sri Lanka for trade from Tondaimandalam, the heart of the Pallava Empire. As Cekkilan was a family name among the cultivator caste of mudaliyars, the proper name Cekkilan Cetti Cankan needs some explanation. The term 'Cetti' here seems to denote the profession of traders and not their caste. In the personal name of Cekkilan Cennai, it is curious to note that cennai is the Tamil name for Madras. Though the origin of the word cennai as a place name is sometimes traced differently, it is worth investigating whether the personal name Cennai could have become the place name cennai. In this connection, it is worthy of note that Kunrattur, the village of Cekkilar Arulmolittevar, the author of Periyapuram, a well known Saiva Tamil classic, forms part of the Madras city.

There was an important Skanda or Murukan temple in the Tamil settlement.

Even though the first two inscriptions refer to that temple, they don't mention the temple by name and both Krishna Sastri and Indrapala missed the point. Quoting from Professor K. A. Nilakanta Sastri, the famous South Indian Historian, Indrapala identified 'Kumara Kanam' as a group looking after a Hindu temple. If he had gone more deep, he could have found out that Kumara kanam was a group looking after a Skanda temple. The inscriptions don't state who built that temple or when that temple was built. Whether this temple might have been built due to the influence of Kataragama or Katirkamam in the Down South needs careful study. As the temple was found within the Tamil settlement, it is more appropriate to look for influence from well known Murukan temples of Tamilnadu. Muruka worship was very popular in the Pandya country where it had most of its leading shrines.⁸ Though the Muruka shrine of Tiruttanikai on the northern frontier of Tondaimandalam was well-known, one cannot say that Muruka worship was very important in that area. So, one cannot say that the mudaliyars of Tondaimandalam were patronising their patron deity as they used to do in their homelands. Further, even in South India, there was only one inscription which refers to donation to a Muruka temple in period of the ninth and tenth centuries A.D.⁹ During the latter half of the ninth century, Varaguna II (862-880 A.D.), the Pandya ruler donated a large sum of money to the Muruka temple at Tiruccentur and arranged to have various services to the temple from interest accruing from his endowment. The Tiruccentur inscription might have served as an example for similar donations to the Murukan temple in Anuradhapura, the capital of Sri Lanka, situated on the other side of the Gulf of Mannar.

There is some evidence to deduce the fact that Muruka worship was very popular at least in the Anuradhapura area. The expression 'Kumara Kanattu pperurom', should be carefully looked into. Either Anuradhapura or the Tamil Settlement in that city must have been referred to as perur. That is why, the phrase reads as Kumara Kanattu pperurom. 'We of the assembly of perur from Kumara kanam' and not as perur KKumara Kanattom, 'We, the Kumara Kanam of perur'. It is not clear whether Kumarar Kanam was connected to mercantile corporation of 'Five Hundred of the Thousand Directions'. There is evidence that in twelfth century Padaviya, the Kali Kanam 'the group looking after the Kali temple' had some connections with the 'Five Hundred of the Thousand Directions'.¹⁰

In addition to the Tamil verse in Venpa metre which is found in lines 27 to 29

of the third inscription, there seems to be another verse in lines 20 to 23. Expressions like 'Ulitoru nilavi', 'tentirai cul' 'porruvar Kanmino', etc. Which occur in those lines indicate the use of poetic language. But this verse cannot be reconstructed as a number of letters at the beginning and the end of each line cannot be deciphered at the present stage. The verse cited by Indrapala praises Dharmapala from Makkotai and not Makkotai, as surmised by him. It is worth investigating whether nanku nattar in this inscription is equivalent to nanateci of later Tamil inscriptions. The Tamil word nattar can be translated as teci (desin) in Sanskrit. The Tamil words nalu and nala, generally meaning 'four', also mean 'many'. The Sanskrit word nana means 'many'.

The importance of Makkotaippalli will become clear when viewed from the historical background of South India and Sri Lanka. The revival of Vedic Hinduism, which commenced in the seventh century adversely affected Jainism and Buddhism in Tamilnadu. The claim of Hindu religious texts that there was complete conversion was an understatement. There is evidence to show that Buddhists, at least in small numbers, continued to live in Tamilnadu upto the fourteenth century A.D. It can be surmised that a section of the the Tamil Buddhists migrated from Tamilnadu to the Buddhist country of Sri Lanka. The discovery of Sanskrit inscriptions at Tiriyai and Kuccaveli, written in Pallava Grantha script should be taken to indicate that the Tamil Buddhists from the Pallava Empire migrated to Trincomalee District.¹¹ The ancient Velgam Vihare might have been rebuilt as Rajarajapperumpalli in Dravidian style of art by about the beginning of the eleventh century, may be to cater to that Tamil Buddhist settlement.¹²

Makkotaippalli in Anuradhapura seems to be a forerunner to Rajarajapperumpalli in Trincomalee District. It is now well-known that Makkotai was the capital of Kerala and that Makkotaippalli was the leading Buddhist institution there.¹³ The revival of Vedic Hinduism commenced in Kerala at the beginning of the ninth century A.D. The Hindu revival in Kerala commences with Kulasekhara I (800 - 820 A.D.), canonized as Kulacekaralvar, a Vaisnava saint-poet.¹⁴ The Vaisnava movement in Kerala gained momentum when Nammalvar, the leading Vaisnava saint-poet from the Pandya country went on pilgrimage to Kerala during the latter half of the ninth century. Kulasekhara II (820 - 844 A.D.), canonized as Ceraman Perumal nayanar, a Saiva saint-poet, inaugurates the Saiva revival movement. Cuntaramurti, the leading Saiva

saint-poet from Tamilnadu was a friend of this Kerala ruler and they performed pilgrimage together.¹⁵ The Kerala Buddhists might have commenced their trek to the Buddhist country of Sri Lanka by the latter half of the ninth century.

It is now generally acknowledged that Kerala people form a substantial segment of both the Sinhalese¹⁶ and the Sri Lanka Tamils.¹⁷ However that may be, the Kerala Buddhists who migrated to Anuradhapura probably preferred to retain their ethnic identity. The mercantile group that built the Buddhist temple claims that they were *nanku nattu tamar*, 'the Tamils of *nanku natu*'. The Kerala Buddhists and the Tamil Hindus seem to have lived together in the same area. That is why this inscription had been discovered among the Tamil or Hindu ruins. As Makkotaippalli must have been constructed according to Dravidian style, the ruins of this palli might have remained indistinguishable from the other ruins of the area.

The Buddhist temple of Makkotaippalli that could not survive in Kerala had been shifted to Anuradhapura of Sri Lanka. Dharmapala who was praised in the inscription must have been responsible for formulating plans and for persuading the rich mercantile group of *nanku nattar* to execute his plans. By the middle of the ninth century, the mercantile group of Manikkiraman was influential in Makkotai. The Kottayam Plates of 849 A.D. gave many privileges to that group. There is no evidence to show that the *nanku nattar*, which originated in Karnataka in the eighth century and spread its activities throughout South India,¹⁸ had any connection with Manikkiraman. It is worthy of note here that contemporary Kerala inscriptions were written in Tamil language and not in Malayalam language. Distinctive Malayalam words and traits are very rarely found. So, not much Malayalam influence can be expected from the Anuradhapura record. Words like *tanmam*(*tarmam*) and *Kammi*(*Karmi*) found in that inscription can be cited as evidences for nasalization, a characteristic feature of Malayalam language.

It is now generally accepted that the Tamil influence in Sri Lanka was on the ascendant from the time of Cola occupation. The state of Sri Lankan Tamil immediately before the Cola occupation can only be deduced from the language of these three inscriptions. While acknowledging that the materials for consideration here are rather meagre and that all the three inscriptions betray South Indian influence, a few intelligent guesses are possible. It is worthy of note that all the three inscriptions are written in Tamil script, then dominant in the Pallava Empire. In

contemporary Kerala and Pandya country, Vatteluttu was the script used. The fact that even the inscription on Makkotaippalli was inscribed in Tamil script and not in Vatteluttu shows that the Sri Lankan Tamils too have adopted the Tamil script of the Pallava Empire. A perusal of the language of these inscriptions, especially those relating to the Hindu temple shows the usage of grammatically pure Tamil. It is curious to contrast the fact that most of the Tamil inscriptions of the Pallava Empire do not have such usage of Tamil. Of the Tamil metrical forms, the composition of a verse in venpa metre is a difficult feat. One venpa occurs in one of these inscriptions. To account for these features, it is necessary to postulate a long standing tradition of indigenous Tamil scholarship.

NOTES

1. Professor K. Indrapala and Professor A. Velupillai had some training in Tamil Epigraphy at the Office of the Chief Epigraphist for India in 1968 and started editing Tamil inscriptions. Professor S. Pathmanathan and Dr. S. Gunasingam have also made some contributions to Tamil epigraphy in Sri Lanka.
2. H. C. P. Bell - Archaeological Survey of Ceylon Annual Report for 1893, p. 12, 5.
3. South Indian Inscriptions (Archaeological Survey of India), Vol. IV, No. 1403, 1404 and 1405.
4. Madras Epigraphical Report for 1913, p. 103
5. Cintanai, Quarterly Journal of Arts and Social Sciences (Tamil), Peradeniya, Volume I, No.4; January 1968, pp. 31-35; Volume II, No.1, April 1969, pp. 19-23.
6. K. Indrapala - Two Inscriptions from the 'Hindu Ruins' Anuradhapura, Epigraphia Tanulica (E.I.), Jaffna Archaeological Society, Vol. I Part I, June 1971, pp. 1-5.
7. M. Iracamanikkam - Cekkilar (Research work), Educational Publishing company, Madras, 1947, p.9.
8. Of the six leading shrines mentioned in the classical work of Tirumurukarruppatai, three - Tiruccentur, Tirupparankunram and Palamutircolai - are found in the Pandya country.
9. Epigraphia Indica, Vol. XXI, pp. 101 ff. South Indian Inscriptions, Vol. XIV, No. 16A, pp. 12-17
10. A. Velupillai - Three Tamil Inscriptions of the 'Five Hundred of the Thousand Directions', Ceylon Tamil Inscriptions, Part I, Kandy, 1971, pp. 46-57, Some More; Records of Ticaiyayirattu Ainnurruvar, Ceylon Tamil Inscriptions, Part II, Kandy, 1972, pp. 7 - 22.
11. S. Paranavitana - Kuccaveli Rock Inscription, Epigraphia Zeylanica (E.Z.), Vol. III . pp. 158-161; Tiriya Rock Inscription, E.Z., Vol. IV, pp. 151-160.
12. K. Indrapala - Fourteen Cola inscriptions from the ancient Rajarajaperumpalli (Velgam Vehera - Natanar Kovil) at Periyakulam, Ibid, pp. 37 -51. A. Velupillai - C.T.I., Part I. pp. 12 - 19; C.T.I Part II, pp. I - 6.

13. Auvvai S. Doraiswamy - Cera mannar varalaru, Madras, pp. 322 - 328.

14. P. N. Kunjan Pillai - Studies in Kerala History, Kottayam, 1970. A. Sreedhara Menon - A Survey of Kerala History, Kottayam, 1967.

15. Cekkilar - Ceraman Perumal Nayanar Puranam, Periyapuram, Eighth edition by Navalar, Madras, 1951, pp. 458-476.

16. Gananath Obeyesekere - The Cult of the Goddess Pattini, University of Chicago Press, Chicago, 1982. He also gave this opinion in a personal communication to me.

17. M. D. Raghavan - Tamil Culture in Ceylon, A General Introduction, Colombo, 1968.

18. Epigraphia Carnatica, Vol. VII, p. 310.

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