Dr. C. W. W. Kannangara Memorial Lecture - 31

Heritage as an Evolution of Knowledge: archaeology of late stone age in Sri Lanka

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Honourable Rev. Sirs, Chief Guest, Director General of the National Institute of Education, Members and the relatives of the Hon. C.W.W. Kannangara family, Deans, Heads of Departments and colleagues,

It is a great privilege and honour for me to be invited to grace this important occasion of the National Institute of Education. The annual event of the commemoration of the veteran politician, the education philosopher, one of the greaterst leaders of the 20th century, Honourable Dr. C.W.W Kannangara, is an occasion of sharing new perspectives, thoughts as well as experiences of different scholars and expert professionals in distinct disciplines, it is a tribute to the exceptional service of this greate son of our motherland. The speakers of previous years who had delivered this commemoration lecture had envisaged the contribution ofthis great personalty in myriad perspectives, with deep analytical approaches, especially the futuristic and revolutionary thinking he conceptalized of the form and *modus operandi* of the system of education inpost-independent Sri Lanka.

His visionaryand clear nationalistic motivation is explicitly reflected in the address he made at the State Council on 2nd June, 1944, as the Minister of Education, pertaining to the free Education Bill. Let me quote one, single paragraph of that speech recorded in the Hansard of the same year.

> *"Sir, it was the boast of the great Augustus that he found Rome of brick and left it of marble, How much nobler will be the state of the State Council*

boast when we shall be able to say that we found education dear and left it cheap, that we found it a sealed book and left it an open letter, that we found it the patrimony of the rich and left it the inheritance of the poor" (Hansard 1944 pp 916-946).

What this beloved citizen envisioned was to leave the inheritance of education for the benefit of the poor in this country. The poor is the majority. The majority consists of ordinary countrymen who inherited the legacy of everything from our predecessors who have invested their physical and cognitive energy to build the nation. The most crucial ingredient of 'everything', as I spelled it is the education. What I intend today, as a part of my presentation is to elaborate on the word 'inheritance' used by him in his exemplary speech. Let me turn to the inheritance of 'learning' what we all acquired from the past.

Prelude

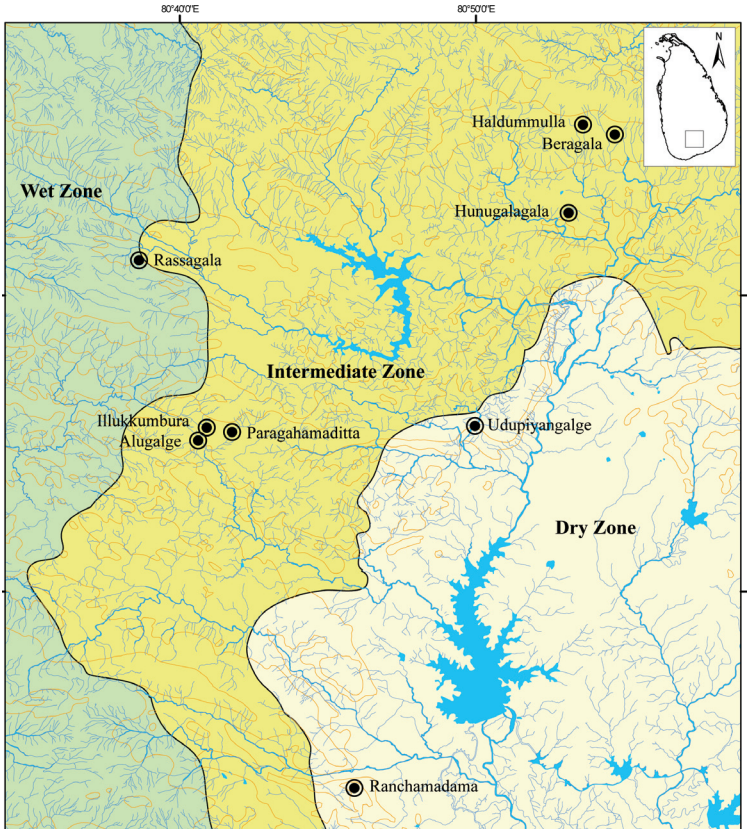
The resilience and the subsequent continuity of the prehistoric Mesolithic hunter-gatherers during the Holocene in Sri Lanka is still archaeologically unexplored. Lack of evidence has delayed any attempt at resolving the problem. Recent archaeological fieldwork reveals evidence in support of the argument of an initiation of mass-scale floral resource exploitation by the traditional hunter-gatherers during the mid-Holocene. Such a change would have signaled a new economic behavior in response to the mid/late Holocene environment. We will discuss here how the Holocene

was also marked by wet and dry phases that potentially would have influenced Mesolithic communities.

A systematic investigation may open avenues to understand the cultural dynamics of this unexplained period that has evolutionary significance and also to understand the formation of the proto and early historic periods in the country. Most of the stratigraphies excavated in caves and alluvial plains suggest a 'techno-cultural leap' from Mesolithic to Iron Age or early historic periods. The terminal phase of the Mesolithic is archaeologically discernible in stratigraphic levels ascribed to the early second millennium BCE (Deraniyagala 1972). The most recent reliable date assigned to the Mesolithic culture in Sri Lanka goes back to c.1800 BCE. This leaves a chronological hiatus, highlighting of a period of nearly one millennium that remains culturally unexplained.

Initially, it was hypothesized that the inferred techno-cultural shift would have been preceded by transformations within the Mesolithic hunter-gatherer communities, and secondly that these transformations took place as a way of ensuring resilience in face of climate variability (*eg*. DeMenocal 1995,2004; Cremaschi 1998; Richerson et al 2001; Petraglia et al 2010). Thirdly we hypothesize that intermediate climate zones which experience regular short-span seasonal variations (rainfall, wind pattern and temperature) demand a high degree of resilience for survival, and that in these zones we would find a higher degree of transformations/adoptions than in zones with more stable climates. Building resilience to climatic oscillations would have provided an impetus to generate a comparatively complex behavior among the prehistoric hunter-

gatherers making intermediate climatic zone ecologically more sensitive than other zones with more stable climates. As has been discussed by a number of scholars (Rowley-Conwy 1986; Gamble 1986; Akazawa 1982; Shinde*etal* 2004) sensitive climatic zones have a greater ecological productivity and an adequate bio-mass to sustain livelihood for a prolonged period of the year.



Map 1. Distribution of the three climatic zones in the study area (source: fieldwork 2015)

With the objective of addressing the problem of resilience, transformations and adaptations of the Holocene Mesolithic hunter-gatherers, a series of field investigations have been carried out since 2006. To test our hypothesis, a transect geographically extending from the Horton Plains in the central highlands in the north, stretching along the southern slope passing the Kaltota escarpment down to the UdaWalave plain in the south was focused on. This area covers three different climatic zones, *viz*; (i) wet zone (ii) intermediate zone and (iii) dry zone, showing a diverse regime of resource distribution and a complex landscape setting (*map 1*). Here we will present the results of surveys and excavations in the context of our original research questions.

Environment and Holocene climatic change

The survey area of the project is geographically confined to the south eastern dry-arid climatic zone (<1000mm mean annual rainfall) in the east and the wet lowlands (3500-4000mm mean annual rainfall) in the west. The northern periphery is demarcated by the mountain ranges of the wet uplands (2500-3000mm annual rainfall) and the coastal belt by the southern dry zone. Middle part of the area experiences intermediate climatic characteristics where the annual rainfall varies between 1000mm and 2000mm (Chandrapala 2007). The terrain diverges from plateaus to rolling slopesand to escarpments to valleys. This divergence in topography corresponds to the distribution of various soil types within the area.

With the exception of palaeocological studies by Premathilake (2003, see also Premathilake and Risberg 2003; Premathilake and

Gunatilleke 2013), our knowledge of the Holocene environment in the southernmost South Asia is limited. A certain degree of understanding is only possible after comparison with paleo-environmental data from widely scattered geographical areas of the mainland India. Overall, climate regime in South Asia has experienced relatively humid conditions during the Holocene (Singh 1971; Premathilake 2003:1) mainly due to synoptic climatic conditions that affected the greater part of South Asia (Shinde *et al* 2001; Krishnamurti*et al* 1981). However, the South Asian region has also experienced several changing cycles of dry-wet climates during the Holocene.

Sedimentalogical data from saline lakes in Western and Central Rajasthan and Central Gujarat, indicate that an inter-pluvial climatic regime had dominated immediately before 10,000 BP (Rajaguru 1973:69-70; Gupta 1974: 644-647; Agrawal and Kusumgar 1974:64; Fairbridge 1976:542). Comparable data also exist from the Horton Plains in the Central highlands in Sri Lanka indicating similar climatic conditions. The lower boundary (9,900 BP) of local pollen zone 2 (LPAZ 2) manifests an increase of upper montane rainforest arboreal taxa showing a transition of the climate from 'semi arid to relatively high humid condition' (Premathilake and Risberg 2003:7). The Pollen records from Rajasthan show the emergence of fresh water lakes suggesting an increase of precipitation (250 mm higher than the modern annual rainfall) (Goudie *et al* 1973:254; Deraniyagala 2004:157). This wet phase corresponds to the climatic regime signaled by the pollen records from LPAZ 3 (9,900-5,400 BP) where the increase

of upper montane rain forest taxa (eg. *Calaphyllumwalkeri*) suggest the amplification of annual precipitation (Prematilleke and Risberg2003:8). A third pollen phase (LPAZ 4 (5400- 3600 BP)) suggests semi-arid environment. Summarizing most of the important works that have been done on the Holocene climatic history in South Asia, Deraniyagala (2004:158) has proposed a scheme for Sri Lanka i.e. (a) > 10,000 BP (very dry); (b) 6,200 BP (dramatically wet); (c) 5,000 BP (dry); (d) 3,600 BP (dry).These shifts are likely to have also affected seasonality and geographical shifts, particularly in the areas that are now intermediate between the dry and wet regions in Sri Lanka and which have been the focus of our present study area. We will however base our interpretation on the existing knowledge of climate variability.

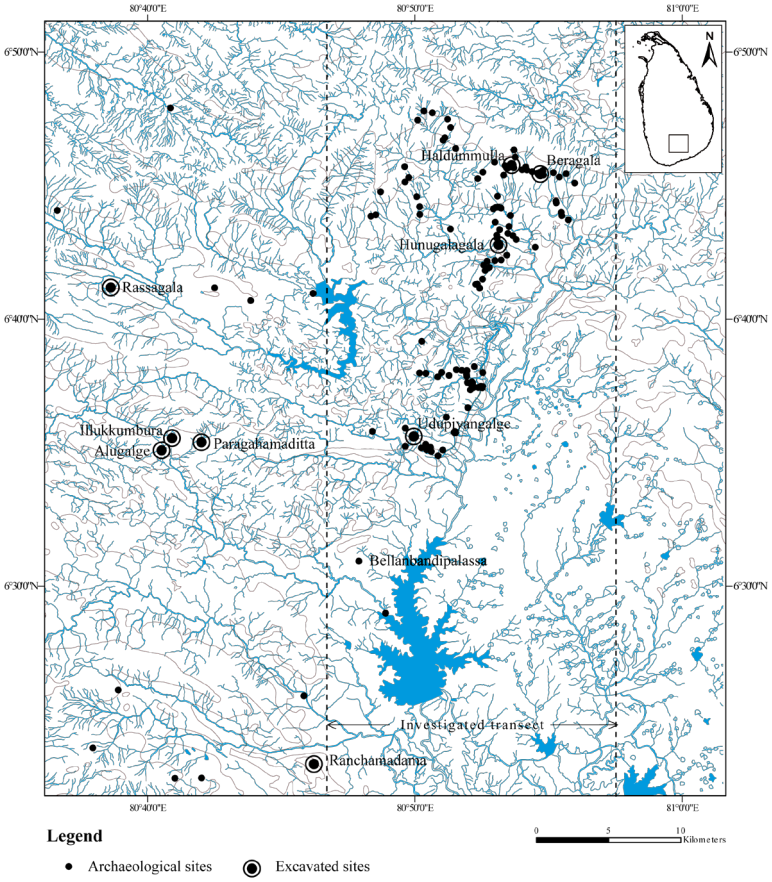
Transition Mesolithic and Iron Age

The terminal phase of the Mesolithic is archaeologically discernible in stratigraphic levels ascribed to the early second millennium BCE (Deraniyagala 1972). ^{14}C dates from charcoal samples obtained 10.20 m below the surface of a mound excavated at Matota have revealed three dates; 3520±45 BP [BM-2340] -ca.3830 cal BP- (*after* Pearson &Stuiver 1986), 3550± 70 BP [BM-2341] -ca. 3850 cal BP and 3790±70 BP [BM-2342] -ca. 4170 cal BP (Deraniyagala 1992:701). The upper boundary of the Mesolithic culture at this site is *terminus ante quem* of *ca*. 3800 cal BP and correlates geologically with the event of Younger Peron high sea-level (Fairbridge 1976). These dates suggest that the most recent reliable date assigned to the Mesolithic culture in Sri Lanka goes back to c. 1800 BCE.

The period from 900 BCE is characterized by the emergence of Iron technology, local variety of Black and Red ware pottery, cultivation of rice and the use of domesticated cattle (Deraniyagala1992:709) based on excavations conducted at the ancient citadel area in Anuradhapura. Another attribute of the newly emerged protohistoric Iron Age is the megalithic cemeteries scattered predominantly in the dry zone areas. Only four cemeteries (i.e. *Ibbankatuva*, *Yatigalpotta*and *Kalavallaulpot*a in the Matale District, *Galsohonkanatta* in the Kurunegala District) have been investigated archaeologically. Dates range over a period from 768-383 BCE (Deraniyagala:734; Bandaranayake 1992). The material culture (use of Iron and the emergence of agriculture) manifested by the stratigraphic levels in Anuradhapura citadel excavation has no indication of mixing or connection with Mesolithic material and therefore an abrupt leap from the Mesolithic to the Iron using culture has been suggested.

Surveys and excavations

As discussed above the ecological focus of the HTP was a wider transect stretching from the *Handagiriya* plateau crossing the *Kaltota* escarpment to the southern slope of the central highlands (*map 2*). Fieldwork in the years from 2006 to 2009 were carried out focusing on the middle basin of the river *Walave,* where the elevation of the terrain was confined to 500 feet msl. Subsequently surveys were shifted towards the headwaters of the same river situated up to 3000 feet msl.



Map 2. The map showing the distribution of the locations of archaeological significance in the study area

The 2010-11 fieldwork included an extensive ground reconnaissance survey program and two excavations were conducted in the higher elevations (from 800-3000 feet msl) of the southern slope of the central mountains. The main focus of

the ground reconnaissance survey was the geographical area extending from *Opanayake* to *Haputale* which is approximately 50km apart. Several archaeological sites were located, scattered on the mountain slopes (3000-5000m msl) starting from the Horton Plains down to the Haputale plateau on the southern gradient of the central mountains. The scatter of sites suggest that a dispersal of settlements has occurred across different biomes (for further reference on transhumance, *vide* Butzer 1971 & 1985; Lieth 1973). The surface survey has revealed a considerably wide scatter of sites on the mountain slopes with stone implements (quartz and chert) on the surface. 90 individual locations were identified within about 20 square km. The number of identified sites, at first glance, does not suggest a thick density of sites, but we estimate that only 40% of the original number of sites remains after the destructive landscape modifications had taken place in connection with the expansion of tea plantations since the early 19th century.

The surveys identified a number of potential sites for further excavations and the selection of sites was based on chrono-stratigraphy focusing on the mid/late Holocene and geographical representation in the three separate climatic zones outlined above. All the caves excavated have very shallow soil deposits confined to less than 5 separate soil layers.

Four excavations were carried out in four selected caves. First was a cave in the village *Rassagala* of the Balangoda Divisional Secretariat region and the second was a cave called *Lunugalge* in the village Illukkumbura of the Valigepola Divisional Secretariat

region. *Udupiyangalge* in Kaltota was the third and *Alugalge* in the village Illukkumbura is the fourth cave excavated. The cave in *Rassagala* is situated in the wet-uplands and the *Lunugalge* and *Alugalge* caves are in the threshold region between wet and intermediate climatic zones. *Udupiyangalge* cave falls in to the dry zone.

Rassagala

Rassagala is at an elevated height (730.m) situated in the village of the same name belonging to the *Polvatugoda* GS division of Balangoda. There is a huge rock that could be seen on the summit of this height. Beneath the eastern edge of the rock forms a cave, its mouth facing southeast. Dimensions of the interior of the cave are 10.5x17.4m At the time of the first visit to this location there was a construction of a cell covering a greater part of the interior space. It has rubble walls erected up to the roof level of the cave. Subsequently it was removed. Sub-surface of the floor area seems disturbed to some extent during the digging of foundation trenches. According to the village informants, this place had been occupied twice by Buddhist monks for short periods sometime back. The history of the recent occupation had been in early 1960s. According to a date inscribed on the rock surface, it was reoccupied in 1983. Except the disturbances caused during the recent constructions, no other serious transformations had occurred at the location. The surrounding landscape of the Rassagala cave has been modified for tea cultivation since mid 20th century. Only a tiny part of undisturbed vegetation remained

in the adjoining land strip of the cave. On the right side of the cave, there is a heap of soil , probably washed off from the hilly terrain at the upper levels. It could be inferred that the infiltration of soil and other colluvial materials on the right side edge of the cave would have been caused by soil erosion. Debris amassed inside the cave might have been removed during the construction of the cell.

On the left side of the cave is a huge rock rising vertically about 30 meters forming a fairly protective shelter. The floor area of this rock shelter has also been covered by a foundation of a masonry construction layered in 1983.

Excavation at *Rassagala* cave has revealed a collection of prehistoric lithic implements comparable morphologically as well as typologically with the other cave sites excavated in the vicinity. However, the dating of the site was constrained by the contamination of sub-surface layers by the modern occupation in the cave.

Lunugalge

The second cave, *Lunugalge* (550m msl),selected for excavation was situated about 30km south of *Rassagala*. *Lunugalge* is situated on a narrow plateau on a steep mountainous slope with its mouth facing south. Dimensions of the cave are 15.5 x 5.9m and the maximum height of the cave roof is 5.4 meters. A series of cavities visible on the cave wall suggest a prolonged physical erosion. Water seepage is visible from the roof on the left side, probably originated from the surface of the rock. Despite detailed

surveys, no painting or etching of a prehistoric origin could be seen on the rock wall. The left side portion of the cave floor, down to 2 meters from the surface (22m^2 square meters which is 24% of the total area of the floor), had been destroyed by treasure hunters. Diggers had dumped the soil of their illegal trench on the cave floor at the right side. A large heap of excavated soil was still remaining when we first visited the cave, as a result thousands of prehistoric stone implements were scattered in and around the cave. Three pitted-hammer stones were collected from the surface of the cave interior during the excavation.

Lunugalge cave revealed 3 consecutive soil layers consisting prehistoric lithic implements (similar to that of found in *Udupiyangalge,* see below). The most important finding from the cave was an assemblage of charred seeds of 25 individual varieties (see below) recovered from the soil layers of prehistoric origin. The topmost soil layer of the interior would have been occupied in the early historic period and it suggests a prolonged occupation of the cave perhaps intermittently for at least 3500 years onwards since mid-Holocene.

Udupiyangalge

A third cave, *Udupiyangalge*,(249.50m msl) excavated in early 2016 is situated on a hill slope below the village Molamure of the Balangoda Divisional Secretariat division. *Udupiyangalge* is a fairly large sheltered space facing southern direction (fig.1). Total habitable area of the interior is approximately 330 m^2.The interior floor area appears at two levels, the remains of the lowest floor,

level 1, can be found in the right corner. The floor of the right side had been elevated by the construction of a low retaining wall to create required space for ritual and residential requirements. According to the local informants, the upper level was filled with soils brought from the outside of the cave premises. The mean height of the lower terrace is 249.50m while the upper terrace has been elevated up to 0.58m (250.08m). Quite a large pit filled with water is remaining at the right side edge of the cave interior which is an abandoned gem-pit dug out by the villagers. *Udupiyangalge* cave was archaeologically investigated by P.E.P. Deraniyagala in 1936. He did a brief investigation in the interior cave floor and he stated that:

> *…… the presence of the semi-lunate microliths and the pebble hammer stones suggests that this was a Mesolithic culture that had evolved into the Neolithic (1958:246).*

In 2016, excavations were carried out at a location on the elevated terrace in the left side edge of the cave floor of an area 3x2.40 m. Excavations revealed 3 consecutive soil layers down to 1.55 m. The first two layers consist of prehistoric lithic implements (quartz and chert) of several new forms which have not been seen before in lithic assemblages in Sri Lanka. The density of the artifacts gradually decreased down to the third layer. A rich collection of bone tools were also found. The presence of a bulky assemblage of prehistoric food residues including charred animal bones and land snail shells(*Acavussp*., *Paludomoussp* and *Oligospeirasp*) may suggest two things *viz*. either a prolonged occupation or an existence of a considerably large group on a seasonal base in

the cave. Two pendants made out of chert flakes are the most fabulous artifacts that have been recovered from the excavation, and that we interpret as symbolic.

Alugalge

The fourth cave selected for excavation is *Alugalge*, situated on a steep slope in the woods of the mountainous landscape (360m msl) of *Maddekanda* in the village Illukkumbura. The mouth of the cave faces the southeastern direction and it prevents the flow of wind and water into the cave during the monsoon rains. The width of the entrance of the cave is 6m and the maximum roof-height is 2.5m. Either sides of the entrance are enclosed by rock boulders of different sizes forming a cladding effect to the interior. A considerably large accumulation of rock fall from the cave roof was observed in the interior before the excavation. Approximate extent of the cave floor is $30m^2$. The cave interior has a prehistoric deposit of 1 m. depth.

The first season of the excavation in *Alugalge* initiated in July 2016 has revealed an assemblage of artefacts which is similar to that of the other caves excavated in the area, showing some striking characteristics pertaining to the prehistoric economy during the mid-Holocene. Findings of shark teeth and several pieces of coral stands as a strong indication of the material exchange maintained with the seaboard which lies 40km south to the cave. As we saw in *Lunugalge*, the prehistoric occupation in the cave had been continued for a considerably long period as suggested by the AMS dates.

Table 1. Radiocarbon dates (AMS) assigned to the prehistoric contexts of the caves excavated

Site	Sample no.	Provenance	Lab ref.	Conventional date	Calibrated date (2 sigma)
Illukkumbura	ILK/2015/S3	context 5	Beta 422152	5060 ± 30 BP	Cal. BC3955 to 3780
		context 4	Beta 422151	5350 ± 30 BP	Cal. BC 4320 to 4290
Alugalge	ALG/2016/ S2	level III-IX	Beta 448329	4630 ± 30 BP	Cal. BC 3505 to 3452 Cal. BC 3380 to 3355
Udupiyangalage	UPG/2015/	context 3	Beta 450381	8680± 30 BP	Cal. BC 7745 to 7595

* Environmental samples were analyzed through AMS dating method in the Beta Analytic Inc. in the USA.

Results

Surveys in 2013 yielded an assemblage of material evidence notably including grind-stones, pestles and finely made microlithic implements showing a probable new leap towards the intensive utilization of wild grasses still available in the surrounding landscape. ^{14}C dates obtained from the recent excavations, indicate that such a deviation could be securely placed somewhere in the 5th millennium BCE. Therefore cave site excavations focused on this time period, and fortunately more detailed data obtained from botanical remains helped to address the problem of shifts in resource exploitation. Below, we will discuss the results from

excavations when it comes to resource exploitation, technology and symbolism.

Resource exploitation

As discussed above, basic experimentation on exploiting wild floral resources (seeds, grains, and nuts) is suggested to have been initiated around 5000 BCE in the marginal area between wet and intermediate climatic zones in the uplands. This is archaeologically indicated by an assemblage of charred seeds excavated from three caves (*Lunugalge*, *Udupiyangalge* and *Alugalge*) situated in wet, dry and intermediate zones respectively. Preliminary investigations show that there are 25 varieties of seeds/nuts in the excavated assemblage. One identification could be made visually of the nut of *Carneriumzeylanicum* (local: *dikkekuna*) which the species is endemic to the wet zone in Sri Lanka. The presence of this seed in *Lunugalge* and *Udupiyangalge* is a continuation of prolonged experience of the Mesolithic hunter-gatherers occupying the wet lowlands as suggested by finding the same in other locations in the country (*vide*, Deraniyagala 1992: 452).

Most of the cell structures of the optically analyzed seeds were destructively changed due to the high temperatures during the food preparation, therefore Pharmocognistical analysis of the plant remains was conducted in the Industrial Technology Institute (ITI) in Colombo. Microscopic observations of the thin-sections obtained from the individual seeds show the presence of different characteristics, such as *sclerenchyma* tissues, *annuler xylem* vessels and *trichomes* identical to modern plant residues (fig. 2a, 2b). but the preliminary analyses show that the Pharmocognistical

method is a productive technique to identify the floral origin of morphologically transformed plant materials.

Fig.2 a. A microscopic image of a plant tissue extracted from the sample

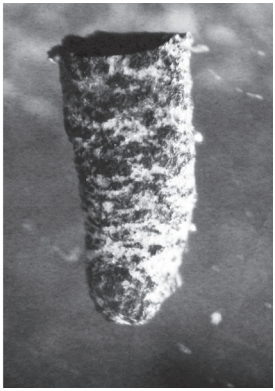


Fig. 2b. Another microscopic image of a plant residual extracted from the sample

An Ethno-botanical plant survey, carried out by the local medical practitioners in the area around *Lunugalge* cave has also guided the tentative identification of some of the seeds in the assemblage(figure.3).

Fig.3. While in a discussion with the local medical practitioners in the field (pic. D. Devage)

All seeds represented in the archaeological excavations are locally available in the surrounding landscape even in the present day. Some varieties are currently used by the local medical practitioners. The presence of Kodo-millet (local: *'amu'*) (*Paspalum sp.*) in the excavated seed collection could be taken as an interesting case. The oldest evidence of millet been reported from South Asia is from a site of Harappa in northern Pakistan dated to a period between 3300 to 1900 BC (Kenoyer 1998; Weber 1999). But the presence of wild millet in this assemblage suggests experimentation with this species before domestication. The grind stones and pestles (fig.4)

found from a locations in *Walmeetalava* of Haldummulla during the site survey in 2013 could be taken as one of the technological inventions prompted by the intensification of the exploitation of wild floral resources (Somadeva 2014). In addition, several pieces of crude hand-made pottery have been discovered on the surface at a location called *Mantenna* in Haldummulla during the reconnaissance survey conducted in the year 2010 (Somadeva 2014). The origin and dating of these ceramic sherds remains to be confirmed but we find it plausible that they belong to a pre-Iron Age context.

When it comes to the bone assemblages bones were recovered and analyzed from *Lunugalge* cave *Udupiyangalage* and *Alugalge*. Bones identified represent a variety of animal species notably

Fig. 4 Grind-stones and pestles recovered during the field survey in Walmeetalava (pic. by author)

small animals, rodents, cats, civets, or reptilian. Monkeys were also represented, primarily small monkeys. The choice of relatively small game might have been a decision taken by the Holocene hunter-gatherer groups to reduce the energy invested upon hunting. Especially in comparison with the other Mesolithic sites in the country, the decrease of hunting cervids such as Spotted deer (*Axis axis*) and Sambhur (*Cervus unicolor*) is noteworthy.

Technology

The stone implements recovered from the surface of more than 80 individual locations scattered in the western slope of the central highlands show a considerably high degree of technological diversity in comparison with the similar artifacts recovered from other Mesolithic hunter-gatherer sites in the country (Deraniyagala1992:185; Perera 2010: 107). Manufacturing of form-trimmed implements are considerably more common in the excavated context than elsewhere in Sri Lanka. 24.92% (n=1226) of the total assemblage sampled (n=4911) are form-trimmed implements and it is an increase of 12.46% against the same (0.2%) in the former collections of Mesolithic implements excavated by others (*ibid*). Greater preference is discernible of manufacturing fine quartz blades. New plane forms including arrow-heads, fish-hooks chisel type implements (burins?) and stone needles emerged (Devage, 2014). The archaeological layers in the excavation at the *Lunugalge* cave have shown an increase of manufacturing stone projectile points (quartz) over time suggesting the hunting of small animals especially like birds and rodents. This corresponds with the faunal assemblage excavated where small animals are in majority.

Symbolic artifacts

Symbolic artifacts found in the material repertoire of Mesolithic hunter-gatherer sites in Sri Lanka, are not well representative in comparison with other material objects. However, the four caves excavated have yielded artifacts that suggest that considerable energy has been invested upon producing what seems to be non-utilitarian objects (hence their interpretation as symbolical). Some of the most elaborated artifacts present in the collection are described below.

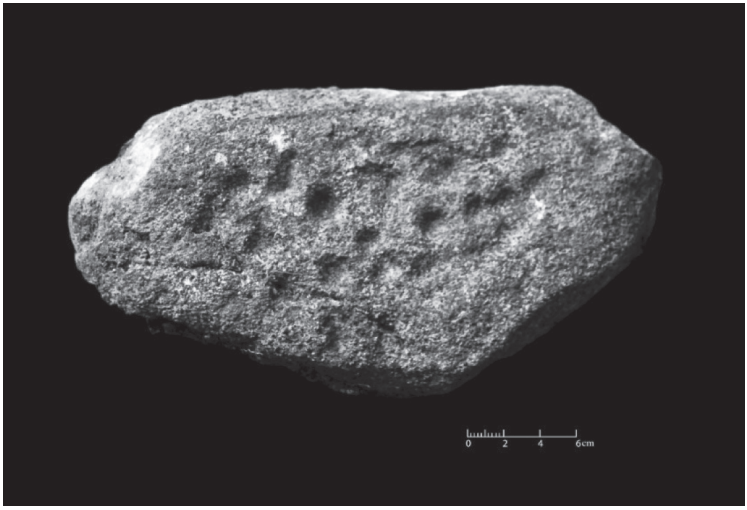


Fig. 5. A pitted sand-stone recovered from Lunugalge
(pic. D. Devage)

The pitted sandstone that has 19 shallow cup-marks was reported from context 4 in the *Illukkumbura* cave. The length of this object is 32cm and the maximum width is 17cm with a thickness of 0.9cm. The depths of the cup-marks remain within a range of 0.3cm and

0.8cm. The perimeter of the hewn area clearly delineated by a line along the edge of the rock confirms the entire piece has been decorated purposefully.

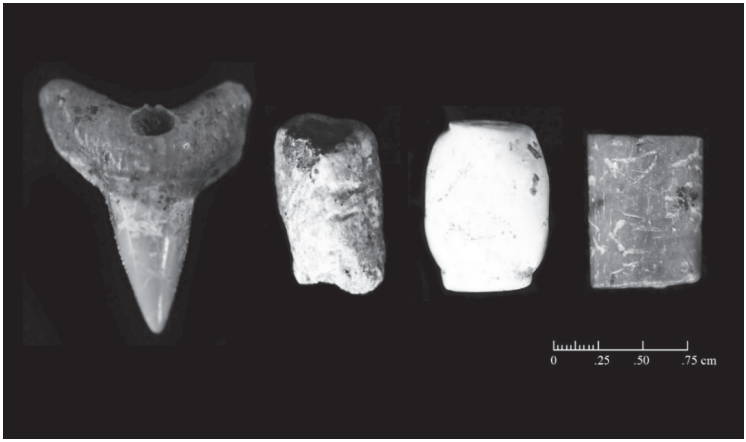


Fig.6. Some of the beads excavated from the investigated sites (pic. D. Devage)

A stone flake (red chert) intentionally shaped into a human heart (length 2.55cm width 1.8cm) has been discovered (context 3) from the interior of the *Udupiyangalge*. The upper part of this object has a tiny perforation that would have been utilized to hang it by a thread. Substantial proofs are available in prehistoric caves in Sri Lanka to show that such perforated objects were used as beads or pendants (Deraniyagala 1992; Perera 2010). Two similar artifacts were recovered from this cave.

The excavation at *Alugalge* in *Illukkumbura* has revealed 4 beads made out of animal bones and teeth.The bead of animal tooth (level III) shows a comparatively high skill of craftsmanship: its

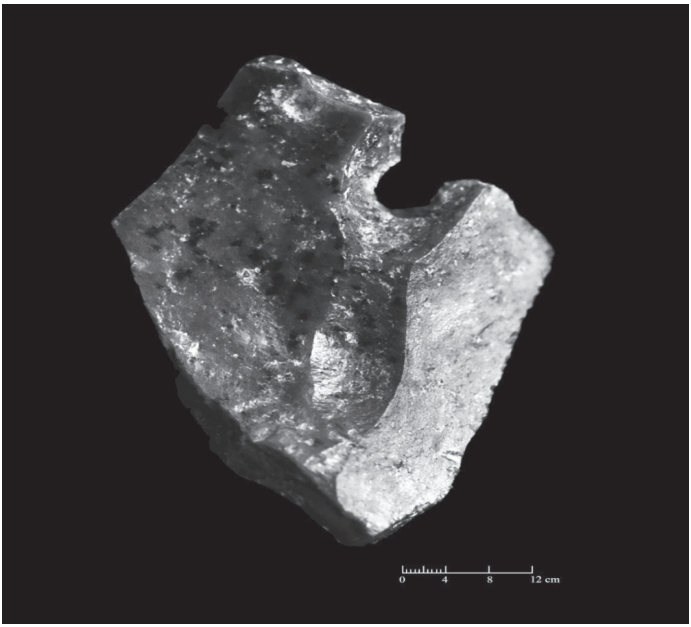


Fig. 8. A stone slab depicting a painted diagram recovered from Alugalge

cylindrical shape has been enhanced by two edges to obtain a collar like appearance. The shaping of the tooth required hard labor and curation. The most sophisticated bead recovered is an altered Shark tooth. Its nutritive groove was enhanced through a perforation. The natural color variation between the crown and the roots in the tooth together with the natural symmetry most probably created an aesthetic appeal to the bead.

A stone slab (gneiss) measuring 0.46m (L) x 0.30m (W) x 0.10m (T) recovered from the *Alugalge* cave has a depiction of a grid demarcated by a series of geometric lines on one of its surfaces. The lines had been defined using a certain kind of a sticky glue. The

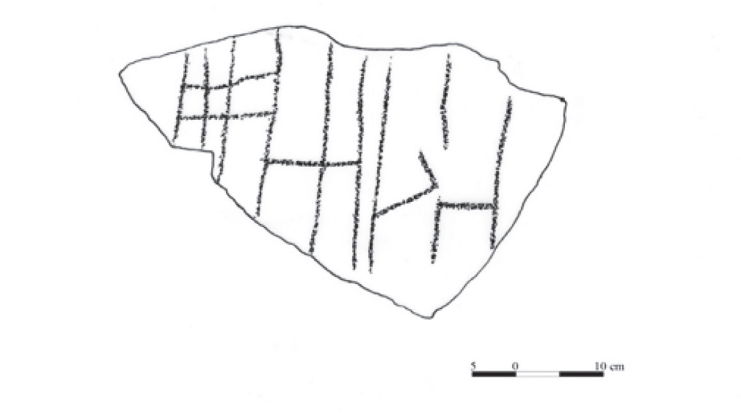


Fig. 7. A pendant made out of a piece of chert recovered from Udupiyangalge (pic. By author)

Pale whitish color of the patches of glue lines contrast with the dark surface of the stone. Nine vertical lines and four horizontal lines were found remaining in this diagrammatic representation. Out of such 3 lines had been drawn as slightly angular projections. The author responsible for creating this graphic representation had an intention to follow a certain tempo on his work as suggested by the distance variations between the vertical lines and the sporadic discontinuations maintained in the horizontal lines.

An assemblage of ancient phallic representations made out of stone (gneiss and sandstone) has been unearthed from the interior of the limestone cave excavated in *Walmeetalava*of Waeliya in Haldummulla. The collection included sculptural icons of 2 female pubic triangles, a single portrayal of a female lower body part with enhanced sexual organs and 2 male phalluses. It is a well known phenomenon that the emergence of making human body parts in an iconic form was a widespread practice among the Neolithic

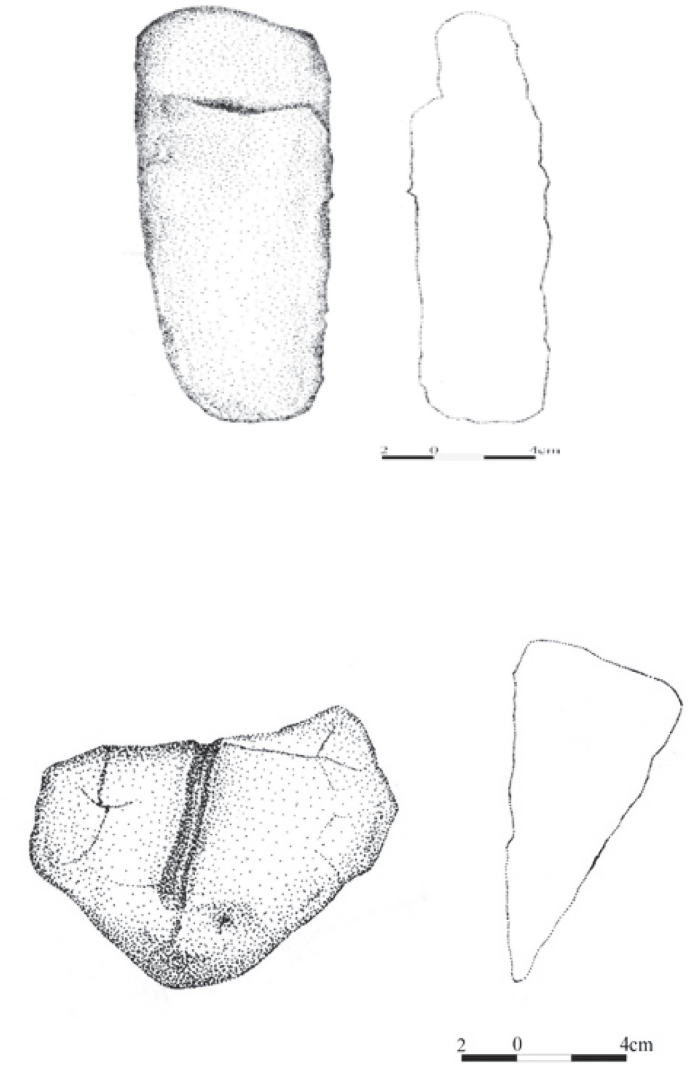


Fig. 9a & 9b. Drawings of the phallic objects excavated from the limestone cave in Walmeetalava

societies in different geographic areas in the world. Neolithic phallic icons have been interpreted along diverse intellectual avenues (*vide*. Baily 1996; Haaland and Haaland 1996; Hamilton 1996; Marcus 1996; Ucko 1996; Lesure 2002). The existence of phallic objects in the present cave suggest an emergence of a system of new beliefs centered on somatic representation among the advanced hunter gatherers of the mid Holocene.

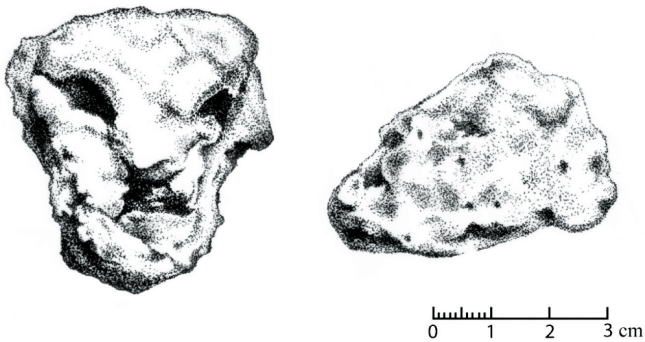


Fig. 10. A clay image depicting a face of a dog recovered from the excavation at Alugalge

A terracotta motif of a dog (*Canis lupus familiaris*) has been reported from level III of the excavation in the interior of the *Alugalge* cave. It is a terracotta work that has a thin coating of lime on the surface. The evidence suggesting the presence of dog in the prehistory in Sri Lanka is scanty. Skeletal remains of a dog were reported from *Bellanbandipalassa* dated to *ca*. 6500 BP and also from Nilgala cave in the Ampara District (Deraniyagala 1992: 454). A global scale study of mitocondrial and Y-chromosome

DNA of the modern dogs suggests their single East Asian origin (Savolainen*et al* 2002; Ding *et al* 2012). Domestication of dog in that region had occurred in the period between 14 000 and 9000 BCE (Freedman *et al* 2014).

Discussion

From the site surveys we can conclude that there is a wide distribution of individual sites. The wide spatial distribution of sites, most of them probably only temporary camps, suggests that the contemporary hunter-gatherers had invested much labor in quest for food searching a wider area along the mountainous tracts. Unpredictability of edible resources in a spinning climatic condition of the Holocene would have produced tension on decision making and the indubitable response to this nature was to turn into reliance on gathering more floral resources than hunting. The major characteristic visible in the archaeological matrix of this scenario is a gradual shift of the lifestyle of the traditional hunter-gatherers. Appearance of several new forms of lithic implements and more receptiveness shown towards the plant exploitation are the basic behavioral characteristics of this new makeup.

We proposed that pre-adaptations in Mesolithic hunter-gatherer communities made way for later Iron Age cultural and technological transformations. As shown here our surveys and excavations do suggest an intensification of the use of wild plant resources around 5000 BCE, with findings of grindstones and use of wild millets as also, other plant material. We have also found evidence of technological changes in lithic technology and also, what can perhaps be interpreted as intensified use of symbolic expression in the same contexts.

Though more dates are needed and complimentary analyses both of archeological and paleoecological data, the results of our surveys and excavations do suggest a cultural-technological shift in the mid-Holocene that does correlate with the shift from wet to dry conditions at 5000 BCE. Most of the evidence of transformations is also from the intermediate climate area, that is the area that today lies in between the wet and dry areas and in which we experience high variability in the period of a region climate regime shift. Thus, tentatively we also have some preliminary evidence that areas of higher environmental communities were more adaptable, in terms of transforming livelihoods from a broad spectrum to intensified use of plant resource to enhance resilience.

By 5000 BCE climatic conditions of the Mid/late Holocene in the mountainous hinterland in Sri Lanka had critically influenced the Mesolithic hunter-gatherer population. The effects were further augmented by the regional climatic variations (wet/dry/intermediate) which were decisive to have made a distinction in the local stock of flora and fauna. The stress triggered by fluctuating climatic regime demanded a high degree of resilience from the prehistoric groups resulting in local transformations manifested by material culture. The symbolic objects presented somehow prove that inhabitants of the investigated caves had attempted to see the external world in a radically new and different way from what their predecessors thought. This move does not mean that they had fully transformed to a novel life style, but, we argue that there had been a fundamental change both in livelihood and mentalities that made way to later transformations in lifestyles with the introduction of the Iron Age innovations.

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Raj Somadeva entered to the University of Kelaniya in 1982 and followed Bachelor of Arts (BA) Degree in Archaeology. In 1986 he won a Second Class Upper division Honors Degree from the Faculty of Social Science. He joined the Postgraduate Institute of Archaeology as an assistant lecturer in 1989. Raj Somadeva has completed his Master of Philosophy Degree (MPhil) in 1994 in the same University. He earned his Doctor of Philosophy (PhD) Degree from the Department of African and Comparative Archaeology in the Faculty of Philosophy of the Uppsala University in Sweden in 2006 where his thesis titled 'Urban Origins in Southern Sri Lanka' was accepted as a part of their publication series on Global Archaeology in 2006. In 1990 he was invited by the German Institute of Comparative Archaeology (KAVA) in Bonn as a visiting research fellow. He was a Charles Wallace Research Fellow (2005) of the Institute of Archaeology in the University of London.

Raj Somadeva was appointed as an Assistant Director to the Sigiriya and Dambulla project of the Cultural Triangle in 1989 and also the Field Director of the Sri Lanka-Germen Excavation project in Ibbankatuva and Pidurangala. He was also served as the same capacity to the SIDA-SAREC funded Settlement Archaeology Project in Sigiriya-Dambulla region.

In 1998 he was awarded as one of the winners of Top Ten award in Sri Lanka under the category of Academic leadership and accomplishment. He was served as a member of the advisory committees to the Director General of Archaeology and the Department of National Archives. In 2015-16 he was appointed to the board of the National Research Council (NRC).

Among his publications are Archaeology of Urban Origins in Southern Sri Lanka (2009), Archaeology of Uda Walava Basin (2010), The Nilgiriseya Survey (2012), Archaeology of Mountains (2014), World Civilizations (in Sinhala) (2016). His publication titled ''Rock Paintings and Engraving Sites in Sri Lanka won the State Literary award for the best academic publication (English) in the year 2013. He won the Vice Chancellor's award of the Kelaniya University for the best researcher in theyears 2015 and 2018. Raj Somadeva has published more than 50 research articles both locally and internationally. He has actively contributed to the compilation of the School History curriculum revisions held in 2014. Raj Somadeva is also contributing his service to the Central Cultural Fund of the Ministry of Education as a Project Director of the Cultural Triangle in Southern province. And he introduced Forensic Archaeology to the country. He was invited to carry out the forensic investigations of the Mass grave recovered from the Matale General Hospital premises and his report was well received internationally. Now he is serving as the Consultant Professor of Forensic Archaeology of the Mass grave recovered in Mannar which is the most controversial forensic investigations in the country. Professor Somadeva is currently being serving as a Senior Professor in Archaeology in the Postgraduate Institute of Archaeology in Colombo and is a founder Fellow of the Sri Lanka Council of Archaeologists. He is also a life member of the Society of South Asian Archaeologist based in New Delhi.

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