



PLASTER AND COLOUR TECHNOLOGY OF ANCIENT SRI LANKAN MURALS

MENAKA NISHANTHI

Assistant Librarian, University of Sri Jayewardenepura, Sri Lanka
E-mail: nishanthi@sjp.ac.lk

ABSTRACT

A large number of murals painted by ancient artists can be seen in various places in Sri Lanka. Always artists set the backgrounds before drawing. They took great care in the architectural features of the temple as well as on the background of the paintings. In the past, they chose different surfaces for the painting and used different types of plaster. They were well versed in the chemical reactions of the mortars used in the paintings as well as in creating paintings to withstand the prevailing climatic conditions in the country. Ancient artists in the past possessed a traditional knowledge of how to prepare plaster and use native plants and minerals to make the colour formulae. This research revealed that Sri Lankan ancient artists had a great ability to use local materials to create colours that have remained unchanged over time. It is proposed to study the traditional plaster used on various surfaces by the Sri Lankan ancient artists for ancient murals in Sri Lanka and the appropriate colours used for the plaster, as well as the techniques of their production.

Keyword: Ancient murals, Color technology, Plaster technology, Sri Lanka

Received : 23 March 2021

Revised : 25 March 2021

Accepted : 05 April 2021

Published : 3 May 2021

TO CITE THIS ARTICLE:

Menaka Nishanthi. 2021. Plaster and Colour Technology of Ancient Sri Lankan Murals. *Journal of History, Art and Archaeology*, 1: 1, pp. 91-100

Introduction

The media of art have a long history as one of the means of expression since the beginning of human civilization and it generally characterised by some particular features. Even from a time when there was no literal capability man freely evolved his imagination

by using art as a form of communication. In examining the Sri Lankan art and related issues the the gradual evolution of art from the prehistoric period to the present can be discerned from the extant specimens.

Buddhist art entered Sri Lankan culture with the arrival of the Aryan speakers. When Arahath

Sangathitta Maha arrived in Sri Lanka with a sapling of the Maha Bodhi Tree, eighteen caste artists came to the island with her. With this, the art of Sri Lanka was rejuvenated and spread through the Buddhist temples. Formal art thus began by painting the character of the Buddha and the events surrounding the Buddha and it has evolved creatively through various eras and continues to the present.

Art in Sri Lanka can be historically divided into eras for the convenience of study. This classification can be done in terms of style, techniques, technology, object, and artistic appreciation. The trends in art can be categorised according to different dynastic periods, viz. the Anuradhapura period, Polonnaruwa Period, Medieval period, Kandyan period and the Modern period (Amarasinghe 2000:15) as the period of each dynasty coincided with the rise and changes in art. The traditional art form has been created by the creative models of the Sinhala art form following the advice and necessities of the kings who ruled in those times.

Art has been used as a means of communication among the indigenous people of Sri Lanka even before the advent of the historical period. Artists of ancient times have painted not only on the interior walls of the caves, but also on the rock surfaces. When painting murals in Sri Lanka, old craftsmen tried to create a suitable surface for it. In the prehistoric era, murals were painted on the rocky surface of caves with colours, but no murals were painted on the prepared plaster. Before drawing murals on the cave or rock surface, a conspicuous feature of these caves is that the upper part of the rock was horizontally carved into drip-ledges on the brow that served to prevent rain from dripping into the cave interior. Three surfaces have been used for painting by the artistes. They are rock surfaces, brick surfaces and wood surfaces (De Silva 1971: 90). In the early days, rock surfaces were the most commonly used for paintings. We find that these rock surfaces are made up of three types :

- Drawings on rough surfaces, examples of which can be found in the Abhayagiri Deegapashana rock cave (Fig.10.1).
- Slightly soft rock surface drawings where the stone spalls were removed and the surface area for the painting was pierced with

a small mattock. This is done to keep the plaster hold fast onto the rock. Using this method, the plane of the Sigiriya paintings (Fig. 10.2) is prepared (Wijesekera 1990: 22)

- Drawings on more soft rock surfaces, where the rock plane is pierced before the plaster is applied. The best example of this is the Wahalkada paintings of Abhayagiriya (Fig.10.3). Strokes of subtle thorns in the *Vidyadhara* Cave (Fig. 10.4) are still visible even today. Depending on the nature of the rock surface, ancient artists have determined the type of plaster applied on them. Often, one or two specific plaster layers have been used on rough surfaces and semi-coarse surfaces. According to Raja de Silva, who researched the plaster, there should be at least three layers of the painting. There should be a colour layer “a Support Layer, a Paint Release Layer: (PRL) and a Paint Layer.” (De Silva 1971: 92-93)

Plaster Technology

There is considerable disagreement among scholars as to the method of plaster used in ancient paintings. Two types of plaster techniques are discernible; dry plaster (Tempera) and wet plaster (Fresco). Scholars

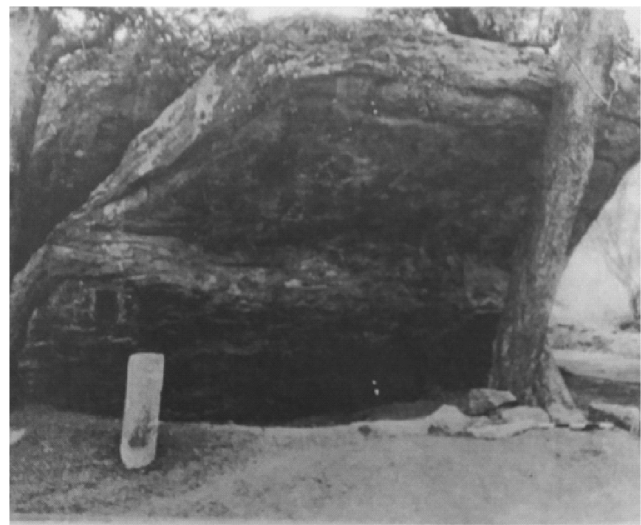


Figure 10.1: The Abhayagiri Deegapashana rock cave

Source: Kulathunga, T. G. 2004, Anuradhpura Abayagiri Viharaya, Colombo : Author Publication



Figure 10.2: Sigiriya paintings

Source: Archer, W. G., 1958, Ceylon: paintings from temple, Shrine and rock: paintings from temple, Shrine and rock. New York : New York Graphic Society

such as H. C. P. Bell and Nandadeva Wijesekera claim that artists used a wet plaster for Sigiriya paintings. But Raja de Silva and Jagath Weerasinghe say that there is no painting system anywhere in Sri Lanka on wet plaster. Jones Mark an analyst, says that due to lack of daily work restrictions, Sri Lanka may have used a method of drawing on dry plaster.

Nandadeva Wijesekera, who studied the Sigiriya frescoes, states that at least three layers have been used for preparing the surface. The first layer is



Figure 10.4: Picture of the Vidyadhara Cave of the Polonnaruwa GalViharaya

Source: Wickramagama, Chandra, 2011, Polonnaruwa Gal Viharaya, Nugegoda: Author Publication.



Figure 10.3: Wahalkada paintings of the Abhayagiri Stupaya

Source: Kulatunga, T. G. 1998, Abhayagiri viharaya., Colombo : Central Cultural Fund, Sri Lanka.

reinforced with herb fibres and paddy husks, and it is treated with Liver Red local alluvial soil. The red colour of this substance, which is very gritty, is due to the presence of ferric oxide. The second layer is made of sand, clay, lime, and herb fibres. Less than

2.75% of lime has been used for this middle layer. Its calcium carbonate content is 5%. Also, sticky materials such as dung, grain flour, glue, and wax have been used. According to Sana Ulla, the last (third) layer used for the Sigiriya paintings is about 1/8 inch thick and mixed with sand and limestone (1.75%) (Wijesekera 1990:23). The plaster is polished on the surface so that it can be painted well. Ananda Coomaraswamy describes the surface of the Sigiriya paintings as follows: “The plaster consists of a groundwork of earth (white ants nest) and kaolin, half an inch in thickness, strengthened with an admixture of paddy husk, and perhaps coconut fiber, and covered with white *chunam* (lime) smoothed with a spoon (Coomaraswamy 1994:176).

Murray, an Englishman who examined the mortar in the Sigiriya paintings, states that seasoned clay, paddy husks, and straws broken into small pieces were used to make the plaster. In this regard, H.C.P. Bell had said the same thing to Nanda Wijesekera. According to technical studies by Mohammed Sana Ullah, the layout and techniques of the Sigiriya frescoes blend well with ancient murals of other places like the Ajanta frescoes of Aurangabad in India. Also, the plaster for the Pulligoda paintings (Fig.10.5) is made of a mixture of clay, lime, and paddy husks and subtle lime was used for the surface plaster.

The surface for the Hindagala frescoes (Fig. 10.6), which were drawn near to the period of Sigiriya is similar to the surface for Sigiriya. In



Figure 10.5: The Pulligoda Galge Frescos

Source: <https://www.lankapradeepa.com/2019/06/pulligoda-galge-paintings.html>

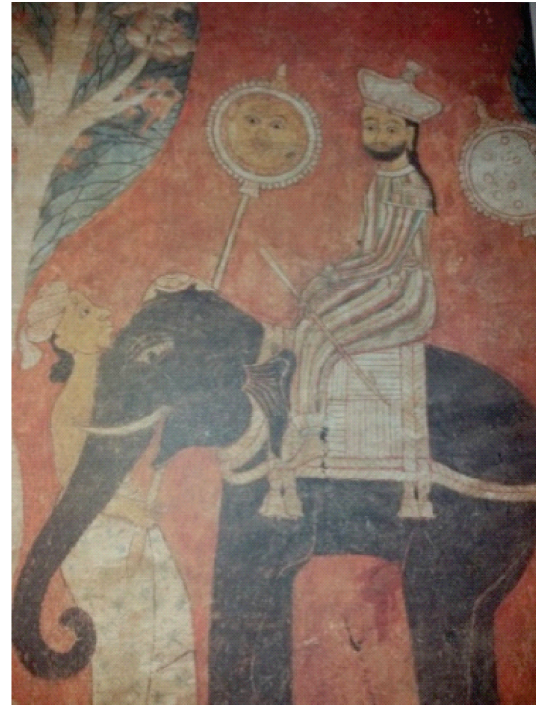


Figure 10.6: The Hindagala Rajamaha Viharaha Frescos

Source: Chutwong, N., Premathilaka, L. & De Silva, R., 1990, *Painting of Sri Lanka: Hindagala, Colombo: Central cultural Fund, Sri Lanka.*

Sigiriya and Hindagala, anthill clay has been used in making plaster and the white ant's saliva has been found to be of a sticky quality. By comparison, the surface layer is a little rough, and dung and paddy husks can be seen. The small openings in the surface which mixed with clay, allow for better internal air circulation. Hence, due to the drying of the plaster, it was also protected from destruction. This plaster is as tough as cement. Luciano Marenci, an Italian researcher on the structure of the mortar of the Hidagala Vihara, states: “The layer is about 5 millimetres thick, and the second layer consists of a white mixture of hydrous magnesium, which is about two millimeters thick and this plaster is applied with a fine spoon on the walls.” (Maranzi 1972:2).

Two layers of plaster can be seen in the Karambagala cave in the Southern Province of Sri Lanka. There is also a cane used for plaster. Two layers of plaster can also be seen at Maraweedi in Dimbulagala where the composition of the plaster is slightly different from the others. The rock surface is covered with reddish clay mixed with sand that does not contain limestone. The plaster is well dried

and there is no sticky texture. The surface is covered with 1/16 inch limestone, and in some cases the lime layer appears to have fallen off (Wijesekera 1964: 94). When executing paintings upon stone pillars, the paintings were upon a thin layer of plaster. Examples of this can be seen in the plaster layers found at the Polonnaruwa Gal Vihara (Rock Temple) and near the Ruwanweli Dagaba. There, a limestone plaster mixed with fine sand and a thin limestone plaster over it is found. The thickness of the entire plaster is less than 1/2 inch.

By the time of Polonnaruwa, the brick wall had a very different appearance than the plaster used in the rock. Nandadeva Wijesekera says that the first layer is made of a mixture of sand, clay and lime (Wijesekera 1964: 94). The mortar used in the painting of the Thivanka Pilimage in Polonnaruwa is akin to a black cement mixed plaster and the walls have a layer of thin white plaster according to S.P. Charles. It is mentioned that spider clay, rice husk, refuse of coir and other materials are used for this plaster. This plaster is about half an inch thick on a brick wall (Charles 2003:2). It seems that beyond the stone and rock paintings of the Polonnaruwa period, the art of temple building had spread.

Also, the portrayal of the *Wessanthara Jathaka* in the Gadaladeniya Viharaya belonging to the Kingdom of Kotte is depicted upon a plaster made of sand and clay. The walls of the temple buildings of the Kandyan period are also unique in that we find a system of wattle walls. Cave temples have walls designed in a manner close to the cave portal. Although the wattle wall method is not an advanced technique, structures were built of strong wood for temple buildings and the wooden structure was filled with a mixture of sand and clay. As the wattle and daub wall created this way had a rough surface another layer of plaster was applied over it and the surface was well polished to suit the paintings. The gallnut (*aralu*), young coconut (*kurumba*), husks of Patana oak (*kahata*), and wood-apple gum were finely crushed and put into a bowl of water. A week later, after it was seasoned, the processed liquid was mixed with white clay and sand, and the paste applied to the wall. After it has somewhat dried, it was polished with a conch shell or *silluwa* and once well dried, *Mathurata makulu* clay was dissolved in

wood-apple gum water and a coat of this mixture was applied. (Karunaratne 1970: 519). With reference to the techniques used to create the wall surface used for drawing. S. P. Charles says that the top end of the wall of the *Gangarama Viharaya* in Kandy (Painting in the Gangarama Viharaya) (Fig.10.7) can be seen in the plaster, which is very well mixed like cotton wool, with a dark yellow substance like raw banana. But this has not yet been confirmed by laboratory research.

The method of making the plaster of the Kandyan period was very complicated. Each generation has produced various types of plaster. For the Anuradhapura period to the Kandyan period, the plasters were made using their long experience. During this time, the husk was not used for the preparation of mortar and the use of limestone was also limited. Instead, *makulu* clay, white clay, glue, and cotton wool have been used. Anthill clay, *makulu* clay, and cotton wool has been used for the plaster at Degaldoruwa Viharaya. For the painting of the Bambaragala Viharaya (Fig.10.8), pieces of cloth were spread over the surface and coated with a layer of plaster.

Also, the way in which the plaster is made from the paintings in the *Dambulla* cave temple is more complex (Fig.10.9). Here, white clay is dried and finely ground with a *kurakkan* (ragi) milling stone and mixed with fine-grained sand. The gallnut (*aralu*), husks of Patana oak (*kahata*),



Figure 10.7: The Gangarama Viharaya Frescos

Source: Chutwong, N., Premathilaka, L. & De Silva, R. 1990, *Painting of Sri Lanka: Gangarama*, Colombo: Central cultural Fund, Sri Lanka.



Figure 10.8: The Babaragala Viharaya Frescos

Source: Chutwong, N., Premathilaka, L. & De Silva, R. 1990, *Painting of Sri Lanka: Gangarama, Colombo: Central cultural Fund, Sri Lanka.*



Figure 10.9: The Dabulla cave Frescos

Source: Chutwong, N., Premathilaka, L. and De Silva, R., 1990, *Painting of Sri Lanka: Dabulla, Central cultural Fund: Colombo, Sri Lanka.*

nodal of young coconut (*kurumba*) and *godapara* (*dillenia retusa*) husks were boiled and well-knead with water, then cotton wool fibers were mixed into the same plaster mixture. These cotton wool fibers are often interconnected with clay. Then the finely prepared wood apple gum is mixed with a considerable amount of plaster and applied to the

surface, and it is flattened by pressing with the palm of the hands. When it is level, it is coated with *makulu* clay filtered three times. Paintings are then drawn on it.

Jeevath Naide, a well-known artist of the generation of traditional painters and a modern artist of the Nilagama generation, says that the traditional plaster is made by a mixture of sand and clay is added to a so-called “plaster water” prepared by boiling cotton wool, gallnut, husks of *Patana oak* (*kahata*), nodal of young coconut (*kurumba*), and husk of *godapara*, then honey is added to the same mixture to create a fine mortar for painting and statues (Dissanayake 1994: 190).

Ananda Coomaraswamy states that there were many ways of making plaster for paintings and the best way to make limestone mortar was to mix limestone and sand with a liquid of husk of *kahata* (Coomaraswamy 1994: 118). In addition, Ananda Coomaraswamy received a description from an old traditional artist named S.D. Mahawalathenna, about a technique used by contemporary artisans for the preparation of plaster.

Take the bark of an immature green coconut, then get the same quantity of the husks of the gallnut, Patana oak, banyan, and Esathu Bho, and slice them all together, and grind them in a wooden mortar. Put about four gallons of water to ten pounds of this mixture and leave it in a jar for about a month. Add to it about a hundred gallnat per gallon. Filter this mixture and apply it as a substitute for water when making the plaster. (Coomaraswamy 1994: 118-119).

It is also said that it is customary to take two limestone oyster to three fine sand or two limestone for two sand to make an ancient plaster. This type of plaster should be kept moist for about twenty days before using it. *Kithul* honey (liquid jaggery), *kaippu* (cutch), *kaduru* (poison nut) and sesame oil are mixed with the above mixture and used to wet the plaster (Coomaraswamy 1994: 119). There may have been many traditional methods of plaster making at that time, and it is clear that they are now completely out of use.

Laboratory research on the plaster of murals in temples built in the 18th and 19th centuries has revealed many important facts. Accordingly, the

necessary background for the paintings is made using various materials. The plaster is made several millimeters thick, then mixed with sand and cotton debris with light-coloured clay such as brown, gray or white and a white clay plaster containing hydrous Magnesite is applied to it (De Silva 1970: 70). In drawing, these artisans have followed the usual practice.

Although the wall surfaces of these temples built during this period are similar in shape the amount of layers of plaster used for them has changed from temple to temple. On the surface of the Gangarama temple wall, the *makulu* coating can be seen as a delicate layer and the plaster layers in place as at Degaldoruwa and Sooriyagoda are slightly thicker. It may have been due to the diversity of techniques of the artisan generation and the specialty of the practice.

Colour technology

The colour production technology of Sri Lankans goes back to the prehistoric era. Herbs and minerals were generally used to produce colours. Archaeological as well as literary evidence throws light on the technology related to colours used in the historical era. It is probable that this durable colour scheme is likely to have arisen from the combination of colours from the prehistoric era with the colours of the artisans who came to Sri Lanka from India with *Arahat* Mahinda Thero. Considerable information on colour production is available after the 17th century. There is evidence that advanced plasters and colours were used in the paintings of the Sigiriya (Fig.10.2), Hindagala (Fig.10.6), Mihintale relic chamber, Vessagiriya, and Pulligoda (Fig.10.5), stone house. The main palette used in these paintings are white, black, yellow, red and bluish green. The colours most widely used by Sri Lankan artists belong to the colour spectrum of yellow and red, which include yellow and white (Weerasinghe: 1997: 29). As a whole, blue and green have been used less frequently in the three periods of Anuradhapura, Polonnaruwa and Kandy.

White is widely used in ancient Sri Lankan murals. Scholars have found that white is created in two ways. Persons like John Still, Raja de Silva, S. P. Charles, and Sirigunasinghe say that they used

Makulu clay for white colour. These *Makulu* clays have been used extensively in the Anuradhapura, Polonnaruwa and Kandy periods. The pigment is naturally deposited on the ground. These types of clay have been deposited in the earth at Dambulla, Galewela, in the hill country and in Kandy. Artists of the Nilagama generation of Dambulla murals are still using *Makulu* clay for painting and this pigment has been used for surface paste for relevance to the painting.

White is used in the production of civil colours to paint the interior of the paintings except for the surface. L. T. P. Manju Sri states that the old craftsmen used a colour of limestone obtained by burning the oyster shells to obtain the white colour (Somathilaka 1994: 107). It is believed to have been used during the Anuradhapura and Polonnaruwa periods. However, after the Kandyan period, *Makulu* clay was the most used for painting.

Minerals were used to create the red colour. The red colour is made from *Guru* Stone, foreign imported *Sadalingam*, and local underground red clay. In Ananda Coomaraswamy's book *Medieval Sinhala Art*, he describes how the red colour was created by grinding *Sadilingam* and warm with the juice of *Ratmal* bark (Coomaraswamy:1994: 179). According to S.P. Charles, the red colour was created in this manner. In addition, the red colour has been made by ancient painters from natural minerals such as *gurugal* from various parts of Sri Lanka. Nandadeva Wijesekera, who studied the Early Sinhalese Painting, says, "The red colour is made of corrosive iron. It could be iron oxide or *Sadilingam*." (Wijesekera 1964: 97).

The red pigments in the chronicles are known as the *Rath Hiriya*. Undoubtedly every artist used different ratio of materials to brighten these pigments. By the time of the Kandy period, *Sadilingam* were widely used for red colour and was imported from countries such as China and India. Jeewath Naide states that brightness of the red pigment was obtained by grinding the *Sadilingam* and dissolving it in water and mixing it with iron powder and the puree of *Dutu sathutu* plant as an alloy.

In addition, the palm leaf manuscript entitled *Colour Making Order* has mentioned two methods for making the red colour:

*Finely cut the roots of jack fruits, put 16 cups of water and let it boil, reduce the liquid content to Six patha (01patha = 240 ml) and mix it 12 patha of boiled water with Kora leaves, then it is well baked with Guru stones and anthill clay and mixed with that puree. To do this, take a significant amount of wood apple gum, gum arabic of Hik tree (Indian ash tree - *Lannea coromandelica*), resin and put them in the aforesaid bowl, and then mix well and stir to combine, filtering it to create a red colour.*

*Take equal parts of Bo (*Ficus religiosa*) bark, Bo roots, Ma Nuga (Banyan Tree -*Ficus Benghalensis*) bark, Kahata bark, and grind them for juice, and put the Kahataareca nuts (*Gole puwak*) in a jar and leave for a day, then keep it in the stove and reduce the liquid to half, mix it Sivanguru, and thinly chopped Hik gum arabic and pathagi roots, boiled that powder, mixed together and set the red colour (Somathilaka: 1994: 106).*

There are also two methods used to create the yellow pigment for the murals. John Daily says that the *Rath - hiriyal* and the *Gokatu* were used for producing the yellow pigment. Evidence has also been found from Dambulla Sannasa that *Gokatu* was used for yellow colour (Somathilaka 1994: 107). *Gokatu* (*Garcinia morella*) tree that grows up to 40 feet high, is found in areas such as Dambulla, Ratnapura, and Badulla in Sri Lanka. Milk is extracted from the *Gokatu* tree, diluted with water and purified. This colour is made by mixing the cleansed *Gokatu* with the Wood apple gum. Ananda Coomaraswamy has stated that “take *Gokatu* juice, *Hiriyal* and *Rathu kaha* in equal parts; collect old jack milk and grind with *dorana* oil, this is yellow colour.” (Coomaraswamy 1994: 179). But laboratory research on mural paintings in ancient times has revealed that artists have used arsenic sulfide-containing *Hiriyals* for yellowing.

How to set the yellow colour is described in the palm leaf manuscript *Colour Making Process*, written towards the end of the Kandyan period. *Warakka* roots, cut into thin slices were immersed in clean water for a day and then filtered. To it was added the hen egg yolk and mixed by hand in a sticky proportion; then the *Guru* stone, *Sivanguru*, and *Rata kaha* (*Bixa orellana*) were ground together and dissolved in the yolk mixture and lastly it was filtered.

The blue colour used in the paintings has been used sparingly in all three periods of Anuradhapura, Polonnaruwa and Kandy. Artists also had difficulties adjusting this colour. S.P. Charles states that the blue clay, which has been deposited in some parts of the earth, was used by some artists as blue colour. Persons of the Dambulla painter’s generation made the blue colour using the *Nil Awariya* (*Indigofera tinctoria*) plant. Jeevath Naide says: “grind the *Nil Awariya* leaves with Roasted *Aralu* (gallnut), place it in the middle of a ball of milk and clay; bury it for a certain time and bring it out later to make blue colour. Ananda Coomaraswamy states that “for a good effect take sea sand, roast and sift it; apply it with arrack where required, polish it with a cheetah’s tooth; it becomes blue (Coomaraswamy 1994: 179). Sometimes green is used instead of blue. The *Nil Awariya* tree has been used to create the green colour, and in addition to the *Ranavara* leaf juice, the *Kehibiththan* leaf juice to make the green colour (Somathilaka 1994: 108).

S. P. Charles states that the black colour used in the paintings was done in two ways. They are made of black colour from coconut charcoal and lamp carbon. These are known as black *anduna* or *andun deli* (carbon). Another form of pigment used by the ancient artists is “take equal parts of pure dry coholle (old jackfruit milk), *Kekuna* oil, *Hal-dummala*, grind them and mix with the pieces of clean cotton cloth, put them in a container and set them on fire and place a folded bowl over the flame and collect the carbon to it, it can be used as black” (Somathilaka 1994: 107-108). Often, this pigment is mixed with wood apple gum or *Keppitia* gum.

Commenting on the black colour, Ananda Coomaraswamy states that “take badulla milk, *Keppitiya*, *lakada*, *hal-dummala*, and old jak milk in equal parts, grind these four together, and warm; apply to what you will, this is black colour” (Coomaraswamy 1994: 179). The method of making the black colour is also outlined in the palm leaf manuscript *Colour Making Process*: “Grind black sea sand that is roasted in frying pan, mix half of it with sulfur powder, take three times the amount of coconut toddy and equal part of *Thibiri* bark juice, then pour them into the jar, and take a portion of the first medicine, cow dung, pot clay, and bake

it in a new bowl and reduce it in half, reduce one part of the first medicine and add a portion of the third of the resin oil and heat it slightly then remove from the oven and filter it and make black colour” (Somathilaka:1994: 108).

Once the painting is done the surface is polished with *valiththi*. In ancient inscriptions, it is mentioned as “*Vaithi*”.The material of *vaiti* is similar to the varnish used today.Ancient artisans used this *vaithi* on paintings based on several facts. Most of the ancient paintings were coloured using watercolours or herbs or minerals dissolved in water. Ancient painters have been used *vaithi* to preserve paintings from the Anuradhapura period due to the fact that the paintings cannot withstand the sun and rain and are easily damaged by insect and they also lack brightness.

The technique of preparation of these *vaithi* varied according to each generation Ananda Coomaraswamy describes a method of making *vaithi* that was common at the time: powdered *dummala* (which must be white clean, not dark) is mixed with *dorana* oil and boiled for half an hour or more and then allowed to cool, when it is ready for use (Coomaraswamy1994: 166). The *vaithi* thus prepared, shall be coated on the mural surface with the help of a bundle made of cloth.Apart from this, the paintings using *Gokatu* have been brightened by polishing them well with a cotton pillow. According to Jagath Weerasinghe the basic techniques of Sri Lankan mural art as a whole can be summarized as follows:

- Applying mud or limestone plaster on the supports for preparing the place for paintings; technically this means adding a layer of stone or brick backing.
- Colour is applied on this layer or the final white coat.
- Making basic sketches of red or white lines on the wall.
- Applying pigments to complete key elements of the painting.
- Shaping the finale and adding subtle elements of the painting.
- Apply an oil varnish layer or polish using a soft pillow as surface protection (Weerasinghe 1997: 29).

It is evident that the Sri Lankan artisans used various methods to produce plasters and pigments for paintings. It is noticeable that the techniques used in the art of prehistoric art have gradually become more complex in the periods of Anuradhapura, Polonnaruwa and Kandy. Since the ancient society was nourished by the Buddhist environment, it seems that from the earliest times, art begun around Buddhist sites. But past artists seem to have used their ideas to embellish and to express spiritual feelings. They seem to have produced great creations that blend lines and colours perfectly. It is evident that the primary form of painting used in the early days was the primary technique and at a later period complicated techniques were used. The plaster and colour technology used in the Anuradhapura and Polonnaruwa periods are somewhat similar and by the time of the Kandyan era, the style used in the paintings and the combination of colours and plasters seems to have become very complex.

Natural plants and minerals have been used to create the paintings and it is clear that they have produced great works. Laboratory research has not yet been done on techniques used in ancient paintings as well as how plasters and the colours were combined.The preservation of paintings in some places up to the present time shows that the techniques used to create the ancient paintings, as well as the composition of the plaster and colour combinations, were of a very high standard.

References

- Amarasinghe, H. Sri, 2000. *Art*, Ganemulla: Nishantha Printers, Sri Lanka.
- Charles, S. P., 2003. *Temple Murals of Polonnaruwa*, Colombo: Godage and Brothers, Sri Lanka.
- Coomaraswamy, A., 1994. *Medieval Sinhalese Art*, Colombo: Department of National Museum Sri Lanka.
- De Silva, R.H., 1971. The Evolution of the Technique of Sinhalese wall painting and comparison with Indian painting Methods, *Ancient Ceylon No. 1. Vol. 1*:pp 90-104.
- De Silva, R. H., 1970. *Rock Painting in Sri Lanka*, Colombo: Archaeological Department of Sri Lanka.
- Dissanayake, D. M. R., 1984. *Matale Generation of Art and Sculptor: Historical Matale*, a publication of the Matale District Cultural Council of Sri Lanka.

- Karunaratne T. B., 1970. Udarata Paintings, *Sinhala Encyclopedia*, Vol.04:pp 517-520.
- Maranzi, L., 1972. *Preservation of Mural Paintings*, Paris:UNESCO Publication.
- Somathilake, M., 1994/95. Chronology and subject of Mural Painting in Sri Lanka from Ancient to the Seventeenth Century, *Samaja Vimasuma*, No.09: pp. 87-121.
- Somathilaka, M., 1994. Medieval Colour Technology, *Literary Bulletin of Sri Sumangala College, Wariyapola: Kandy.*, Department of Cultural Affairs of Sri Lanka.
- Somathilaka, M., 1994. Technical Knowledge and Scientific Foundation of Ancient Sri Lankan Artists, *Indigenous Knowledge and Sustainable Development: Proceedings of the national Symposium on Indigenous Knowledge and Sustainable Development*: pp. 103-112.
- Weerasinghe, J., 1997. Materials and Techniques in Sri Lankan Art, *Economic Review October & November*: pp. 29-30.
- Wijesekara, N., 1964. *Old Sinhala Murals*, Colombo: Department of Official Languages of Sri Lanka.
- Wijesekara, N., 1990, Art, *Department of Archaeology Centenary Book Series (1890-1990) Vol. 5*, Colombo: Department of Archeology Sri Lanka.