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Present condition of wall paintings at the Polonnaruva Citadel

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This project was started at the Polonnaruva citadel with the intention of digital graphic documentation of wall paintings. Information about the present condition of the documented paintings is given in this research paper. Two main traditional image houses are in this citadel. These are Lankatilaka image house and the Tivanka image house constructed by King Parakramabahu in the twelfth century, when Polonnaruva was the capital city. These brick vaulted image houses are huge, with Lankatilaka being the largest image house in the country. They consist of the chambers of cella, entrasol, pronaos and porch with a large number of wall paintings in them. The scientific investigation was done by examining survival patterns of paintings. The long-term survival patterns were determined by detecting temperature and humidity variations of paintings and the growth of microorganisms in them. Cracking in the paint layer, fracturing, flaking of paint, presence of lacunae, cracking and fracturing of ground and deposits present were the observations made in each area of paintings. There are paintings on the walls of all chambers of the Tivanka image house although paintings in the cella are totally deteriorated. The total area of painting is about 340 m^2. A large portion of this area is in lacunae at present exposing the paint-receiving layer. Powdering, lacunae and cracking were observed in paintings. The lack of adhesion between support and ground was evident in few places of the porch. Voids were present in the ground. White eggs of insects were present in the cavities of external surface of the left wall. Bore-holes were also present. White fungal spores were present on the walls of porch. White lacunae were present in the entrasole. Some of them had turned brown, possibly due to the application of a synthetic polymer. Support is strong and can bear weight. Emergence of cup shaped lacunae in the surface layer destroys paintings. Dissolution and dislodging of pigment particles give a blurred appearance. Paint fades rapidly. It powders and disintegrates. *Microspora* and *Cunninghamella* spores were present in air samples of the interior chambers. No growth of fungi was taking place on the surface of paintings. Fungal and algal spores present in the porch deposit on walls, grow as soon as the relative humidity rises to 90 % during the rainy season. The Lankatilaka image house was in a state of ruin with walls overrun by shrubs; roof and parts of wall caved in and with disintegrated outer facades. About 4 m^2 of paintings are present in some areas in a good condition. The total area of existing paintings including small patches is about 20 m^2. Patches of red and yellow paint are still present on lime paint-receiving layer all over the internal and external walls. Red ochre and yellow ochre remain at present. Some external paintings are detached. Detachments are in between support and ground and ground and the paint-receiving layer. These paintings withstand direct exposure to solar radiation and precipitation. However the paintings were in a totally dry condition exposed to direct solar radiation at the time of observation. Microorganisms were found on walls and in the air. The support and ground still have adequate strength and stability. Adhesion between layers and cohesion of particles

were adequate. Behavior is different to the original condition due to the absence of the surface coating, i.e. the paint layer, and roof. The whole mass was totally dry. Movement was under 0.0001 % in all surfaces measured. This is an obvious indication that the surface movement of paintings is almost totally within the paint layer. It is a result of absorption and evaporation of water. *Monosporium* and *Cunninghamella elegans* were present on walls. A green lichen was present in the porch. Investigations done at Lankatilaka proved that the paint layer was responsible in maintaining ideal behavior and conditions.

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