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A methodology for recording pre-Hispanic mural paintings

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36.1. Mural painting of Cacaxtla

Cacaxtla was discovered in 1975 when treasure seekers found the first mural paintings. When excavations began, archaeologists soon realised that this site had the largest number of mural paintings ever found in meso-America. The preservation of these paintings was remarkably good, due to the care with which they were buried before the final period of construction.

Cacaxtla was at the peak of its development between AD 650–900. Situated on the commercial route between the Mayan and Teotihuacan areas, the mural paintings of Cacaxtla depict both Mayan characteristics and those of the Mexican highlands. The origin of the people of Cacaxtla is still unknown, but their economic power is fully understood, and it is believed that they used their wealth to employ the best painters of the time — probably Mayan. In fact the Mayan area had an important pictorial school, as can be seen in Bonampak, near the border with Guatemala.

To date, four sets of paintings have been found (Fig. 36.1): the "Battle" (1), the "Portico A" (2), the "Venus Temple" (3) and the "Red Temple" (4).

36.1.1. The "Battle"

The Battle mural is dated *c.* AD 650 and is 1.50m. high by 14m. long. It represents a bloody, mythical battle between two different ethnic groups: eagle-men and jaguar-men. In the first group all the men are standing with threatening postures, and they are armed with obsidian knives and round shields decorated with feathers.

In the second group they are barefoot and almost naked, carrying only a square shield and a blue lance; two of these men lie on the floor trying to extract arrows from their bodies. All these figures show pain and prostration. They represent the defeated.

36.1.2. The "Portico A"

The "Portico A" mural is dated AD 750. On the walls at both sides of a door that leads to a chamber there are painted panels measuring *c.* 2.50m. high by 2.00m. wide. On the door jambs are two more paintings of smaller size, created in the same period and using the same pictorial technique.

On the right hand side is found the "man-bird". He has a rich outfit and his body is painted in black. His feet are actually claws, and he wears a bird-like top. He holds a blue ceremonial bar that ends in a snake head. Surrounding the scene there is a feathered snake with yellow plumes interleaved with blue Quetzal feathers. The long body of the snake lies along an aquatic ribbon with marine fauna including turtles, fishes, snakes and hippo campus.

On the left hand side is the "Jaguar-Man", with feline claws and jaguar mask, the face painted in black. He also carries in his arms a diagonal blue bar, with obsidian ends from which drops of water emerge. The man-jaguar is standing upon a serpent-jaguar, with a tail ending with yellow feathers and also interleaved with long blue Quetzal feathers. The scene is surrounded by an aquatic ribbon.

On the jambs, the figure on the south side is standing in a dancing posture. In one arm, he carries a green snail from which emerges a long-haired small man, with ornaments of jade. The person on the north side holds a green vessel from which drops and a stream of water emerge. In his other hand he carries a blue serpent with small blue spheres and yellow flowers. From his navel two types of flowers grow: one yellow, the other sprouting tails of the serpent-jaguar and serpent-bird.

36.1.3. The "Venus Temple"

The third set of murals, the "Venus Temple", is dated AD 850 and comprises two columns *c.* 3m. in height. The northern column contains the painting of a man, while the southern one depicts a woman; both of them depicting an animal duality. Both carry a belt which is known to be a Tláloc symbol and a skirt made of jaguar skin; they wear bracelets and gloves with claws handling starfish; both wear a shell necklet, and a feathered mask covers their faces. As in "Portico A", they stand barefoot on an aquatic ribbon.

36.1.4. The "Red Temple"

Finally, the "Red Temple" mural is dated AD 850. Discovered in 1988, the painting is located on both sides of a staircase, the west side mural measuring *c.* 4m. by 3m., while the east mural measures *c.* 7m. by 3m.

The east mural (Fig. 36.2) is surrounded by a feathered snake sitting on an aquatic ribbon, with elements such as starfish and heron. A serpent motif starts at the upper south side, descends, and continues northwards up the stairs to the last step, where the mural was damaged during the final phase of construction.

On reaching the first step, the serpent twists around the aquatic ribbon and thereafter continues below it. Standing on the feathered snake is a man, probably the Mayan god "K", the divine representation of the merchants. On his back he carries a basket of ritual goods (cacaxtli) with Quetzal feathers. On the aquatic ribbon there is a cocoa plant where the Quetzal bird stands, and adjacent to it is a corn plant whose fruits are human heads; a jaguar-skinned frog receiving thick drops of water completes this magnificent scene.

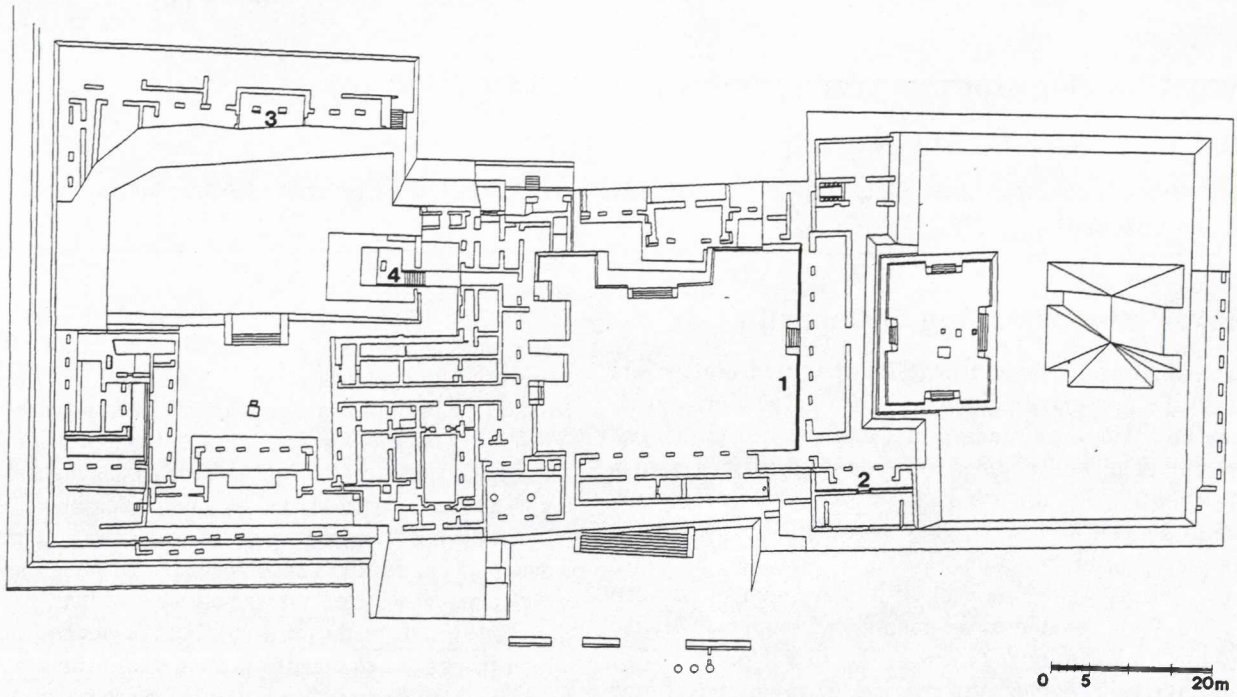

Figure 36.1: Location of the mural paintings.

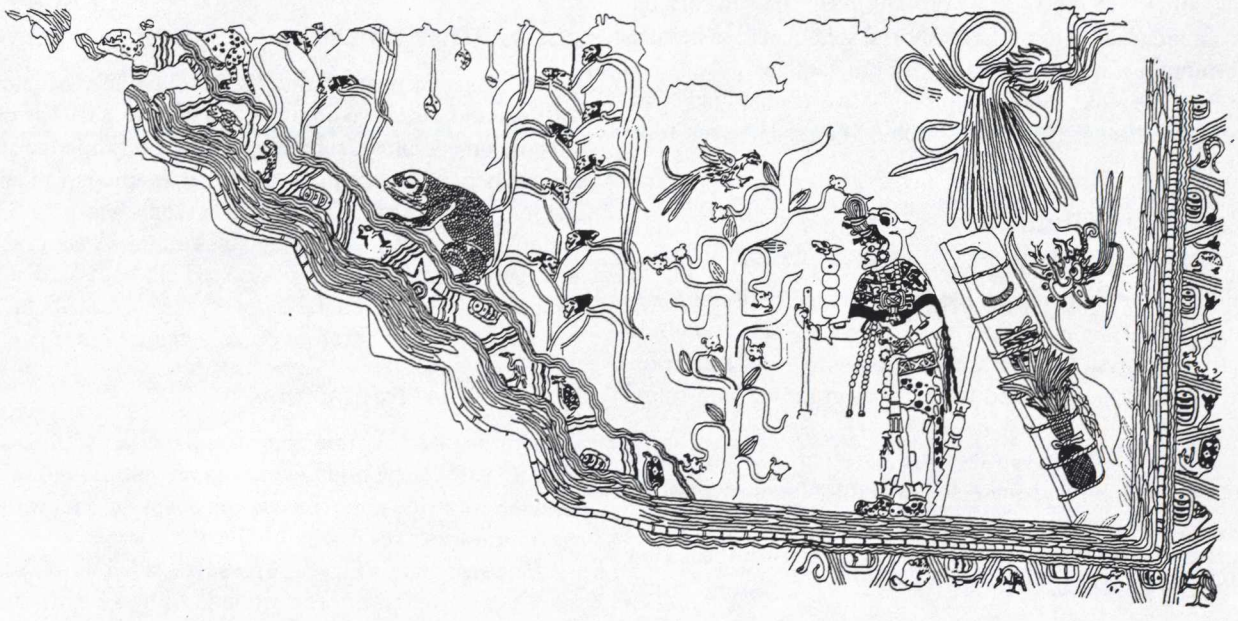

Figure 37.6: The east mural painting redrawn with Canvas.

On the west side of the staircase another painting carries similar motifs, the main elements being: the frog-jaguar, corn with human heads and a turtle-jaguar.

In the "Red Temple" is found the only painted floor in meso-America. It contains three human skeletons painted in red that may be guards of prisoners of war. The icons drawn in the vertical part have been interpreted as being references to conquered cities.

36.2. Recording for conservation

Frequently, each mural painting has a uniquely different type of deterioration. Therefore, an appropriate recording methodology is required as an aid to deciding restoration strategy.

In the case of pre-Hispanic mural painting, it is critical to trace the history of deterioration as well as previous restoration treatments. It is important to keep track of the success of previous interventions, and to analyse specific zones

Figure 36.3: Heron — Bit map image.

which have new damage, with a view to determining its cause. Documenting these observations is an invaluable help in later analysis and treatment.

Part of the duty of the restorer is to fulfil the tasks of recording and maintenance, which must not be reduced to temporary or definitive intervention. The restorer must keep records of changes observed after intervention, must suggest appropriate environmental conditions for maintenance, and must be in charge of preventive or periodic treatments. To neglect these tasks would jeopardise the earlier restorations, and may condemn other workers to inadequate repetition of restoring treatments that may even accelerate degradation. These considerations are extremely relevant to the case of Cacaxtla.

36.3. The "Red Temple": a computer-based methodology for preservation

36.3.1. General methodology

The east mural of the "Red Temple" was considered a good example to illustrate the application of this methodology.

Figure 36.4: Mayan God "K" — Bézier curves.

The first step was to obtain an exact base drawing of the whole mural. This was hand-measured using a reticulated frame to give reference coordinates for each element of the painting.

In the second step, the original drawing was digitised with the aid of a scanner; for precision, the actual drawing was divided into 150 pages each requiring *c.* 1mb before compression. After compression the files could be reduced by 95%. The scanner used had 300 pixels per inch.

Since the drawing is digitised as bit image, it presents the problems associated with this kind of image *i.e.* an enlarged picture is not attractive since jagged lines cannot be avoided, and the reduced image suffers from an unpleasant overlap of dots (Fig. 36.3). A bit image does not lend itself to the description of the form of curves, length of lines, angles, etc. It was therefore necessary to redraw each page using a program that could handle graphs both as bit mapped images, and as vector forms.

The Canvas package from Deneba was selected for this purpose, since it handles both bit images and Bézier curves; it also allows use of a variety of scales, and incorporates features typical of CAD systems. Other programs with similar characteristics were tested but were found inadequate when high precision was required.

The use of Bézier curves has the advantage of providing soft lines which can be modified easily, and a high quality of printing at every scale (Fig. 36.4); the interactive form has black dots which are used as "handles" that show the points where the curvature is controlled. The system also allows modification of line thicknesses independent of nearby elements.

The third step consists of rejoining all the redrawn pages using the original reference grids. The final drawing of the East Mural redrawn with Canvas (Fig. 36.2) only has a file size of *c.* 2mb, while the digitised image would have consumed *c.* 150mb.

36.3.2. Recording colour

The mural was created using a fresco technique, apparently using the gum of Opuntia (a common cactus of the area) as agglutinative. The painting surface is rugged.

It was possible to record the colour of the mural using the Pantone guide as a chromatic reference. It was not possible to reproduce the sensitive quality of the pictorial technique.

The chromatic palette is composed of the following colours:

- **Blue**: Mayan Blue (consisting of the white inorganic base paligorskita and the organic dye indigo).
- **Red:** haematite.
- **Yellow**: illite-montmorillonite clay with iron oxide impurities.
- **White:** not used as a pigment. It is actually calcium oxide and it is used as the base for the painting.
- **Black:** obtained from vegetable carbon.

Blue and red were layered to obtain different tones of blue and pink.

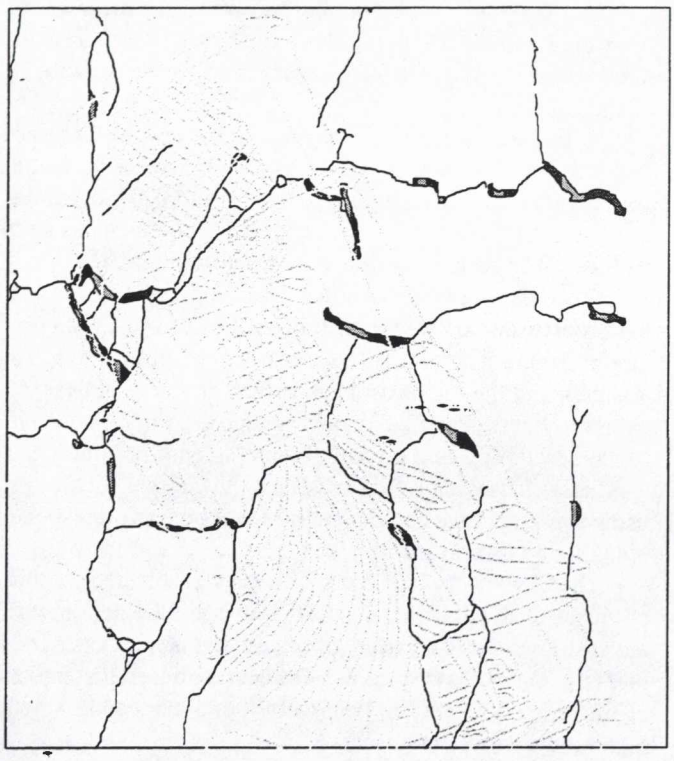

Figure 37.6: Recording of fissures and missing parts by the computer system.

36.3.3. Recording damage and deterioration

Damage to the mural painting included fissures, missing parts, cavities, and samples taken for physical and chemical analysis (Fig. 36.5).

When preparing the base drawing, damage was indicated using different colours, to differentiate from the actual painting.

As software offered the facility to work with different layering facilities, each deterioration was recorded in a separate layer.

A coding system was used to register specific damage as distinct from general deterioration, so that each could be easily located by analysts at the site. The use of a uniform scale and simple black-and-white symbols is recommended to avoid confusion when using copies of the original drawings.

36.3.4. Recording previous treatments

Areas of previous intervention, including restoration processes, were also recorded using the system of layering and symbology described above.

36.4. Conclusions

The proposed methodology for recording mural paintings allows:

- obtaining precise measurements between elements of the painting
- comparison between elements of the drawing
- printing at different scales
- study of damage and restorations
- iconography studies

It is hoped that many more meso-American mural paintings will be recorded with a similar computer system to aid their study and conservation.

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