TREATMENT OF ADOBE FRIEZES IN PERU

GIACOMO CHIARI [X]

SUMMARY

The consolidation technique adopted in the treatment of some painted and unpainted adobe friezes in Perù is here described.

This technique was applied in three UNESCO sponsored projects (1975-77) and is now one of the tools used by the pilot conservation project working in the Tschudi Citadel of Chan Chan.

The process consists of the following steps:a) consolidation of the mud layer underlaying the painting using ethyl silicate spaying technique; b) strengthening of the inner part of the wall by injections of an acrylic emulsion (Primal); c) fixing of the painted layer if present, with Paraloid.

The results of the treatments performed five years ago are very encouraging.

[X] Assistant Professor at Istituto di Mineralogia
Via San Massimo 22, 10123 Torino, Italy.

June 12 1980.

INTRODUCTION.

Perù is one of the countries that exibit the largest number of adobe friezes, painted and unpainted. The archaeological and artistic importance of these friezes is inestimable. Being made of mud, their chances of surviving after excavation for even small periods of time are very limited. Most of the friezes have in effect already disappe ared.

In Perù almost all major civilizations extensively used adobe in their constructions. Even the Incas, master in stone masonry, often dealt with mud brick construction in the mountain region. When the expansion of their empire broght them to the cost, they built entire cities, like Tambo Colorado, in adobe, transfering to the mud brick buildings some of the architectural techniques used for stone palaces. Typical example are the trapezoid doors and windows, consequent to their ignorance of the arch. Very often the walls were plastered and painted in bright colors. (Hence the name Tambo Colorado, meaning the painted city).

Two civilizations exelled above all others in the art of decorating buildings with alto relieve mud friezes: Chavin (1300 B.C. -300 A.D) and Chimù (1100 - 1450 A.D.). The conservation of one frieze for each of those two civilizations is the subject of this paper.

HUACA GARAGAY, CHAVIN (1300 B.C.)

The ruin is located above the soil level, about half a mile from the Pacific ocean, and five miles from the center of Lima.

The mud bricks are not molded, and do not present sharp edges. They are more like rough spherical blocks about 10-15 cm in diameter. The material used for the bricks was clayish soil surrounding the Huaca. No extra sand or gravel or organic material was added to the soil.

Discovered in 1959, the systematic escavation started in 1974, conducted by the Departemento de Investigaciòn of the Istituto Nacional de Cultura, under the direction of R. Ravinez.

The archaeologic complex consists of 5 hills of different sizes, distributed on three sides of a big U shaped square. The rectangular central body in 23 m high, while the two side platforms are smaller. All of it is man made, in mud and stone.

A temple is located on the top of the pyramid, also U shaped and with the opening pointing to the North. The wall of the temple, now 1.4 m high, is made of mud bricks and some random stones. It shows four clay plasters; the first three are about 2 cm thick; the more superficial, made with finer clay, is about 1 cm thick. Above this a series of mistic images were sculpted in relief. The figures were painted in black, white, yellow, blue, red and pink.(J.M. Cabrera,1977, performed an optical microscopy analysis of the pigments. Independently by X-Ray diffraction I reached the same conclusions which are the following: black is animal and/or vegetal coal; yellow is limonite; red is hematite; white is caolinite and gypsum; pink is a mixture of red and white. In all pigments various amounts of clay minerals are present).

The friezes were repainted many times, almost always using the same colors. In same spots one can find up to ten different layers of painting. The figures are disposed all around the atrium, facing toward the central part of the temple, as in procession.

No roof has survived but there is evidence (bases of wooden poles painted in white, located in front of the friezes) that anciently a roof, probably made with cane and mud, covered the procession. Immediately after the excavation a temporary cane and mud covering was made, sobstituted by another more permanent roofing, using the same materials. The use of cane and mud is justified by the fact that it blends well with the surroundings of the monument not jet excavated, and also allows cheap maintenance by the workers of the excavation. Special care has been devoted to guarantee enough aeration through a series of shutters that also protect the friezes from direct sunlight. Inspite of the fact that the friezes have been consolidated as described below, due to the importance of the remains, it is highly advisable to keep them protected under a roofing.

The climate is very favourable: almost no rain (although one bad storm can be expected every 25 years or so). Very slight seasonal and daily temperature variations (average 15°C in July and 24°C in January; daily variations of about 8-10°C). Relative humidity is very high in winter only. No problems with ground water raise for capillarity, salinity or vegetation. Earthquakes constitute a major risk.

FRIEZE OF CASA VELARDE CHAN CHIMU

This particular frieze was selected to be shown here because of it's particular beauty. It is also representative of a whole series of unpainted friezes constituting the ornamentation of a great number of walls in the palaces and temples of Chan Chan. Excavated in 1969 and then recovered with fine soil it was occasionally undug to be shown to some important visitor. Every time a few more details were missing. After consolidation it was covered one more time to protect it especially from "huacheros".

It depicts fishing scenes, with men riding on the typical boats made of cane still in use, and a large number of fish and sea food so accurately depicted to be easily recognized, despite the small size of the frieze and the difficulty of sculpting in mud.

The problems connected with the conservation of this and other friezes in Chan Chan are somehow different from Garagay. The climatological conditions are almost the same but here strong evidence of hygroscopic salt deposition are evident. These salts are brought in by winds carrying in suspension small droplets of sea water. The wind is also a major cause of damage by mere erosion helped by the presence of suspended sand. On the other hand the fact that these friezes are not painted constitute an obvious simplification of the treatment.

DESCRIPTION OF THE TREATMENT.

The work in Garagay was fully described in my Unesco report. (Chiari, 1975). I will here therefore simply summarize the main steps of the procedure.

The major problems in the preservation of these friezes are:
a) extreme friability of the superficial crust.
b) necessity of conserving the original color.
c) necessity of anchoring to the interior part of the wall every small detail, even when it was already partially cracked and half detached from the rest.
d) protection of the entire complex to shelter it from dust deposition, rain and light that could alter the color.

The first step was to consolidate as much as possible the mud brick support of the painting, even before attempting to clean the surface. (Infact in some spots simply cleaning the frieze was impossible

even beeing very careful, because the painted layer crumbled along with the dust or sand adeherent to it.) This was obtained using the ethyl silicate spraying technique (Torraca, Chiari, Gullini,1972) after reassurance by treatment of small samples already detached from the wall that the treatment would absolutely not change the color of all the pigments. Several applications were performed, a few days apart, to allow the wall to dry out and reassume the porosity necessary to absorb the next application. In this way the chances of damaging the very delicate layer of painting during the application itself were reduced. After three applications the frieze was sufficiently hardened so that the outer laying dust could easily be removed with mechanical tools, without damaging the painted layers.

Ethyl silicate after hydrolisis creates a three dimensional net of polymerized silica chains, bridging in a random intricate way the clay particles present in the mud brick. For sand or dust deposit the consolidation action is almost null, with the advantage in this particular case of facilitating the cleaning operation. It is also true that ethyl silicate does not fix the pigments used in Garagay, which needed therefore an ad hoc consolidation at the very end of the treatment. Infact, while the ethyl silicate allows a following appliaction of painting fixers as Paraloid or Calaton, the reverse is not true.

In the consolidation of well preserved vertical surfaces of mud a treatment with ethyl silicate alone may constitute enough protection especially if the rain water is properly disposed of. If on the other hand a crust is present, or there is evidence of pieces of frieze already detached from the inside wall, then a second more delicate treatment is needed. Infact ethyl silicate has a big disadvantage as surface protection material, of not beeing able to glue together pieces of adobe already detached. To anchor the crust once consolidated to the interior of the wall a series of injections of a 10 % water emulsion of Primal AC 33 were performed. To avoid drilling new holes into the frieze the preexisting cracks were used as injection points. The acrylic resin could not be injected under pressure both because of the serious possibility that the superficial crust would fall during the treatment, and the tendency of the liquid to leak from the crack producing a drip on the painted layer, which would be very difficult to take off without damaging the painting itself. These drawbacks were partially avoided using a large number of small plastic siringes with a fine needle, left in place and refilled with the emulsion as soon as it penetrates into the wall. In this way a slow but constant flow of liquid was assured, without a great loss of time by the operator. Some holes absorbed much more solution than others ;

that only means that different parts of the wall need a different amount of liquid to be consolidated. With the use of the siringes this different distribution is realized automatically.

The final touch was given by an application of Paraloid (performed by R. Vallin, Unesco expert) to fix the superficial layers of painting.

In the case of Casa Velarde the injections of Primal were not needed, although small repairs were done mainly to mantain details of the frieze. In this case the small holes present were filled with mud before the application of ethyl silicate, obtaining a good solidity of the ensemble.

CONCLUSIONS.

The advantages in the use of this mixed technique are, in my opinion, that one can exploit the best properties of each product, avoiding most of the drawbacks. For example, acrylic or polyvinylic resins do not perform too well on the surface because of their tendency to form thin films and to change the color, the texture and other physical properties such as thermal dilatation coefficient of the treated material. When injected inside the wall instead, they do work very well as binding agents, while the above mentioned changes become obviously not important. Conversely, the ethyl silicate performs well only in surface.

In conclusion, after a few years have passed one can state that "the frieze appears to be in a condition which is sufficiently stable to guarantee preservation in the present situation".(Torraca,1978).

ACKNOWLEDGEMENTS.

I would like to acknowledge UNESCO for financing my three missions to Perù and providing the material for the treatment.
Silvio Mutal, José Correa and Rogger Ravinez in Lima, and Cristobal Campana and Ricardo Morales in Trujillo for their support and warm friendship. Also all other friends in Perù whose list here would be too long.

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