FROM “COLOR PLANS” TO THEIR PRACTICAL USAGE: AN INTRODUCTION OF A RESTORATION MANUAL FOR HISTORIC FAÇADES

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ABSTRACT
The colour plans of the historical city centres in Italy have stimulated the correct solution of the restoration of the historical painted facades, with the use of the same traditional materials with which the painted facades were originally made. Notwithstanding the fact that the Colour Plan of Turin has been established in 1978, that is more than 30 years ago, in this city, where each year several hundreds of historical facades are restored, the restoration of the historical painted facades continues to be approached generally with the use modern materials (concrete, instead of limestone for stucco mortars, and acrylic or silicate colours instead of the traditional lime colours with mineral pigments and so on). The aim of this paper is an introduction to an up-to-date practical manual in the field of the historical painted facades restoration, in view of publication. This particular manual is based on historical researches on 18th and 19th Century manuals and archive documents, on the professional practice experiences and on the professional training courses held by the author in the field of colour plans and historical facades restorations since 1970.

Introduction

In Italy the “Color Plans” raised the issue of restoration of historic façades and, consequently, of the return to the use of traditional materials and techniques. Despite the debate about this issue has sparked over 30 years ago, with the adoption of the Color Plan in Turin in 1978, a common position was reached only in the scientific restoration field, but not in the restoration of the ordinary historic buildings forming the fabric connector of our cities. To make a point about the topic, it is worth examining some of the issues underlying the restoration of historic façades, which we directly experienced, both in academic research, that in professional and vocational training, related to: binders, aggregates, additives, water, materials and tools for the formation of mortars and plasters, materials and tools for historical coloring, decorative types and finishing touch.

Binders

The lime is the main binder in historic buildings and façades. With the building boom in the '50s, lime disappeared almost entirely from constructions and reappeared only after the '80s, when restoration culture began to develop.
A key contribution was provided, on scientific grounds, from the conferences held in Genoa in 1982, in Rome in 1985 and many others we attended. In the ‘80s, were also carried out the initial experiences of training in the restoration of historic façades, at various levels, with the “Central Institute of Restoration” in Rome, the European Centre for the training of artisans of San Servolo, the Cignaroli Academy in Verona, the “School of Urban Restoration” and the “Mobile Restoration Laboratory for historic façades” of Turin etc. The same Building Schools began to produce the early training courses in the field of restoration and the Schools of Architecture activated the first courses of “Urban Restoration”. In the same year, the UNI imposed the Munsell color notation system for the historic city centers and promoted a legislation on traditional plasters. Gradually, the slaked lime reappears on the market in forms “ready for use”, which encouraged their usage.

**Aggregates**

“Aggregates” are, joining with lime, the main element for mortar and sand is the main aggregate. Since the antiquity to obtain “hydraulic” mortar from ordinary lime, were added particular aggregates such as “natural pozzolana” and “artificial pozzolana”, whom can also be used with natural hydraulic lime, obtaining mixtures similar to concrete. The “artificial pozzolana”, whose range is infinite, chemically are similar to “natural pozzolana”. Aside from silica and lava sands, the most known “artificial pozzolana” still used today are “cocciopesto” (pulverised tiles) and “marble dust”. After the invention of the artificial hydraulic lime, many artificial pozzolana fallen into disuse. The artificial pozzolana, in addition to the technical properties mentioned above, has also a contemporary ecological value because it is made of “reclaimed materials” as “cocciopesto”, “pulverized brick”, the “marble
“Additives" for mortars are essential complements to the binders and aggregates. In old manuals are mentioned additives like materials to slow the lime setting, as the "straw", or with "antifreeze" features, as "salt" or "soda ash", or with fire-retardant properties, such as "powdered pumice", or to fix the stucco as the “Marseille soap”. Other additives, such as the “linseed oil”, had special uses in plaster as the Dihl’s and Thénard’s mastics. Many other additives mentioned by the manuals (“urine”, “horse manure”, “white wine”, “vinegar”, etc..) now are mere curiosities. Even in the additives field the advances in chemistry led to a modernization of the products.

Water

In mortars production, water has a major role, both in the lime slaking and in the manufacture. We defere to tell about the slaking, because nowadays the lime is produced and distributed ready for use in the form of lime putty. Relatively to the packaging of the mortar, the water in the putty is already more than enough for it.

Materials and tools for mortars manufacturing

The mortars are the result of a mix of binders with aggregates and possible “additives”, using only the water contained
in the slaked lime. Mixing lime with the sand, you get “ordinary mortars”, while mixing the same lime with hydraulic aggregates or mixing natural hydraulic limes with sand or hydraulic aggregates, you get “hydraulic mortars”. At present, ordinary, cocciopesto or stucco mortars are commercially prepackaged. To mix the mortar is used the “mortar mill” that, crushing and blending the components, amalgamates them intimately.

Materials and tools for plaster application

“Ordinary plasters”, used for façades, are made of lime mortar and sand, they are applied in layers (scratch, plaster and finishing), after the surface preparation. The “scratch” is the single plaster layer that covers a rustic wall or the first layer of ordinary plaster. Plaster is used to give to the scratched surface a better regularity and above this layer, can be spread the finishing layer. A variant of the ordinary plaster is the “colored plaster” obtained mixing lime with colored sand (as the red or black Sicilian “sestito”, the yellow silica sand of Priverno etc.), or cocciopesto (red or yellow) or coloring pigments. Colored plaster can be applied smooth or “sprayed”. The “special plaster” used for façades consists of lime mortar and marble dust (“stucco”) or of lime with hydraulic aggregates sometimes joined together (pozzolana, iron slag, cocciopesto, etc.). Other “special” plasters are the “fake marbles”, the “fake travertines”, the “fake stones”, the “fake granites”, the “fake bricks”, the “fake woods”, etc. In addition to these special plasters, should be mentioned the “graffiti”, composed by two layers of different colored plasters, of which the top one decorated by engravings to show the background of contrasting color.

The tools for plaster application are “trowels” of various shapes and dimensions, for ordinary plaster, and “American trowels”, for stucco plaster. The mortar for the plaster is poured from the mortar mill to the “bucket”, large enough to store the mortar for the work in the scaffolding. From the bucket the plasterer transfers the mortar on the board-shaped trowel, from which it is drawn with a trowel and applied to the façade. The plaster can also be applied with modern plasterer machines instead of the trowel. A wooden hand float is used to smooth the plaster applied with the trowel or with a “pump” and another float, similar to previous one but covered with sponge, is used to refine the plaster. A “sponge” or a “wide brush”, dipped in water, keep the plaster wet during the work. “Strollatrici” driven by cranks are used to apply “sprayed” plasters, while to obtain “fake travertine” plaster, it takes special tools or are added grains of salt in the dough, whom once washed away will leave the surface pimpled. “Steel spikes” are used to scrape the top layer of plaster, when is still fresh, to produce “graffiti” finishing. Rules for stripes and a wood or steel bit
allow to make the joints of the “fake bricks” plaster. To make the ashlers joints there are special shapes of steel, with wooden handle, that are slid on wooden strips parallel to the joints to form. In order to survey the cornices requiring integration or to be redone, these are smeared with water and Marseille soap and than liquid plaster is thrown on them. The soapy water allows, after the setting, to remove the plaster formwork that can be sawed transversely in order to derive the exact section, whose shape would be reproduced on a sheet of steel and trimmed. At the end this sheet is secured to guide and brace strips. To create new cornices or integrate the existing ones, is created a skeleton, made of galvanized steel nails and wires, on which is applied the mortar (usually cocciopesto) to run the cornices, which is then “plastered” with stucco and refinished running the “raffetto” on a underlying rail formed by a wall mounted wooden strip, parallel to the frame to pull. To make small frames can be used “molds” made from wooden planks or from thin steel plates, hand operated on a guide similar to that above described. To restore fallen plaster, that need to be redone, should be used the mortar more similar as possible to the original, after appropriate cleaning and wetting of the surface. To fix the plaster detached from the back, after jetting are practiced infiltration of grout of lime putty and marble dust joined to a fixative with special syringes.

Materials and tools for historic coloring

The materials used for historic colorings are compound from “limewash”, “pigments”, “fixatives” and by any additives. The “limewash” is formed from slaked fresh lime diluted in water. Traditional “pigments” for façades coloring are made of natural earth colors and other natural pigments compatible with lime. Lime colors must be “fixed”, especially when they are full of pigments. Once fixative consisted of the “casein” contained in the cow “milk”, of the “cooking salt”, of the “Marseille soap”, etc. A fixative still used, especially in France, for colors compound of hydraulic lime powder, is from the “alum rock”. Other fixatives are “calcium carbonate”, the “silica dust”, the “quartz powder” etc. Historic fixatives such as the animal glues, obtained from skin, bones or meat, are now obsolete, as the “white wine”, the “cow piss”, the ‘egg’ etc. Now these are mere curiosities. Currently the most used fixatives for lime colors are the “Primal” and “calcium caseinate”. To avoid the use of fixatives, the lime may be slaked with the addition of raw linseed oil. At present on the market are available lime colors ready for use.

Tools for the application of lime colors are traditional “brushes” of various sizes, “wide brushes” for whitewashing, brushes to make thin stripes, “round brushes” to write, “comb brushes” to make the “fake wood” etc. A useful tool to apply lime color to shares not accessible because of the height or narrowness, or to paint spraying plaster, is the “paint roller”, which can be applied to a long handle. Even less common of the “paint rollers”, are the “rollers for decoration” once existing in a wide range of patterns. To create “fake granite” paintings dimples can be manually spraying or made by a “strollatrice” activated with appropriate speed and at a proper distance. To make the “fake stones” are used “sea sponges” soaked with different colors and pressed on the uniform background of the overall color of the stone to imitate. To make special decorations, it must resort to the “spolvero” (cartoon), once drawn with pencil on “cartoon” (or “oiled tissue paper) and then pitted with special needles, now easily achievable with markers on sheets of polyethylene, then pitted. The spolvero is then “beaten” with appropriate “swabs” consisting of fabric bags filled with pigments contrasting with the background. Stencils are used to create repetitive patterns, once they were realized.
with appropriate supports, today they are made of polyethylene sheet, on which the design can be executed with a pen and then cut with a cutter. Letters or numbers are made using stencils in galvanized sheet. Besides these tools should be noted those used to trace (“meter”, “lignola”, “plumb line”, etc.), clean (water, steam or calcium carbonate cleaners) for minor surgery on walls (“drills”, “syringes”, “small trowels”, “spatulas,” “scrapers”, etc.)., accessories such as containers (to hold water, putty, paints, fixatives and additives), “sieves”, “blenders”, “sponges”, the “pumps to spray”, “atomizers” etc. Clearly even in this field has been a strong modernization, both in preparation for the application of paints.

The techniques for historic coloring

The most common type of coloring in the historic façades is the dry lime painting, that is to paint with proper brushes on the dry plaster. Usually when the façade presents evidences of previous colorings, after the surfaces arrangement and their wetting, is firstly extended a layer of whitewash, called “primer” followed by two “coat of paint”: carried out one horizontal and one vertical, with long and parallel strokes. A second type of coloring is the “glue” or “tempera” one, used in the case of pure colors. In this case, the colored pigment is dissolved in water and mixed with the desired fixative. To test the color, the tip of a small trowel is dipped in it and heated from the bottom until the paint is dry or is dried on any surface with a normal hairdryer. A third type of coloring, the most noble and lasting, is “the fresco” one, completed when the plaster is still wet. In this case, the pigments (particulary resistant) are dissolved in water, without using fixative. This technique can be used not only for decoration but also for the simply painting the north walls. The last kind of coloring, used to standardize façades of brick, stone or travertine is the “scialbatura”. In this case a tempera dye of the same color of the bricks, stone or travertine, is applied on the surface to equalize. A particular variant of “ scialbatura” is represented by “sagramatura” that differs from the previous because it contains aggregates, which make it more solid.

Decorative types and finishing touch

A traditional type of decorative painting is represented by trompe-l’oeil. This is normally done by chiaro-scuro, in the case of string courses, vertical bands, windows, blinds and other linear features, or with the help of spolvero. Special cases of trompe-l’oeil comprise the “fake bricks”, “fake marble”, “fake granite”, “fake rocks”, “fake travertine”, “fake timber”, “false gratings,” “fake windows” etc. Another example of application are stencils, used in case of repetitive elements. A variant of the molds is the “paint roller decorations”, already described, and another type of decoration, that involves not only brushes, is represented by the “graffito”, which we already spoken about.

Conclusions

The overview of materials and techniques applied to the realization and restoration of façades plaster and decoration, highlight how, in the last 30 years, the construction practice has significantly evolved compared to traditional pro-
cedures. Materials once manually prepared and applied (plaster, lime, dyes, etc..), are now available on the market “ready for use” and are applied with equipment that relieve the manual fatigue of the operators. Testing we have done, by necessity, with materials and techniques in their traditional appearance, learning how to “slake” the lime, how to prepare plaster and colours, now allows us to know them directly and to select the most abiding between the range of pre-packaged products offered by the market. A crucial contribution to the rediscovery of a modernized tradition was given by the transfer of diagnostic techniques (stratigraphy, thermography, etc..) from scientific restoration to the restoration of historic façades, and even to the cleaning techniques for stone, plaster and colorings with systems less tiring than manual “delaminations” by scalpel etc. Another contribution came from the study of historic manuals and from archival research on specifications and price lists of the period, in addition to the tests performed during the restoration of the historic façades of several different types carried out both professional and vocational training. At present, restoration of historic façades theoretically is no longer a problem, although in our cities only a small minority of façades is correctly restored, using plaster and lime hues of the original colors and designs.
And this comes at a time where is happening the transition from the “restoration of historic façades” to “restoration of modern architecture” that involves different issues than the “traditional restoration”, so it must be separately conceived.

Notes
2. This article is a summary of the forthcoming manual for historic façades restoration edited by the author.
4. BRINO G., RAJNERI G., Il Restauro del Moderno. Il recupero della Capanna Lago Nero dell’Architetto Carlo Mollino (1946-