If we scan the bibliography on the painting of stone artifacts we see this is largely concentrated within the last fifteen years, roughly a century after 1888, when Louis Courajod devoted a fundamental and almost unique monograph to Medieval and Renaissance polychrome sculpture. The plea of this famous art historian, urging restorers of the time, employed in the large restoration workshops for France's Gothic cathedrals, to respect the polychromy of sculptural reliefs, and not to exclude a course leading to a more considered and scientific approach to the question, also produced no concrete results.

Furthermore, it was not easy for the respect or research involving the painting of stone surfaces to have early effects on restoration practices given the scant attention paid to the subject in the area of art history studies. In the early 19th century a deep-rooted Classical bias had long postponed the admission that polychrome painting existed on the idolized candour of Greek marbles.

A similar resistance, or it might be more exact to say indifference, to the acceptance of the painted "facies" of sculpture recurred, and persisted at length from the 19th into the 20th century, in the area of the otherwise more thriving studies on Medieval and Renaissance sculpture. Hence, it is interesting to point out how recent studies, referred to at the beginning of this contribution, were not born of the world of historiographic scholarship, but from the direct experience of restoration workshops.

Thus, among the merits of modern methods of operating on stone artifacts, in many instances struggling with still unresolved problems, we should include the ability to develop an intellectual attitude and an operational practice capable of detecting the varied and often intricate processes of the finishing and conserving treatment of stone surfaces, and the changes suffered over time, and to recover, when they exist, the remains of the original painting.

However, given that this is a recent area of research, the results can as yet be only partial and they require more thorough investigation; we need only consider the still quite unresolved problem of the creation of oxalic acids. More concrete information than has so far been published on colour recovered during restorations has now emerged, but here too a broader survey is called for in order to reconstruct the historical outline of materials and technical procedures for painted stone sculpture.

The few comments devoted to this question by early technical works are certainly inadequate and, when compared with what has so far been revealed by the analysis of colours retrieved during restorations, they do not always appear to coincide. In 13th-century prescriptions the White Lead foundation, almost always found on Medieval sculpture, is to be mixed exclusively with an oily binder "album...cum oleo", while in more than one instance (for example, the cathedrals in Lausanne and Bourges) the binder for the White Lead has proved to be a protein. For the actual painted layer, works on the subject also concur on the use of oil as a medium for the pigments, but this also only partly accords with analytical findings which have identified a protein binder in the reliefs in the Panna Baptistry, the panels of the Months in Ferrara Cathedral, and in the cathedrals of Lausanne and Bourges.

The methods of executing the frequent gildings seem to vary even more. The gold leaf can be found applied on an oil mordant mixed with red or yellow Ochres (Strasbourg and Bourges), while in Italian examples it was more often simply made to adhere to a varnish composed of resin dissolved in oil, and in some cases a layer of tin formed a backing for the gold leaf. Cennini's treatise on the subject gives an elaborate recipe which involves a coating of coarse plaster, fine plaster mixed with animal glue, and yolk of egg with brick dust and bole, which has not yet been encountered on any stone artifact.

If it is permissible to venture some general comments on the basis of a still very partial case history, it seems possible to deduce that in practice the ground preparation, colouring and gilding of stone was carried out with hastier methods than those described in the technical prescriptions. Quite understandably, the sculpted stone was not treated like a picture which relied on the painting alone for its artistic entity. In the case of sculpture exposed to the open air, the impermanence of the painted surface was certainly well known. With the effects of environmental conditions this could not last long and, in fact, in many cases has proved to have been successively renewed. The repaintings were often
unfaithful to the original, being updated to accord with changes in artistic taste, as we see from the south portal of Bourges cathedral, repainted with variations thirty years after the first painting. But it can be hypothesized that these repeated polychrome paintings were also dictated by the need to renew what appeared to have deteriorated and, at the same time, continue to protect the stone with a painted covering which, apart from its primarily artistic purpose, also played a "sacrificial" role in the climatic conditions.

In any case, of these two purposes entrusted to the application of colour, the artistic and the conservative, it was certainly the former that prevailed. This is shown both by the practice of painting works destined for more protected interior positions, and by the gradual "withdrawal" of colour which took place, at least in Italian sculpture, in the move from the Romanesque to the Gothic and finally to Renaissance Humanism. In the 12th and 13th centuries when colour was used (which I believe was so in the majority of cases), it generally completely covered stone sculpture. We can therefore imagine, with some margin of doubt, that this was the case even where minimal traces now remain, as on the pair of 12th-century statues restored by the Opificio delle Pietre Dure. These are the so-called Berta (fig.1) and Baldesio, from an unidentified position in Cremona Cathedral, whose clothes carry three minute fragments composed of Minium, Minium and Red Ochre, and Red Ochre, with a protein binder.

The relationship between painting and sculpture seems to have been changed, at least in Tuscany in the second half of the 13th century, by the work of Nicola Pisano and his followers. It seems probable that it was Nicola's sought-for inspiration, drawn from examples of ancient Roman statuary, that stimulated his inclination to leave the natural appearance of the marble in view, though without abandoning that relationship between sculpture and colour which seems so integral a part of Medieval artistic sensibility. In the pulpits of Nicola and Giovanni Pisano and their disciples, despite the modifications made in their original appearance due to various operations of dismantling and drastic cleaning, on the marble relief panels it is possible to discern traces of the painted and gilded glass which once gave them their luminous and coloured ground.

For example, this is the case of the pulpit built towards 1270 for the church of San Giovanni in Pistoia by friar Guglielmo, Nicola Pisano's assistant, which is now being restored by the Opificio. Both the grounds for the scenes from the Life of Christ, which are the subject of the high reliefs on the pulpit's enclosure, and the explanatory texts which ran beneath, were composed of pieces of glass, gilded and painted on the reverse side, some fragments of which exist today (fig.2). But colouring was not limited to the glass alone since traces of gilding, and rarer remnants of colour, have been found on the figures too. However, the application of a painted surface on these marble pieces, which seem to be polished in a way that exploits their gleaming whiteness, was perhaps limited to certain areas of the reliefs, such as the folds of the garments, according to a custom which we see became widespread in Tuscany in the course of the following century.

Tino di Camerino's early 14th-century marble relief with busts of Saints, formerly part of a destroyed tomb in the church of Sant'Agostino in San Gimignano, has green, red and blue colours on the folds of the drapery alone, while gold is more in evidence, both on the figures and on the geometric decorations which divide them (fig.3), where the gold leaf was found to have been applied on a ground of White Lead mixed with red and yellow Ochres and copious oily binder.

A similar use of colour reappears, about twenty years later, in the Aringhieri tomb⁵ sculpted in 1324 by Giovanni di Agostino for the cloister of San Domenico in Siena, today in the courtyard of the city's university. The frontal relief, which follows the tradition for tombs of teachers at Bologna University by depicting the professor giving a lesson to students, is of Apuan marble, and the blue, green, red, brown and yellow pigments mixed with an oily binder are restricted to the figures' head coverings and the folds of their garments, and to the elegant Gothic inscriptions traced on the manuscripts (fig.4).

Nevertheless, this progressive limiting of the use of colour for stone sculpture, even though it continued to be a throughout the 14th century, does not appear as a hard and unbreakable rule. In his tabernacle for the Florentine church of Orsanmichele, executed in the 1350s and 1360s, Andrea Orcagna gave colour an important role. He not only covered the grounds and the architectural features with decorated glass but also painted the marble reliefs liberally, as is being revealed by the present restoration. In this church's Gothic interior, colour provided the particular character and unifying element for the whole body of decorations, from the walls, to the vaults and the window panes set in stone trefoils, also painted.
In the 15th century the strong bonds between sculpture and painting began to loosen, but more slowly and less generally than we have been led to believe by the lazy habit of not verifying certain art history preconceptions directly against the works themselves. It might seem unthinkable that in classicizing Tuscany, the centre of Humanistic renewal in the arts, the taste for coloured sculpture could have persisted until the end of the century, as is proven even if we restrict ourselves to what has emerged in restorations carried out by the Opificio over the last ten years.

Executed by Jacopo della Quercia between the second and third decades of the 15th century, the Fonte Gaia has been exposed to all weathers in the Piazza del Campo in Siena for over four centuries and has reached us in a pitiful condition. Yet, the restoration now under way has discovered, at present only on one slab with a foliate decoration on the back part, traces of colour composed of Red Ochre and Black Carbon, and beneath this is a thin whitish coating which may perhaps originally have been a liquid glue. The hypothesis that the veined (and not very aesthetically pleasing) Sienese Montagnola marble of which the fountain is made was painted with colours is supported by a document of 1415. This invites those in charge of the project to avoid the back part being “flat and white”, thus averting results discordant with the panels of the front part.

In Florence during these same years, sculptors like Donatello and Nanni di Banco, who had moved from the Gothic style to take their models from ancient Roman sculpture, produced the solemn and expressive statues of the new Humanist “gravitas” for the aedicules of the Art guilds, for the exterior of the church of Orsanmichele. Yet the austere physical and moral grandeur of these marble figures did not preclude them from being covered in the richness of gold. Both Donatello’s St Mark and Nanni’s St Philip have gilded hair and garments with borders and braid which were also rendered with gold leaf, applied on a resin dissolved in oil (fig.5). The bishop Saint Eligio, sculpted by Nanni di Banco for the aedicule of the goldsmiths’ guild, is cloaked in a pluvial trimmed with a border with gold and Ultramarine Blue ornamentations.

The same three colours, white marble, blue and gold, reappear in the prototype of 15th-century Humanist tombs: the tomb of the historian Leonardo Bruni, executed by Bernardo Rossellino for the basilica of Santa Croce in Florence, at a date after 1444. The cleaning of this architectural tomb, darkened by smoke and dust deposits, has ascertained that at least the carved cloth that covers the sarcophagus was gilded (fig.6), and has revealed traces of Azurite on the marble slabs of the ground of the two crowning putti and on the plasterwork forming a background to the tomb.

In this same church of Santa Croce, other and more unexpected novelties have emerged from the recent restoration of the Cavalcanti Annunciation by Donatello. This is a rare example of sculpture in pietra serena, a material traditionally reserved in Florence for architecture and its decorative features. But did Donatello really intend to leave the pietra serena open to view? This question, not touched on as yet by art historians, arises as a natural outcome of the results of the restoration, which has uncovered widespread traces of a white colouring (fig.7). In fact, both the architectural aedicule surrounding the scene of the Annunciation, and the two figures of the Virgin and the Angel sculpted in high relief, proved to be covered in a white colouring matter when the work was restored in 1884. The intervention removed this tempera, and the “resistant oil varnish” (as described in an article of the time) which lay beneath, with the aim of restoring the natural appearance of the pietra serena. But not all the painted film was removed, and during today’s restoration we have been able to retrieve and analyse the residue found in some more protected areas of the figures’ carving, and in some areas of the crowning part, hard to see from below.

The painted layers beneath the last repainting in Zinc White (therefore not before the end of the 18th century) actually appear to be two in number, of similar composition, consisting of White Lead with an oily binder, mixed with granules of Red Ochre and Terre Verte, so that this painted film had the chromatic range and soft luminosity of an Antique marble, enlivened by extensive gold decorations. Those we see today are the result of the 19th-century restoration that overlaid and hid traces of early gildings, which nevertheless emerge on some of the aedicule’s architectural features where the gold leaf was applied with varnish on tin foil, according to a technique Donatello also used for his stucco works in the Old Sacristy of San Lorenzo. Confirmation that this work was painted is to be found in the six stucco putti modelled by Donatello for the crowning part, which have also reached us with the “naked” look of terracotta, something that was never left in view in 15th-century sculptural practices. Indeed, thin but not insignificant traces of
flesh-colour have been discovered on the putti, composed of the same pigments used for the stone.

At this point we may presume that Donatello, a great experimenter with techniques and unusual combinations of materials, employing materials other and less noble than marble (and also less costly, which may have carried some weight with commissioners), wanted to give the whole piece the unified aspect of a marble gleaming with gold, and the ivory tones evocative of Antique marbles, whose influence is also clearly shown by this work's stylistic features.

The taste for colouring works in stone did not wane in Florence, but continued into the 15th century. And at the end of the century it appears again in the monument to Cardinal Niccolò Forteguerri in Pistoia Cathedral (fig.8), designed and largely carried out by Verrocchio and completed by his assistants. The very recent restoration, in which the Opificio participated with scientific and operational advice, has revealed that the marble ground of the high reliefs with the figures of Christ, Angels and Virtues was coated with a layer of blue smalt. The choice of smalt, the first time it has been ascertained on a sculptural marble work, can perhaps be seen as connected to the contemporary diffusion of della Robbia glazed terracotta altarpieces, although Verrocchio would seem to have been inspired, less by the wide variety of colour produced by Luca della Robbia's followers at the time, than by the sober and classicizing three shades of white, blue and gold favoured by the founder of the della Robbia workshop.

Restoration has revealed two subsequent repaintings of the monument. The earliest was done with Azurite which became transformed into Malachite, so that the painter of the subsequent operation, misunderstanding the chromatic tone of the marble's ground, applied a coat of Verdigris in an oily binder and painted, moreover, some small clouds whose character seems to place this intervention between the 16th and 17th centuries. However, this suggests that even after the taste for monochrome sculpture which had been established in the early 16th century had been affirmed, there was a desire to maintain the chromatic ground of the Forteguerri monument which the author had given it.

In the 16th century, at least in the field of Italian sculpture, rejection of the fusion of painting and sculpture became the norm, and it was left to less "noble" materials such as wood and terracotta to continue this ancient tradition.

Notes

1 The following is an almost exhaustive bibliography of this subject:
V. Furlan, R. Pancella, Le Portail peint de la Cathédrale de Lausanne, in "Chantiers", 12, 1981;
V. Furlan, R. Pancella, La polychromie de la Cathédrale de Genève, ibid, 1982;
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M. Tabasso, G. Guidi, F. Pierdominici, Duomo di Orvieto. Portale centrale: studio sulla policromia, in
2a Conferenza Internazionale sulle prove non distruttive*, edited by M. Marabelli, S. Santopadre, Rome 1988, II, pp.10-1/10/7;


T. A. Hermanès, *La riscoperta del colore nel monumento: il caso delle cattedrali di Ginevra e di Losanna*, *ibid*;


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5 Das Strassburger Manuskript etc., Munich 1966, pp.60-61;


7 The restoration of this monument is recorded, edited by A. Giusti, E. Tucciarelli, M. Oeter, in "OPD Restauro", 1990, pp.150-154.


9 For Orsanmichele, besides the three statues mentioned above, the Opificio has also carried out restoration of the St James by Niccolò Lambert, and the St Peter attributed to Donatello; only the latter has failed to reveal traces of gilding. The interventions on the Orsanmichele sculpture is documented in "Restauro del marmo. Opere e problemi", edited by A. Giusti, Florence, 1986, pp.134-150; "Capolavori e restauri", exhibition catalogue, Florence 1986, pp.47-52, 87-88; "OPD Restauro", entry edited by A. Giusti, E. Tucciarelli, 1989, pp.180-184; "OPD Restauro" 1990, entry edited by A. Giusti and A. Venticonti, pp.145-149.

10 The restoration has been published, edited by A. Giusti and A. Venticonti, in "OPD Restauro", 1992, pp.161-169.


Fig. 1. Detail of Berta, statue in Greek marble from Prokonnesos, once polychromed. Cathedral, Cremona.

Fig. 2. Grounds, with gilded and painted glass, in friar Guglielmo's marble pulpit, 1270. Church of San Giovanni Fuorcivitas, Pistoia.

Fig. 3. Part of a funerary casket attributed to Tino di Camerino, gilded and painted. Church of Sant'Agostino, San Gimignano (Siena).

Fig. 4. Detail of the Arrighi tomb, in polychromed marble, attributed to Giovanni d'Agostino. Palazzo dell' Università, Siena.
Fig 5. Gold leaf decoration on Donatello's marble St. Mark. Church of Orsanmichele, Florence.

Fig 6. Detail of an area with traces of gilding in Leonardo Bruni's tomb, sculpted by Bernardo Rossellino. Basilica of Santa Croce, Florence.

Fig 7. Remains of early painted marbling, on the Cavalcanti Annunciation, sculpted in pietra serena by Donatello. Basilica of Santa Croce, Florence.

Fig 8. Monument to Cardinal Niccolò Forteguerri, sculpted in marble by Verrocchio. Cathedral of San Zeno, Pistoia.