Faenza's art technologies : chemistry of materials and working methods

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Resumen :

Nel presente lavoro viene dato un quadro sulla natura, qualità e composizione dei ceramici faentini fra Medioevo e Rinascimento, considerati di migliore qualità fra quelli italiani dell ' epoca. Verrano date informazioni relative alle materie prime impiegate sia per i supporti che per gli smalti ricorrendo agli esami chimici. Inoltre saranno riportate notizie per quel che concerne la lavorazione e la preparazione sia del biscotto con particolare riferimento a formature, essiccamento, cottura, che dei rivestimenti coinvolgendo materiali usati, pigmenti e decorazioni varie. Attraverso alcune loro esperienze ricavate da studi su reperti ceramici faentini, provenienti anche da scavi di fornace, in confronto con altri di varia provenienza, i relatori illustreranno quanto ricavabile dalle apparecchiature di analisi anche le più sofisticate.

1. INTRODUCTION

It is well known worldwide that the term faïence has been used as a synonym for majolica since at least the 16th century AD. It appears, though, that experimentations had been carried out ever since at least the 12th century, producing qualitatively good results as in the case of the faiences of the «archaic» period (Ravaglioli and Krajewski, 1989; Bojani et al. 1984). Specialists in ceramic art have long wondered if these results depended on superior technical expertise or purely on artistic skills (Ravaglioli et al., 1985:326). The research that we have conducted prompts us to conclude that there definitely was no technological superiority but a pure and simple professional pre-eminence of the artisans of Faenza, whose orientation was more towards quality than quantity. The awareness of their own excellence explains the ability of Faentine artists as entrepreneurs in making known and marketing their products, as is testified by numerous documents relative to systems of commercial competition. And thanks to their commercial flair the craftsmen of faenza were ready to produce in a very skilfulmanner the more fashionable articles.

Around 15th century, Faenza was prevalentely a rural town. However, thanks to the statutes of 1414 and under the incentive of the ruler Gian Galeazzo Manfredi, the town set off towards a more and more importance as a commercial reality. Even if it is impossible to go back to the story of the (artisans)corporations of the town, the classes of artisans are well known, among them the one of the potters and of the wool makers had a particular development and was for Faenza a true source of richness.

The economic policy of Faenza appeared to beat that time prevalentely protectionistic, centralizing all own efforts and particularly addressed to satisfy the local requirements of the surrounding county side.

The administration didn't stimulate the free exchange and didn't foster cooperation and exchanges of workers with other cities, and no care of the possibilities to open new markets was undertaken. A change of this unfavourable situation took place later, starting from 1470, under Carlo Manfredi. Thanks to the higher liberalization of the market, the artistic majolica was going on to development, with the transformation of the potters in more advanced producers. Even if in a lesser extent, parallely also the glass art began to have a qualitative evolution of the artistic production thanksto the efforts of the sons of Andrea De' Zanelli. The qualitative evolution and the introduction of new productive techniques are due essentially to this new commercial deal that gave also the possibility tothe artisans to enter into possession of the productivetechnique of competitor of other towns.

The new requests and the numerous contacts brough out the latent expressive skilfulness that Faenza's ceramic art could finally express in it production thanks to the quality of the ceramic material obtained also for the suitable clay quarries invied by many italian artisans of the period.

Ulisse Aldovrandi was so convinced of Faenza's excellence that he wrote: «Argilla faventina est nivei coloris propterea ex illa fungitur vasa, quae Balearica

minimum maiolica imitantur». And further on he underlined the concept: «Nostris temporibus haec vasa maiolica faventiae ad imitationem Maioricae elegantissimae fungitur ...». (in Ulisse Aldrovandi,1644). Museum metallicum in libros III.... Bononiae. typys Jo. Baptistae Ferronii. 1944. p.)

2. THE REASONS FOR THE PRESTIGE OF FAENZA

The great renown of the majolicas produced in Faenza was principally due to the following reasons:

1. The spirit of entreprise that allowed the master ceramists of Faenza - sensitive and far-sighted - to anticipate the commercial impact and profitability of each new technique:

2. their entrepreneurial ability in marketing their products and promoting each technical innovation:

3. their remarkable creative and professional skills. and the capability of creating real work of art:

4. their great technical expertise and an ability to refine and optimize techniques borrowed from other centres of ceramic production while at the same time working away at their extremely accurate (to the point of perfectionism) manual creations.

3. THE FUNDAMENTAL CANONS OF THE «VASI BELLI» (BEAUTIFUL VASES)

The Faentine ceramists therefore largely owed their success to the fact that they adapted themselves to what they believed were the main criteria to befollowed for gaining recognition by the public. According to Vannoccio Beringuccio (1540) such criteria consisted of four secreti (i.e. rules) universally applicable for creating vasi belli et ben garbati (beautiful and well-shaped vases) to be decorated by a painting technique suitable to ceramics.

These rules called for (Biringuccio's text in quotes):

1. «The availability of a good and fine-grained type of earth. free from gravel or lumps».

2. In the first place a skilful moulding on the potter's wheel to obtain the graceful and slender shapes desired. and then an accurate working of the surfaces. «If one wants the vases rough. one only has to allow them to dry and fire them. But if one whishes to paint and embellish them. it is necessary to apply on them. once they are dry. a coat of the colour of white earth (authors'note : i.e. highly probable an engobe); and if one wishes to make them white. it is necessary to apply the coat before they have dried completely (authors'note: i.e. if the background engobe were insufficient to produce the desired shade and fineness of white).»

3. «A correct preparation and application of the varnish. and then the painting of it using various and appropriate colours.»

4. «Adequate firing of the vases», observing the rules for a correct stacking inside the furnace and keeping at first a moderate temperature which subsequently should be allowed to «gradually increase but not excessively. because if the fire is too powerful it will produce a colouring effect.

This is why during the first four hours the fire is kept low...» (The aim is clearly. at this stage. to favour only the softening of the varnish and the diffusion of the colours thereain. by maintaining a reducing environment sufficient on the one side to prevent colouring agents from changing to different hues and on the other side. at the same time. to prevent the surface of the object from adsorbing soot and becoming grey. while it is obvious that it is necessary that the firing subsequently should continue in an oxidizing environment). «... and over the remaining hours the fire is gradually oncreased until one judges that it has finally attained the white colour desired and that the varnish and the colours have become diffused. at which stage the fire is allowed to die out and the pieces are removed once they are cold.»

In some pieces there may seldom occur detachments of the painted varnish. perhaps for an incompatibility development at the interface as a result of an ageing of the supporting material during the time. It was observed that the colours of the decorated patterns in the areas corresponding to detachments of the underlying support remained unchanged : thiswas precisely due to the diffusion. which took place on firing. that permeated not only the thin vitreous film developed together with the coloured slip applied by brushwork. but also the underlying material (engobe. biscuit. or white glaze).

4. EQUIPMENT FOR «CERAMIC MAKING» AND TECHNIQUES FOR WORKING CLAYS AND GLAZES

The kinds of equipment used by ceramists to prepare and fire faience artefacts are well known.Important among them are the grinding mill. the pestles for treating glazes and colours. the iron bars for the pounding and working of clays. and the tanks (generally wooden) for refining clays. An accurate collection (whether by hand or with a small hoe) and selection of the clays already in situ (by the way. Leonardo da Vinci praised the clays of the Lamone - Faenza's river - as «very suitable for pottery»). an accurate cleaning of the gathered clays. and above all their accurate manipulation during their sorting by the process of fractional sedimentation. alla these pre-conditions played an essential role in allowing the ceramists of Faenza to obtain high-quality products. It was not. in fact. by having recourse to substantially different techniques that such results were achieved. It is evident that sorting out very fine and suitably worked clays permitted to produce veryplastic mixtures which thanks to the manual skill of craftsmen were moulded into very thin biscuits and graceful. fashionable shapes.

In TABLE 1 are given composition ranges of biscuits from Faenza along with average ranges of biscuits from all over Italy. These average compositions find a very good correspondence with those.

(TABLE 2) - determined by a re-evaluation of clays after deduction of fire loss - of samples coming from quarry areas that presumably are the same ones that were exploited at that time. (Fiori and Ravaglioli. 1974: 505; Fabbri et al., 1988: 220; Dondi et al., 1991: 47).

As for the glazes. the artisans of Faenza were capable of compositions adaptable to biscuits of various nature (the biscuits were in themselves available in extremely

wide varieties). The craftsmanship and the particular style of execution ofthe Faentine ceramists are in fact famous. and so therefore are the products of Faenza (especially the white-and-blue background theme) (Ravaglioli andVecchi. 1981:1).

TABLE 3 indicates some characteristic average compositions of glazes destined for different uses. A comparison is shown with the compositions of some Medicean coatings (Kingery and Aronson. 199O: 226).

The glazes then utilized as a covering engobes were certainly more fusible. It should however be remembered that it was common practice to add sand to the mill to obtain translucent effects.

It has been statistically demonstrated that the compositions of enamels used for executions in turquoise styles (after the manner of porcelain) are similar to the corresponding compositions adopted for Medicean porcelains.

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Table 1 Interval of the mean composition of historic majolica bisquits: in general for all Italy (A), for the neighbour area of Imola - Castel Bolognese (B) and for Faenza town (C).

	SiO_2	Al_2O_3	MgO	CaO	Na_2O	K_2O	Fe_2O_3	TiO_2	MnO_2	P_2O_5	Cl	F.L.
(A)	48-63	15-23	1.2-5.5	2-18	0.8-1.9	3.0-4.5	5-9	0.6-0.8	<0.15	0.1-0.8	0.2-0.4	0.5-8.0
(B)	48-52	19-21	3.2-3.6	12-14	0.8-1.6	2.9-3.4	5-7	0.6-0.7	<0.15	0.1-0.3	0.2-0.3	<5
(C)	53-57	14-16	3.0-4.4	14-18	1.0-2.1	1.9-3.4	5-7	0.6-0.8	<0.15	0.1-0.3	0.1-0.3	0.5-4

F.L.=fire loss

Table 2 Chemico-mineralogical characterization of the marly-illite clay cropping out from the area between Senio and Lamone river.·

	SiO_2	Al_2O_3	TiO_2	Fe_2O_3	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	S	F	F.L.
Green	44.22 ±0.70	12.14 ±0.3	0.59 ±0.02	4.41 ±0.10	0.99 ±0.02	3.58 ±0.25	14.76 ±0.52	1.34 ±0.30	2.47 ±0.09	0.16 ±0.02	0.18 ±0.10	0.10 ±0.02	15.93 ±0.36
Fired	52.77 ±0.53	14.49 ±0.27	0.70 ±0.02	5.26 ±0.09	0.18 ±0.02	4.27 ±0.28	17.61 ±0.50	1.60 ±0.35	2.95 ±0.09	0.25 ±0.02			

(a) Chemical composition expressed as percent weight oxides (F.L.=fire loss)

Mineral Component	Quartz	Feldspar	Calcite	Dolomite	Illite + Muscovite	Chlorite	Caolinite	Smectites	Iron oxides	Other
Content %wt	23 ± 2	10 ± 3	20 ± 2	9 ± 2	23 ± 1	5 ± 2	2 ± 1	2 ± 1	4 ± 1	2 ± 1

(b) Mineral composition

Table 3 Range of chemical composition of different enamels utilized in the area to cover majolica products [not-vitreous bodies included inside the glass are generally crystals of: cristobalite (SiO_2), wollastonite ($CaSiO_3$) and diopside ($CaMgSi_2O_6$); intentionally introduced sand at mill lead to the presence of both SiO_2 phases: quartz and cristobalite]

Components	Medicea porcelain (#)		Transparent copertas		Opaque base glass		
	outerglaze	innerglaze	for ingobes	outerglaze	typical of that time	of Luca Della Robbia	Coloured (§) on bisquit
SiO_2	53-55	54-62	37-47	40-52	45-60	38-42	47-62
Al_2O_3	5-6	5-7	5-6	3-5	3-7	1-3	4-6
TiO_2	0-0.3	0-0.3	0-0.1	0-0.4	0-0.6	0-0.5	0-0.2
CaO	2-3	2-6	0-1	0-2	0-3	1-3	1-3
MgO	0.4-0.5	0-0.5	0.2-0.4	0-1	0-1	0-1	0.3-0.4
Na_2O	6-7	4-7	0-2	2-3	1-3	2-3	1-2
K_2O	3-5	4-5	1-4	4-7	4-6	2-3	3-5
PbO	22-24	13-24	33-54	28-34	16-30	28-35	18-33
SnO_2	0-0.1	0-1	0-0.1	0-0.1	0-10 (*)	10-22	2-6
P_2O_5	0.4-0.8	0-4	0-0.2	0-0.1	0-0.2	0-0.2	0.1-0.4
Cl	0.3-0.7	0-1	0-0.3	0-0.1	0-0.2	0-0.2	0-0.2
FeO	0-1	0-1	0-1	0-6	0-1	0-1	0-1

(#) light coloured with CoO (0-0.3%) azure; CuO (0-0.2%) green; MnO (0-0.8%) violet-brown
(§) in particular with CuO (1-2%) for green
(*) low tin content opacified with mill additions