THREE CERAMOLOGICAL MARGINAL NOTES ON INDIAN CERAMICS OF THE 19th AND THE BEGINNING OF THE 20th CENTURIES

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The following notes are the result of my cooperation in preparing the exhibition for the Náprstek Museum in Prague, "Indian ceramics of the 19th and the beginning of the 20th centuries" (6), arranged by the indologist Mrs. Hana Knížková (1976—1978). While I was scrutinizing with her exhibits selected from the collections of the Náprstek Museum in Prague and of the City Museum at Moravská Třebová, and revising the catalogue, there appeared no doubt concerning the historical profile and location of the exhibits. Nevertheless, the typological profile of certain items was not entirely clear — which concerned namely such specimens as did not show characteristics identical with those of the ceramics generally known in the European production. Typological classification of about ten various ceramic types was very exacting. Macroscopic and comparative examination disclosed a number of problems of tectonic nature. To succeed in a correct typological classification, analytical proofs were called for.

The following notes aim at assisting in the ceramological, i. e. typological, determination with the aid of spectral analysis, of three types of Indian ceramics exhibited at the occasion.

The famous M u l t a n ware of the Punjab region(a) showing the characteristics of faience, revealed certain macroscopic particularities in the tectonic nature of the crock material, in the paint and in the glaze. This created some dilemma concerning the classification of this ware as true high fire faience. The types of faience coming from India proper — akin in their style to the Multan ware — were specified with comparative accuracy as two basic types: 1. high fire faience proper, 2. semi-faience [17]. With the aid of this analogy in general, the Multan ware could also be taken for semi-faience [b].

The first obvious condition for specifying faience ware is found in quantification of the Sn-component in the glaze material. In the high fire faience proper, this is found in a first order concentration, i. e. in tens of percent, while in semi-faience it is totally negative. It is not possible to specify the Sn-component macroscopically even though in the Multan ware a white layer in the peripheral parts of the article was evidently not smelted, and in a neighbouring zone covered with glaze — which indicated a probability of a slip ("Anguss" in Weiss] and glaze — tectonic layers typical of semi-faiences. In high fire faience proper, macroscopy shows clearly the following tectonic sequence: crock — underglaze — paint; whereas in semi-faiences, the structure is: crock — slip — paint — glaze. Naturally, the specification is more detailed. A further tectonic problem was presented in the turquoise tones of the paint and glaze on the Multan ware, shown generally in two ways: either as a monochrome application [if only on some part of the article], or as filling in the cobalt contours [and, along with the cobalt tracing, in planes, also over the turquoise exposition]. According to a general law in ceramology, the turquoise tonality may be activated by alcalic components contained in the ceramic material .In semi-faiences, this function is performed by the glaze — an upper covering translucent non-chromatic layer, non-plumbous boric glaze — working "from above", i. e. the paint under the glaze is exposed on a chemically passive foundation, and is activated by this glaze.

M a c r o s c o p i c examination of the tectonic layers, of their nature and sequence:

The first tectonic layer — crock — shows properties so significant as not to require analytical proof; any data resulting from an eventual analysis would be vague as documentation. These properties represent a common profile of fine coloured-paste porous matter of a simple, strongly ferrous and limy sialitic disposition. In low fire ware, the disposition of such a paste is not even typologically relevant. The glossy disposition of an insertion may be suggested here — on the strength of the presence of a concentrated Mg-component in the gradient layer slip — paste — see below, report on spectral analysis (c).

In the second tectonic layer there is a white slip, unsmelted, dusty, visible in the border areas of the articles. This slip was subjected to spectral analysis. The evaluation of this tectonic layer is of a first importance for typological classification. From the above it follows that a specification may determine significant differences between high fire faience proper and semi-faiences.

R e p o r t on results of an emission semiquantitative spectral analysis carried out by Ing. Jaromír Čermák, CSc., of the Institute of Chemical Technology, Analytical Chemistry Department.

Conditions: spectrograph Q - 24, generator ABR - 3, current 8 A, exp. 90 secs.:

Coll. item No. 13 396, Náprstek Museum

The numbers in the table give the concentration in %.

Si	1	Mg	/—1/—/ 0/
Al	0	Cu	/—1/—/ 0/
Pb	—1	Co	—
Sn	/—3/—/—2/	Zn	—
Ca	1	Cr	—
Na	1	Ni	—
B	—1	Ti	/—3/—/—2/
Fe	0	Bi	—
Mn	/—2/—/—1/	V	—

E v a l u a t i o n of the spectral analysis of the tectonic layer of the slip:

The typologically significant content of the Sn component in the slip is determined in a low-order negligible concentration — i. e. in a quantity that cannot prove the white tectonic layer as an under-glaze, or foundation layer of glaze usual in high fire faience proper. Follows that cassification of the Multan porous ware as high fire faience proper can be eliminated. The preponderant quantity manifest is Ca, typical of the lime clay, or chalk. A high Si concentration points specially to clay. Specification of the slip is therefore fully reliable.

A third tectonic layer is formed by the exposed paint — in cobalt tracing, from outline to area filling, entirely non-plastic, of a wavering tonality, conspicuously exposed, — in turquoise tracing, characteristically diffused, of a wavering tonality, exposed mainly in the fillings of cobalt outline.

A fourth tectonic layer is represented by the exposition of the glaze of two different modifications, achromatic and chromatic. The achromatic layer is completely translucent and active to the third tectonic layer, i. e., to the exposition of the turquoise—traced paint. The chromatic layer is a coloured modification of the achromatic one, and is exposed also over the cobalt paint, this being of a varying translucence, while its primary function apparently consists in creating a cover even though the paint is exposed firstly under the achromatic layer. Both kinds of glaze are very glossy and thoroughly vitrified. The difference between the tonality of the turquoise covering glaze and the turquoise paint is explained in the difference between the tectonic layers: the turquoise covering is a single consistent layer of glaze whereas the paint is exposed under the over-glaze which activates the paint tracing, thus adding to it a different viscosity and tonality. This glaze, i. e. the fourth tectonic layer, was subjected to spectral analysis.

Report on the emission spectral semiquantitative analysis (conditions, procedure the same as above):

Coll. item No. 13 397, Náprstek Museum.

Si	1	Mg	0
Al	0—1	Cu	0—1
Pb	—1	Co	—1
Sn	—2	Zn	—1
Ca	1	Cr	—
Na	1	Ni	/—5/—/—2/
B	0—1	Ti	—2
Fe	0—1	Bi	—
Mn	/—2/—/—1/	V	—3

Evaluation of the spectral analysis report:

When we work with a fine porous vitreous ware, i. t. semi-faience bakable in the neighbourhood of 1.050 °C, that is, with porous matter harder than the common potter's clay, the glaze may be specified in the following tectonic ground-plan formula:

$$\begin{matrix} 0.55\ CaO \\ 0.45\ K_2O \end{matrix} \cdot 0.7\ Al_2O_3 \cdot \begin{matrix} 3.3\ SiO_2 \\ 1.3\ B_2O_3 \end{matrix}$$

The formula is typical of the boric alcalic nonplumbous outside frit glaze, i. e., of a commonly alcalic silicoborate. This kind of glaze is technologically adapted to application onto the crock. This kind of glaze may be determined by means of a simple visual examination. The turquoise tonality of the paint with the Cu component, and also the chromatic glaze, are activated by a strongly alcalic silico-boric, non-plumbous glaze. (On the other hand, the simple lead glazes activate the mountain-green tonality).

The concentrations of Na, Al, Si, B specify the frit — i. e. alcalic siliceous boric — component. The high-concentration Ca specifies the component of the left side of the formula even though a higher concentration certainly is influenced by the gradient slip as well. A high concentration of Cu specifies the colouring component. The remaining concentrations are irrelevant. One circumstance should be emphasized, namely the fact that the boric component strongly reduces the vitrifying temperature of the glaze which is technologically important under the Indian conditions. This glaze must be plasticized while raw. It is applied onto the raw crock material, the article is baked once only. The technology is facilitated by a favourably balanced reology of the paste and of the other tectonic layers in the fire.

In this way, we are able to classify the Multan ware safely — according to its basic properties — as typical **semi faience with over-glazed paint**, in complete agreement with Weiss' typology. These are single-fire faiences. In the collection of semi-faiences, technological analogies may be pointed out with Near-Eastern wares — Persian, Turkish and Byzantine (17).

The typical group of J a i p u r ware (d) in the collections of the Náprstek Museum in Prague, and in the City Museum at Moravská Třebová, and similar ware, are termed vaguely as follows:

— Persisches Steinzeug (17)
— Persisches Porzellan (17)
— Polychromisches — Persisches Porzellan (17)
— Halbfayenzen im Porzellanstil (17)
— glazed pottery (3)
— glazing earthenware (3)

— frit faience (17)
— whiteware (6)
— rock faience (2)
— hard porous ware (porous hardware) (2)
— stone paste pottery (18)

These pseudo-synonyms do not, however, practically express more than a basic principal differentiation within the group of descriptive terming of the classical types, i. e. kinds of ceramic products, — which only serves to demonstrate the difficulty in classifying the ceramics under consideration. Each name naturally expresses a certain property of the composite group, pertaining to these particular wares — perhaps with varying precision — the decriptive elements overlapping. Each name offers a certain measure of opportunity for gathering a number of fundamental characteristics and, through elimination, to settle for the most reliable method leading to basic classification. The fact is that the most reliable method of classification must be based on careful and correct tectonic and analytical specification.

At the start, the typological examination revealed that the articles are of a hard porous character which pointed to classifying them as whiteware. But differences in nomenclature as used by different authors awakened some doubts which led us to subjecting these articles also to a closer ceramological examination.

Macroscopic examination:

The Jaipur ware shows three tectonic layers of ceramic materials: a layer of crock, a layer of paint, and a layer of glaze. This statement is supported by an object kept in the City Museum at Moravská Třebová, it. No. I E 356/71, which is not covered with glaze. It also offers proof of a specific quality of the crock material, i. e. its high-grade vitrification, solidification and hardness. Its crock is white, formed by solidified vitreous hard grains, highly vitrified, that is, the crock is non-homogenous, partly porous, not translucent, lustreless, passive in heat to the exposed paint. These qualities may specify synthetic paste. Through research in literature (1, 2, 3, 4, 15, 16, 17) it is possible to specify beyond any doubt that the siliceous and frit (alcalic) components, and also, according to certain authors, the clayi (i e. kaolinic) components were added (1, 4, 16). This last addition is not, however, macroscopically discernible. Now generally, in the ground-plan, the paste material is an alcalic alumosilicate of the system R_2O — R_2O_3 — RO_2.

From the possible definition span porcelain — stoneware — hard porous ware — semi-faience — we may now eliminate. Classifying the crock as "porcelain" (i. e. porcelain paste) does not meet the case owing to the lack of certain specific qualities — namely, the quality of translucence, and the quality of nullitic modification of the paste material, although the composition of the paste material might, in the ground-plan, indicate these qualities. "Frit porcelain" does not apply owing to the mentioned lack of translucence even though it might be applied on the strength of the fundamental frit component. The term "stoneware" is eliminated by the frit component and the lack of homogeneity in the paste, i. e. its partly porous character.

Classification applying the terms "hard porous ware", "whiteware", "semi-faience", is more problematic since its shared meanings may be commonly applied. Which circumstance represents the reason for our conclusion: For purposes of primary classification by the elimination method, exemption of porcelain and stoneware is satisfactory, whereas for classification aiming at a consequent application of correct terms, a more exact tectonic specification must be achieved. The second tectonic layer — subglaze paint — is important for the specification of the glaze. As shown on the collection item No. I E 356/71, the paste material remains totally passive in relation to the quality of the paint. But the turquoise tonality of the paint indicates a plumbous and strongly alcalic glaze. As evident, the turquoise tracing component is highly activated by the glaze which is typical of the specific character of faiences and semi-faiences. This quality leads us to further typological elimination. Follows that the Jaipur ware is not simple whiteware since in this kind of product, the paste is entirely passive to the material of the colours, i. e. paint. Col. item No. 352/71 proves this as a fact. The object appears as typical whiteware but falls under a completely different group of products. The relatively high specialization of materials of a porous nature indicates also a degenerate quality. The classic values of ceramic wares are expressed in balanced proportions of the material properties in raw condition, and properties following on the baking, which means, in a set of qualities effected by heat and fire, resulting in a final visual character of the ware.

The remaining colour properties of the Jaipur ware may be described as the above-mentioned passivity — that is, naturally, partly intentional. The stability of colour tracing of a porcelain effect is conditioned by synthetic paint components whereas typological specification rests on their ceramic function — there, the paints are exposed under the glaze. The subglaze active paints are typical of semi-faiences, the passive paints are indicative of porcelains and of whiteware. Thus the tectonic layer of paints on the Jaipur ware leads us to conclude there are two different and distinct genetical typological strata. This typological bivalence is extensively documented by Weiss [17], specifically on the Near-Eastern ware. The turquoise paint is expressive of the genetical stratum of porcelain. Cobalt and mangan paints are typologically polyvalent.

The third tectonic layer of the Jaipur ware is formed by the glaze. As stated above with regard to the turquoise tonality, it is possible to specify macroscopically that the Jaipur glaze is plumbous and strongly alcalic, naturally translucent, achromatic, highly vitrified. The plumbous and alcalic components are documented in literature [1, 2, 3, 4, 15, 16, 17, 18]. In addition, the frit component, logically the siliceous, boric components, are quoted, and also the component of plastificators. This composition is brought out also in the report on spectral analysis of the glaze [carried out under the same conditions as above]:

Coll. item I. E 373/71, Moravská Třebová

Si	1	Mg	—1
Al	/—1/—0	Cu	/—3/—/—2/
Pb	0	Co	—
Sn	/—3/—/—2/	Zn	—
Ca	0	Cr	—
Na	0—1	Ni	—
B	0	Ti	—3
Fe	/—1/—0	Bi	—
Mn	/—3/—/—2/	V	—

This glaze may be determined with relative precision in the general formula for glazes of hard porous ware.

$$RO \;.\; 0.1 - 0.4 \; Al_2O_3 \;.\; 2.0 - 4.5 \; SiO_2$$
$$0.5 \; B_2O_3$$

Baking temperature within the span of 800—1200 °C.

Which amounts to this:

The glaze may be evaluated as upper vitrified achromatic translucent boric alcalic plumbous siliceous glaze. A substantial component of the glaze material is represented by the frit which is also contained in the crock material. This indicates that there exists a ceramological interplay of the two silicates — paste and glaze. This characteristic must be considered relevant in typological classification.

In the narrowed definition area hard porous ware — semi-faiences, we are now able to classify through specification with precision: Since the paste is vitrified only in conglomerates of particles while around these it remains porous — which means it is not homogenous — this tectonic character of the crock is fully typical of hard porous ware. This description, however, covers a wider selection of ceramic types. We concentrate only on semi-faiences of a specific kind, "frit faiences", not the simple ones. This classification is supported by factual circumstances quoted above. In a brief survey, see analogies with Weiss' typology:

Halbfayenzen im Porzellanstil: (17)

14. Jahrh.	Syrien	„Blau-Weiss Ware"
15.—19. Jh.	Persien Kirman, Mesched	„Persisches Porzellan"
17.—19. Jh.	Kirman, Mesched	„Polychromisches-Persisches Porzellan" (Unterglazurfarben, Quartzfrittenscherben)

In conclusion, the group of Jaipur ware may be ceramologically specified as **frit faience with overglazed paint**, showing a genetical bivalence — active and passive to exposed paint — or, in relation to cultural history, as frit faiences (= a kind of semi-faience) with over-glazed painting in porcelain style.

In indological research, this ceramological classification may yield a closer determination of cultural influences, and assist in historical, iconographical etc. research. The actual proof of fundamental properties, and analogy with Weiss' work, indicate Near-Eastern influences, n o t influences deriving from the porcelain-producing sphere (f. i. the Far East).

A third group of ceramic wares in the Náprstek Museum, ceramologically very puzzling, includes D e l h i ceramics (e). It has outstanding ceramological characteristics, it is very thin and translucent. The glaze of one of the four kinds at our disposal has a brilliant turquoise tonality. Considering their thin walls and translucence, this ware may be classified as porcelain. But the crock is very porous and incongruous even though the glaze is brilliantly glossy and vitrified. This awakened some doubt about the classification, and produced a query — how can a porous, and, what's more, incongruous crock be translucent? This directed us to subjecting the silicate to tectonic and analytical examination.

The Delhi ware may be examined in three tectonic layers: the layer of crock material, the layer of paint, the layer of covering glaze.

The texture of its highly porous crock material may be described as a conglomerate of structurally independent particles. Only a higher degree of viscosity of the surface of these particles in the heat allows the conglomeration and, in consequence, only a partial coherence of the crock material. The main coherence of the thin crock is caused — naturally — by the tectonically gradient glaze-crock layer. A layer of the glaze, i. e. its finer fraction, with some part of the crock material, forms a favourable eutectic which leads to smelting of the surface layer of the crock. The coherence of the crock as such is minimal as revealed by mechanical probe. This technological condition doubtless requires, in this kind of ware, single fire baking (whereas in the French frit porcelain which is baked in two fires, the crock, covered for the first baking in siliceous powder, is then baked over once again).

The necessity of a single fire baking is very typical of the rudimentary ceramics, answers also logically the Indian economical conditions. The glaze, the gradient glaze-crock layer, and the crock, are all translucent. The glaze is smelted, so is the gradient, — follows, they can both be translucent. They are specific, vitreous, free of opacity, but the translucence of the crock is caused by its texture — consisting of independent vitreous particles. Even though the crock material is non-homogenous and very porous, these properties do not prevent translucence. An attempt at further baking with the view of effecting homogeneity of the article, would result in deforming it. The thinness of the crock is not only an obvious aim but stands as a technological requirement for retaining the quality of translucence. As will be demonstrated, the paste material is selected in a very special manner — which is natural with porcelain — but in the Delhi ware it is very specific. The crock material was subjected to spectral analysis.

R e p o r t : (Procedure and conditions identical with those of the first analysis):

Col. item No. 43.609, Náprstek Museum.

Si	1	Mg	0
Al	1	Cu	1
Pb	—3	Co	—1
Sn	/—3/—/—2/	Zn	—
Ca	0—1	Cr	/—2/—/—1/
Na	1	Ni	0—1
B	—1	Ti	/—4/—/—3/
Fe	1	Bi	/—3/—/—2/
Mn	/—2/—/—1/	V	—3

E v a l u a t i o n of the report on spectral analysis of the crock material:

From a high concentration of Al and Si, alumosilicate may be specified; high concentrations of Ca and Na point to alcalic alumosilicate. Literature (1, 2, 4, 8, 9, 10, 11, 17, 18) corroborates the finding that feldspar is the basic raw material in the crock. This is a general specification; it is necessary to point out that, more exactly, it is an isomorphous mixture of albite and anortite i. e. medium plagioclas (oligoclas) called andesine. There are world-renowned deposits of Indian andesine at Coromandel Coast and Carnataka (5). Andesine from Carnataka is generally called indianite. Indian pegmatites from which andesine is produced are very micaceous. The mica component substantially reduces the melting limit of the silicate. Pegmatites are specified also by a higher Ti concentration.

The crock material may also come from China stone (synonyms: petnutse, pe-tun-se, cornish stone, etc.) (1). In fact it is a kind of micaceous granite in which feldspar is partly converted to koalin. An interesting reference — for Jaipur ware only — is found in Hallifax (4): ... "inferior porcelain clay and semi-decomposed feldspar in the vicinity of the granite masses at upper Hazāra ..." ..."China clay and stone have been known at Delhi for a very long period ...". This material then has been the fundamental raw material for porcelain stoneware, i. e. white crock translucent hardware of early China which is genetically rudimentary since it is of an organic nature, non-synthetical: petrographically, of one single material. The genetically more developed porcelains consist of several components, and are kaolinic in nature, by intention. This specialized multi-composite nature of true mullitic porcelains developed genetically — perhaps — from a complex of qualities of organically single-material stone porcelain.

Both special crock raw materials under consideration are hypothetically acceptable; they both allow for resulting basic qualities — translucence and thinness — achieved in a rudimentary and specific technological process.

The crock, admittedly, reveals one of the basic qualities of porcelains — translucence, but lacks the siliceous component in the mullitic modification, — and, not being perfectly vitrified, is not possibly a true porcelain crock. It is not even a stoneware crock since it is not entirely vitrified while being highly translucent. It is, therefore, some sort of a porcelain crock that may be classified as soft and porous (in difference to a hard, i. e. true porcelain crock). The term "soft" expresses, in the first place, a low baking temperature, not the mechanical qualities of the crock.

The second tectonic layer, the layer of paint, does not require ceramological examination. As far as certain important relations to the glaze are concerned, we shall deal with them when examining their own tectonic layer — the glaze.

The third tectonic layer — the glaze — was subjected to spectral analysis (procedure and conditions identical with those for the first analysis):

Coll. item No. 13.717 a, Náprstek Museum

Report:

Si	1	Mg	/—1/—/0/
Al	1	Cu	—2
Pb	—1	Co	—2
Sn	—2	Zn	—1
Ca	0—1	Cr	—1
Na	1	Ni	/—2/—/—1/
B	0—1	Ti	—2
Fe	0—1	Bi	—
Mn	—1	V	/—3/—/—2/

Evaluation of the report on spectral analysis of the glaze:

High concentrations of Si and Al suggest a siliceous vitreous matter, or else, a component of silex accompanied with pegmatites which have a high content of Al and a rich selection of rare metals manifest in the analysis. A fair quota is due to the gradient crock-glaze layer of which the values are quoted above in the text. High quantities of B and Na suggest a boric component (B accompanied with Ca and Mn) — a frit glaze, i. e., borosilicate. This calls for specification by means of Indian tincal — refined, naturally (5). Borosilicates are the simplest translucent kinds of glass, i. e. glaze, the simplest frits. Already from this rudimentary ground-plan of the glaze, originated in the organic matter, of an organic basic nature, a specific character of the Delhi ware may be determined. It shows no interference by some genetical specialization, neither in the crock nor in the glaze. The glaze on the Delhi ware is exposed in two ducts, one of them turquoise, the other colourless; the turquoise tonality is achieved by introduction of a copper component into the frit (f).

Ceramologically, the glaze may be specified as an achromatic and chromatic transparent non-plumbous frito-boric-alcalic silicose, — in its descriptive nature and expressive ground-plan as a non-plumbous frit.

The Delhi ware may be specified as rudimentary **feldspar porous porcelain with a plumbous frit glaze.** Its genetical value is ceramologically archetypal even though the iconography of the paint shows Persian influences, and the duct is very incongruous. The basic qualities of this porcelain do not point to any Near-Eastern analogies; even the Eastern influences are not overexpressive, and remain in the general sphere as shown in the specification of the crock. Ceramologically, the Delhi ware may be taken for endemite. The problem of the cultural-historical specification of the Multan, Jaipur and Delhi wares should be left to indologists. The exact sciences are, nevertheless, very much in debt to modern culture even though the archeologists have been using the exact scientific examination methods in almost all the sectors of material culture.

Notes:

a) cf. Hana Knížková, Indian Glazed Ceramics of the 19th and Early 20th Centuries, pp. 76—78, plates 1—5, in this volume of the Annals of the Náprstek Museum.

b) semi-faiences have not been dealt with by research in Czechoslovakia, with the exception of Prof. Bárta (2) who mentions this particular typological group without going into specification. It is in the work of Weiss (17) we find the most thorough specification up to this date, introducing the term "Halbfayenzen". An earlier work by O. Falke (19) introduces specification of semi-faiences using French and English equivalents: Halbfayencen — faience silicieuse — siliceous glazed pottery.

c) Kipling (12) describes ... "brick earth of feeble tenacity and mica, gum, goat's dung and tinfoil". This version may be partly correct while it is not evident why plastificators should be necessarily introduced into the paste material: the tin component is clearly a technological error; it is not known up to this date that this kind of component had been introduced into the crock material. Perhaps this is a misplaced statement since in the neighbouring tectonic layer there is now and again to be found a tinny component — but only in true high-fire faiences. Plastificators are introduced into non-plastic paste materials (i. e. frit faiences, porcelains etc.) in which sphere Kipling's error has probably originated.
The case speaks for many; a ceramological criticism of literature would require an independent study.

d) cf. ibidem, pp. 85—87, plates 40—51.

e) cf. ibidem, pp. 79—81, plates 8—21.

f) Birdwood (3) believes that a plumbous component also is added to the borosilicate. Spectral analysis does not reveal it in a quantity that should be typeformative —1; neither does the crock which would contain Pb at least in the gradient layer, betray more than a —3 concentration. The plumbous component would be technologically superfluous since the reology of borosilicates is theoretically favourable. Very likely, this supposition was suggested to Birdwood through analogy with the tectonically different glaze. He even states that this component contains 1/2 of the weight of the Sn component! Naturally, spectral analysis does not show it in any significant quantity — and what's more, there is a gross technological error: Sn quantity of so high a degree would cause complete opacity, i. e. opacity of the glaze which — to the contrary — happens to be completely translucent. This may once again be an error taken over from certain Near-Eastern analogies. It should be stated here that none of the classical Indian faiences shows the Sn component; in other words, the Indian faiences are semifaiences — ref. to the Multan ware.

Literature:

1) Bárta, Rudolf: Kamenina (Stoneware), Praha 1921

2) Bárta, Rudolf: Sklářství a keramika. Jemná keramika (Glass Manufacture and Ceramics. Fine Ceramics), Praha, 1952

3) Birdwood, George, C. M. — C. S. J. — Edin, M. D.: The Industrial Arts of India, London, 1880

4) Hallifax, C. J. in: The Journal of Indian Art, Monograph on the Pottery and Glass Industries of the Punjab, 1890—1892

5) Hintze Karl: Handbuch der Mineralogie, Leipzig 1894

6) Indian Ceramics of the 19th and the Beginning of the 20th Centuries. From the Collections of the City Museum at Moravská Třebová and of the Náprstek Museum in Prague. Exhibition Catalogue. Text by H. Knížková. Moravská Třebová — Praha 1977

7) Jaenicke, F.: Grundriss der Keramik, Stuttgart 1879

8) Jacquemart, A. — Le Blant, E.: Histoire artistique, industrielle et comerciale de la Porcelaine, Paris 1861, III. Tome

9) Jacquemart, M. A.: Histoire de la Céramique, Paris 1875

10) Julien, St.: L'Histoire de la Fabrication de la Porcelaine Chinoise, Paris 1856

11) Kenny, J. B.: The Complete Book of Pottery Making, New York 1944

12) Kipling, J. L. in: The Journal of Indian Art, Vol. I, 65

13) Lach, V.: Keramická příručka (Handbook of Ceramics), Praha 1958

14) Leach, B.: A Potter's Book, London 1945

15) Rada, P.: Kniha o technikách keramiky (Book on Ceramic Techniques), Praha 1956

16) Rustam, J. M.: The Handicrafts and Industrial Arts of India, Bombay 1960

17) Weiss, G., Ullstein: Fayencebuch, München 1970

18) Wulf, H. E.: The Traditional Crafts of Persia, The Massachusetts Institute of Technology 1966

19) Falke, O.: Majolika, Berlin 1896