Materials and Craft in the Exterior Frescoes of Churches in Northeastern Romania

Mihaela D. Leonida
Professor of Chemistry
School of Natural Sciences
Farleigh Dickinson University
Teaneck, New Jersey

[Fresco is] "the most difficult and daring painting technique, the ultimate test for a painter."
- Michelangelo

Orthodox churches in the European Southeast have typically interior walls covered in frescoes (Figure 1). The technique used is what is known as *buon fresco*. The painting is applied on a wet wall (on a lime plaster layer) using only water-based colors. Upon drying, the mural (the fresco) becomes an integral part of the wall surface. The result has a better resistance in time compared to painting applied to dry surfaces (the *secco* technique).

Figure 1. Interior fresco in the church of Humor Monastery (built in 1530, painted in 1535)

There is a region in northeastern Romania which saw a period of high quality humanistic accomplishments during the second half of the 15th century and the first half of the 16th century, about the same period which enriched Western Europe with the most remarkable Renaissance artefacts. We can illustrate this parallel between the spirit of religious painting in Western and Eastern Europe of the time if we look at two masterpieces representing *The Last Judgment*, from both areas (Figure 2). The difference between the two frescoes is that, while the

(a)

(b)

Figure 2. Representations of The Last Judgment: (a) Western Europe – The Sistine Chapel, Michelangelo, 1536-1541; (b) Romania, the church of Monastery Voroneţ, built in 1488, painted in 1496

one in the Sistine Chapel is an interior fresco, the *Last Judgment* at Voroneţ (church also known as the Sistine Chapel of the East) is painted on the exterior western wall of the church.[1] It has stood the test of time for more than five hundred years in a typical continental weather pattern with hot summers and inclement winters.

(a)

(b)

(c)

(d)

Figure 3. (a) Sucevița Monastery (1589); (b) Humor Monastery (1535); (c) Arbore Monastery (1541); Moldovița Monastery (1537)

[1] The *Last Judgment* always appears on the western exterior wall, as required in the iconographic part of the *hermeneias*, the manuals written by iconographers, considered secret, and addressed to their closed circle.

There are in northeastern Romania several churches entirely painted on the outside, displaying an entire *Biblia pauperum,*[2] a seen Bible of the poor, at a time when very few people could read (Figure 3). Different painters, most of them unknown, followed the canonical iconographic guidelines, but interpreted the scenes with personal touches. Their palettes favored different hues (the famous "Voroneţ blue", the green-red of Sucevița, the yellow of Moldovița, the red of Humor, and the green of Arbore) when they described the biblical stories of the earth and heaven, scenes from the lives of the Virgin Mary, of Jesus Christ, stories of man's beginnings and of his afterlife. The interior walls were painted first and the exterior ones several years later, giving walls enough time to "settle". The reasons for such huge undertakings were both religious and didactic: to promote Orthodoxy to a mostly illiterate population. At the middle of the twentieth century Mikhail Alpatov, who is known to have said that "colors are the vehicle of spiritual expression", looking at the exterior frescoes of these churches located inside monasteries in northeastern Romania wrote: "… what an astonishing courage! The Romanian masters painted the exterior walls….without being afraid of the fact that colors could fade".[3]

The *fresco* technique requires a complex set of skills: self-discipline, courage, craftsmanship, ability to make fast decisions, experience and a good understanding of the technique (since the colors look different when they are dry than when they are wet). The materials used for murals varied from one geographical area to another depending on climate, availability, and intended use for the mural. In ancient Egypt watercolor was used to paint engraved designs on mud-plaster walls while on stone the design cut/engraved on it was painted using watercolor as well. The Pre-Hellenic civilizations developed the *fresco* technique which attained its highest level during the Renaissance. While ancient Greeks were not keen on preservation or keeping accurate records, there are later writings mentioning the *fresco* technique from Roman authors[4,5] or from western authors like Cennini[6] and Vasari.[7]

[2] Paupers' Bibles - colorful hand-painted illuminated manuscripts on vellum. In the fifteenth century printed examples with woodcuts took over, mostly in the Netherlands and Germany. The simpler versions were used by clergy as a teaching aid for those who could not read, which included most of the population. The name *Biblia pauperum* was first used by German scholars in the 1930s.

[3] Mihalcu M., ed. *Conservarea obiectelor de arta si a monumentelor istorice*, Bucharest: Stiintifica, 1970.

[4] Bailey K.C. (ed.), *Pliny the Elder's chapter on chemical subjects*. New York: Longmans, Green and Co., 1929.

[5]Granger, F. (ed. and translator), *Vitruvius on Architecture.* New York: G. P. Putnam's Sons, 1931-1934.

[6] Cennini CA. *The craftsman's handbook,* translated by Daniel Thompson. New York: Dover Publ. Inc., 1960.

[7] Vasari G. *Vasari on technique*. Translated by Louisa S. Maclehose, New York: Dover Publ., 1960.

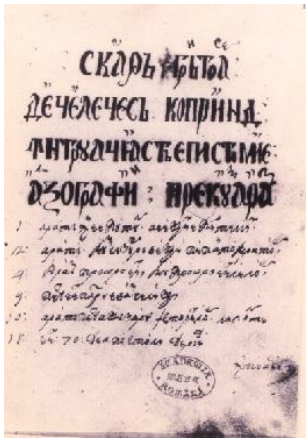


Figure 4. Page from a Romanian *hermeneia* (*Scara* – the table of content)

Very little is known on the subject of the craft involved in making/writing icons[8] on the territory of today's Romania for several reasons. First, the artisans involved were members of a closed circle to which access was achieved only following a long apprenticeship during which the knowledge was passed from master to apprentice directly and also through the information contained in the *hermeneias* (iconographer's manuals)[9] compiled by iconographers and intended exclusively for their restricted group (Figure 4). Due to the manner in which that knowledge was acquired and, even more importantly, due to the targeted qualities of the products made by iconographers, the icons, the information contained therein was considered a "secret" and could not be shared outside the iconographers' guild. While in Western Europe these "secrets" ceased to be considered as such no later than the twelfth century, in the Orthodox East the situation remained unchanged until much later. The iconographers, after a long training designed to follow a strict set of rules, were the only ones believed to make successful/functional icons.[10]

In true/*buon fresco* the colors are applied with a brush on a humid calcium carbonate-based foundation (applied fresh, every day on the surface intended to be covered that day). The pigments, using water as vehicle, are absorbed in the humid layer of plaster (*intonaco*) and, upon drying, are entrapped in the calcium carbonate crystalline structure, thereby becoming an integral part of the wall. The mechanical resistance of the painted layer in *buon fresco* is higher than in another technique used in murals, *secco*. In the latter the colors are applied on dry plaster (typically in an organic medium, egg or glue solution) which makes the product less resistant and more likely to detach over time. In the sixteenth century yet another *fresco* technique appeared, *mezzo-fresco.* It

[8] Icon - used in the most comprehensive sense of the word, irrespective of the support it was painted on (wood, wall, textiles, etc.), of the technique used (*fresco*, *secco*, tempera, etc.), irrespective of the place it was exhibited (church, private house, exhibition hall), or of its dimensions. Icons were considered relays which offered to those who prayed in front of them the unique possibility of establishing a direct connection with the Transcendental

[9] *Hermeneia* (Greek) – means translation, interpretation, explanation. In the ancient Greek-speaking world was used for detailed, systematic exposition of scriptural content.

[10] Mihalcu M, Leonida M. D. *Din tainele vechilor iconari de altadata*, Bucharest: Eikon, 2009.

involves painting on nearly dry *intonaco,* firm enough not to take a thumb-print so that the pigment only penetrates slightly into the plaster. By the end of the 16th century this technique had largely displaced *buon fresco* in Western Europe, and was used by painters such as Tiepolo and Michelangelo.

Experience taught iconographers that frescoes painted on newly built walls were not resistant in time. In the Romanian area at least five years would pass between the completion of a church construction and the painting of the permanent frescoes. During this time the walls were considered as still "working"/settling and temporary decorations (using only 3-4 colors) were applied to serve during that period. The prolonged exposure to the air has been beneficial since the majority of the Romanian medieval frescoes do not have fissures in the mortar as do better-known frescoes (e.g. those in the Church of the Savior, at the Chora Monastery, in Istanbul, which needed extensive restoration work).

Information about the materials used in *fresco* appears in the technical part of the *hermeneias* together with that describing the techniques. Iconographic guidelines are given a separate, extensive section in them.

Concerning the mortar used in *fresco*, Romanian manuals, like Dionysius of Fourna's Byzantine one,[11] mention that it was a different one from that used by masons. Natural calcium carbonate of a convenient purity has always been available and using wood only for burning it (calcination) contributed to maintaining that purity. This explains why the *hermeneias* and other manuscripts from that time do not elaborate on this topic. Due to the high quality of the lime obtained by calcination,[12] the *fresco* painters in this area did not resort, as did the Russian painters,[13] to applying a first mortar layer in which a resinous binder was introduced or to consolidating the mortar layer with big nails as in some Italian frescoes of the fourteenth and fifteenth centuries.[6] Since there are no recommendations in the *hermeneias* concerning the rugosity of the mortar layer, we conclude that the average granulation of the river sand used was probably satisfactory. Besides lime and sand, water is a component of mortars but there are no definite amounts mentioned in the *hermeneias* or details about their required consistency. In painters' workshops mortars were prepared by apprentices under the supervision of a master. The amount of water varied, probably, from one master to another (based on experience) and, over time in a certain area. This is different from Cennini's Handbook where the thickness of the "equalization mortar" and the amount of mortar which can be prepared for a one-time use are clearly indicated**.** The proportion of lime

[11] Dionysius of Fourna. *The painter's manual* (translated by Paul Hetherington). Yonkers, NY: St. Vladimir Seminary Press, 1974.
[12] Mihalcu M (1984), ed. *Valori medievale romanesti*, Bucharest: Sport Turism, 1984.
[13] Kiplik D.I. *Pictura monumentala. Editura de stat pentru literatura si arta*, Bucharest, 1952

introduced in the mortar indicated in the Romanian handbooks was similar to those recommended by Cennini and Vasari.[14]

Often the mortar layers in the Romanian frescoes, like the Roman, Byzantine or Russian ones, contained, besides sand, a reinforcement material (hemp, leaves, straws, plant stems) and/or fillers (chalk, brick, coal). When hemp, flax, and stems of other plants were used as reinforcement agents, after removal of the wooden parts, they were cut to "standard" lengths and "conditioned" by soaking in a solution of calcium hydroxide. In some manuscripts, this treatment was replaced by the recommendation to use the mortar to which the reinforcement agents had been added only three days after preparation (which would have the same effect). The choice of materials used in mortars varied from one region to another. For instance, while flax was used in Moldavian frescoes of the fifteenth century, in other regions of Romania, at the same time, that same material was very seldom used. Numerous examples offer proof of the ability the artisans of those times had in choosing their materials in order to obtain a strong and durable mortar. An example thereof can be seen at a monastery in the Argeş region where the exterior mortar layer was reinforced with leaves (low volumetric density) for the case when the lime used had mediocre binding characteristics. Since the wall was wet daily (5-6 times in this area, more than in the Byzantine and Russian ones) only on an area meant to be painted that day, the reinforcement materials increased the drying time of the mortar the fresco was painted on from ten to fourteen hours. Consequently, unlike their Italian contemporaries, the Southeastern *fresco* painters were able to apply the mortar layer on larger surfaces. The local climatic conditions contributed to the increase of that period of time too, compared to Italy for instance. The leveling was done as the work progressed. This reduced to an acceptable minimum the risk of visible differences between surfaces painted on different days.

When mortars contained filling agents, those used at Mount Athos (at the school of the legendary Panselinos[15]) were used over the entire area together with others of higher porosity and low volumetric density (like coal dust). Chalk dust was also used as filling agent by the Romanian *fresco* painters. This filler was recommended by Vitruvius[16] too. Unlike in the ancient Roman frescoes, the Romanian artisans did not use marble dust as a filler in the final mortar layer.

The total thickness of the mortar layers (8-20 mm) was not "standardized" and, in most cases, was lower than in the Byzantine frescoes. As everywhere else in this geographical area, the thickness of the mortar layers varied from one part of the building or wall to another. However, the adherence between the mortar layers was excellent. The number of mortar layers in the Romanian medieval

[14] Vasari G. *Vasari on technique* Translated by Louisa S. Maclehose, New York: Dover Publ., 1960.

[15] Manuel Panselinos was an Athonite painter from the Paleolog epoch (thirteenth century). He was known as one of the greatest painters of frescoes. Most of these can be found in the Protaton Church, on Mount Athos.

[16] Marcus Vitruvius Pollio (born c. 80–70 BC, died c. 15 BC), Roman architect, engineer, and author of the treatise *De architectura* (On Architecture), a handbook for architects.

frescoes (2-3) resembles the Byzantine (2) or Russian ones and it is inferior to the ancient ones (6-7 in Roman frescoes). Besides a variable proportion of lime in the different layers of mortar, the quality and quantity of the filling agents was also variable. In this respect, the Southeastern European frescoes are similar to the ancient ones and different from the Russian frescoes.

The Romanian iconographers who painted the outside walls of the churches in northeastern Romania showed advanced knowledge of their pigments too (natural sources, preparative technologies, and techniques to use them). The chromatic values and vivid hues maintained over several centuries prove that the iconographers of times past knew how to choose their pigments. They had to resist exposure to light and to the atmospheric agents. The painters' knowledge and ability in using pigments are evident not only when speaking of the resistance to microclimate and the alkalinity of the calcium hydroxide solution but also when considering the very method of application (how, how much, and to what extent each pigment changes its hue after the fresco dried). Concerning the resistance to the basicity of the environment, a Romanian manuscript states that "…pigments have to stand the strength of lime, have to be long-lived and pleasant to look at…"[17]

The white pigments used in *fresco* were prepared using technologies which are still in practice today and show a good knowledge of the natural resources accumulated through accurate observations done during generations of artisans, and a solid technical tradition which recorded and transmitted the information. The white pigments were of four different types, all of them based on calcium compounds. The differences were in the raw materials used, in the preparation, and in the percentage of calcium carbonate present at the time of their use. In some of the pigments calcium carbonate was obtained over time, through the action of carbon dioxide from the air on slaked lime. Also, while in *buon fres*co the vehicle for pigments was clean water, for chalk *fresco* limewater, a solution of lime, was used for that purpose. Because lime is only partially soluble in cold water and even less so in hot water, limewater was used as a very low concentration solution.

Because in frescoes color is applied to freshly laid plaster, after having been exposed for a while to the action of atmospheric agents, the chemical composition of all white calcium-based pigments becomes identical. That is why it is very difficult, after many years, decades, or centuries, to recognize which were the raw materials used in their preparation. Eventually all become solid calcium carbonate, chemically the same as the original limestone, chalk or marble. The most reliable and direct information concerning the raw materials and the preparative methods of the

[17] Romanian manuscript 2151, Library of the Romanian Academy, Bucharest.

white pigments used in the Romanian exterior frescoes comes from the Romanian *hermeneias.*[18,19,20]

Of the four white pigments used during medieval times and later in this area, two contained, at the time of their use, almost exclusively calcium carbonate. Since, in true *fresco*, colors are absorbed into wet freshly laid plaster, all calcium-based white pigments, after the painting had been completed and the mortar had dried, are trapped in the crystalline structure. When, in time, all the water evaporated, the part which was not calcium carbonate yet (but lime – calcium oxide or slaked lime – calcium hydroxide) began to be converted to calcium carbonate by the carbon dioxide in the air. The fact that the painting becomes an integral part of the wall accounts for the good mechanical resistance of frescoes (to air currents, impact with hard particles, etc.).

One of the white pigments was prepared from lime kept for a long time in contact with water (slaking) when slaked lime was produced. The resulting material, a calcium hydroxide-based paste, lime putty, after drying and grinding was called *lime white*. It is this region's version for the preparation of a pigment used during the Middle Ages in Italy under the name *bianco sangiovanni*.[6] The difference is in the reaction (contact) time, much longer in the Southeast, between six months and twenty years.[21] The long contact with water seems to improve considerably the plasticity and to decrease "popping" effects in the resulting material, the lime putty. When long curing times were used, irrespective of how much longer than six months, the aged slaked lime (which became stiff, paste-like) was called *old pit lime putty.* In Italy, during the Renaissance, painters were aging slaked lime in casks stored in pits dug below the frost line; such materials are said to have been handed down through several generations. The pits (where reaction and curing were taking place) used in Romania and described in the *hermeneias,* were 1.5-3 m deep, sometimes lined with wooden planks and always covered (to avoid contamination). On top of the wooden cover, soil was placed during storage. The beneficial effect of long contact times in quick lime hydration was known prior to the Middle Ages. The Elder Pliny recommended in his writings[22] to use lime putty after three years. Vitruvius recommended at least two years, while mentioning that some of his contemporaries obtained very good results with slaked lime after a contact time of two decades.[16] There are no indications that in the Romanian area continuous removal of the "skin" formed on carbonated lime was performed periodically as was recommended in Russian manuscripts (the periodicity of the process was connected either to numbers with occult significance or to the great religious holidays of the year). Some of the *hermeneias* recommended removing the thin formation

[18] Grecu V. *Carti de pictura bisericeasca bizantina*. Ed. Glasul Bucovinei, Cernauti, 1936.

[19] Romanian manuscript 1795, Library of the Romanian Academy, Bucharest

[20] Romanian manuscript 5769, Library of the Romanian Academy, Bucharest

[21] Verona A.G. *The painting at Neamt Monastery*. Bucharest: Tipografia Cartilor Bisericesti, 1943.

[22] Bailey K.C., ed., Pliny the Elder's *Chapter on chemical subjects*. New York: Longmans, Green and Comp., New York, 1929, p. 123.

of calcium carbonate (the "skin") off the lime white surface when the latter was taken out of the storage pit to be used, but not periodically.

Another lime white, which was obtained using shorter slaking times, was only used for leveling. In the language of the artisans the mortar prepared using this type of slaked lime was called "black mortar" and was never used in frescos. Long contact times make the probability of having unreacted calcium oxide almost zero. If some were left unslaked, when the product is used for *fresco* mortar, it will be hydrated by the atmospheric moisture after having been included in the wall structure. The resulting calcium hydroxide has a larger volume than the oxide and will give what eastern painters were calling "shots" and today we call "popping": small pieces from the pictorial layer coming loose.

As quality control methods for the completion of the slaking process, in some Romanian manuscripts it is recommended for the aged slaked lime to be clay-like,[17,23] the same recommendation as in the Greek *hermeneia* of Dionysius of Fourna.[11] In other Romanian manuscripts, as in similar Russian manuscripts, it is recommended for the slaked lime to be "like pot cheese", like butter, or to have the proper consistency "to be taken by shovel", or "not to fall off the trowel when stirring it". In Cennini's instructions for painters the same type of recommendation appears, to use lime which was "so well slaked that it has the appearance of an ointment". Another quality control method recommended in the *hermeneias* for the aged slaked lime was tasting: it was supposed to be neither bitter nor sour.

A third type of calcium carbonate-based white pigment recommended by the *hermeneias* and used by the Romanian iconographers in past centuries was prepared in their own studios as well and used as raw material mortar from very old frescos. This *old lime putty* needed to be processed through more numerous steps than the first two raw materials in order to become white pigment (scraping, separations, etc). There is no test indicated in the painter's manuals for the quality of this material. The long time interval between the completion of the original fresco and the recycling of its mortar was a guarantee that carbonation had been completed.

A fourth raw material used in white pigments in this geographical area was chalk. It was found in nature or imported. It was seldom used by the painters of Orthodox Europe and only in later times (last 2-3 centuries) than the first three pigments.

The black pigments used in *fresco* were obtained in painters' workshops by controlled partial combustion of numerous wood essences (oak, birch, tree bark), of vine shoots, bones, nut shells, or peach kernels. Not all the details and justification for the uses assigned to each type of black have reached us through either written or oral testimonies. In his manuscript Macarie of Căldăruşani[20] recommends to use a black obtained from the wood of a resinous tree to paint the

[23] Romanian manuscript 1808, Library of the Romanian Academy, Bucharest.

pupils. He argues that "if you use the one you work on wood and canvas, the color will fade". Other *hermeneias* mention that a darker purple hue, like the one used to paint gray hair, is achieved by mixing black obtained from an oak tree with a very well-specified white, obtained from the white lime from old fresco mortar. At the same time a lighter shade of black used for more luminous backgrounds was prepared from vine shoots.[24]

The green pigments typically used in fresco were obtained from praseolite[25] and malachite[26], found in nature or basic copper acetate (prepared in the painters' workshops from vinegar and metallic copper.[27])

Yellow pigments were first obtained from a natural "earth", limonite.[28] Some of the pigments were from local sources, others were imported (names would typically indicate the source, e.g. the *Constantinople ochre*). By calcinations – briefly described in the *hermeneias* – new hues were obtained. Unlike in Western Europe, in Southeastern Europe these new hues seldom had special names.

As red pigments, minium and cinnabar (natural or synthesized in the painter's workshop) were used, unlike the West European artisans who did not use the former in *fresco.*[29] The synthesized cinnabar was not purified as was recommended in Theophrastus' book.[30] Also, as red pigment, some aluminum silicates tinted by iron oxide were used. It is interesting to note that the iconographers knew that cinnabar and minium were two different compounds and that they behaved differently when exposed to the atmospheric agents. Skillfully the *fresco* painters recommended in a *hermeneia* to use minium only when painting the red of the cheeks, while for lips, they recommended either a mixture of cinnabar with ochre and black or cinnabar with *lime white*, or cinnabar with burnt umber[31] and black.[17]

[24] Leonida M. D. and Mihalcu M. "Black organic pigments used by medieval painters." The 34th Middle Atlantic Regional Meeting, Towson University, Towson, MD, 2001.
[25] Hydrated silicate of aluminum, magnesium and iron
[26] Basic copper carbonate. Fine, clear yellowish green, not reliably permanent when used as pigment. Found as major copper ore and, later, synthesized as Bremen blue
[27] Leonida M.D., Mihalcu M. "Old copper-based pigment." *The Bulletin (NJAS)*, 50 (2005), 2:15-19.

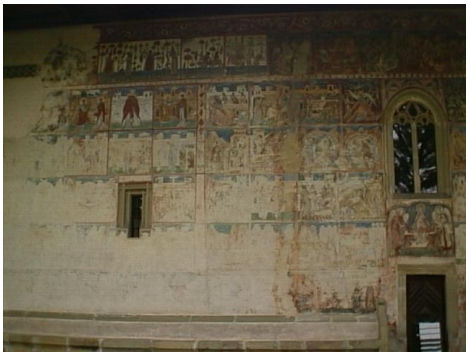
[28] Mixture of hydrated iron oxides. Found naturally as iron ore
[29] Zucchiatti A., Prati, Bouquillon A., Giuntini L., Massi M, Migliori A, Cagnana A, Roascio S "Characteristics of early medieval frescoes by μ-PIXE, SEM and Raman Spectroscopy." *Nuclear Instruments and Methods in Physics Research B* (2004), 219-220, 20-25
[30] Theophrastus (1774) *History of Stones (De lapidibus)*, English version Sir John Hill, ed., London: C. Davis,

[31] Reddish-brown pigment - it is obtained by calcining umber, a greenish-brown natural mix of manganese (major) and iron oxides.

Figure 5. Southern wall of the church at Monastery Voroneţ (background – "Voroneţ blue")

The brown pigments were made of natural or burnt umber mixed with black, and with some iron oxides either natural or roasted. They were used for the shadows around the eyes, nose and arms.[32]

The most frequently used blue pigments were natural azurite[33] and lapis lazuli.[34] Concerning the lapis lazuli, some *hermeneias* pointed out that it had to be mixed with some indigo and with calcium carbonate or *lime white* for better resistance over time. "Voroneţ blue",[35] has been added to the lexicon of art alongside colors such as "Titian red" and "Veronese green". The magnificent exterior frescoes at the church of Voroneţ Monastery, painted on a "Voroneţ blue" background (Figure 5), are known world-wide.

 (a)  (b)

[32] Mihalcu M. and Leonida M.D. *The hidden face of form and color*, second ed. Cluj-Napoca: Eikon, 2013.

[33] Basic copper carbonate. It is found as a minor ore of copper and it is used as pigment and ornamental stone, in jewelry.

[34] Sodium calcium aluminum silicate sulfate. For centuries it was the most expensive pigment. It was replaced by synthetic ultramarine.

[35] A color obtained by applying azurite on a black (charcoal) background (to enhance color intensity and insulate the pigment from the alkalinity of lime.


(c)

(d)

(e)

(f)

Figure 6. Church of the Monastery Voroneţ, (a) northern wall and (b) southern wall; Church of the Monastery Sucevi̧a, (c) northern wall and (d) southern wall; Church of the Monastery Moldovi̧a, (e) northern wall and (f) southern wall

In most cases the colors were prepared by controlled grinding of the pigments with water or a dilute solution of calcium hydroxide. As in Cennini's book, it is often mentioned in the *hermeneias* that the more thorough the grinding is ("… grind it fine, to butter consistency…"), the more adequate the color would be.

There are in some *hermeneias* lists with pigments recommended for use in *fresco* and, in a few cases, even lists with those which should not be used. Sometimes it was indicated which pigments give certain hues when used in certain parts of the fresco or which pigments should be applied on a certain background (e.g. it was obligatory to apply a blue pigment on burned umber and on black). The technological indications referring to the latter category of pigments contain an intermingling of precise details and, sometimes, recommendations that we cannot accept or understand today. Such an example can be found in [19] where some components listed for the preparation of a blue pigment are not appropriate for use in *buon fresco.* At the end of the recipe, the anonymous author indicates the bibliographic source ("so do the Russian ones"). Immediately after that, in the same manuscript, there is another recipe for the preparation of the same pigment, a simpler and clearer recipe, adequate for the purpose and used in the painter's workshop.

In all cases, depending on orientation, the southern walls have been preserved the best, while the northern walls, the most exposed to precipitations and strong winds, show the most extensive wear

and tear (Figure 6). An unanswered question about these exterior frescoes in northeastern Romania remains: how is it that all of them have been well preserved (Voroneţ, Humor, Putna, Moldoviţa, Sucevița, Arbore), while only those at Probota were far more poorly conserved? The climate is the same, since they are in the same part of the country, and Humor was painted only 3 years after Probota (1535 vs. 1532) and it is in a much better state. A possible explanation for that would be that less durable technical procedures were used on the frescoes of the latter, the first church to be fully painted on the outside in this geographical area.

Fresco is a form of art requiring a thorough knowledge of materials and high technological skills in order to make an art work which can withstand agents of time and weather (especially when painted on exterior walls). The passing of time and poor restorations have worsened the condition of many a mural in different countries. In countries with limited resources (as those in Southeastern Europe) restoration of religious monuments has been scarce and the elements have been the relentless enemy.

Figure 7. Students at the Orthodox Theological Seminary "Veniamin Costachi", at the Monastery Neamţ, in northeastern Romania

The exterior frescoes in northeastern Romania are a testimony to the talent and skills of the artisans of times past from that area, and to their success in producing masterpieces which passed successfully the test of time in an area with a trying continental weather pattern. In order to produce functionally effective icons and religious frescoes, the old artisans would have an intensive and arduous training which followed well-established rules mentioned in the *hermeneias* as well. After a graduation ceremony (during a religious service held on special days) the iconographer would start his activity as an independent but continue the self-conditioning spiritual training for his entire active life[10]

The art of *buon fresco* painting is still alive in that part of Southeastern Europe. It is still taught in art schools and seminaries (Figure 7). The future iconographers start their training with lesser tasks and advance to actually doing the drawing only in their graduating year. The practice of continuous, spiritual life-long self-conditioning, and the customs of fasting and praying while painting the frescoes became casualties of the passing of time.