

ingly represent the variety of textures that materials exhibit. Texture was considered an important part of visual observation and the representation of reality. Earlier, Cennini did discuss the way artists should represent reality but displayed some confusion in his discussions of the subject. He described the way artists should paint a variety of textures such as wool and velvet, but did not refer to depicting textures as a function of light.

Cennini, writing in the 14th century, is even more clearly immersed in Medieval tradition when he instructs artists to apply gold to their panels. Richness and splendor in paintings was depicted by introducing the precious metal directly into the picture plane. Leon Battista Alberti, philosopher and humanist, in his treatise *De pictura* of 1435-1436 is critical of artists who applied gold to their panels. He felt that such renderings had no place in paintings and suggested that the artist should represent gold by the skillful application of colors instead.

Documented evidence of the use of oil paint by glazing over metal to imitate gold first appears in the 8th century Lucca Manuscript. The use of orpiment ( $As_2S_3$ ) and saffron mixed with an oil-varnish to create a gold tone is found in the 11th century work of Theophilus, *De diversis artibus*.

## Early Use of Oil

The earliest references to colors being mixed with oil is also found in Theophilus' manuscript in his discussion of "translucent painting," where he recommends that the colors be ground in linseed oil.<sup>10</sup>

The technique evolved from miniature painting in northern Europe, where it rapidly developed before being adopted in Italy. A number of early documents with reference to painting in oil indicate that this technique was known to artists since ancient times. Evidence in the literature

indicates that oil was first used on glass and metal-leaf before being adopted in easel paintings.

The early mention of the use of oil for painting on wood in Petrus de S. Aude-mar's manuscript, which dates from the end of the 13th century and the beginning of the 14th century and comes from northern France, indicates this technique was known there at the time. Several recipes for the customary pigments are given and vehicles employed. Six pigments are recommended for use with the oil medium: white (lead) for painting on wood, and also green (verdigris) and azure (azurite). Black on walls can be mixed with water and egg, but oil is preferred on wood. Minium, "when used on wall is ground with gum water," never egg, but "it should be mixed with oil when used on wood."<sup>11</sup>

Audemar's manuscript gives several recipes for golden colored varnish. Made by adding saffron, it was applied over tin foil. A similar recipe is given in the earlier Lucca Manuscript and the *Mappa Clavicularia*. The varnishes are made in several ways. One is made with linseed oil and resin with *vernix*, believed to be sandarac. Another is composed of linseed oil boiled with the inner bark of the black plum, *glassa*, alum, and dragon's blood (a resinous material from a tree of eastern Asia). A third one is made with boiled linseed oil, resin, the inner bark of the black plum, and frankincense.<sup>12</sup>

Light plays an important role in 15th century paintings. Its reaction to surface textures was explored to its fullest in the art of the Netherlands. Jan van Eyck was master of his range of the use of reflection and sparkle. Indeed, the character of each material is carefully and accurately rendered. His *Madonna with the Canon van der Paele* of 1436 (Figure 3, Groeninge Museum, Bruges) demonstrates a marvelously rich texture. The shining armor of St. George reflects the clothing of the

kneeling Canon. Jan van Eyck played a significant role in the development of oil painting during the Renaissance. However, early documents show that painting with oil was used nearly eight centuries earlier, although with limited application. Not until the Flemish artists began to use oil paint did the new methods spread to southern Europe. The desire to depict particular aesthetic and strong coloristic values was the driving force behind energetic experimentation with new materials.

## References

1. E. Panoksky, *Early Netherlandish Painting*, Vol. 1, Harvard University Press (Cambridge, 1953) p. 2.
2. J. Plesters, "Ultramarine Blue, Natural and Artificial," *Studies in Conservation* 11 (2) (1966) p. 62.
3. *Ibid.*, p. 67.
4. H. Kühn, "Verdigris and Copper Resinate," *Studies in Conservation* 15 (1) (1970) p. 12.
5. R. Getters, R. Feller, and W. Chase, "Vermilion and Cinnabar," *Studies in Conservation* 17 (2) (1972) p. 45.
6. C. Wolters, "The Care of Paintings: Fabric Paint Supports," *Museum XIII* (1960) p. 137.
7. See M. Baxandall, "Bartholomaeus Facius on Painting: A Fifteenth-Century Manuscript on the *De Viris Illustribus*," *Journal of the Warburg and Courtauld Institutes XXVII* (1964) p. 103. This is the first documented evidence of a statement concerning research into the properties of color. It is a theme often repeated by early critics. See G. Vasari, in *Le vite de' piu eccellenti pittori, scultori ed architettori*, Vol. II, edited by G. Milanesi (Sansoni, Florence, 1878), p. 565-567.
8. M. Merrifield, *Original Treatises on the Arts of Painting* Vol. II (Dover, New York, 1967) p. 327.
9. Vasari, Vol. II, from Ref. 7, p. 563-567.
10. Theophilus, *De diversis artibus*, translated by J. Hawthorne and C. Smith, *On Divers Arts*, Chapter 27, (Chicago University Press, Chicago, 1963), p. 33-34.
11. Petrus de S. Audemar, *De Coloribus Faciendis*, in M. Merrifield I, from Ref. 8, p. 138-141.
12. *Ibid.*, p. 114-115. □

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