THE USE OF COLOUR IN PARISIAN MANUSCRIPT ILLUMINATION c.1320-
c.1420 WITH SPECIAL REFERENCE TO THE AVAILABILITY OF PIGMENTS AND
THEIR COMMERCE AT THAT PERIOD.

VOLUME I

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Volume 3 consists of transparency slides.

Contact the University if required
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SLIDES IN BACK POCKET OF VOLUME TWO
This thesis is divided into two parts. In the first part there is an account of the raw materials used in the manufacture of pigments, concentrating on those used in book illumination in the later Middle Ages and their availability to artists in western Europe. It also includes a discussion of recipes for colour making. I will show the extent to which technical improvements furnished manuscript painters with a wide range of colours, easily available and of an acceptable standard of colour stability and resistance to light. The aim is to establish what pigments were at the disposal of artists during the XIVth and early-XVth centuries.

Part two examines ways in which colour was used by Parisian manuscript painters in the period c.1320-c.1420. A change takes place in the palette of late-XIVth-century Parisian miniatures; colours become brighter and stronger. Having understood what colours were at the disposal of the medieval artist, it may then be possible to examine the extent to which changes in the palette can be explained by technical rather than aesthetic factors.

For part one, the major source of information on pigments used by artists in manuscripts, on walls and on panels, is in technical treatises or manuals. For while the principal means of transmitting technical knowledge was certainly oral, there are several technical treatises, some of which exist in different versions, which explain partially, or in full, the methods and
techniques used by artists to illuminate and paint. These works fall into several categories. Some, like Heraclius' *De Coloribus et Artibus Romanorum* are half practical and half alchemical. Others like *Segreti per Colori* are compendia of recipes, but there are a few, most notably Theophilus' *De Diversis Artibus* and Cennini's *Il Libro dell'Arte* which are clearly accounts of painting techniques taken from artists' own experiences.

Commercial documents complement the technical treatises by providing information about trade in the precious dyes and metals from which many pigments were manufactured. One can learn how much they cost or more often what tax they carried, when and where they were available. Most commercial information comes from Italy and there is unfortunately no comparable documentation for France. But this need not be an impediment to understanding what pigments might have been used during the XIVth century in Paris. There is sufficient evidence in the treatise of Jean Alcherius (see below under Jean Le Begue's Compilation) to show that Italian pigment recipes were known in Paris and there is no reason to suppose that the same raw materials and techniques of pigment manufacture used in Italy were not, after an interval, also used in France.

APPENDICES 3 and 4, at the end of the thesis, contain two lists of commodities used by illuminators and other painters. One is arranged in chronological order and the other in price order. They detail the pigments and raw materials found in the commercial documents discussed in PART ONE of the thesis. While
most of the documents cited concern taxes (gabelle), some give the wholesale price for colours and a few, retail prices. The early-XIVth-century building accounts of Mahaut, Countess of Artois and Burgundy, are particularly interesting because Mahaut regularly bought pigments for decorating the rooms of her chateau at Hesdin from a local merchant in Arras.

Although safe techniques for the scientific examination of pigments in illuminated manuscripts have been developed unfortunately they have not yet been widely applied and there is very little such examination of medieval illuminations(1). Nonetheless, careful gathering of material makes it possible to deduce the pigments available to make up a XIVth-century Parisian illuminator's palette. PART ONE concludes with a brief discussion of the merchants concerned with the sale of pigments.

Having established the possible contents of this palette, albeit tentatively, in its second part the thesis studies the way that colour was exploited by Parisian manuscript artists in the XIVth and early-XVth centuries. In this section there is particular emphasis on developments in colour use during a period when Parisian manuscript painting became more "naturalistic". Architecture is painted in strong perspective and landscapes apparently stretch into the distance.

The first section of PART TWO concerns the period c.1320-c.1380 and in particular the use of grisaille. The evolution of grisaille is traced from the Hours of Jeanne d'Evreux where, it
is suggested, Pucelle used it to express volume, through the pen and ink technique of Jean le Bon's Bible Moraliste (B.N. Ms. français 167) to the arid and highly ornamental style of La Pelérouage de Vie Humaine (B.N. Ms. français 823). With the exception of Pucelle, artists used grisaille as a decorative convention only, but it had a profound effect on the treatment of colour in Parisian manuscripts throughout the mid-XIVth-century. Despite areas of strong, bright colour, the overall appearance of the miniatures is pale and cool.

The palette of these miniatures shows a continuity throughout the whole sixty odd years under discussion in the first chapter of PART TWO. There is a predominance of pale blue, orange, strong green and pink and despite evolutions in style, there were few attempts to experiment with a wider range of pigments. Early and mid-XIVth-century Parisian miniatures reflect what can be deduced from the painting treatises cited in PART ONE, that there was a continuity of painting traditions dating back to the XIIth century. Now, however, artists were developing the aesthetic possibilities of a relatively limited palette.

The second section of part two treats the period c.1380-c.1420 when a brighter palette was introduced and the possibility that technical advances might account for these changes is investigated. Suddenly the rather muted tones of the mid-XIVth century become bright and strong and there are several colours that have not been seen used, or at least only rarely, in Parisian illumination. Early XVth-century manuscripts show a
change in workshop traditions which seem to be reflected in a change in pigment use. Perhaps Parisian illuminators, released from traditional workshop practices, opened themselves to the variety of colours used by their Italian counterparts half a century earlier.

Most important for a study of the period c.1380 in Paris are the books painted for Jean de Berry, the Très Belles Heures and the Petites Heures; the latter particularly as it shows the transition from one style to another. There are miniatures in the Petites Heures by Jean Le Noir, the artist of many mid-XIVth-century manuscripts, whose palette is closely linked to that of his contemporaries. But there are also miniatures by Jacquemart de Hesdin whose style and use of colour differ radically from those of Le Noir. Finally, there is a brief account of early-XVth-century Parisian manuscript illumination with comments on the way that artists developed the brighter palette and established an equilibrium between the decorative use of colour and the now increasingly three-dimensional image.
INTRODUCTION TO PART ONE: THE TREATISES

PART ONE: PIGMENTS AND RAW MATERIALS USED IN MEDIEVAL ILLUMINATION

THE TREATISES

The colours used by artists and their painting techniques are often conditioned by certain material constraints. Thus, any study of colour or painting techniques should logically include, if not start from, an understanding of the raw materials available to an artist. Attentive reading of medieval technical treatises will enable the modern scholar to appreciate what materials and to some extent what painting techniques were used by medieval artists. It is then possible to make well informed estimates of the processes used by painters to create images as well as to understand artistic traditions. The treatises also throw light on the problem of availability of materials and enable one to understand at what point materials and techniques became available and how their use subsequently evolved. Once these factors have been elucidated, the steps an artist took to create an image can be better understood.

Several of the more widely known painting treatises have been transcribed and translated. The following is a list of treatises used in this thesis. They are representative of a large body of medieval technical literature. The list is arranged in roughly chronological order, with summary discussions of the problems of dating, text transmission and content. Abbreviations used in the notes of this thesis follow the bibliographical references.

Mappae Clavicula is a compilation of recipes for the decorative arts, painting and dying. Its origins lie first in antiquity and then in the Carolingian period, and it represents a starting point in the western treatise tradition. Some of the recipes come from the so-called Lucca Manuscript (Codex Lucensis Ms. 490), often called the Compositiones variae, which dates to the late-VIIIth or early-IXth century. The Lucca manuscript contains much the same material as two IIIrd-century Alexandrian collections of recipes in Greek, the Leyden and Stockholm papyri, although the Lucca Manuscript tends to concentrate more on techniques for dying fabrics, colouring metals and making imitation gems.

The Mappae Clavicula itself is almost contemporary with the Lucca Manuscript, but comes from north rather than south of the Alps. It contains material found in the Lucca Manuscript with additions. There are two extensive extant copies of the Mappae. One, from the Xth century, is in the Bibliothèque Municipale of Sélestat in Alsace (Ms. 17). This manuscript includes almost all the recipes from Lucca and some new ones. The second, most
complete compilation, dates from the mid-XIIth century, according to Smith and Hawthorne. This is the "Phillipps Corning" manuscript (Corning Museum of Glass Ms. 3715) which may have been written in northern Europe, and more specifically, northern France or Germany. It includes material not found in the Sélestat or Lucca manuscripts. Some of the instructions date only from the XIIth century, but they are scattered throughout the text. The whole is preceded by eleven chapters concerned specifically with colour making which do not appear in the Sélestat manuscript. Smith and Hawthorne think that these recipes were compiled separately at a time contemporary with the Phillipps manuscript, that is the mid-XIIth century.


The De Coloribus et Artibus Romanorum attributed to Heraclius is another compilation. The origins and date of the text are obscure, but the author may have been Italian and some of the work may date from the Xth century. There are several versions, of which four are considered to be significant(3). The version to be cited in this thesis appears in Jean Le Begue's compilation of 1431 (see below: Jean Le Begue's Compilation). It is one of two extensive, related versions of the text belonging to the same
tradition. The other is found in a XIIIth-century manuscript (B. L. Ms. Egerton 840A). The Egerton copy is divided into three books, the first two in verse and the last in prose. Jean Le Begue's copy of the recipes is much the same, but contains material not found in the Egerton manuscript.

Mrs. Merrifield argues that Heraclius was in fact two authors. The first was responsible for the two metrical books which she thought might have been compiled in the Xth century, while a second, later writer compiled the third book which differs in the Egerton and Le Begue versions. In the Egerton manuscript, the chapters are arranged methodically in subject matter, while in Le Begue's version, the arrangement is less coherent, but much more extensive. It contains all that is found in the Egerton version (with one exception) and thirty extra chapters. Mrs Merrifield considers that the third book probably dates from some time in the mid-XIIth century. Dodwell in his edition of Theophilus (see below) agrees with this date(4)


This is a very short treatise on making glair, egg white tempera. The only copy is in Bern (Ms. Bern A. 91.17), but there is no evidence that the author came from there or for the original date of the text. The extant manuscript was written in the late-XIth
or early-XIIth century. Thompson thinks that the extant version was copied from a slightly earlier original.


Theophilus' *De Diversis Artibus* is the first homogeneous artist's treatise of the medieval period. It is written in three parts which deal respectively with painting, glass making and metalwork. *De Diversis Artibus* is not a compilation, but a coherent attempt to set down a method and approach to the decorative arts. If Theophilus borrowed recipes from other sources, he reexamined them and made them intelligible. He did not include all the recipes that he knew for any one colour or operation, but the one he thought best.

In all probability the author came from Germany and was a metal worker. Dodwell examines the evidence for dating Theophilus' work between 1110-1140.

There are three extensive version of *De Diversis Artibus* and four less complete versions. Dodwell studies the relative merits of
INTRODUCTION TO PART ONE: THE TREATISES

each manuscript and it is sufficient to list and give a brief description of the most important manuscripts(5)

1. Wolfenbüttel, Herzog-August Bibliothek. cod. Guelph Gudianus lat. 2069. (G): This manuscript contains a copy of Theophilus' treatise written in a good early-XIIth-century hand. All three books of the treatise are included with the exception of De Incausto, the last chapter of Book I.

2. Vienna Nationalbibliothek Ms. 2527 (V): Also from the first half of the XIIth century, this version is in a less elaborate script than G and appears to be a copy for use in a workshop rather than in a library. The hand is German. Again De Incausto is omitted. The origin of the book is not known, but the script points to northeast of the Rhine. G and V are the oldest versions of the text.

3. British Library, Harley 3915 (H): Written in an early-XIIIth-century German hand, this copy includes all three books of De Diversis Artibus and sixteen chapters of Heraclius' work. These follow Theophilus' treatise and are included in the table of contents. There is other material, including some of De Architectura, parts of the Liber de Coloribus and Mappae Clavicula and a compilation called De Unguentis. H is the fullest copy of De Diversis Artibus, but its origins are unknown.

4. Cambridge University Library Ms. Ee 6, 39 part iii (C): This manuscript is an amalgam, but the Theophilus material is written
in a pointed XIIIth-century hand, possibly English. It contains nearly all of book I and parts of book III. There are six chapters (some only in parts) of a portion of book III that is missing in V and G. C belongs to a tradition different from V, G and H.

5. Karl Marx University Library, Leipzig, Ms. 1157 (L): This version is written in a XIVth-century hand and belonged to the Cistercian Monastery at Altzelle in Saxony. It contains Book I, Book II and some of Book III. L is similar to H, but not copied from it, and belongs to the same textual tradition.

6. British Library Ms. Egerton 840A (E): This manuscript contains a XIIIth-century copy of the treatise. There are thirty chapters of Book I only to which five more chapters taken from other works have been added, but treated as if they belonged to De Diversis Artibus. It is followed by Heraclius' treatise.

7. Paris, B.N. Ms. Latin 6741 (P) (part of Jean Le Begue's compilation finished in 1431. See below: Jean Le Begue's Compilation): Le Begue only included the first twenty-seven chapters of Book I, which concern painting. This is in keeping with his interest in collecting recipes for painting rather than for other techniques.
This treatise is known only in the copy found in Jean Le Begue's compilation of 1431 who attributes it to Peter of St. Audemar. There is no information on the author's origins or on the date of the treatise. Mrs. Merrifield suggested XIIIth-century date seems, in the light of the fairly wide variety of recipes included, to be correct (6). If St. Audemar can be interpreted to mean St. Omer, it is possible that Peter came from northern France. The use of the words warancia for madder (garance in modern French), a recipe for making green "according to the Normans" and the use of the English names for honeysuckle (galetrice) and folium (worina) might also point to a northern French connection (7).


This treatise or "tract", as Thompson calls it, deals with making
colours for illuminating and painting. It forms part of a cyclopaedia in Sloane Ms. No.1754 and exists only in one copy. Once again there are indications that this treatise is French. There is a recipe for making "Rouen green" and the author mentions Tours, Paris and the "land of St. Giles", probably Provence. According to Thompson, the manual is written in a French hand. The material is taken from four different sources: Mappa e Clavicula, the XIIth-century additions to Mappae Clavicula, Heraclius' third book and other recipes found in B. L. Ms. Harley 3915 deriving from both Mappae Clavicula and Peter of St. Audemar's treatise (see above). Thompson dates the compilation to c.1400.


Like De Diversis Artibus, Il Libro dell'Arte is not a compendium of knowledge, but a coherent account by a single author. The treatise deals mainly with panel painting techniques, but there are several useful references to illumination.

Although very little is known about Cennini, he gives some biographical information in the introduction. Cennini gives his full name, saying that he came from Colle and that he joined
Agnolo Gaddi's workshop at the age of twelve. He says that he himself is a craftsman and that he intends to set down what was taught him by Agnolo.

Thompson uses the two extant manuscripts in his translation:

1. Florence, Biblioteca Mediceo-Laurenziana Ms. 23 P 78 (L) and
2. Florence Biblioteca Riccardiana Ms. 2190 (R).

L was completed in 1437. Thompson thinks that Il Libro dell'Arte was written after 1396 when Agnolo Gaddi died, but L is not the original text, so the treatise may be dated between 1397 and 1437. Thompson suggests that L was copied from an unbound original. R is an early modern copy, only dating from c. 1700, but it is not a copy of L. Thompson considers that the two versions come from independent traditions and were mutually complementary.

De Arte Illuminandi is a unified treatise by a single, unknown author, and not a compilation. It deals with the making of colours and glues. It also gives extensive treatment to the laying on of gold leaf. The author of this treatise was an illuminator and is concerned with no other branch of the decorative arts. Furthermore, the author was an illuminator rather than a scribe; there is no information about ink.

Thompson and Hamilton place the composition at the end of the XIVth century. The single, extant copy dates from the end of the XIVth century and was probably taken from the original. Its place of origin is not known, but its preservation at Naples may indicate a southern Italian source.

Jean Le Begue's Compilation is a compilation (finished in 1431) of various treatises concerned with painting and some other crafts. He transcribed the works of Theophilus (not included in Mrs. Merrifield's edition), Heraclius and Peter of St. Audemar. Of particular interest for a study of the XIVth century are the recipes of John Alcherius which he incorporated into his compilation.

Alcherius collected instructions from artists with whom he was
acquainted. He seems not to have been an artist himself, but he obviously often went to Italy and most of his information refers to Italian painting techniques. In 1382 Alcherius returned to Paris from Milan where he had obtained a recipe for ink from a scribe, Alberto Porzello. On 28 July 1398 he wrote *De Coloribus diversis modis tractatus* which was dictated to him by a Flemish artist then living in Paris, one Jacob Cóna\(^{(12)}\). This group of recipes deals with miniature painting and laying on gold. On 8 August of the same year he wrote *de Diversis Coloribus* which was dictated to him by Antonio de Compendio, an old illuminator, who said that he had tried all the recipes himself. His other recipes were gathered together under the heading, *Experimenta de Coloribus* and were collected between 1398 and 1411. Among them is a recipe for making ultramarine which he obtained in Venice on 4 May 1410 from a very famous artist called Michelino de Vesuccio\(^{(13)}\). Back in Paris, in 1411, Alcherius corrected his manuscript and seems to have died at about that date. How Alcherius' various recipe collections came into Le Begue's possession is not known.

At the end of his compilation, Le Begue added some recipes in French. These are interesting because they contain instructions for making plant-based colours (lakes), other sorts of colours, imitation metals, tempera and glues. Mrs. Merrifield concluded that Le Begue was also the author of a *Table of Synonyms* and two fragmentary alphabetical indices which precede the compilation. She drew this conclusion because some of the information found in
INTRODUCTION TO PART ONE: THE TREATISES

them comes from Le Begue's French recipes at the end of the compilation.

The recipes of Alcherius and Le Begue are of particular importance to this thesis. Although Alcherius collected information from Italians, he clearly lived in Paris and returned there to write up his collection of recipes. It is, however, noteworthy that it was in Italy that he collected most of his material. He may have considered that the most advanced information on painting techniques came from there. Le Begue's own recipes are in French (Alcherius' are in Latin) and he may have collected them from craftsmen of his acquaintance. They would thus predate 1431 by a few years and be contemporary with many of the manuscripts discussed in the second half of this thesis.


*Segreti per Colori* is a XVth-century compilation from northern Italy. Manuscript 165 of the Library of the Convent of St. Salvatore at Bologna is the only copy of this compilation. Mrs. Merrifield dates the treatise to the first half of the XVth century. The compilation was arranged by subject with space left
after each section so that more information could be added. The last part of each section is written in a different ink and indicates additions of a somewhat later date. *Segreti per colori* deals extensively with making ultramarine and vermilion. There is also a large section on manufacturing red lakes from brasil wood.

Although certainly incomplete, this list of treatises gives a sufficiently detailed picture of the materials available to artists for one to see the development of the medieval palette from the XIIth to the XVth century. *De Arte Illuminandi*, *Il Libro dell'Arte* and Alcherius' recipes are among the most informative treatises or collections of recipes and date from the period under discussion in this thesis. Although they do not deal exclusively with illumination, it is clear that many of the recipes concern the manufacture of an all-purpose pigment which could then be mixed with a medium suitable to whatever techniques was being used: gum arabic and glair for illuminating, lime for walls and egg tempera and oil for panel painting.
NOTES


2. There is, of course, a very extensive body of unpublished technical literature. Much of it is alchemical; it is scattered among medical or other types of "scientific" writings. The best summary of this material can be found in Thompson, "Trial Index", pp.410-431.

3. M.C. p.4; Merrifield I, pp.169-70. After Mrs. Merrifield wrote in 1849, two other versions of the text belonging to another tradition were discovered. One is in a XIIIth-century manuscript (B. L. Ms. Harley 3915). This is probably a copy of a manuscript in the New York Eastman School of Music (Sibley Library Ms. I Acc. 1499667) dated towards the end of the XIIth century. For studies of this text see: Richards, "A New Manuscript of Heraclius"; Theophilus, pp.xii, xii-xvi.
4. Dodwell believes that there is insufficient evidence to date the first two metrical books of the *De Coloribus et Artibus Romanorum* to the X\textsuperscript{th}, but thinks that these metrical parts of the work were certainly in existence before Theophilus wrote his treatise. He admits that the final date of the compilation has not been established with certainty and that even if the third part dates from the mid-XII\textsuperscript{th} century, it could post-date Theophilus' work (*Theophilus*, pp. xii, xii-xvi).

5. *Theophilus*, pp.xxxiii, lvii-lxx. A further discussion of the dating of *De Diversis Artibus* can be found in John Van Engen's article who also believes that the treatise was written at the beginning of the XII\textsuperscript{th} century (Van Engen, "Theophilus Presbyter and Rupert of Deutz", pp.147-163).

6. Merrifield I, p.158. Charles Eastlake considers Peter of St. Audemar's treatise to be contemporary with Theophilus' work (*Eastlake, Methods and Materials*, p.42). Thompson thinks that there is no evidence for this assumption and can only date the treatise before 1431 (Thompson, "Liber Magistri Petri", p.28, n.5).


9. Brunello, dates the manuscript c.1350-1400 (*Brunello, "De Arte Illuminandi"*, pp.25-6).

11. Jean Le Begue was licentiate in law and Notary of the Masters of the Mint at Paris (Delisle, Recherches, p.392).

12. It has been suggested that this artist was the Boucicaut Master. For this problem see: Meiss II, pp.60-62.

13. Mrs. Merrifield suggests that this artist is Michelino da Besozzo (Merrifield I, pp.ccxii, 12, 13 & 102).
This first chapter of PART ONE discusses the colouring agents used by illuminators and other artists to make pigments. It is divided into sections on pigments made from minerals, chemically produced pigments and pigments made from dyes, both exotic and common. The second chapter discusses other materials used in pigment manufacture that were not the colouring agents. These are alum, metals and, finally, some other plants materials.

MINERALS AND EARTHS

LAPIS LAZULI AND AZURITE

Two mineral blues were used by medieval craftsmen; lapis lazuli which was ground to make a high quality blue pigment called ultramarine and blue copper carbonate, azurite, which was ground to make an inferior blue pigment. Ancient and medieval authors recognized the physical, but not the mineralogical differences between lapis lazuli and azurite.

Lapis lazuli is a compound mineral, usually dark blue tending to purple. Its main source is in Badakshan in northeast Afghanistan on the river Oxus (see map 1)\(^1\). It was not used for painting in classical times, but Roosen Runge identifies it in the VII\(^{th}\)-
century Lindisfarne Gospels and ultramarine blue pigment made from lapis lazuli was recently identified in Corbie manuscripts of the XIIth century. Lapis lazuli came to the West via the Near East. It would have been taken from the mines in Afghanistan to the markets of Baghdad and Tabriz (see map 2).

Treatises and Recipes For Ultramarine Blue

For the remainder of PART ONE, treatises and pigment recipes will be discussed after an introductory section on the history and commerce of the material in question. However, for ultramarine and azurite, the problems of nomenclature in the commercial documents may be easier to comprehend if one first understands how these pigments were made and what they might have looked like to the medieval merchant. It may then be possible to understand how various blues might have been described in commerce and so enable the reader to follow the arguments put forward.

Early methods of extracting ultramarine consisted simply of grinding the stone. *Mappae Clavicula* gives instructions for milling blue with soap. It is possible that an impure ultramarine made from lapis lazuli was obtained in this way although later recipes for preparing azurite require soap, so this recipe may refer to the preparation of azurite.

The process used in the later Middle Ages to extract a blue colour from lapis lazuli was lengthy and irksome, but extremely
successful. There are no known recipes for preparing ultramarine before the end of the XIIIth century and the first workable recipe is found in the late-XIVth-century *Il Libro dell'Arte*.

However, it is probable that the complicated methods of extracting blue from lapis lazuli found from the XIVth century onwards, enabled artisans to make the colour from a stone with more impurities than they had previously been able to use. The object was to extract, with the aid of a *pastille*, a blue colour from the impurities. Recipes for the *pastille* vary a little in different treatises, but usually consist of some type of gum, wax, resin and oil which are mixed together and added to the powdered stone. As the section on commerce will demonstrate, the stone was apparently bought either whole or already powdered (see *Documentary Evidence* below).

Whether the stone was already part ground or not, it had to be further pounded. Cennini suggests using a covered bronze mortar to prevent the dust from escaping. The finer the colour was pounded, the more beautiful, but the less violet, it would be.

For each pound of lapis lazuli, Cennini made a *pastille* of six ounces of pine resin, three ounces of gum mastic and three ounces of new wax. These were mixed, melted and strained into a basin. He added the powdered blue and mixed the ingredients together well. The mixture was left to stand from three days to a month, and mixed up every day. When the *pastille* had stood long enough, Cennini added a porringer of warm lye (see glossary) and kneaded
the whole. The blue came out of the pastille and coloured the
lye, which was then poured into a basin. He repeated the process
until the lye failed to turn blue.

From one pound of lapis lazuli Cennini made six porringers of
blue powder, which he graded. The first two yields were worth
8 ducats an ounce; the last very little. Segreti per Colori
records that the unprocessed stones cost about 5 ducats a pound
according to their degree of fineness. If this is the case, the
treatises bear out the indications of the commercial documents,
namely that the process of preparing the blue considerably
increased its cost (see below).

Other instructions from about the same date as those found in Il
Libro dell'Arte appear among Alcherius' recipes. There are
several in the XVth-century Segreti per Colori, but the principle
is the same.

AZURITE

Azurite, blue copper carbonate, was called "Armenian stone" from
the time of the first-century writer Dioscorides and went under
this name in Platearius' Livre des Simples Medicines written in
the XIth century. Later it was generally called azzurro della
magna ("German blue") when sold as "blue", but when sold as a
stone, it was still called Armenian stone. Although tradition-
ally, azurite may have come from Armenia, its late medieval name,
"German blue", and its relative cheapness compared to lapis lazuli, indicate a European source.

Segreti per Colori describes azurite clearly:

"... know that German azure is of several sorts ... because it usually contains in itself the stone from which this colour is made; it is partly of a pale and opaque blue, and partly earthy, of a yellow colour and frangible, so as to be broken by the nail: and these are the noblest azures of Germany that are found, and they usually appear somewhat translucent [penetrabili] and transparent [transparenti] if you keep your eyes steadily fixed on them ... "(11)

Treatises and Recipes For Blues Made from Azurite

Instructions for preparing azurite for painting are far rarer than recipes for making ultramarine. Those that do exist are often rather complicated, but the basic principle is that the stone should be lightly ground to retain its colour. Segreti per Colori has elaborate instructions for preparing azzurro de lamagna or azzurro spagnolo(12). The stone was pulverized and repeatedly washed in lye and mixed with urine, gum arabic and soap(13). The instructions seem unnecessarily long and complicated for the preparation of a pigment in such general use. De Arte Illuminandi describes a simpler process and suggests grinding the colour with gum and repeatedly washing it with water until the colour comes clean. Thompson and Hamilton say, however, that this tends to reduce the quality of the material(14).
Documentary Evidence For Lapis Lazuli and Azurite

A XIII\textsuperscript{th}-century Arab writer on gems, Teifaschi, has left an account of the several sorts of lapis lazuli for sale at Baghdad. He reports that lapis lazuli was sold both unground for making jewellery and reduced to a powder and washed, but otherwise untreated. A third type was also available. This form of lapis lazuli had been ground and washed, with the water squeezed out and the resultant powder reconstituted into a lump. In this last form the stone cost one third more than the other two forms of lapis lazuli. This higher price indicates, perhaps, that the type of lapis lazuli that was ground, washed and reformed into a lump had undergone some type of special preparation(15).

Pegolotti, a century later, (see APPENDIX 1 "The Merchants" and APPENDIX 2) mentions two markets where blue was for sale, Venice and Alexandria. At Alexandria he lists azurro fine della magna ("German blue", that is azurite), which had probably been imported into Egypt, and at Venice he lists azurro d'ogni ragione which may include ultramarine (see APPENDIX 2). At the end of his book, there is a section in which the author describes how to recognize good quality merchandise. He explains that there are two sorts of blue, ultramarine (\textit{oltramarino}) and azurite (della Magna); of these \textit{oltramarino} is the better product. His descriptions imply that both products were in powder form. Pegolotti says that the difference between the two blues can be recognized in the following way: the blue powder must be heated and if, when it has
cooled down, it is still blue, it is true ultramarine. Otherwise it is azurite

In commercial documents, the first reference I have found to azur or azzurro is in a XIIIth-century Narbonnese tax list. Here azur is taxed at 4 d. a quintal (see glossary), but it is not known what type of blue is meant or whether this refers to azurite or lapis lazuli. An early XIVth-century Bolognese gabella (1317) (see APPENDIX 3) has two entries for azzurro: azzurri sottili and azzurri grossi. The former is more highly taxed and may refer to ultramarine. This supposition is born out by entries in later gabelle. An undated XIVth-century Florentine gabella (see APPENDIX 3) lists azzurro sottil o gabbadeo while in 1402 (see APPENDIX 3), another Florentine gabella lists as one item azzurro sottile, azzurro baccadeco ultramarino which may be assumed to be the same thing; gabbadeo and bacchadeo being synonymous. Gabbadeo and bacchadeo mean "from Baghdad" and are used to describe both blue (azzurro) and indigo (an exotic blue dye: see INDIGO below). Soft (sottil) blue appears to be some sort of high quality blue powder. In the case of ultramarine, the name "of Baghdad" could refer either to the place where lapis lazuli was acquired; or to describe its dark blue colour, thus associating it with the dark blue of high quality indigo which traditionally went under the name "of Baghdad".

Commercial documents demonstrate that most blue pigments, mineral or plant-based, were expensive and by far the most costly was the material called az(zi)urro. It is one of the most highly taxed
items in the gabella of Bologna (1317) where a soma (in this case 500 lbs.) of azzurri sottili is taxed at 2 lr. 5 s. 8 d. Nevertheless, spun gold carried just under double the tax at 4 lr. 7 s. 6 d. a soma. In the undated XIVth-century Florentine gabella, a 100 lbs of azzurro sottile carries a slightly lower tax (at 5 lr. 6 s. 1 d.) than the most expensive type of red dye, grana (see GRANA below), grana di Romania, (at 5 lr. 11 s. 1 d.)

In the 1402 Florentine gabella, azzurro...oltromarino carries the very high tax of 14 s a pound, while the most highly taxed grana only carries the tax of 4 s 7 1/5 d a pound(19). Another highly priced dye, indigo, was taxed at 2 s a pound. A valuta (price list of goods at wholesale) from the Datini archives dated 31 December 1393 lists the prices of goods on the Venetian market; azzurro oltromarino is priced at 2 ducats (see glossary) for a libbra sottile. Among the materials used by craftsmen, there is no other item that approaches azzurro oltromarino in price. It can only be compared with such very exotic items as pearls (5 ducats a pound) and musk (2 1/2 ducats a pound)(20).

It is suggested that azzurro (sottile) was ultramarine pigment already prepared from lapis lazuli. The stone itself, lapis lazuli, appears much more rarely as a commodity in the commercial documents. However, lapis lazuli and azzurro are found listed separately in gabelle and are obviously two distinct items of commerce. It is therefore possible to conclude that azzurro had undergone some preparation and was not the gemstone, lapis lazuli. In the 1402 gabella of Florence lapis lazuli is taxed at 4 d. a
pound while, as was noted above, a pound of azzurro...oltramarino was taxed at 14 s. a pound. The Datini valuta (a price list and not a tax) corroborates the relative value of the two items. A pound of lapisilazeri, cost 32 grossi, but a pound of azuro oltramarino cost 2 ducats (N.B. 2 ducats=48 grossi. See APPENDIX 3, No.30)\(^{(21)}\) It appears from this information that lapis lazuli as a stone both carried less tax and cost less than the material listed as azzurro or azzurro sottili.

Most of the recipes describing the process of making ultramarine from lapis lazuli date from the end of the XIV\(^{th}\) century and it is rare to find the stone, lapis lazuli, mentioned in commercial documents before the mid-XIV\(^{th}\) century. Therefore, the product called azzurri sottili in the 1317 gabella of Bologna and the two blue powders (oltramarino and della Magna) described by Pegolotti in the 1340s were, in all probability, prepared pigments, available in commerce and bought for use in painting. Later, the XIV\(^{th}\)-century and XV\(^{th}\)-century gabelle and valuta include both lapis lazuli and azzurri. This implies that despite knowledge of manufacturing techniques for making ultramarine from untreated lapis lazuli, artisans continued to buy a prepared pigment which was widely available.

There are many references to artists using different qualities of blue. They were often enjoined not to use poor quality blue or azurite\(^{(22)}\) However, azurite was clearly extensively used, both fraudulently, instead of ultramarine, and with the consent of the
patron. For example, in 1372 Jacopo di Lazzero contracted to paint the altar of Santa Maria di Grignano and undertook to facere bene coloratas et deaureatas ex illis coloribus bonis et finis et azzurreis allamanneis finis ...(23) In 1304, the building accounts of the Countess Mahaut of Artois and Burgundy for her chateau at Hesdin (see APPENDIX 3) record that she bought two qualities of blue, blue at 20 s. a pound, and blue at 10 s. a pound. One of these may have been azurite and the more expensive blue, bought in a smaller quantity, may have been ultramarine(24).

It is thus possible to deduce that although a blue pigment made from lapis lazuli was used before the XIVth century, commercial documents and treatises indicate a much wider availability of ultramarine blue from the early-XIVth century onwards. Evidence for commerce in blue in France is very limited, but azur appears on a Parisian tax list dated 1349 (see APPENDIX 3). This could be ultramarine or azurite. However, the brilliant blue colour of ultramarine can certainly be seen in Parisian manuscripts of this period. By the end of the XIVth century documents and treatises point to wide availability of the pigment in its prepared form as azzurro and of the untreated stone, lapis lazuli. Large workshops might have undertaken the complicated process of preparing ultramarine from lapis lazuli and a smaller workshop might have purchased a ready-made product. Ultramarine was an expensive commodity that had to be handled with care. Azurite would have been used for less important paintings or parts of paintings and it would have been mixed with other colours.
VERMILION

Vermilion is made from a natural red sulphide of mercury, called cinnabar found mainly in Almadén in Spain (see map 1), or from a chemical combination of mercury and sulphur mixed together to produce cinnabar (25).

Cennini in the XIVth century says:

"I am leaving out the system for this because it would be too long to set forth in my discussion all the methods and receipts. ... you will find plenty of receipts for it, and especially by asking the friars. But I advise you rather to get some of that which you find at the druggists' for your money... Always buy vermilion unbroken and not pounded or ground...it is generally adulterated with either red lead or pounded brick" (26).

This statement leads one to suppose that vermilion was commercially available, not manufactured in the artisan's studio. The reference to the friars making or providing recipes indicates that it was manufactured artificially. While there are many medieval recipes for manufacturing artificial vermilion from mercury and sulphur, one should be wary of assuming that they were ever followed. Cinnabar is the world's main source of mercury and there seems little logic in reconstituting cinnabar with the mercury that had already been extracted from it.

Pegolotti lists cinnabar for sale on the major markets of Europe and the Levant (27). He nearly always refers to it as vermiglione cioè ciniabro or vice versa, although in Alexandria and Famagusta,
he calls it vermiglione with no further qualification. Only at Venice is there a reference to both vermiglione and cinabro (APPENDIX 2). Perhaps both the raw material, cinnabar, and manufactured vermilion were available there(28) In his description of vermilion in the section on recognizing merchandise, Pegolotti says that vermilion should be red, streaked with white and as unified and unbroken as possible(29) He is presumably writing of natural cinnabar.

**Documentary Evidence**

Vermilion (or cinnabar) appears early in commercial documents. It is mentioned in a Marseilles tax of 1228 (see APPENDIX 3). Compared in price to "blue" it is taxed relatively low, perhaps because it is a European product. The Parisian tariff of 1349 groups several commodities together, including vermilion, azure, orpiment (see ORPIMENT below), minium (see WHITE AND RED LEAD below) and indigo, to be taxed at 4 d. a pound, and so it is not possible to deduce the relative value of these products to each other. They all carry different taxes in Italy(30) However, the Hesdin building accounts for 1304 give a good idea of the comparative price of blue and vermilion. (These are purchase prices, not taxes). Blue cost 20 s. and 10 s. a pound, while vermilion cost 7 s. a pound. In 1380 asur was bought at 15 s. a pound while vermilion still only cost 8 s. a pound.
In the undated XIVth-century gabella of Florence, cinnabar is taxed at 33 s. 4 d. per 100 lbs which is more than azzurro grosso (probably azurite) at 22 s. 2 2/3 d. and orpiment at 16 s. per 100 lbs. It is considerably less heavily taxed than azzurro sottile 5 lr. 6 s. 8 d. or Baghdad indigo at 4 lr. per 100 lbs.

**Treatises and Recipes**

Whether vermilion was ever made artificially or not, recipes are numerous. The basic principle was to combine mercury and sulphur in a closed flask until a black sulphide of mercury was formed which vaporized and recondensed at the top of the flask. The flask was broken and the material inside ground up.

The recipe given by the Liber de Coloribus is fairly straightforward. A glass jar was covered on the outside with very fine clay. Then three times the weight of mercury was mixed with twice the weight of sulphur. The pot was supported on four stones and a moderately hot charcoal fire built around it. When blue or yellow smoke escaped, the pot was covered with a tile or stone which was easy to remove, so that the artisan could look into the pot. When the smoke coming off the mixture was almost as red as vermilion itself, the mixture was ready(31).

Judging only by an optical examination, pure vermilion unmixed with any other pigment (distinguished by its dense surface and
cold blue/red colour) is rarely seen used alone in XIVth-century Parisian manuscripts. It may have been more important for rubricating than for miniature painting. In 1378-9, at Troyes, Nicolas Lesgelè who was a writer and illuminator was paid "...pour enluminer d'azur et de vermilion", and in c. 1480 Everard d'Espinques charged 2 s. 6 d. for "rebricher" two books of "Tristan en vermilhon" (32).

ORPIMENT

Orpiment, the yellow sulphide of arsenic, was used throughout the Middle Ages to make a yellow pigment. A graphic description in the XVIth-century English translation of Dioscorides' De Materia Medica accords with what one can see even with a low magnification magnifying glass. It describes orpiment as "crusty and gold like" with "fish scale like crusts" which should lie one upon the other and have no impurities (33). Cennini says it is the colour closest to gold, but he warns strongly against its use (34). It is an extremely corrosive substance and incompatible with almost every other chemically produced colour, especially verdigris, red and white lead (see RED AND WHITE LEAD and VERDIGRIS below) (35).

Documentary Evidence

There is no medieval account of the sources of orpiment, but it was exported to the Levant from Europe for use in the glass
industry and probably had an European origin in the XIV\textsuperscript{th} century\cite{36}. Like cinnabar, orpiment was sold at most of the markets considered by Pegolotti. It is frequently mentioned in the tariffs and while it is not among the most highly taxed or expensive merchandise, it was not cheap. At Florence in the XIV\textsuperscript{th} century it was taxed at 16 s. for 100 lbss. while cinnabar was taxed at 33 s. 4 d. However, red lead was taxed at 6 s. 8 d. per 100 lbs. The Datini valuta of 1393 prices cinnabar at 24 1/2 - 25 ducats per 100 \textit{libbre sottile}, while orpiment cost 17-18 ducats per 100 \textit{libbre sottile}\cite{37}.

\textit{Treatises and Recipes}

Orpiment is extremely hard and the XII\textsuperscript{th}-century treatise of Heraclius advises putting it in a leather bag while crushing it. After that, it was ground with water and calcinated bones and tempered with glair. If the colour was not good enough, Heraclius suggests adding ochre\cite{38}.

Cennini also discusses the problems of breaking the stone, saying that it is the most difficult colour to work in the profession. He recommends grinding it very gently with powdered glass\cite{39}. When the stone was sufficiently broken it could be ground with water; the more it was ground the better it would be. Cennini tempered orpiment with size and mixed it with indigo to make green. Although most treatises warn against its use as a pigment, commercial documents show that it was extensively traded. It had
an important pharmaceutical use and this was probably its main commercial outlet.

REALGAR

Realgar is the red sulphide of arsenic, even more corrosive than orpiment. Both Cennini in the XIVth century and the XVIth-century mineralogist, Georgius Agricola say that it was used by painters, but Cennini's strictures against it are even stronger than those against orpiment "...this colour is really poisonous" (40). Like orpiment, it was imported into the Near East. Realgar appears to have been a rarer commodity than orpiment and appears less frequently in tax lists and valute. Pegolotti only lists it for sale at Alexandria. A Datini valuta of Paris, dated 1395 (see APPENDIX 3), states specifically realgar was not sold there: non ci se ne vende. In most cases the tax on realgar was lower than that on orpiment. This can be seen in the gabella of Bologna (1317), in Florence in 1402 and in Pisa in 1408. According to the Datini valuta, while orpiment cost 17-18 ducats per 100 libbre sottile, realgar only cost 5 ducats per 100 libbre sottile. Only in the undated XIVth-century tax at Florence is realgar taxed more heavily than orpiment at 21 s. 4 d. per 100 lbs (orpiment is taxed at 16 s. per 100 lbs).
MALACHITE

Green copper carbonate, malachite, is closely related to azurite and they are often found together in the same stone. Malachite was apparently used in soldering gold, hence its Greek name chrysocolla. It was used from early times, although there is no medieval European account of malachite mining. The XIIIth-century Arab writer, Teifaschi, writes that malachite was to be found in the copper mines of Persia, India and other places, but it is much more likely that the malachite used in Europe came, like azurite, from central Europe.

Documentary Evidence

Malachite is found neither in commercial documents, nor in lists of pigments purchased. Cennini says that it was used and he instructs his readers to buy it "ready made". If the washing process was truly as complicated as that given for azurite in Segreti per Colori, perhaps "ready made" meant that it was already washed clear of impurities. Cennini suggests grinding it very little as the colour will spoil. It should be worked with plain water. As Cennini calls it verde azurro, it is possible that it is grouped with other blues in the tax lists.
COLOURED EARTHS

Most coloured earths used by painters were probably mined or found locally. However, sinopia, Armenian bole and terre-verte, were items of commerce.

Sinopia took its name, according to Pliny, from Sinope in Northern Turkey (see map 1) (44). Armenian bole was a red earth often used to give body and colour to the ground under gold or silver leaf. The XIIth-century doctor Platearius writes that it came from Armenia, hence its name (45). Rosamund Harley in her excellent book on artists' pigments, which deals with a later period, says that eighteenth-century writers considered Armenian bole and a red earth from Lemnos (see map 1) to be of equal quality (46).

Artists also used green earth, especially as an undercolour for flesh painting. The XIIth-century part of Heraclius' De Coloribus et Artibus Romanorum says that the best green earth was called creta cirina, or theodote (47).

Documentary Evidence

Because earth colours were probably dug from local sources, they figure rarely as items of import or export. A XIVth-century painting treatise from Montpellier records that good quality ochre comes from Tours (see map 1) and while this manuscript is a compilation of various older treatises, the compiler would
probably have been in a position to know relatively local sources (48). Cennini describes how he went with his father to the Colle di Val d'Elsa to dig for coloured earths (see map 1). They found ochre, dark and light red, blue and white earths (49). The Hesdin building accounts record the purchase of a brown called d'Auchoirre, but this appears in no valute or tax list (50).

Armenian bole was used both in medicine and painting. It appears in the undated XIVth-century Florentine gabella taxed at 1 1/2 d. a pound. As a general rule, only very expensive goods were taxed by the pound, but Armenian bole was apparently not subjected to a high tax (it compares with a pound of woad (see WOAD below) and is less highly taxed than second quality indigo at 5 d. a pound). It may have been sold in relatively small quantities and so taxed by a small unit.

There are also references to sinopia in commercial documents. It is taxed fairly low in XIVth-century Florence at 6 s. 8 d. for 100 lbs. or the same as red lead; while cinnabar is taxed at 33 s 4 d. per 100 lbs. However, in the 1304 and 1312 accounts from Hesdin, Mahaut paid 12 s. and 7 s. for a half pound of sinnoble and 7 s. for a pound of vermilion (51).

Treatises and Recipes

Instructions for preparing painting pigments from earths are scarce. Their treatment is self-evident and they were mainly
used on walls. The Liber de Coloribus advises grinding sinopia with water and mixing it with white to make a rose colour. The same treatise has instructions for preparing ochre to be used on parchment, but the author goes on to say that it could only be used as an underlay for gold. It should be ground with water and mixed with egg white.

Cennini writes that terre-verte is suitable for faces, draperies and buildings, in fresco or secco on walls or panels or wherever one might wish to use it. De Arte Illuminandi mentions the colour and says it is only to be used inconspicuously for flesh painting.

**BROWN**

Treatises tend to mention brown only in passing, but the compilation from Montpellier explains that brown is made by heating ochre and tempering it with gum; the brun d’Auchoirre of the Hesdin building accounts was surely an earth colour. However, a XVth-century English treatise gives a recipe for "tawney" colour made from soot tempered with gum. Manuscript artists often used brown, especially towards the end of the XIVth century and it is quite probable that many of these browns were made by combining other colours with ink, or lamp black.
The main use of earth colours in manuscript illuminations was as underlays for gold, but there are certainly some earth colours in the miniatures themselves. For example, the Boucicaut, Egerton and Bedford masters use a green for face-painting which is in all probability green earth (see CHAPTER NINE below). Miniatures by Jean Le Noir (see CHAPTERS FIVE and SEVEN below) have areas of brownish yellow which has the colour of yellow ochre.

**CHEMICALLY PRODUCED COLOURS**

**WHITE AND RED LEAD**

The medieval artist used three or four colours which may be described as chemically produced: white lead (ceruse, cerusa), red lead (minium), verdigris (green copper acetate) and possibly lead-tin yellow. In addition, during the XIVth century in Italy and somewhat later in Paris, artists began to use an imitation gold colour made from a mixture of sulphur and tin, called in English "mosaic gold".

White lead oxide was the only truly white pigment available to artists until modern times (c.1940). Lead white is incompatible with orpiment and to a certain extent with verdigris. Consequently artists wishing to mix orpiment or verdigris with white or put them next to an area of white, had to find substitutes for these colours because there was no substitute for white lead\(^1\). Red lead, lead dioxide, was the cheapest red
pigment available and although it too is incompatible with some other pigments, it was probably the most widely used red in medieval manuscripts.

There are recipes in early treatises for making red and white lead, but by the late XIVth century the author of De Arte Illuminandi says that they could be bought anywhere. As white lead was also used in pharmacy, there was presumably a sufficiently large market to make commercial production viable.

**Documentary Evidence**

*(White Lead)*

According to Pegolotti white lead could be bought at three markets, Alexandria, Majorca and Pisa. In his section on how to recognize merchandise, he writes that white lead must be white, not grey. His description implies that it was sold attached to sheets of lead as he says that it should be whole and not in pieces. The more solid (salsa) and white the panels were, the easier it was to sell and transport from one country to another.

The first clear reference to white lead as an item of commerce that I have found comes from a list of brokerage fees dated 1305 at Pisa, but white lead is listed in the building accounts of the Painted Chamber at Westminster and at Hesdin before that date.
In 1305 at Pisa, the brokerage fee is 1 d. a barrile (see glossary). After this, white lead appears regularly in Italian documents.

(Red Lead)

According to Pegolotti, red lead could be bought at Alexandria and Venice and although it seems to have been a rarer commodity in the gabelle and tariffs, it appears earlier. However, it could easily be made by heating white lead in the workshop. Red lead is included in a list of goods to be taxed at Marseilles in 1228, levied at 1 d. a quintal. In 1317 at Bologna, red lead is taxed at 6 d. a soma and in Florence in the undated XIVth-century gabella, it is taxed at a little less than the 8 s. of white lead, at 6 s 8 d per 100 lbs. and is one of the cheaper products among the pharmaceutical goods.

Treatises and Recipes

D.V. Thompson in The Materials and Techniques of Medieval Painting describes the manufacture of white lead at length and only the general outlines of the process will be recalled here. In order to make white lead, carbon dioxide is necessary. Medieval treatises describe two processes. In one, the pigment was manufactured with an air hole to facilitate circulation of carbon dioxide. In the other, no air was allowed to penetrate, but the instructions usually conclude with the
advice that the white lead should be roasted in the open air. Red lead was made by heating white lead over an open fire.

Recipes, although they differ in detail, agree on the principle. Sheets of lead were exposed to warm vinegar fumes and the resulting deposit on the lead was tempered with glair. The vinegar and lead were often buried in a warm dung heap or heated together over a fire. The XIIth-century prefix to *Mappae Clavicula* recommends exposing the lead to vinegar fumes in a sealed pot and then heating and stirring the resulting deposit over a fire (67) Theophilus also suggests that the receptacle should be sealed. In his recipe, pieces of lead are suspended above vinegar in a wooden chest, but carbon dioxide may have been able to penetrate a wooden box. He does not say that the box should be buried, but this recipe is related to the previous recipe for salt green. In this case, the same sort of box was placed in dung. Perhaps the white lead box was also buried (68)

The *Segreti per Colori* which is generally so detailed, mentions the manufacture of white lead almost in passing and it may be possible to assume that by the XVth century, artists bought ready made white lead (69) Cennini describes white lead thus:

> This white lead is very brilliant; and it comes in little cakes like goblets or drinking glasses. And if you wish to recognize the choicest sort, always take some of that on the top of the lump, which is shaped like a cup.

This is obviously a purchased product (70)
In studying the development of colour use in XIVth-century Parisian manuscript illumination, one is struck by the introduction, towards the end of the century, of bright yellow. Although there are some ochre-like yellows in Parisian manuscripts before this date and some rare, small areas of bright yellow, presumably orpiment, copious use of bright yellow is unknown in Paris before the Très Belles Heures (B.N. ms. nouv. acq. latin 3093) and the second campaign in the Petites Heures (B.N. ms. latin 18014). This bright yellow is by far the most problematic colour in the Parisian palette of this date. Not only is this yellow bright, but it is clearly stable and does not react adversely with other colours. Its stability indicates that it is not orpiment and even with a hand-held magnifying glass, it is possible to see that the pigment does not have the distinctive microstructure of orpiment. Although there is some literature on the subject of yellow pigments, the situation is still unclear. There is no proof that the bright yellow used in the Très Belles Heures and Petites Heures is not a plant-based resin like gamboge. A résumé of the current state of research into the subject may be useful.

By the end of the XIVth century there may have been two lead-based yellows: lead yellow (PbO), (yellow oxide of lead) and lead-tin yellow (Pb₂SnO₄). However, the extent to which lead yellow was used is now in debate. Until about 1940 it was generally assumed...
that the yellow found in panels and manuscripts which was not orpiment, was yellow lead (now called "Massicot"). However, in about 1940 spectrometric analysis showed that tin was usually present.

(Yellow Lead)
The evidence for the existence and use of yellow lead is limited. It was believed among ancient and medieval writers that a product called "litharge" was the scum produced when gold or silver was heated. For instance, the XIIth-century doctor Platearius thought that litharge was the scum of gold, lead and apparently also of tin. Theophilus in an obscure passage writes that when white lead is heated it will turn yellow (flavus). The Göttingen Model Book gives a recipe for lead yellow made by heating white lead and Heinz and Marie Roosen-Runge in their analysis of Stephen Scriber's Musterbuch claim to have found lead yellow.

(Lead-Tin Yellow)
Until recently, all the evidence for the use of lead-tin yellow came from studies of panel painting, but it is now clear that lead-tin yellow was also used in manuscripts. Analysis with a Raman laser of a XVth-century Missal from the Departmental Archives of Cher revealed the presence of lead-tin yellow.

Documentary Evidence

There is some evidence for the medieval commerce in what was
probably pure yellow lead, that is the material that went under
the name of "massicot" or "litharge". Pegolotti calls it collo,
ghetta, ghetta, litar&Lro, mar-dasangue or vena di piombo(76)? It
was sold at Naples, Arzilla in Morrocco, Alexandria and
Constantinople. In 1317 litragero was taxed at Bologna. After
that, the term "massicot" was used. In the undated XIVth-century
Florentine gabella, marzacotto is described as being "for making
glass" (da fare vetro). It is more highly taxed than red and
white lead at 13 s. 4 d. per 100 lbs. In 1402 at Florence it is
also described as da fare vetro and in the Sienese gabella (before
1442) as da bicchieri. Thus, the main use of the product called
marzacotto was in glass making. Probably both litharge and
"massicot" were pure yellow lead.

The product which went under the name giallorino in Italy seems to
have been what is now known as lead-tin yellow. Cennini says that
giallorino is manufactured artificially "de artificato" and that
it is hard to break. Thompson in his notes suggests that Cennini
is referring to yellow lead(77); but the author of De Arte
Illuminandi writes that giallorino is made out of glass(78)? Only
in Segreti per colori is there a recipe for what is called
zallolino(79). The first part of the recipe is for making glass
paternosters. The artist must mix 1 lb. of lead and 2 lbs. of
tin, melt and calcinate them. Then, in the next recipe, there are
instructions to make zallolino. Two pounds of the paternoster
glass is mixed with 2 1/2 lbs. of minium and 1/2 lb. of fine sand.
They are then put together in a furnace to be refined (affinare).
This product thus contained both lead and tin.
Commercial documents throw some light on the problem. There was a commodity called giallorino which is separate from massicot. The Florentine tabella of 1402 lists giallorino da dipintori, taxed at 4 d. a libbra. It is thus clear that giallorino was da dipintori rather than marzachotto which was da bicchieri.

Both massicot and lead-tin yellow seem to have been connected with glass making techniques and yet they appear to be two different substances. The one, massicot, was perhaps simple yellow lead and the other, giallorino was lead-tin yellow. On the other hand, perhaps giallorino was only massicot in a more prepared state. If, as Cennini indicates, it was difficult to grind, perhaps giallorino was in some way prepared for painting "da dipintori".

VERDIGRIS

Verdigris, green copper acetate, is an ancient pigment. Like white lead, there are many recipes for its manufacture and depending on the method used, the colour will vary from dark, transparent green to a brilliant blue/green. According to the XVIIth-century druggist, Pierre Pomet, in his time it came from Montpellier and it seems likely that Montpellier already specialized in making verdigris during the Middle Ages(80).
Documentary Evidence

Although as late as the mid-XVth-century Segreti per Colori there are still recipes for making verdigris, by the XIVth century it was sold ready made. Pegolotti records it for sale on the markets of Majorca, Venice, Pisa and Nimes and Montpellier.

Verdigris does not appear on tax lists before the XIIIth century when verdet is taxed in Narbonne at 1 s. 2 d. It was among the more expensive pigments although it was extensively used. In Hesdin in 1304 Mahaut bought 20 lbs. of verdigris for which she paid 3 s. a pound. The account justifies this extravagance by saying that it is good (mes il est boins). From the mid XIVth century verdigris appears regularly in price lists and gabelle; it was always more expensive than white lead, which was produced by a similar method. In the undated XIVth-century gabella of Florence, verdigris is taxed at 20 s. 8 d. per 100 lbs. and white lead is taxed at 8 s. per 100 lbs. In the 1392 valuta from Avignon, 100 lbs. of Montpellian verdigris cost 22-24 grossi while the same quantity of white lead cost 4 3/4 grossi.

Treatises and Recipes

Verdigris was made by exposing copper to the fumes of warm vinegar. The recipes remain much the same throughout the Middle Ages although there are variations. The XIIth-century addition to the Mappae Clavicula gives a recipe for "Byzantine green". The
author suggests putting copper in a sealed pot, filling it with vinegar and leaving it in a warm place for six months. This method is that most usually found in treatises. However, many recipes specify that a space should be introduced between the copper and vinegar.

Theophilus' recipe for "salt green" shows what was probably a technical advance although it may only have produced a different green. He introduced a space between the vinegar and the copper. His instructions are to hollow out a piece of wood to make a box and to cut pieces of copper large enough to span the inside. These sheets, supported on a platform of twigs, were covered in honey and finely ground salt. The box was closed and, having made a hole in the side, Theophilus poured in hot urine and vinegar. Then he closed the hole to prevent vapour from escaping. Finally the box was buried in dung to keep it warm and left for four weeks. The instructions for making "Spanish green" which follow are similar except that the copper is covered with pure, hot vinegar. This time the whole is to be placed in a smaller box for two weeks. There is no honey or salt added and a different colour must have been produced.

Peter of St. Audemar's recipe would be more practical for an artisan working in a confined space. He poured equal quantities of honey and vinegar into a copper or brass vessel and buried it in the hot part of a dung heap. After twelve days a green deposit could be scraped off the bowl. Recipes persist into later
treatises. Jean Alcherius gives different instructions which tend
to show increasing complexity (83). The verdigris produced from the different recipes was certainly not the same. Cennini warns strongly that verdigris and white lead cannot be mixed, but white lead and verdigris were combined together to make a bole for gilding in recipes by both Alcherius and Cennini himself (84).

MOSAIC GOLD

From early times artists used imitations of gold and silver, but by far the most important was "mosaic gold", a yellow sulphide of tin. According to Thompson, it was not until the XIIIth century that recipes for "mosaic gold" were known in Europe and most come from Italy (85). Mosaic gold is rather gritty to look at under a magnifying glass, but towards the end of the XIVth century and certainly by the beginning of the XVth century it is very golden in colour (86).

Treatises and Recipes

The first known workable recipe is found in Il Libro dell'Arte. Cennini took equal parts of sal ammoniac (ammonium sulphide), tin, sulphur and a little less mercury. These he put in an open pot and melted them together on a fire. He tempered the resulting
mixture with glair (87). De Arte Illuminandi gives a similar recipe, but the instructions are more complicated and the result may have been better. One part tin was mixed with one part mercury over a fire and then salt and vinegar were added. The mixture was then washed clear of salt, melted again over the fire and placed on a marble slab. At this point the artisan added one part sal ammoniac and one part sulphur. These were worked with the mixture until it turned black.

The black mixture was put in a wide-necked bottle and surrounded with dung from the level of the mixture to the bottom (88). The bottle, thus "luted", was placed in a furnace. All the cracks were sealed, including those in the furnace. The top of the pot was covered with a piece of tile or something that could be removed easily. From time to time the artisan had to put a stick into the neck of the bottle. When golden particles attached to the stick, the "mosaic gold" was ready (89).

Alcherius has two similar recipes (90). Those found in Segreti per Colori also differ only in minor details (91). One tells the reader to put a cork in the top of the bottle with a hole in it and to wait until the smoke is yellow. Another says that the artisan should watch for a silver line at the top of the bottle. All the instructions require that the neck of the bottle be left open or at least that it should be covered with something moveable. The fumes must have been very dangerous. In the XVth-century the Strasburg Manuscript gives instructions for using mosaic gold, but not for making it. The author tells the reader to go to a
druggist for the material. Although recipes exist, the material was probably actually made by specialists(92)

VEGETABLE DYES

Several painting pigments were made from the vegetable dyes used in the cloth industry. Some came from the Far East and were expensive commodities, but many of the plants used to make vegetable dyes grew in Western Europe. Pigments made from plant materials are called lakes. They have a tendency to be fugitive and erratic. Nevertheless, throughout the Middle Ages and especially towards the end of that period, coloured lakes were extensively used. As no good substitute for white lead had been found, artisans sought adequate pigments that were chemically compatible with white lead. Red lakes were made from brasil wood, gum lac (see LAC below) and grana. There are recipes for green and yellow lakes made from buckthorn berries, blue lakes were made from woad and indigo and there were a few other vegetable blues and greens. There may also have been a lake made from turnsole or folium which could be pink, blue or mauve according to the acidity of the medium.

EXOTIC DYESTUFFS

The two most important exotic dyes imported into Europe during the Middle Ages were brasil wood and indigo.
INDIGO

Indigo comes from the plant *indigofera* which grows extensively in the Far East and India. During the Middle Ages, the largest indigo market was at Baghdad and it gave its name to good quality indigo from the XIIth century onwards although there is no evidence that indigo grew in or around Baghdad at this period. In the XIIIth and XIVth centuries fine indigo was also bought at Tabriz (see map 1) in Persia and Sultaniéh (see map 1). The indigo was probably brought to these markets from India via the Persian Gulf (93).

The major growing areas were in the valley of the province of Kabul, at Kerman and Ormuz, Cambay and the Malabar Coast (see map 1) (94). Marco Polo saw indigo growing in Quilon, Gouderjart and around Cambay (see map 1), but he does not mention Baghdad (95). An inferior quality indigo was grown further west in Cyprus and Egypt and was an important item of commerce for both these countries. It could also be found in North Africa, Spain and Sicily. These lower quality indigos were sold under the names saccafe, socafe, sacheze and indaco del golfo (96).

Marco Polo wrote a valuable account of the manufacture of indigo. He describes how the indigo plant was uprooted, placed in tubs of water and left to rot. Then the mixture was put in the very hot sun to boil and coagulate. He says it "becomes such as we see
it”. This dried indigo was divided into pieces of 4 oz each and exported (97).

**Documentary Evidence**

According to Pegolotti, merchants bought indigo on most of the European and Levantine markets. It was found at Constantinople, Adalia, Alexandria, Acre, Famagusta, Messina, Majorca, Venice, Pisa, Genoa, Nimes and Montpellier, the Fairs of Champagne, Antwerp, and Arsila in Morocco. In his section on recognizing merchandise, Pegolotti says that the best indigo must come in pieces, neither too small nor too large, flat at the bottom and pointed at the top. (This agrees with Marco Polo’s statement that indigo was exported in pieces of 4 oz). Inside, the indigo had to be soft and violet in colour. Pegolotti writes that the finest indigo was called coronato and that the inside of this, when broken, showed a "fine soft mould" (una gentile e sottile meffa). The merchant was enjoined to buy indigo as free of leaves and impurities as possible (98). At Constantinople indigo was examined by making a little hole in the sack and extracting a sample. No more detailed examination was allowed (99). In Pegolotti’s opinion, Cyprus indigo was worth about 1/4 less than Baghdad indigo.

There are early mentions of indigo in XIIth-century documents from Genoa (1140), Ferrara (1193) (100) and Narbonne (1153). This last seems to be the earliest mention of indigo in the French
region. In both the 1153 Narbonnese document and the 1228 tax at Marseilles indigo is levied at 3 d. a quintal. In the XIIIth century at Narbonne the tax is greater, 21 d. a quintal.

In 1349 at Paris indigo is grouped with other items like azur, orpiment and minium and taxed at 4 d. a livre. Consequently it is not possible to establish its relative value with regard to other commodities. Indigo, a valuable product, carries the same tax as azur, also valuable, and red lead, a far less valuable product.

In the XIVth-century Florentine gabilia, indigo is taxed at 4 lr. ? s. (the soldi are missing) per 100 lbs. This rate places indigo among the more highly taxed commodities, but if indigo was an expensive item, it was not as costly as ultramarine blue or grana. Grana de Romania (the highest quality grana) was taxed at 5 lr. 11 s. 1 d. per 100 lbs. Gulf indigo (second quality indigo), taxed at 40 s. a 100 lbs., carries a lower tax than second quality grana, grana di Provenza taxed at 2 lr. 13 s. 4d per 100 lbs.

Treatises and Recipes

Il Libro dell’Arte and De Arte Illuminandi instruct the reader to mix indigo with white which will make it look like azurite. Indigo could be simply ground with water and needed no further preparation.
BRASIL WOOD

Brasil wood (verzino) was the major exotic red dyestuff. Brasil wood comes from the tree caesalpinia found in India and the East Indies (102). It was widely used in the cloth industry and painting and is frequently mentioned by medieval technical treatises.

Documentary Evidence

The major growing areas for brasil wood were the Malabar coast and Calicut (see map 1). Marco Polo describes brasil wood growing in Lacock, the kingdom of Lambri, Quilon and Ceylon (see map 1) and is of the opinion that the finest brasil wood comes from Ceylon. However, Pegolotti does not mention brasil wood from Ceylon. He considers brasil wood from Quilon to be the best. This may be because the wood that came to the West under the name of verzino colombino, "Quilon brasil wood", came from Ceylon via Quilon. Verzino colombino, according to Pegolotti, was worth three times as much as verzino seni (probably brasil wood from Siam) and six times as much as what Pegolotti calls verzino ameri (probably from Sumatra) (103).

As brasil wood was such an important and valuable item of commerce, Pegolotti describes it in some detail. Verzino colombino ought to be bright (chiaro) red; good quality verzino
**CHAPTER ONE: PAINTING PIGMENTS**

*amez-i should be dark red and *verzino seni*, yellowish. The wood should have been exported from its place of origin in large, firm and heavy trunks and should not be hollow, light (*leggere*) or crumbly (*midolluto*). The less bark there was, the better. Removed from the trunk, pieces of the wood were sold as *verzino mondo* and *mondiglia di verzino*. *Verzino mondo* consisted of the valuable red core of the wood with the bark removed; it was the most expensive type of brasil wood. *Mondiglia di verzino* was the outside of the wood with as much of the red interior and as little of the white exterior bark as possible. It could be worth a quarter of good brasil wood. *Verzino scorzuto* had only the outer bark removed(104)

*Brasil wood was available in Europe from the XIIth century. The earliest mentions of the wood known so far are a document dated 1140 concerning the public scales at Genoa and, in the same year, a privilege given by Philip of Flanders granting a market to Nieuport in Flanders. Brasil wood seems to appear next in the 1153 tariff at Narbonne(105). By the XIVth century Pegolotti lists it for sale at Alexandria, Lajazzo, Acre, Famagusta, Venice, Majorca, Pisa, Genoa, Nimes and Montpellier, Antwerp, Constantinople, Sicily, the fairs of Champagne and Bruges.

Before the XIVth century, the brasil wood listed in tax documents has no qualifying description. However, in the 1317 gabella of Bologna *verzino* is divided into different categories. *Mondigle de verzino* and *schorza di verzin* are taxed at 9 s. a *soma* while *verzino* is taxed at 14 s. per *soma*. In a list of brokerage fees
at Pisa dated 1323 (see notes to APPENDIX 3 no. 24) _verzino mondo_ and _verzino fiorito_ are charged at 8 s. a centonaio while _buschagla di verzi_ is charged at 4 s. a centinaio.(106)

The gabelle verify Pegolotti's information that _verzino mondo_ was the most expensive type of Brasil wood. In the XIVth-century Florentine gabelle, _verzino mondo_ is levied at 2 lr. 3 s. 4 d. per 100 lbs. while _mondiglia di verzino_ is taxed at 20 s. 8 d. The 1402 gabelle taxes _verzino mondo_ at 1 fl. 1 lr. a cento and _mondiglia di verzino_ at 1 lr. 12 s. a cento. Three types of _verzino_ are listed in the 1408 gabelle of Pisa, of which _verzino mondo_ is once again the most highly taxed at 3 lr. _Verzino colombino_ is taxed at 2 lr. a cento and finally _verzino in mondiglia_ is taxed at 1 lr. 10 s. a cento.

The XIVth-century gabelle of Florence shows that compared to cinnabar at 33 s. 4 d. (1 lr. 13 s. 4 d.) per 100 lbs., _verzino mondo_ was more highly taxed at 2 lr. 13 s 4 d. per 100 lbs. In the same gabelle, Brasil wood is less highly taxed than Baghdad indigo (taxed at 4 lr. per 100 lbs.). Baghdad indigo is also taxed higher than _verzino mondo_ in the 1402 gabelle of Florence, the 1408 gabelle of Pisa and the undated gabelle of Siena. These taxes ought to reflect the wholesale and retail prices. However, valute seem to show that the price of Brasil wood was considerably greater than that of indigo. In the Venetian valuta of 1393 _verzino colombino_ was worth 30 to 35 ducats a centinaio while Baghdad indigo was worth 24 ducats a centinaio.(107) It may be that the Lombard towns, with their extensive dying industry,
had a specific reason for taxing indigo more highly than brasil wood. The function of the *gabelle* in this case may have been more protective than to raise money. Exotic, imported indigo would have been in direct competition with woad, a locally grown product.

**Treatises and Recipes**

There are more recipes for painting colours made from brasil wood than for any other lake. A transparent red colour was made by dampening the precious scraping of brasil wood with a mordant, usually lye or alum. With lye the colour was apparently deep red, but slightly purple and with hot alum the colour turned towards orange. The excess liquid was poured off and the remains, which tended quickly to become tacky, were spread on an absorbent surface, for example, a new brick. Degrees of transparency were dependent on the amount of alum or lye. Sometimes chalk, white lead, egg shells or marble dust were added to increase the opacity of the mixture and make the colour more rose(108).

The *Liber de Coloribus* suggests soaking the brasil in egg white and when the mixture was "ripe", adding alum. The writer warns that alum must be added to prevent the colour from disappearing as it is very fugitive(109). Among the recipes in the *Experimenta de Coloribus* collected by Jean Alcherius, there are seven recipes for making painting colours from brasil wood. One includes egg
shells and three marble dust. The recipes are fairly standard. First the brasil was scraped, amalgamated with urine or lye, and alum added. Usually the product was allowed to stand and then drained onto a brick or into a basin so that the liquid could run away. Recipes for transparent brasil colours required the artisan to boil brasil wood with urine and then add honey or to steep brasil wood in glair and alum (110).

_Segreti per Colori_ has seventeen recipes for making brasil lake, not including those with brasil in a mixture. The recipes are simple and quite a high proportion are probably intended to produce a transparent lake because only four have a whitening agent. Most require alum to be added, but in one the brasil wood is steeped in glair. Two recipes call for wine (111).

**GRANA AND KERMES**

_Grana_ and _kermes_ are the names given to a red dye produced by a small insect, _coccus illicis_ which attaches itself to the _kermes_ oak. The bodies of these insects, when dried and crushed, make a bright red pigment used in painting and dying. There is a certain confusion of nomenclature and the two names, "grana" (in English grain) and "kermes" seem to be used fairly indiscriminately, although technically grana is a European product and kermes is an eastern commodity. The two will be considered together here. Highest quality _grana_ came from Greece and _kermes_, from Armenia (112).
Documentary Evidence

The grana produced and sold in Europe came mainly from Spain, Provence and most particularly, Greece. Six or seven different types of grana are listed by the Datini notebooks for 1394 and 1396\(^{113}\). Clearly, however, the fact that high quality grana or kermes came from Armenia had also long been known, although it may only have been exported from there to the western markets after the XVth century\(^{114}\).

From the beginning of the XVth century, kermes and grana were certainly two separate items of commerce. In Florence and Pisa at the beginning of the XVth century, if not before, both grana and kermes were available and are listed separately in the 1402 and 1408 gabelle of those cities. Probably at more or less the same date, a treatise L'Arte della Seta in Firenze makes a clear distinction between the two and gives different prices for them\(^{115}\).

Pegolotti records grana on the markets of Majorca, Venice, Pisa, Genoa, Nimes and Montpellier, Paris, Bruges, Antwerp, Seville and Florence. He says that grana should be round and light in the hand, beautiful to look at, free of earth, leaves and bark. When powdered, it should not be sandy or contain any impurities and this should be evident if the grana is tested by being placed in the mouth\(^{116}\).
Throughout the Middle Ages, the fine dying properties of grana were the main incentive to commerce in the commodity. In 1153 at Narbonne it is taxed at 5 s. 8 d. a quintal, more than indigo taxed at 3 d. a quintal, even though indigo came from further away. Later, at Marseilles in 1228, grana is taxed at 3 d. and 8 d. a quintal, a tax identical with that on indigo. In the XIVth-century Florentine gabella, grana is divided into two different types and taxed at different amounts. Grana di Romania (Greek grana) is taxed at 5 lr. 11 s. 1 d. per 100 lbs., more than the highest quality blue, azzurro sottile taxed at 5 lr. 6 s. 8 d. per 100 lbs. Grana from Spain and Provence is taxed at about half the amount at 2 lr. 13 s. 4 d. per 100 lbs.

The difference in value between the different grades of grana can also be noticed in the 1402 gabella of Florence. Here 100 lbs. of Greek grana is taxed at 4 fl. 2 lr., grana from Provence at 3 fl. and finally Spanish and Barbary grana at 2 fl. 2 lr. The Pisan gabella of 1408, shows the same type of difference. Kermes is recorded in the 1402 gabella of Florence and the 1408 gabella of Pisa. In the first, it is taxed at 5 fl. per 100 lbs. as opposed to Greek grana which is taxed at 4 fl. 2 lr. At Pisa, kermes is taxed at 8 lr. and Greek grana at 6 lr. 10 s. In both kermes was more highly taxed and so was probably more expensive to buy than grana.
Treatises and Recipes

Grana had long been used in manuscript painting and has been identified in the Lindisfarne Gospels. The colour could be turned from pink to brown and orange by the addition of different amounts of acetic acid (119). Grana was probably the material which the Mappae Clavicula calls vermiculum terrerum. The Mappae says that it grows on the leaves of the cerus or Turkey oak (120).

Jean Alcherius' Experimenta de Coloribus has three recipes for making lakes from grana. All need a lye made from oak ashes or urine. He put cloth clippings dyed in grana into the lye and left it until the clippings decomposed. The remains he spread on a stone to allow the rest of the liquid to drain away. Once dry, the clippings were ground and strained (121).

Instructions for making red lake from grana in Segreti per Colori differ little, but have become increasingly complex. For example, the artist took a pound of cloth dyed in grana, boiled it with a strong ash lye and strained the mixture. The lye was boiled again without the clippings and poured back onto the clippings and strained. Then five ounces of rock alum was gradually added until the lye settled; once settled the lye was strained again. When dry, the colour was put in a dish of cold, clear water and well mixed. A scum would form that had to be lifted off with a feather. Again the mixture was strained and the water drained away, taking the rock alum with it. When the
product was nearly dry, it was removed from the strainer and spread on a tile to dry. The more often the mixture was rinsed with water, the better it would be.\(^\text{(122)}\)

\textit{LAC}

Another red lake was made from gum lac, but recipes for its use are rarer than those for making red lake from \textit{grana} and brasil wood. Rosalind Harley describes lac clearly. It is made from the eggs of the \textit{coccus lacca}, an insect that infects several trees, especially the fig tree of Asia and India.\(^\text{(123)}\) The overall appearance is like a growth and not an animal product. These "growths" were collected still attached to the twigs on which they had formed, before the larvae had hatched. People in the West only saw the cluster attached to twigs and thought that both lac and \textit{grana} were a type of berry \textit{kokkos}.

\textit{Documentary Evidence}

There seem to be no classical or medieval accounts of lac growing or being harvested. In oriental commerce there were two kinds of lac, \textit{lacca martabani} and \textit{lacca sumatri}, but in Europe no distinction seems to have been recognized. Pegolotti refers to \textit{lacca conbaiti} or \textit{ganbainti} which may denote Cambay. The first European traveller to give a first-hand account of gum lac being sold is Nicolo Conti (1415-1440). He writes that it could be
bought on the markets of Calicut and Cambay (see map 1). In India it was probably grown in the kingdom of Narsinga, on the coast of Coromandel and in the Ganges Basin (see map 1). The main source of lac was Indo-China in particular the provinces of Pegu, Martaban and Tenasserion; it was also harvested in Burma, Siam and Sumatra (see map 1). European traders certainly obtained lac from Calicut via Aden and Alexandria. Calicut and Cambay and thus, indirectly, Europe received lac from Indo-China(124)

Pegolotti lists several kinds of lac, but he clearly considered them to be different varieties of the same thing. With the exception of "conbaiti" he leaves the name of the place of origin obscure. Lac was an important commodity and Pegolotti describes it in great detail. It was sold attached to a stick, or it was detached from the branch, heated and milled. Lacca conbaiti, was sold in rolls, incanollata. Lacca Cruda was sold attached to twigs. Lacca Matura, "ripe", lac was good quality lac and was sold powdered. Lacca acerba, green lac, was supposedly "unripe" or "immature" lac, but in fact this was old lac whose colour had been reabsorbed into the wood. There was also fiori di lacca, probably grains of the gum and polvere di lacca which seems to have been made from particles that had come away from the crust. Polvere di lacca and fiori di lacca were inferior grades of lac(125)

According to Pegolotti lacca matura looks like mulberries: brown and blood coloured tending to black. Lacca Acerba should be the colour of unripe mulberries, that is an unpleasant (turbido)
"unripe" red. *Lacca matura* should be easily broken, revealing within red and white grains; a sign of good lac. *Lacca acerba* should not break easily.

Good lac was free of impurities, earth, bits of wood and costiere (or *fichi* as the Catalans called them) and remained attached to the twigs of the tree from which it came. If the costiere were ground up when fresh, they had the consistency of pitch, but red not black. There were more costiere in unripe than in ripe lac. When testing the lac, the merchant took some powdered lac, put it in the mouth and chewed it. One could also put it in a mortar, grind it until soft and put it in the hand and mix it with saliva. The reddest and most blood coloured was best.

Pegolotti bought lac at Tauris, Constantinople, Alexandria, Lajazzo, Acre, Cyprus, Messina, Majorca, Venice, Naples, Pisa, Genoa, Nimes and Montpellier, Antwerp, London and Seville.

Lac appears early in European commerce, but not as early as grana or indigo. The first mention in commerce that I have found seems to be in 1228 at Marseilles where it is taxed at 4 d. 1 obole (see glossary) a sporta (see glossary). The 1317 gabella from Bologna taxes lac at 12 s. per soma and the Pisan brokerage fees of 1323 levy 100 lbs. at 8 s. This places lac among the highest priced commodities. In the XIVth-century gabella of Florence, lac is taxed like saffron, by the pound. It carries a lower tax than saffron at 1 s. as opposed to 4 s. a pound. In 1402 at Florence, lac is taxed at 1 s. 2 d. a pound while saffron
is taxed at 8 s. a pound. These examples show that although lac was considered a sufficiently rare or costly product to be taxed by the pound, it still carried less tax and so presumably cost less than saffron which was a European product (128).

Treatises and Recipes

Cennini recommends lac very highly saying it will make a good quality colour. He says most specifically that lac was bought from a druggist because, although he knew recipes for preparing lac, it was better if bought ready made (129).

In Alcherius' Experimenta de Coloribus there are recipes for making a red lake with either lac or grana. Lac was boiled in lime for half an hour. Half an ounce of rock alum and half an ounce of sal gem (see glossary) were ground and added to the lac just before the end of the boiling. The mixture was added to urine or strong lye, placed in a glazed jar and shaken every morning and evening for fifteen days. Later the mixture was to be strained and ground (130).

Segreti per Colori has complex recipes for making lakes from lac. In one, three ounces of powdered rock alum was mixed with warm old urine. These were boiled together and skimmed. When the mixture was clear, 5 lbs. of gum lac was added and stirred over a fire for three misereres. Then brasil that had been boiled in water, strained and cooled for a day, was joined to the lac
mixture and strained. Then the artisan added two pounds of rock alum and which had been boiled with two metadelles of clear water. The mixture stood for a day, was strained and stood for another day. When the product was nearly dry, it was cut into pieces. Interestingly, the author added that this recipe was suitable for any lake \( \text{componere laccha isto modo} \) made from dragon's blood, grana, vermiculus, minium, brasíl and flowers of herbs\(^{131}\).

**DRAGON'S BLOOD**

Dragon's blood is a red plant gum, probably most commonly **Draccone Ombul Kotschy of Socotra**\(^{132}\). Traditionally dragon's blood was held to be the mingled blood of an elephant and a dragon; medieval merchants, artists and doctors were probably unsure as to its exact nature\(^{133}\). Nevertheless, Platearius in the XII\(^{th}\) century is quite informative about it. He says that there are those who believe that dragon's blood is the juice of a herb, but in fact it is the gum of a tree which grows in India and Persia. He considers that the best type of dragon's blood should be red and clear within, like minium\(^{134}\). From this and a reference to dragon's blood in the XII\(^{th}\)-century part of Heraclius' work, it is possible to conclude that it was known quite early in the West.
Recipes for the use of dragon's blood are few. Heraclius mentions it and Jean Le Begue, in his table of synonyms, says that it is *morellus* or dark red. Dragon's blood also appears in a recipe for red lake in *Segreti per Colori*. It is transparent and seems mainly to have been used as a varnish over gold and silver for it is very fugitive unless it is incorporated into a resin (135).

**Documentary Evidence**

Although mentioned by Platearius, there seem to be no references to dragon's blood in commercial documents before 1305 at Pisa. Pegolotti mentions it quite frequently on the markets of Europe. It was sold at Constantinople, Alexandria, Famagusta, Majorca, Venice, Naples and Genoa. He says that it must be red, not tending to black, hard and dry. When it is too black, this is a sign that it is dried up and of inferior quality. It can last unspoiled for thirty years (136).

Commercial records mentions dragon's blood less frequently than lac and it was almost certainly less often used (137). Like several other commodities, for example saffron and lac, dragon's blood seems often to have been sold and taxed by the pound. At Pisa in 1305, dragon's blood was subjected to the relatively high brokerage fee of 1 s. for 100 lbs. In the XIVth-century Florentine *gabella*, dragon's blood is taxed at 1 s. a pound like lac. A similar comparison can be made in the 1402 *gabella* of Florence, where lac is taxed at 1 s. 2 d. a pound and dragon's
blood at 1 s. 4 d. a pound. According to the 1393 Venetian Datini valuta, it was sold by the pound and cost 8-16 grossi a libbra sottile (or about 33 ducats a 100 lbs.). Lapis lazuli, in comparison, cost 32 grossi a libbra sottile.

EUROPEAN DYESTUFFS

The most important European dyes for illuminating and painting were madder, saffron and woad. Dyer's weld, a plant which produces a yellow dye, was used in the cloth industry, but seldom in painting.

Woad

The most widely used blue dyestuff in Europe was not indigo which had to be imported from the East, but woad, isatis tinctoria. There are two types: cariesciers (D.C.) and stenocarpa. Woad grows fairly easily and can be found in Europe, North Africa, Asia, China and Japan. To make a dye, woad was mixed with a mordant and water, heated and kept hot for about 3 hours.

Woad was extensively grown in Southern Europe. In France, the area around Toulouse, the valley of Ariège, especially Hers and the area between Lavaur and Albi, were major woad growing areas. Woad was also an important crop in the North of France, at Amiens (see map 2). By the XIVth and XVth centuries, Tuscany and
Lombardy were major woad-growing areas. As a cash crop it superseded madder which could only be harvested once every two years while woad could be picked several times each year (140). The main use of woad was in dying, but painters and illuminators also used it to make a dark blue colour. In particular they used the scum of the dye vat called the "flower" (141).

**Documentary Evidence**

Woad appears on relatively few markets listed by Pegolotti, probably because it was a European product; it could be bought at Majorca, Venice, Pisa, Bruges and Antwerp. He does not describe it at the end of his book.

It does not seem to make its appearance in commercial documents before the XIIIth century at Narbonne. In the XIVth-century *gabella* of Florence, it is listed, like madder, among the dyes (tintori), and not among the spices and pharmaceutical goods, the "speziali". The same is true of the 1402 *gabella* from Florence. Other materials used as dyes, like brasil, indigo and saffron are listed among the speziali, but madder, woad and dyer's weld, all of which were produced locally, are listed as "dyes". In the XIVth-century *gabella* of Florence, woad is taxed at 9 s. per 100 lbs., higher than, for example, white lead at 8 s. for a 100 lbs. Madder was a little more expensive, at 11 s. 10 d. per
100 lbs. Indigo was taxed at 4 lr. and 40 s. (2 lr.) per 100 lbs.

Treatises and Recipes

Either indigo or woad was used in manuscript painting as early as the Lindisfarne Gospels\(^\text{(142)}\). Segreti per Colori has several recipes for blue pigments made from woad. Six recipes need the "flower" of woad rather than the leaves themselves. Different whitening and bulking agents were used: gesso, white earth and starch. Bulking agents are fairly general and found in recipes from all periods. All the recipes in Segreti per Colori are fairly straightforward. A typical recipe calls for two ounces of gesso sottile to be mixed with ten ounces of "flower" of woad. These should then be ground well together. The mixture could then be cut into pieces and kept for use. A little rock alum would improve the colour\(^\text{(143)}\)

MADDER

The root of madder, rubea tinctorum was used to make a red dye. As in the case of so many dyes, a painting lake was a by-product of the cloth industry.

Madder was a major export from Flanders and was widely available\(^\text{(144)}\). Pegolotti lists it for sale at Azov, Constan-
tinople, Alexandria and Cyprus as well as Messina, Venice, Pisa, Nimes and Montpellier, Bruges and Antwerp. He says that good madder ought to be in large pieces, dry and heavy. When broken, it should be as red and large (grosso) as possible while the bark on the outside must be as smooth, delicate and unscratched as possible. If the madder was soft it was worth less.\(^{(145)}\)

**Documentary Evidence**

Madder appears in *gabella* and tax lists throughout the Middle Ages. In the XIV\(^{th}\)-century *gabella* of Florence, it appears among the tintori and is taxed at 11 s. 10 d. per 100 lbs. This is a little more than woad, which is 9 s. per 100 lbs. By the 1402 *gabella*, the tax has gone up to 13 s. 10 d. also for 100 lbs., representing perhaps a small rise in price. In all cases, woad was taxed lower than madder.

There are very few recipes for preparing madder for painting, but it has been identified in panel paintings.\(^{(146)}\) It may have been more popular with panel painters than illuminators.

**SAFFRON**

Saffron is a yellow dye and cooking spice made from the stigma of the autumn crocus.\(^{(147)}\) It is native to the southern Mediterranean, Asia Minor and Iran. However, by the XIV\(^{th}\)
century saffron was almost certainly taken to the Levant rather than bought there and it was a major item of export for Abruzzi, the Marches, Umbria, Tuscany, Lombardy and Spain (148).

**Documentary Evidence**

Although saffron was one of the most expensive commodities available, it was sold on most European and Levantine markets. Pegolotti records it at Azov, Constantinople, Lajazzo, Acre, Alexandria, Famagusta, Rhodes, Messina, Venice, Ancona, Naples, Florence, Pisa, Genoa, Nimes and Montpellier, Antwerp, London and Seville. He writes that saffron should not be too yellow and the redder and dryer it is, the greater its value (149).

Probably because of its high value, saffron seems to have nearly always been taxed and sold by the pound. Where it is sold in a larger quantity, one is struck by its high price. In 1317 at Bologna, a soma (500 lbs.) is levied at 2 lr. 5 s. 8 d. which is the same as azzurri sottili. Nevertheless, in 1402 at Florence, azzurro sottile is taxed at 14 s. a pound while saffron is taxed at 8 s. a pound and similarly, in Siena, azzurro ultramarine is taxed at 15 s. a pound while saffron is taxed at 1 s. and 3 s.

However, the wholesale prices in the 1393 Datini valuta of Venice, show that the most expensive sort of saffron, zaferano toschano, was more expensive at 52 grossi per pound than ultramarine at 2 ducats (48 grossi) per pound. It might be the case that the Lombard towns, for which saffron was a major item...
of export, taxed this home-grown commodity relatively low compared with its actual retail value.

Pegolotti thought Tuscan saffron the best, then saffron of Abruzzi and finally saffron from the Marches and Catalonia. This gradation is, for the most part, borne out by the tariffs and gabelle. In the 1408 gabella of Pisa, zafferano nostrato di Toscana, della Marca is taxed at 4 s. a pound; zafferano del ducato e di qualunque altra parte, is taxed 3 s. In Venice in 1393 (see APPENDIX 3 & 4) tuscan saffron was the most expensive followed by Lombard saffron. Then comes a form of Catalonian saffron zaferano orta (see glossary); Marches and berlinghieri saffron (see glossary) were slightly less expensive.

Treatises and Recipes

It is difficult to judge the extent to which saffron was used as a painting pigment in the later Middle Ages. In the XIIth century, Theophilus describes how to paint a tower on a ceiling panel in a mixture of saffron and ochre with a little red. He also used it to gild tin. Cennini writes that saffron should be put in a linen cloth over a hot stone or brick, then placed in half a glass of good strong lye and worked on a slab. He warns that saffron should not be exposed to the air as it will lose its colour. If added to verdigris, it will make a very fine grass green. The Liber de Coloribus gives a simple recipe which tells the reader to saturate saffron in glair and temper it with
wine if desired. *De Arte Illuminandi* and *Segreti per Colori* give similar advice (142).

**IVY GUM**

The tradition that a painting pigment could be made from ivy gum is persistent, but has often been doubted (153). The early, metrical part of Heraclius' work gives a recipe for preparing ivy gum and Peter of St. Audemar in the XIIIth century also gives a recipe. Jean Le Begue in the XVth century repeats Peter's instructions and also includes ivy gum under *lacca* in his Table of Synonyms (154).

**Documentary Evidence**

Ivy gum also appears in the *gabelle*. Like saffron it was taxed by the pound, and was relatively expensive. In the XIVth-century *gabella* of Florence its tax compares with a pound of *lapis lazuli*, both taxed at 3 d. a pound. It was taxed at a little less than cinnabar at 4 d. a pound and a little more than *mondiglia di verzino* at 2 1/2 d. a pound. In the Venetian Datini valuta it cost 6 *grossi* a pound (the same as indigo) while *verzino mondo* cost 8-10 *grossi* a pound. The fact that *gommedera* appears in relatively few documents may indicate that it was not a widely distributed item of commerce, but it certainly existed.
Possibly the gum was imported from the Far East and tapped from an ivy that will not grow in the West.

**FOLIUM**

It is generally thought that *folium* was made from the plant *heliotropium tricoccum* called in Old French *tournesole*, and in Provençal, *mourela* or *maurelle*<sup>155</sup>. Supposedly three colours could be made from "*folium*", red, blue and purple, but it is hoped that current research will reveal both the nature of *folium* and the precise meaning of the word *folium*<sup>156</sup>.

There are references in treatises to both *morella* and *folium*. The *Liber de Coloribus* describes a colour made from the plant *morella* which has three seeds and comes from the South of France<sup>157</sup>. The XIV<sup>th</sup>-century compilation from Montpellier treats *morella* and *folium* as synonymous<sup>158</sup>. Here, the instructions are more or less a paraphrase of a recipe given by Theophilus' (see below) and the same text can be found in a Venetian manuscript (B. L. Ms. Sloane 416); the plant is called *tournesole* and there is a drawing showing three berries or seeds [sl.1].

In the *Lindisfarne Gospels* Heinz Roosen-Runge identified what he believed was *folium* in all its three characters: *folium rubeum*, *folium purpureum* and *folium saphireum*<sup>159</sup>. *Folium rubeum*, the initial colour, is a mild acid. When alkali in the form of urine
is added, the acid is neutralized and the *folium* becomes purple. With the addition of more alkali, in the form of quicklime, the *folium* goes blue.

Theophilus gives a full description of how to treat *folium*. For *folium saphireum* he made a lye with ashes and urine which he poured over *folium rubeum* and ground them together lightly. Theophilus added a fourth part quicklime, then he strained the mixture and it was ready for use. If he wanted *folium purpureum*, the lime was omitted.

Cennini does not discuss *folium* or *tournesole*, but *De Arte Illuminandi* gives a detailed account of how to make *folium saphireum*. Plant seeds had to be collected in July and squeezed into a dish through a hemp cloth leaving the kernels unbroken. Then linen *pezole* were soaked in the liquid for a day and a night. Loam was put in a dish and the urine of a man who has been drinking wine was poured over it. The *pezole* were laid on reeds placed across the dish so that they were exposed to the fumes of the urine, but did not touch the loam. Then they were dried. The author says that the material stays blue for a year and then turns violet.

**OTHER COLOURED LAKES**

Painting treatises have various recipes for other colored lakes made from plants. Whether they were used or not is unsure, but
there is no reason to suppose that those suggested by Cennini or De Arte Illuminandi were not (163).

Red lakes had always been used, but with the exception of saffron, green and yellow lakes seem not to have been used as individual colours before the late Middle Ages, although both Mappae Clavicula and Heraclius give recipes for green inks made from plants(164). However, in the later treatises there is a proliferation of recipes for green and yellow plant-based colours. These would have been much simpler to prepare than the traditional chemically-produced verdigris and much less corrosive than either orpiment or verdigris. These new greens and especially yellows freed the artist from the problems of incompatibility. The great disadvantage of this type of colour is that they are rarely light-fast. However, in a period when landscape in particular was becoming an important aspect of many paintings, there was surely a pressing need for more greens and yellows. This factor must have played an important part in encouraging artists to develop a wider palette with more flexible pigments.

In one of his recipes, Cennini says that the addition of wild plums to blue lake will make it green; he calls them prunghole salvatiche. However, D. V. Thompson in his notes says that these may not have been plums and that the colour was perhaps made from Rhamnus infectorius (buckthorn)(165). Cennini used another yellow called arzica which he says was particularly favoured by
illuminators, especially in Florence. This yellow might have been dyer's weld (166).

There are several recipes for vegetable greens and yellows in De Arte Illuminandi. The author gives recipes for a green made from iris or rue juice and saffron and for a blue made from lilies. For this last colour one had to pick fresh spring flowers when they were flowering, pound them in a marble or bronze mortar and squeeze the juice through a cloth into a glazed porringer. Then pezole (see glossary) were steeped in the juice which had already been soaked twice in rock alum. When the pezole were completely saturated with lily juice, they were left in the shade to dry. They were supposed to be kept between the leaves of a book (presumably to protect them from the light) and combined with giallolino to make green if desired.

The recipe for green or yellow vegetable colour made from prunameroli (probably buckthorn berries) is similar. The berries were collected in the autumn, put in a porringer and crushed by hand. Then a mixture of rock alum and lye was poured over them and the whole allowed to stand for three days. The colour could then either be used to dye pezole or it could be strained and sealed in a glass bottle (167).

Alcherius says that rue and parsley juice can be mixed with verdigris and ground. For one recipe he strained flamma (probably gladioli) juice, mixed it with verdigris and tempered it with gum. He remarks that rue is better than flamma
In other recipes Le Begue recommends that one should boil black nightshade and grind it with ochre or saffron, or both, or that fresh corn flowers and other herbs should be crushed and ground with well baked gypsum, dried and stored. He adds that if one wants a green colour, quicklime should be added. This passage implies that the original colour was not green; perhaps it was blue.

There are four recipes for greens made from buckthorn in Segreti per Colori. One had to mix the berry juice with alum or vinegar. One recipe gives instructions for making buckthorn yellow. The juice was extracted from ripe buckthorn berries; and kept in a sealed bottle for a fortnight. Then one mezzetta (see glossary) of clear, strong lye was boiled with an ounce of powdered rock alum for the space of one paternoster and allowed to cool. For every tumbler of this mixture, one third tumbler of buckthorn juice was needed. These were mixed together and left to stand overnight. Enough white earth was added to make the liquid like dough and dried in the sun. The product was tempered with glair and left for the night. The author adds that the colour is better stale than fresh.

It is hoped that this resume of the colouring agents available to medieval illuminators and artists has clarified the possible range of pigments used during the later Middle Ages. However, in order to manufacture pigments, artisans also needed a selection of "secondary" materials from which to make and then bind and
temper the colours. CHAPTER TWO discusses the metals, gums and alum required to make and paint with the pigments created from the raw materials discussed in CHAPTER ONE.
NOTES

1. Dana, *The System of Mineralogy*, p.35. Natural ultramarine (Na₈₋₁₀Al₆Si₁₆O₄₂₆S₂₋₄) is a complex sulphurous Natrium-Aluminiumsilicate. Marco Polo mentions the mines, but the fullest account of lapis mining comes from a XIXth-century traveller, James Wood. Although mining techniques may have changed a little between the Middle Ages and the XIXth century, the basic process probably remained much the same. Wood describes how the stone was found in a formation of black and white limestone in the Kokcha valley where at about 1500 feet a tunnel had been cut leading to the mine. Underneath the place where the miners hoped to find the stone a fire was lit and when the rock was hot enough, the miners hit it with hammers until all the outer covering was removed, revealing the blue stone underneath. Grooves were made around the stone and it was extracted with some of its matrix (Wood, *A Personal Narrative*, pp.262-266). See also: Gettens, "Lapis Lazuli and Ultramarine", pp.351-352, & 352 & n.6.

2. Kühn et al. p.35. Kühn in his chapter (Farbmateriale Pigmente) says that he does not think that there is strong evidence for the use of ultramarine before the XIVth century, but various teams of researchers have found evidence of ultramarine before this date. See: Roosen-Runge, "The Pictorial Techniques of the Lindisfarne Gospels", p.266; Guineau et al. "Identification de bleu de lapis-lazuli", passim. See also: Raft "About Theophilus' Blue Colour", pp.1-6 which treats the problem of whether lapis lazuli was used during the XIIth century.

3. Claude Coupry in a personal communication expressed the opinion that simple grinding was all that was required to obtain the high quality blue seen in manuscripts like those from Corbie.


5. See notes 12 and 13.


7. Cennini, *Il Libro dell'Arte*, p.37. Cennini says"...To begin with, get some lapis lazuli. And if you want to recognize the good stone, choose that which you see is richest in blue colour, because it is all mixed like ashes. That which contains the least of this ash colour is the best. But see that it is not the azurite stone, which looks very lovely to the eye, and resembles an enamel...". This seems to imply that Cennini bought his blue ready ground or powdered and the possibility should not be ruled out that the various azzurri found in the gabelle were different qualities of ground, but otherwise untreated lapis lazuli and azurite. Furthermore, Pegolotti in his description of azurro oltramario and azurro della Magna indicates that both these products are in powder form (Pegolotti, p.372).
8. Merrifield II, p. 343. The text is a little obscure, but seems to be referring to the unrefined stone. The Datini valuta of 1393 lists ultramarine (azuro oltramarnino) at 2 ducats a pound (see APPENDIX 3), but it is not possible to know if this had been treated by the pastille method or was simply ground and washed lapis lazuli.


10. Gunther, trans. The Greek Herbal, p. 637. Matthaeus Platearius was active in Salerno in the mid XIIth century and wrote two treatises: Liber de simplici medicina, seu circa instans and Glossae in Antidotarium Nicolai (Platearius, pp. v & 102).


12. Merrifield II, pp. 364-368. This is presumably azurite as at the end of the passage the author says "you will have an azure like ultramarine".

13. The powder was washed four or five times in clear strong lye and the liquid was poured into several different basins. The lye was then tipped away leaving a blue deposit. Using clean white honey, the colour was ground gradually on a porphyry slab until it was very fine. Again the colour was mixed with strong lye. When well amalgamated, it was poured into another vase and the process was repeated until the lye became clear. The coarse deposit left behind was ground again and mixed with the fine powder. Finally the powder was put in a basin and covered with vinegar and salt for two days. The vinegar was poured aside and then the powder was washed three or four times in water. The artisan continued the process by putting hot lye and finely scraped soap into a glazed dish. Each pound of azurite required half an ounce of soap. All the ingredients were put together in a small bag, shaken until frothy and then put back into a dish. This was carefully emptied by taking off the scum with a spoon leaving only the coarse particles. The process was repeated with this scum until all the coarse particles had been located and reground. Next the colour had to be ground with lye. Then the artisan mixed some boiled urine with half an ounce of gum arabic, skimmed it off and mixed it with scent. This mixture was boiled, cooled and added to the blue. It was allowed to stand for a night and then the liquid was drained off and the colour left to dry. It was placed in a leather bag or an ox bladder which had been soaked for a night in vinegar and salt. After this, it was ready for use (Merrifield II, pp. 364-8).


15. Clément-Mullet, Essai, pp. 10, 12, 13, 165-6. Clément-Mullet based his essay on an Arabic treatise on precious stones by Teifaschi. In chapter IV (on the beryl) Teifaschi gives the date (1264 C.E.) and his full name Ahmed-ben-Iossouf-Al-Teifaschi. For his chapter on lazulite, Clément-Mullet used two additional
manuscripts also on stones, one undated and the other dated (1282 C.E.).


17. This list has no entry for indigo (see INDIGO in main text), but the tax seems rather low for indigo, especially when compared to the tax on indigo in other XIIIth-century Narbonnese documents. It may well refer to azurite.

18. The second quality of blue listed in the 1317 Bolognese gabella as azzurri grossi was probably azurite which is distinguished by its gritty quality.

19. It is very difficult to make comparisons between the tax and price documents because the premises upon which the taxes were based are not fully understood. Furthermore, rates of exchange fluctuated and the relative numbers of lower denomination coins (soldi and denari) within a larger denomination coin (lira, ducat) also fluctuated (see introduction to APPENDIX 3 nos.30 & 34). For instance, the undated XIVth-century Florentine gabella gives the tax on a soma, on a hundred pounds and on a pound of azzurro. However, the tax on one pound of blue seems to have been 10 4/5 d (see on this de Robertis, "Una Proposta Burchiello", p.50 n.2 who explains that a figure seems to be missing from the gabella, leaving the figure of 1 4/5 d. De Robertis believed that it should in fact have read 10 4/5 d.) Assuming the figure of 10 4/5 d. to be correct it is a great deal less than the 14 s. found in Florence in 1402. In Pisa in 1408 (see APPENDIX 3) the tax on azzurro ultramarino is 5 s., much less than the tax of 14 s. in Florence only six years earlier. The wholesale prices in the Venetian valuta clearly indicate, however, that ultramarine blue was very expensive.

20. A libbra sottile of azuro de la Mangnin (clearly prepared azurite) is priced at 8-16 grossi (see introduction to APPENDIX 3 no.30) and there were 24 grossi to a ducat (Melis, Documenti, p.300).

21. The same quantity of azurite (lapisiamatici) cost 3 grossi.

22. In the Breve dell'Arte de Pitori Senesi, dated 1355 chapter 14 deals with Di non metter uno oro per uno altro, o uno colore per altro (Milanesi, ed. Nuovi Documenti, p.7).

23. Milanesi, Nuovi Documenti, pp.62-63. See also: Glasser, Artists' Contracts.

24. It is possible, however, that the Countess bought two qualities of ultramarine, or indeed, two qualities of azurite. (Michael Baxandall cites: Giglioli, "Su alcuni affreschi", p.20). Two qualities of ultramarine were used in 1408 by Gherardo Starnina who, for a painting of a Life of the Virgin at San Stefano at Empoli, undertook to use ultramarine at 2 florins an ounce for the robe of the Virgin and ultramarine at 1 florin an
ounce for the other blues (Baxandall, *Painting and Experience*, p.11).


27. According to an anonymous merchant manual of c.1315, it was among the goods sent from the West to Constantinople and Pera, Tana, Caffa, and Sarai for sale or barter against Eastern merchandise (Bautier, "Les Relations Commerciales", pp.399-416 (appendix I, "Une Géographie des courants commerciaux Orient-Occident au début du XIVème siècle (vers 1315?)"), pp.313-316).

28. Hermann Kühn is doubtful about the amount of artificial vermilion manufactured before the XVIIth and XVIIIth centuries (Kühn, *Farbmittel Buchmalerei*, p.21). Maurice Bouvet says that there was a cinnabar factory in Venice from 1294, but I have not been able to find any further reference to it (Bouvet, *Histoire de la Pharmacie*, p.452). Frederick Lane explains that Venice did, however, have a thriving chemical industry dependent on the glass industry (*Venice*, pp.157-60). The merchant manual of Zibaldone de Canal says: ...*Item cenabrio e ciaschun altro sulfimado se lavora ben in Veniça*. Lane, in his part of the introduction, dates the treatise to 1311-1331 (Strussi et al. *Zibaldone de Canal* pp.lv & 78). Included in a list of goods sold by the quintal in a valuta (dated Avignon August 1392) is *vermiglione di Vinegia* at 35-40 grossi, while among the goods sold by the libbra is *cinabro* at 40 florins (sic) a pound (Heers, *Il Commercio*, pp.162-63; see also INTRODUCTION TO APPENDIX 3 no.29). This implies that two separate commodities were sold here: manufactured and natural vermilion.

29. Pegolotti p.373.

30. In Italian, *gabelle*, azzurro and indigo are both highly taxed items while orpiment and especially minium are taxed quite lightly.

31. *Liber de Coloribus*, p.283. The first recipe for making vermilion found in a painting manual comes from the *Mappae Clavicula* (M.C., p.26). Other recipes can be found in *De Diversis Artibus*, (Theophilus, pp.31-32), in the recipes of Peter of St. Audemar in Le Begue's collection (Merrifield I, pp.139-141), and in *Segreti per Colori* (Merrifield II, pp.479-481).

32. Rondot, "Les Enlumineurs de Troyes", p.43; Guibert, "Mémoire relatif à l'enluminure de deux ouvrages", p.463. I would like to thank Susan Blackman for drawing my attention to this interesting document.


35. The evidence concerning the incompatibility of orpiment is rather confusing. Certainly it seems to have been corrosive. Gettens and Stout point out that by its nature, being a sulphide, it must be incompatible with copper and some lead colours (Gettens and Stout, Painting Materials, p.135). The third book of Heraclius says that orpiment cannot be mixed with folium, green or minium, (Merrifield vol. I, p.253). The author of De Arte Illuminandi writes ...sed non est bonum auripigmento uti in carta, quia cerusam, minium et viride es odore suo reducit ad proprium colorem metallicum: et idcirco de isto nec de viride esse modum facienda ponere non curavi. (Brunello, "De Arte Illuminandi", pp.70-72). The Strasbourg Manuscript says that orpiment cannot be mixed with red lead, white lead or bistre, but in another place gives a recipe for painting yellow flowers in a mixture of red lead and orpiment (Borradaile, ed. and trans. The Strasbourg Manuscript, pp.50 & 54).

36. In modern times it is found in Copalnic in Romania, Adreas-Berg in East Germany, Valais in Switzerland and Çölmérick in Turkey (E.B., Index, 1984).

37. There seems to have been a rise in price in orpiment in France. According to the Hesdin accounts in 1312 Mahaut paid 16 d. for a pound of orpiment, but in 1380 her daughter paid 10 s. for a half pound.

38. Merrifield I, p.252. The XIVth-century Liber de Coloribus (p.284) virtually repeats Heraclius' instructions, but the author adds the interesting detail that orpiment should be ground in a pepper mill.

39. Cennini, Il Libro dell' Arte, p.29. A similar instruction is given in Segreti per Colori (Merrifield II, p.503). It is possible that artificial orpiment existed at this time and Cennini may have used or known of artificial orpiment. Thompson was uncertain whether Cennini did, in fact, consider orpiment to be an artificial, that is man-made pigment (Cennini, Il Libro dell'Arte, p.36 n.55). Rosalind Harley is of the opinion that chemically produced orpiment was generally known by Cennini's time (Harley, Artists Pigments, p.94). It is even possible that the author of Mappae Clavicula knew artificially produced orpiment because one recipe calls for orpiment that is fresh and not prepared (M.C., pp.27-28).


41. Theophrastus and Pliny write that the best malachite comes from Cyprus, Armenia and Macedonia (Eichholz, ed. and trans. Theophrastus, p.67; Pliny, vol.9, bk. XXXIII, ch. XXVI-XXVII; 88-90, pp.66-69).

42. Clément-Mullet, Essai, p.158-162.

44. Pliny, vol. 9, bk XXXIII, ch. XXI; 38 p. 286.

45. Platearius, p. 28 & p. 142 n. 1; Biringuccio says that in ancient times Armenian bole came from Armenia, but in his time (the XVIth century), it could be found in Germany and Portugal as well (Biringuccio, "The Pirotechnia", p. 117).


47. Merrifield I, p. 247.


50. Richard, *Une Petite-Nièce*, pp. 325, 332 n. 1. On p. 325 Richard calls it brun "d'Auxerre" so it was probably a locally dug colour.

51. There was, however, a considerable confusion of nomenclature and the name was also given to ivy gum, realgar and madder (Merrifield I, p. CLXXI).

52. *Liber de Coloribus*, p. 287. The text gives *sinoplum* which Thompson translates as sinoper or sinople.


54. Cennini, *Il Libro dell'Arte*, p. 30 & 50. All of Cennini's references to the use of terre-verte are for panel or wall painting except for those related to the practice of drawing on tinted paper in which terre-verte is used to provide part of some of the tints.

55. *De Arte illuminandi*, pp. 6 & 21. There is a green underlay in some of the paintings related to the Boucicaut workshop, particularly in the work of the Egerton Master (for example B.L. Ms. Royal 15 D III f. 422v [sl. 21]).

56. *M.C.*, p. 26; *Liber de Coloribus*, p. 287, also mentions brown and says that it should be treated like vermilion.


59. For example, *Très Belles Heures* (B.N. Ms. nouv acq. latin 3093, p. 155 bas-de-page).

60. Gullick, ed. "The Art of Limming", ff. ivv & vi. This is a XVIth-century treatise which has recipes for making browns. "Browne blewe" on f. ivv was made by mixing indigo with white lead.
(and probably some ink). There is also a recipe "to temper Browne of Spaine" (f.vi) which seems to have been an earth.

61. De Arte Illuminandi, p.3. There was a white pigment made from calcinated bone, but it appears to have been lumpy and unsympathetic to use. Thompson and Hamilton translate the author's Latin pastosum, as "pasty". (For the Latin see Brunello, De Arte Illuminandi, p.48).

62. De Arte Illuminandi, p.3; Platearius, p.231 & 232.

63. It is possible that lead colours were made in Pisa. In the Datini valuta of Avignon (1392) Biacca pizana Pisan(?) white is listed among the goods sold by the quintal at 4 3/4 grossi (Heers, "Il Commercio", p.163; see also APPENDIX 3). A valuta of merchandise for sale at Genoa in 1396 gives a centinaio of Pisan white and red lead at 5 lira and a valuta for Pisa of 27 August 1405 lists red and white lead among the goods for sale there (Melis, Documenti, p.304-6).

64. Peggolotti, p.379: Biacca si fa di piombo, e vuol essere bianca e non livida, in colore di piombo, e suoi panellini vogliono essere sani e none spezzati; e quanto è più salda e più bianchi i suoi panellini, tanto è migliore per vendere e per trasvare d'un paese in altro.

65. White lead was bought for use at Hesdin in 1301 & 1304 (see: APPENDIX 3). The 1288 accounts of Gilbert of Sutton and Hugh of Pekekyck, clerks of the King's works at Westminster, show colours bought for painting a new room and the Painted Chamber. Among them was white lead (Rokewode, "A Memoire on the Painted Chamber", pp.10, 12). On the chronology of the work in the Painted Chamber see: Binski, The Painted Chamber at Westminster, pp.15-24.


67. M.C., pp.42, 64, & 27. The main text of the Mappae has instructions that tell the reader to hang a leaf of lead over vinegar and in another recipe to put the ingredients in an enclosed jar, but with an airhole.

68. De Diversis Artibus, p.32.

69. Merrifield II, p.484.

70. Cennini, Il Libro dell'Arte, p.34.

71. The word "massicot" is generally assumed to apply to yellow lead, but analysis of a bottle labelled "massicot" found in an old pharmacy cupboard proved that the contents were also lead-tin yellow. It is now used to refer to yellow lead. I would like to thank Joyce Plesters for this information which she set out in a very long and helpful letter. See also: Kühn, "Lead Tin Yellow", 7-33; Harley, Artists' Pigments, pp.95-99.

73. De Diversis Artibus, p.5: Tolle cerosam ... et mitte eam ... in vas cupreum vel ferreum, et pone super prunas ardentis et combure, donec convertatur in flavum colorem.


75. Lead-tin yellow has been identified in mid XIVth-century panel paintings by Nardo di Cione and his brother Orcagna (Gordon et al., "Nardo di Cione", pp.31-32). A C.N.R.S. group has identified it in a fragment of a XVth-century manuscript from the Departmental Archives of Cher (Ms. fragment no.511) (Delhaye et al., "La microsonde Raman", pp.119-124). Signora Tosatti Soldano analyzed a XVth-century Italian manuscript and found lead with traces of antimony, but she did not test for tin. She postulated that the material could be 1. lead antimony usually called "Naples Yellow": 2. lead monoxide with traces of antimony; 3. lead-tin yellow with traces of antimony. The manuscript she tested was in the collection of F. Taccani in Milan, an Exclamantes et dicentes advenisti xedemptor noster, f.100 (Tosatti Soldano, "Sulla tecnica della miniature", pp. 6 n.7, 9, n.17 & 18-19). Brunello in the notes to his edition of De Arte Illuminandi states that during the Middle Ages there was not always a clear distinction between lead and antimony and that antimony can often be found in deposits of lead. If a combination of lead and antimony was subjected to the treatment described in Segreti per colori, lead-antimony yellow, not lead-tin yellow could result (Brunello, De Arte Illuminandi, pp.221-222). However, the National Gallery team (see above) say that lead-antimony yellow (Naples yellow) replaced lead-tin yellow as a stable yellow pigment in the mid-XVIIIth century. See also: Harley, Artists' Pigments, p.98.

76. Fegolotti, pp.34, 70, 77, 306.

77. Cennini, Il Libro dell'Arte, p.28 & n.2. D.V. Thompson did not know of the existence of lead-tin yellow when he wrote his notes to this edition.

78. De Arte Illuminandi, p.1; The Latin reads glaucus ... fit ex vitro et vocatur giallulinum (Brunello, De Arte Illuminandi, pp.38-42). Kühn says that there are two types of lead-tin yellow. The first is made by heating a mixture of minium (Pb3O4) and tin dioxide (SnO2) at 650-800°C. The higher the temperature, the more lemon yellow the colour would be. The majority of lead-tin yellow has the chemical component Pb2SnO4. However, he says that another type was related to glass manufacture (Kühn, Farbmittel Buchmalerei, p. 27; Kühn, "Lead-Tin Yellow", pp.11-12).


81. In the following recipe for making "Rouen green", copper sheets are smeared with soap and also placed in a sealed pot in a warm place, but this time for fifteen days. The product was then dried and used (*M.C.*, pp. 27).

82. *De Diversis Artibus*, pp. 32-33.

83. Merrifield I, pp. 46-48, 66, 126; The artist must fill a brass vase to a finger's depth with urine, add some sal ammoniac and leave the mixture in very strong sunlight until it dries. Or, the artisan can take six ounces of alum *zuccarino*, one pound of brass filings, two pounds of common salt, two ounces of nitre (see glossary) and three ounces of burned, bleached rock alum. These are reduced to a powder and smeared over brass plates. The process is then much as usual. The sheets are put in a dry glazed jar, covered with hot urine and vinegar and the whole buried in dung of forty days (Merrifield I, p. 66). There are also recipes in *Segreti per Colori* (Merrifield II, p. 418).

84. Cennini, *Il Libro dell'Arte*, p. 33; Merrifield I, p. 94. Some recipes ignore this stricture. *De Arte Illuminandi*, p. 20 says that verdigris mixes well with white lead. Joyce Plesters in a letter writes that white lead and verdigris were frequently mixed. However, it is possible to see bad spoiling of white lead by verdigris in the *Coronation Book of Charles V* (B.L. Ms. Cotton Tiberius B VIII [s.e.119-120]) where verdigris has soaked through the parchment from one side to spoil the other. In B. L. Additional Ms. 32454 f. 59 there is a large hole made by verdigris. The hole probably results from the verdigris having been tempered with wine or vinegar which would have softened the parchment and allowed the verdigris to eat into the fibres. On this see: Peter of St. Audemar who suggests using vinegar to temper verdigris (Merrifield I, p. 120), the *Liber de Coloribus* (pp. 288 & 292) which proposes vinegar or wine. Alcherius suggests vinegar or urine (Merrifield I, pp. 49 & 67). See also: Thompson, *Materials*, pp. 164-165.

85. It is not known why the name *oro musica* or *musivo, aurum musicum*, or *mussif* and *mosaic gold* became attached to this material, or why it became known in Italian as *porporino* (Thompson, *Materials*, p. 181-184).

86. However, it may be possible to see it in a late-XIIIth-century Italian Bible (B. N. Ms. latin 18 f.65v) and in the so-called *Bible of William of Devon* (B. L. Ms. Royal I D I). The material that can be seen in both is rather a dirty golden brown and gritty. For the observation concerning the *Bible of William of Devon* I am grateful to Dr. Nigel Morgan. He also briefly discusses the use of mosaic gold in the *Windmill Psalter* (New
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87. Cennini, Il Libro dell'Arte, pp.101-102 & 101 n.3.

88. There is a drawing in the margin of the manuscript, reproduced in both Thompson and Hamilton (op.p.4) and Brunello's editions. This shows a double jar whose bottom is deeper than the top. The top part of the pot looks like a dish placed on top of the lower part of the jar, but the whole is probably a specially made piece of glass or pottery. There seems to be inner jar with its neck sticking out beyond the top of the outer jar.

89. De Arte Illuminandi, pp.4-5.

90. Merrifield I, pp.54-56, 64. The recipes included in Alcherius' compilation are among those that he collected from Fra Dionisio of Milan, March 1409, and are consequently almost certainly Italian.


95. Yule, Marco Polo, II, pp.373, 393 & 398.

96. Heyd II, p.628; see also: note 107.

97. Yule, Marco Polo, II, p.375.

98. Pegolotti, pp.371 & 420 n.

99. Pegolotti, p.33. An English translation can be found in Yule, Cathay, III, p.165.


101. Similar instructions are found in Alcherius' recipes. Baghdad indigo should be ground with white lead and gum arabic. If it was not needed immediately it should be ground with water and left to dry naturally (Merrifield I, p.272).

102. The brasil tree, known in Malay as sappan, is the Caesalpinia sappan. It is a thorny tree which grows both wild and cultivated in western India from Goa to Trevandum and in South
Malabar (see map 1) (Singer, *The Earliest Chemical Industry*, p.262). Heyd believes that *Seni* was probably brasil wood from Siam bought by Chinese merchants to India. He considers the forest of the archipelago of Mergoui, in particular Borneo and Nicobar and Indo-China to have been the main sources of the wood (see map 1) (Heyd II, pp.589-90 & 589 n.4). There are medieval Arab accounts by Idrisi in the XIIth century and Ibn Battuta in the XIVth century of brasil wood growing in Sumatra and Ceylon (Idrisi, *India*, pp.31, 33, 63, 69, 107, 160, 162; Ibn Battuta, *Voyages*, p.166; Yule, *Marco Polo*, II, pp.276-279 n.3, 299, 300 n.313 & 375). The brasil wood that Pegolotti called *verzino amari* may have come from the northern part of the west coast of Sumatra. Pegolotti calls brasil wood from Quilon, *verzino colombino*, or *coloni* (Pegolotti, p.433).

103. Although *verzino colombino* may not always have been six times more expensive than *verzino ameri* (*almeri*), Ashtor shows that *verzino almeri* was consistently cheaper than both *verzino colombino* and *verzino seni*. For example:- 26 March 1411, per kintar (see glossary) in dirhems (see glossary):-- *Colombino* 6,000,-- *seni* 4,600,--, *almeri* 4,000,--; 24 July, 1411 per kintar in ducats:-- *Colombino* 180,--; *seni* 160,--; *almeri* 140,--. (Ashtor, *Histoire des Prix*, pp.430-31). In the Datini valuta of 1393 *verzino almeri* and *sanai* are grouped together at 16-20 ducats for 100 libbre sottile and *cholombino* is much more expensive at 30-35 ducats a 100 libbre sottile. *Mondiglie di verzino* is sold under a different heading, by the pound at 2 grossi per libbra sottile (see APPENDIX 3 and 4).

104. Pegolotti, pp.261 & 433 n.


106. The *Cambridge Italian Dictionary* gives *bruscolo* as a speck or shaving.

107. It was also more expensive in the 1392 valuta of Avignon. Prices in the Levant show similar discrepancies, and from indications given in lists of prices it seems that brasil wood was a great deal more expensive than indigo. At the end of 1379 a kintar of *socefe indigo* (a second quality indigo) is priced at 500 dirhems a kintar while at the same date, *verzino seni* (second quality *verzino*) is priced at 3,000 dirhems a kintar. On 26 March 1411, a kintar of *verzino colombino* (first quality *verzino*) cost 6,000 dirhems and Baghdad indigo (first quality indigo) cost 3,400 dirhems. On 14 April 1412, a kintar of *verzino colombino* cost 160 ducats and a kintar of Baghdad indigo cost 50 ducats (Ashtor, *Histoire des Prix*, pp.429-30). See also: Heers, "Il Commercio", p.196.
108. Thompson, Materials, pp. 117-8; Instructions in De Arte Illuminandi (pp. 9-10) tell the artist to use lye. This recipe requires alum and marble. The alum was to help the precipitation and the marble was used to turn the colour pink. If grana was added the colour would be richer and powdered egg shells would give body. For a transparent brasil colou the writer recommends covering the brasil wood with glair. For each half ounce of brasil the artists needed three beans of alum dissolved in a mixture of gum arabic and water and some glair. The mixture was allowed to stand, dried and put away. Honey could be added when painting to make the colour flow.

109. Liber de Coloribus, p. 285. See also p. 287 for a similar recipe. In another recipe the instructions are to boil brasil in red wine, mix it with lac (lactam) tempered with urine and having boiled all together, to add alum (pp. 299-301).

110. Merrifield I, pp. 52, 54, 56, 64-6, 92 & 94.

111. Merrifield II, pp. 436-446, 450-4. In a typical recipe the instructions are to boil brasil in rain or river water, to add one pound of rock alum and to boil all these together for one paternoster. When the mixture cooled, white vinegar was added, but if one wanted "cardinal colour", one added strong lye. The author goes on to say that it is possible to get yet a third colour by boiling the dregs with strong lye. This colour will be violet (Merrifield II, p. 454). Mrs. Merrifield discusses the colour worn by Cardinals at this date. She says that cardinalesca, may be crimson not scarlet because alkali (alum) will turn red vegetable colours towards blue while the addition of vinegar ought to have turned the brasil scarlet (Merrifield II, p. 327, 454-5 n. 1).

112. D.V. Thompson in his book on painting materials gives a long discussion of the differences in terminology and concludes that grana and kermes are two different products (Thompson, Materials, pp. 111-5). Roosen-Runge considers there to be no distinction (Roosen-Runge, Farbgebung und Technik, vol. II, pp. 40-51). In English, at least, it appears that the name "grain" was out of use by the XVIIth century and was entirely replaced by "kermes" (Harley, Artists Pigments, p. 132).


115. Gargioli, L'Arte della Seta in Firenze, p. 109. The highest quality kermes came from the orient. It was found in Asia Minor and Jacques Heers is of the opinion that it was quite frequently imported into Europe. It would have come via Trebizond and from the Balkans and Bulgaria (Heers, Genes, p. 392 & n. 3, & 489).

117. Corinthian and Greek grana are taxed at 6 lrs. 10 s. a 100 lbs., Valenzia and Provençal grana at 4 lrs. and finally Barbary and Spanish grana at 3 lrs.

118. The very high wholesale price of grana is well demonstrated by the Venetian valuta of 1393 (see APPENDIX 4).


120. M. C., p. 52.

121. If a lye made from oak ashes was used, the clippings were boiled in the lye, alum was added and the mixture strained. Then the remains were left to dry either in a brick or an earthenware vase (Merrifield I, pp. 50-52).


123. Harley Artists' Pigments, p. 131-2. This insect, like the kermes insect, is small and round with a shield over the back. The female has only vestigial legs and wings, spending her life in clusters on the host plant. When harvested, the animal nature of lac is scarcely recognizable because the dead insects make up a solid mass. Each of the females is surrounded by 200-500 eggs and the whole conglomeration is encased in a brown-red secretion. Lake originally meant a colour made from lac (Cennini, Il Libro dell'Arte, p. 26 n. 1).


126. This very difficult passage reads in Italian: Ella nasce appicacca a fusti, cioè a rami d'albucelli, e però vuol essere netta di fusti e di polvere di terra e di sabbione e di costiere; e' fusti si sono i fuscelli dello legno a che ella nascie; le costiere o vero fichi così l'appellano i catalani, e si è della polvere sua quando è fresca si s'amassa insieme e diviene dura in modo di peca... (Pegolotti, p. 366). I have not been able to find any satisfactory translation for costiere which seems to mean fig-like clumps of matter.

127. Recipes for the use of lac appear as early as the Mappae Clavicula where instructions are given both for incorporating it into a varnish and for its use as colour (M. C., pp. 52 & 66).

128. It is known that lac prices more or less followed the pattern of pepper prices which rose in 1391-6 and fell again in 1397-8 (Heers, "Il commercio", p. 208). This seems to be borne out by the Venetian Datini valuta where lache mature are, after ginger, among the highest priced goods at 30-35 ducats per
100 libbre sottili; verzino cholombino is also 30-35 ducats and cinabro is 24 1/2-25 ducats (Melia, Documenti, pp.298-304).

129. Cennini, Il Libro dell'Arte, pp.26-27. It may have been a colour used particularly by panel painters. Cennini says that it should be worked on a slab and ground up with water and used on panels, but not on walls. The author of De Arte Illuminandi says that he will not write about lac, but leave it to the painters (De Arte Illuminandi, p.10).

130. Merrifield I, pp.50 & 52.


132. Pegolotti, p. 429 n. It comes from Indonesian daemonorops draco. The fruit is rounded and scaly, the size of a large cherry. When the berries are ripe they are covered with resin. Dracaena cinnabri produces the material known as "drop dragon's blood". This tree grows on Socotra east of Somalia in the Indian Ocean (see map 1) (E. B. index).

133. Pliny, bk. XXXIII, ch. XXVIII; 116, p.86-88; Pegolotti, p.429.

134. Platearius p.189.

135. Merrifield I, pp.25, 248 & II, p.448; Gettens and Stout, Painting Materials, p.111; Harley, Artists' Pigments, p.146. Cennini says that dragon's blood was sometimes used on parchment, but he advises against it (Cennini, Il Libro dell'Arte, p.26).


137. Rosalind Harley believes that by the XVIIIth and XIXth centuries it had almost disappeared (Harley Artists' Pigments, p.146).

138. Hurry, The Woad Plant, pp.5-6,9, 32-33; Charles Singer says that the dyeing properties of woad are about 1/10th those of indigo (Singer, The Earliest Chemical Industry, p.266).

139. Bourquelot, Etude sur les Foires de Champagne, vol. I, pp.221-2. In the Midi, all the preparation of woad passed via Toulouse and it was distributed from Albi and Carcassonne (Wolff, Commerce et Marchands, pp.247-8). Woad cultivation in Normandy can be traced back to 1292. However, the cold climate tended to yield a lower quality product. This type of woad was called voudde or petit pastel (Hurry, The Woad Plant, pp.103-4).


141. From Segreti per Colori: Recipe partem unam floris guati qui flos colligitur in caldarea tintorum quando guatum dequoquatur... (Merrifield II, p.415).

143. Three of the recipes need woad leaves. One recommends reducing the herb over heat, another the addition of salt, rock alum and sulphur vivum to powdered woad leaves and a third, rather unpleasant recipe, encourages the production of blue worms by allowing the leaves to sit in urine in the sun for some considerable time (Merrifield II, pp.412-416).

144. Heers, "Il Commercio", p.197.


146. In Heraclius' De Artibus Romanorum, there are two recipes for making red or purple lakes from madder (Merrifield I, pp.249 & 251).

147. Three stigma are taken from each saffron plant and it requires 75,000 blooms to make 1 lb. of saffron. It remains the most expensive spice in the world (E. B., Index). For an extensive discussion on the history and use of saffron see also: Soll, "Gelb Pflanzenlacke", pp.73-110.

148. Ashtor, The Levant Trade, p.162; Saffron was reputedly introduced into Spain by the Arabs and reached the rest of Europe either from there or by means of the Crusades (Heyd II, pp.668-9). Peter of St. Audemar repeats Isidorus' assertion that Sicilian saffron is the best, but he also says it came from Italy or Spain (Merrifield I, p.132). The Liber de Coloribus also says that saffron comes from Spain (Liber de Coloribus, p.296).

149. Pegolotti, p.376. He says that kept in a leather sack, in conditions that are neither too dry nor too damp, saffron will keep for ten years.

150. Theophilus, pp.15 & 23, 29; The author of Mappae Clavicula considered saffron thick and clear on parchment. The reader is instructed to darken it with vermilion and lighten it with white lead. Saffron is included in many recipes for imitating or enhancing the colour of gold and it is also included in a mixture to make green (N. C., for example, pp.27, 43-44). In 1310-11, the countess Mahaut had some repairs done in her chamber: Ce sont estoffes de painture prinses pour vernir le pan de la noeve loge du manoir au lès devers le garding...Item, pour une livre de safranc, xxx s. (Richard, Une Petite nièce, p.335 & n.3).


154. Merrifield I, pp.30, 144, 190-2, 310.

155. To add to the confusion, in the Middle Ages, two plants went under the name morella. One was black nightshade and the other, heliotropum minus tricoccum or crozophora tinctoria, was probably what is now called folium (tournesole or maurelle (Merrifield I, pp.CIXXXVIII-CXCII). Interestingly in a valuta from Bruges dated 1399 (see APPENDIX 3) tornasole is included among the goods priced at 4 grossi per libbra (Melis, Documenti, p.314). Whether this is folium or some quite other commodity is impossible to say.

156. Bernard Guineau's team of researchers (C.N.R.S., Paris) is currently engaged on this problem.

157. Liber de Coloribus, p.299.


160. Theophilus goes on to add that purple and blue folium should not be ground, but moistened with the same tempering medium, without lime. After they have been applied they should be coated with glair (Theophilus, p.31).

161. De Arte Illuminandi, pp.5-7 & 41-3 n.60; Cennini does, however, give instructions for tinting paper "turnsole" (morella) colour or purple (Cennini, Il Libro dell'Arte, p.11).

162. The author considered the pezole to be better if they had first been soaked in a quicklime lye and then washed out and dried. The use of pezole or "clothlet colours" seems to have been quite prevalent for making a painting colour from folium. The Liber de Coloribus tells the reader to cut up cloth dyed in folium and to steep the cuttings in egg white to get purple (Liber de Coloribus, pp.287 & 301). On "clothlet" colours see: De Arte Illuminandi, pp.41-3 n.60 & 55 n.123; Thompson, Materials, pp.141-145).

163. M. Guineau of the C.N.R.S (Paris) informs me that until now research into lakes has made very little progress. However, techniques are currently being developed that should prove more accurate.

164. M.C., p.54; Hawthorne and Smith think that Theophilus' sucus was buckthorn green. Theophilus also used the juice of cabbage and leek (Hawthorne and Smith On Divers Arts, p.15 n).

165. This plant was probably not a plum, but a plant bearing plum-like fruit. It may have also been another Rhamnus, for example R. alaternus, R. catharticus, or an exotic R. saxatilis, R. amygdalinus, or R. oleoides. The colour was clearly
sufficiently strongly yellow or green to turn blue, green (Cennini, *Il Libro dell'Arte*, pp.30, 32-33 n.1). Thompson, *Materials*, pp.187-88 says in his general work (written after his edition of *Il Libro dell'Arte*), that *Rhamnus* is buckthorn. However, Anna Soll says that real buckthorn berries were used from the XIVth century to make green, but probably not until the XVIth century to make yellow (Soll, *Gelb Pflanzenlacke*, p.50).

166. Cennini, *Il Libro dell'Arte*, p.30; Merrifield I, p.CLIII. Dyer's weld was used increasingly from the XIVth century to make a yellow pigment for illuminating. (Soll, "Gelb Pflanzenlacke", pp.83-85, 87, & 91). The possibility that *arzica* is something other than dyer's weld cannot be ruled out. Unfortunately dictionaries refer to Cennini's text for an explanation of the word *arzica*, but the 1317 *gabella* of Bologna lists both *erba gualda* (usually translated as dyer's weld) and *arzica*. Orna and Mathews possibly found gamboge in an Armenian Gospel book dated c.1300 (Orna and Mathews, "Pigment Analysis", p.68 (table 6). It might be possible to speculate that *arzica* and gamboge are the same thing.

167. *De Arte Illuminandi*, pp.2, 3, 6-7, 15, 43 n.68 & n.69. In n.69 pp.43-44 Thompson and Hamilton suggest *l.florentina* or *l. germanica* for these lilies; Soll, "Gelb Pflanzenlacke", p.75.

168. Interestingly, Alcherius says that the flower juice counteracts the acidity of the verdigris. If this is indeed the case, coupled with the absence of vinegar in this mixture, one would have been able to mix the verdigris with other colours (Merrifield I, pp.286-8).


In order to manufacture pigments, the artisan needed several raw materials apart from the colouring materials; most important were tin, lead, copper, mercury, gold and silver. Artists also needed painting media. For illuminators these were usually gum arabic or glair, but they may sometimes have used gum tragacanth. Alum was important as a mordant for lake colours; galls were used for making ink. Included in the appendices, but not dealt with here in detail, are the taxes on other raw materials found in the studio. Sal ammoniac and tin were combined to make mosaic gold; in the preparation of ultramarine, artisans needed incense and turpentine. Recipes also include wax, honey, wine and vinegar; most of these are not listed in the appendices as they were probably found locally to the artist's studio. Artists used sugar in laying on gold.

**Alum**

Alum was probably the most important industrial product during the Middle Ages\(^1\)\(^2\) It was a major component in dyeing and leatherwork, but illuminators and painters used alum in most recipes for making vegetable lakes. For example:

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Take verzino, scrape it fine and put it into a glazed vase to soak with a sufficient quantity of cold and
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purified wine to cover the verzino; then add 2 parts alum zucharino...(2)

Documentary Evidence

The major alum producing centres were Turkey and Phocaea (Faca) an island under the control of the Genoese from 1275-1455 (see map 1) (3). Because of its great commercial importance, Pegolotti describes all types of alum in great detail. He divides it into several categories, considering rock alum to be the highest quality. Rocca seems to denote a quality rather than a place. According to Pegolotti, rock alum of Karahissar was the best. There were three types of Karahissar alum. Rocca di Colonna (rock alum of Karahissar) should be like ice, clear and brilliant green. Allume di Sorta della buona allumiera, "choice alum from the Good Alum works" was made up of two-fifths rocca di Colonna and three-fifths allume corda, "cord" alum. Fossa "pit" alum was a poor quality, fine-grained alum (4).

Pegolotti goes on to say that allume di Foglia, alum of Phocaea, is similar to allume di sorta of Karahissar, that is about two-fifths rock alum and three-fifths "cord" alum. Allume di Coltai came from Kutahieh (Ayasoluk), but was sometimes called after other places in Turkey (see map 2). Allume lupae, Ulubad alum, came from Turkey, this side of the Black sea, near the sea of Marmora (see map 2). It was a larger grained alum than that of Ayassoluk and was of poorer quality. Allume giachile (Diaschilo), allume corda or fossa ("pit" alum) and allume Ciasisco were low quality alums from the Black Sea.
in "Romania" (see glossary). They had to be as white, clear and brilliant as possible and the larger the lumps, the better.

Finally, Pegolotti describes Allume di Castiglione, an alum which came from the Barbary coast (see map 2). Called in Florence allume di piuma (feather alum), it was long and shiny and looked like a feather. Further types of alum available in the Middle Ages were Spanish alum, which was of poor quality, Vulcan alum which came from Vulcano in the Lipari group of islands (see map 2) and alum zuc(c)harino ("sugar" alum) which was alum mixed with water and white of egg. This type of alum is often called for in pigment recipes.

Pegolotti describes the manufacture of alum at Phocaea in some detail. It was cut from the rock, heated in a furnace for 18 hours and then cooled. The cooked alum was piled up and watered daily for four months. When the alum was sufficiently soft it was placed in a cauldron and after 14 hours the water from the cauldron was poured into a lead lined oak tank. The liquid remained here for fourteen days and the resulting product was solidified alum. Alum left clinging to the sides of the tank was rock alum, that at the bottom was pit or cord alum. It was then washed and dried.5

The commercial importance of alum is reflected by Pegolotti's extensive list of European and Levantine markets where it could be bought. He records it for sale at Constantinople, Ayassolük, Adalia, Alexandria, Cyprus, Messina, Majorca, Venice, Naples, Nîmes
and Montpellier, the fairs of Champagne, Bruges, Antwerp, London, La Rochelle, Arsila, Ancona, Genoa and Pisa.

As might be expected, alum appears early in commercial documents. In 1153 at Narbonne "sugar" alum and castiglia alum were taxed at 14 d. a quintal. This is a high tax when compared with the tax on brasil wood at 2 d. a quintal in the same document and 3 d. on the same type of alum at Marseilles in 1228. By the XIVth-century gabella of Florence, allume di Castiglio is taxed at 20 s. per 100 lbs. This compares more or less with 100 lbs. of vernice cotta (varnish) taxed at 20 s. 8 d. and is more than 100 lbs. of copper in pieces taxed at 13 s. 4 d. per 100 lbs.

Although Pegolotti considered allume della rocca to be the highest quality alum, Castiglia alum appears to have been one of the more sought-after alums; this may be a question of availability. The 1153 document from Narbonne taxes "sugar" alum and Castiglia alum higher than alum de Bolca; this is also true of the 1228 tax at Marseilles and the XIIIth-century documents for Narbonne. In the XIVth-century gabella at Florence, allume di Castiglio is taxed at 20 s. per 100 lbs. while alums rocca, minuta and feccia are taxed at 13 s. 4 d. per 100 lbs.

Similar differences in price can be seen in the 1402 gabella of Florence; alums roccho, lupaiuo, minuto and di feccia are taxed at 15 s. 8 d. per 100 lbs., while allume di chastiglio is taxed at 1 lr. 3 s. 4 d. per 100 lbs. In this gabella a pound of allume di
chastiglio is taxed at 2 4/5 d. while allume schagliuolo (see glossary) and allume di piuma are taxed at 3 s. 6 d. a pound(6).

This evidence leads to the conclusion that Barbary alum, allume di Castiglio was almost the highest taxed and that rock alum, despite Pegolotti's opinion that it was the best, was taxed lower. However, the Datini valute of Venice, Paris, Genoa and Bruges all place rock alum as the highest priced alum, but do not mention Barbary alum (see APPENDIX 3).

THE METALS

PRECIOUS METALS

Gold and silver leaf were used in illumination and panel painting. They were usually laid on over a "bole" made from glue and some colouring agent, for example Armenian bole (see COLOURED EARTHS above). Different forms of gold and silver were widely available; they were sold in pieces, as plate and in coins. The two Florentine gabelle list gold da dipintori. Commerce in precious metals is a complex subject because it involves not only the trade in the metal itself for use in goldsmithing and other crafts, but also the trade in bullion and currency.
GOLD

It is impossible to determine the origins of the gold available in medieval commerce or to know whether it had been mined recently or was reused gold that had been mined in ancient times. The majority of the gold in European trade, and hence in painting, came from Africa. It arrived at the North African ports from the interior. The main source of gold in Europe itself was southern Germany (see map 2) (7).

During the XIVth century, gold was available in many of the markets of Europe and the Levant. Pegolotti lists it for sale in several different forms, as buglione, in piatti or in verghe at Tana, Tauris, Constantinople, Adalia, Lajazzo, Acre, Alexandria, Famagusta, Crete, Messina, Majorca, Venice, Florence, Mimes and Montpellier and Seville (8).

SILVER

In the Middle Ages, the main sources of European silver were Hungary, Saxony, Goslar and the Harz mountains (see map 2). In the XIIth century silver was discovered in central Germany and the mines were financed by the merchant cities of Nurenb erg and Augsburg (see map 2) (9). Towards the end of the Middle Ages European silver mines began to decline. However, by this time there were almost certainly very large stocks of silver in Europe even without new supplies (10).
CHAPTER TWO: OTHER RAW MATERIALS

Silver, like gold, was traded in several forms, in particular bullion, plate and coin. Pegolotti lists it for sale at Tana, Tauris, Constantinople, Ayassoluk, Adalia, Lajazzo, Alexandria, Famagusta, Rhodes, Majorca, Venice, Naples, Florence, Genoa, Nimes and Montpellier, the fairs of Champagne, London and Seville. The fact that silver was the precious metal used most often in the major European currencies may account for its wide availability.

Documentary Evidence

Silver and gold were highly priced items of commerce and neither seems to appear in the tax lists before the XIIIth century. In the Narbonnese tax lists and a tax for Paris dated 1296, the tax on silver is levied by the marc (see MARK in glossary). The form in which it was transported and sold is not specified, but it was probably in coins. With gold, however, the Narbonnese documents and the Paris tax of 1296 show that there was also spun gold in rods (for weaving into cloth). (11)

However, by the XIVth century, documents are much more specific about how gold and silver were sold. At Bologna in 1317 both gold and silver were available spun and beaten. Spun gold was taxed at 4 lr. 7 s. 6 d. a soma (500 lbs.) and beaten gold at 4 d. a pound. Spun silver in the same gabella is taxed at 3 lr. 7 s. a soma, a lira less than gold, beaten silver is also taxed at 4 d. a pound. In the XIVth-century gabella at Florence gold and silver were taxed under two headings. Spun gold and oro buono e pura are taxed under
Dell'Arte di Porta Santa Maria e Orafi (the Arte concerned with goldsmithing) while oro da confetti and oro da dipintori are sold in sheets as ispeziali.

The tariff does not specify the size or thickness of the sheets of gold. This seems to point to a standard size. Cennini writes that craftsmen ought not to get more than one hundred leaves out of a ducat. However, judging by the gabella, one hundred sheets together can hardly have amounted to very much. While the tax is 2 s. on 100 sheets, the tax on a pound of pure gold is 1 lr. 10 s. Oro da dipintori appears again in the 1402 Florentine gabella, also under the spice heading. In the gabella of Siena (before 1442) oro di metà battuto da dipintori is taxed at 3 s. per 100 pieces. Perhaps the gold was sold half beaten so that artists could finish beating it to the thickness of their choice or conscience.

In the case of silver, ariento da confetti and ariento battuto are taxed among the ispeziali at 1 s. 6 d. for 100 pieces or leaves and a pound of worked silver is taxed at 12 s. a pound. Other silver (spun, broken, old and worked) is taxed with goods from the Porta Santa Maria Arte.

Treatises and Recipes

It is interesting to look at instructions for preparing and laying on gold in some detail. There are hundreds of recipes for the preparation and laying on of precious metals. Many of the recipes
in *Mappae Clavicula* are almost alchemical in nature and probably have nothing to do with reality, but some are quite informative. Many are concerned with grinding gold, which is a very difficult process as the more gold is ground, the more it sticks together. Salt or honey must be mixed with the gold to prevent the metal sticking to itself. Sometimes other metals, typically lead or quicksilver were alloyed with the gold or silver to render them more brittle.

A coloured underlay is almost always recommended in recipes for laying gold or silver. Not only does it enhance the colour of the metal, but it provides bulk and shows the artist where to put the metal. At least from the time of Theophilus, recipes are very specific and give clear instructions which are easy to follow.

Theophilus describes how to lay gold in books using a coloured bole made from a mixture of minium, vermilion and glair. He amalgamated sturgeon bladder glue with the gold and laid them on together, but in some recipes, the glue is incorporated into the bole so that they can be laid on together. Theophilus warns not to use too much glue as it will turn the gold black. If the gold is laid on too thick, it will flake. This effect can be corrected by the quick application of old glair which should be washed over the gold and burnished when dry. When the gold had been laid it could be polished with a tooth or bloodstone burnisher.

To make a size suitable for gold writing or grounds, Cennini recommends a mixture of one part *gesso sottile*, a third of that
amount of white lead and even less candy sugar. These he ground with clear water and allowed to dry. When it was required, Cennini tempered the size with glair, laid it and let it dry. He says that the gold could be laid on with or without breathing. (This clause refers to the fact that sugar will attract moisture from breath and make the mixture sticky thus facilitating gilding). The gold was then ready for burnishing.

A size suitable for grounds only could be made from *gesso sottile*, a third part of white lead, a quarter part of Armenian bole and a little sugar. These should be ground and laid like the other type. In both recipes Cennini says that the parchment should be supported underneath by a wooden panel or stone during burnishing. If the gold would not take a good burnish, the *gesso* could be wetted with clear water during gilding(17).

*De Arte Illuminandi* has detailed instructions for making boles and laying on gold. *Gesso sottile* is soaked for some time in water and when it is sufficiently soft, a quarter of that amount of Armenian bole is added to it. This mixture is ground fine with water and then with stags horn or parchment glue. Enough honey must be added to sweeten slightly the taste of the mixture. This is ground again, placed in a dish and carefully mixed under water. The water is thrown away and a size remains which will not form bubbles. The artist must taste the size to ensure that it is not too sweet and if it is, add some water.
To lay the gold, the parchment is first painted over with stag's horn or fish glue. This step is to make the parchment sticky so that the artist can avoid putting too much glue into the size. It is also possible to lay several thin layers of size, allowing them to dry each time. The last coat is made with glair mixed with water, wine or lye. Gold leaf was laid on and rubbed and burnished. Any damage could be repaired with glair and some new gold.

Manuscripts of the late XIVth and early XVth centuries have a great deal of powdered gold. Jean Le Begue gives several ways of powdering gold with mercury, salt and wine. Segreti per Colori has many recipes especially for coloured sizes, either yellow or red. Some have the curious ingredient of ear wax which will prevent bubbles.

BASE METALS

COPPER

Copper had an European source. It came from Mansfeld in Saxony and merchants of Nurenbheg probably also obtained it from Rammelsberg near Goslar and it was mined at Kuttenberg from at least 1370 (see map 2). The Venetians also bought copper in Flanders which probably came from Sweden or Slovakia.
Artists used copper to make verdigris. It was widely available and Pegolotti lists it on the markets of Tana, Constantinople, Adalia, Lajazzo, Acre, Alexandria, Cyprus, Crete, Messina, Majorca, Venice, Frioli, Ancona, Pisa, Bruges and Antwerp.

Pegolotti describes several types of copper. There was Rame in Pana and Rama detta della bolla di San Marco di Vinegia which were types of refined copper, both very red. There was also hard copper and Polish copper which came in large oblongs and was used for making basins and seals; copper from Goslar in Germany was redder than Polish copper and also came in oblongs. It was used for delicate work (23).

Copper is a standard item in tax lists and gabelle. It appears in 1153 at Narbonne taxed at 12 d. a quintal, rather more than tin at 8 d., but less than mercury at 2 s. a quintal. In Paris in 1349 copper is taxed at 2 s. a cent while lead is taxed at 4 d. a cent. Here copper is taxed higher than tin (at 12 d. a cent), but much lower than mercury at 4 d. a livre. The XIVth-century Florentine gabelle taxes copper in pieces and unworked tin at 13 s. 4 d. per 100 lbs. while lead is taxed at 6 s. 8 d. per 100 lbs. Mercury carries the relatively high tax of 40 s. per 100 lbs. In the Datini Venetian valuta, a migliaio grosso of rame di bolla cost 81 ducats and rame de’veerre (sic) cost 61–62 ducats. Tin cost much more: stagno l’ame is priced at 91 ducats and stagno in verghe at 102 1/2 ducats. Lead cost less: 14 ducats for piombo in piastre and
13 ducats for *piombo in pezze.* Very much more expensive is mercury at 21 ducats for 100 libbre.

**LEAD**

Lead was used to make white, red and yellow leads and lead-tin yellow. Spain was the main source of lead, but Britain was also a considerable exporter. It also came from Bosnia and the Genoese obtained their lead from Sardinia (see map 2)(24)

**Documentary Evidence**

According to Pegolotti's handbook, lead was widely available. It was a major export from the West to the Levant. Pegolotti records it on the markets of Constantinople, Alexandria, Cyprus, Candia in Crete, Majorca, Venice, Naples, Pisa, Bruges, Antwerp and London.

Lead makes an early appearance on the tax lists and is never among the most highly taxed items. In 1153 at Narbonne, it is taxed at 1 d. Tin is taxed at 8 d. and copper at 3 s. a quintal. The sales tax at Paris in 1349 lists lead at 4 d., tin at 12 d. and copper at 2 s. a cent while mercury is taxed at 4 d. a livre. In the XIVth-century Florentine *gabella,* lead is taxed at 6 s. 8 d. per 100 lbs. and unworked tin is taxed at 13 s. 4 d. per 100 lbs. In the 1402 *gabella* of Florence it is taxed at 7 s. per cento while unworked tin is taxed at 1 lr. 8 s. per cento. Comparison within the 1408...
gabella of Pisa is difficult because lead is taxed by the *migliaio* (1,000 lbs.) and copper and tin by the pound or cento, an indication, perhaps, of the wide use and easy availability of lead compared to other metals.

**TIN**

Medieval painters used tin for two main purposes. As leaf it was sometimes gilded with saffron to look golden or was used to imitate silver. Tin was also used in the manufacture of mosaic gold and presumably also lead-tin yellow. In the Middle Ages the major source of tin was Cornwall.

**Documentary Evidence**

Tin was quite widely available on the markets of Europe and the Levant during the XIVth century. According to Pegolotti, it could be bought at Tana, Tauris, Constantinople, Adalia, Armenia, Acre, Alexandria, Candia, Messina, Majorca, Tunisia, Venice, Naples, Pisa, Genoa, Bruges, Antwerp and London.

In the Narbonnese tax list of 1153, tin is taxed at 8 d. a quintal. It is more expensive than lead at 1 d., but copper is taxed at 12 s. At Bologna in 1317 tin carries, like mercury, a tax of 7 s. a *soma*. Here copper is still more expensive at 8 s. for a *soma* of *rame vecchio*. The most expensive type of tin in the XIVth-century
Florentine gabella is worked tin (*stagno lavorato*), taxed at 33 s. 4 d. per 100 lbs., *stagno non lavorato* is taxed at 13 s. 4 d. *Rame in piastre* (copper in pieces) was also taxed at 13 s. 4 d. per 100 lbs. Mercury carries a much higher tax of 40 s.

In 1402 at Florence unworked tin is taxed at 1 l. 8 s. and *rame in piastre* at 1 l. (*Stagno lavorato* is taxed higher at 2 l. 10 s.) *Stagno lavorato* "worked" tin first appears in the XIVth-century *gabella* of Florence and "worked" copper *rame lavorato* is found a little later in 1408 at Pisa. It is difficult to judge if, once the material was worked, it should be used as an example in price comparisons; it was probably not in this form that artists bought their copper and tin to use in pigment making. If the prices of "worked" metals are excluded, the price of tin and copper seems to fall quite closely into line in the *gabella*, but the Datini *valuta* shows that tin was slightly more expensive than copper (see APPENDICES 3 & 4).

**MERCURY**

Painters used mercury to make vermilion and by the end of the XIVth century, also to make mosaic gold. Pliny writes about the cinnabar mines of Almadén and this is the first place listed by the *Encyclopaedia Britannica* as a source of mercury(26) Even if there were other deposits of mercury, Spain remained the major exporter. A XIIIth-century document, *C'est li roiaume et les terres desquex les marchandises viennent à Bruges et en la terre de Flandres,*
records: ...Dou royaume de castele vient ...vif argent(27) In the XVth-century poem The Libelle of Englyshe Polycye it is listed as being one of Spain's chief exports(28).

**Documentary Evidence**

The importance of mercury to medieval industry ensured its wide distribution on the markets of Europe and the East. Like lead and copper, mercury was a major European export towards the East. According to Pegolotti, mercury could be bought on the markets of Tauris, Constantinople, Cyprus, Messina, Majorca, Naples, Genoa, Nimes and Montpellier, Antwerp and Seville.

In 1153, at Narbonne, mercury carries the same tax as tin at 8 d. a quintal. At Bologna in 1317 a soma (500 lbs.) of mercury is taxed at 7 s. This is the same as a soma of tin, but less than a soma of copper at 8 s. In the 1349 tax at Paris, mercury is included in a long list of goods which are taxed by the pound. The list includes azur and minium, the one usually very expensive, the other usually relatively cheap. It is therefore difficult to estimate its comparative value in Paris to other merchandise. All that can be deduced is that it counted among the goods that were sold or at least taxed by the pound indicating, perhaps, a certain rarity or high commercial value. Copper, lead and tin are all taxed by a larger quantity, the cent.
The XIVth-century tabella of Florence taxes mercury at 40 s. per 100 lbs. Copper in pieces is taxed at 13 s. 4 d. per 100 lbs. and lead at 6 s. 8 d. per 100 lbs. The most expensive type of tin, stagno lavorato (worked tin) is taxed at 33 s. 4 d. Although cinnabar is the raw material from which mercury is extracted, it is taxed at 33 s. 4 d., less than the tax on the metal itself. Processing the ore to release the metal seems to have added to the final cost of mercury (29).

However, the Venetian Datini valuta lead one to question this assertion. Here, 100 lbs. of cinnabar cost 24 1/2–25 ducats while the same quantity of mercury cost 20 ducats. The valuta of Avignon reveals the same slight difference in price with mercury and vermilion costing about the same (vermilion 35–40 grossi and mercury 36 grossi per quintal). In Genoa cinnabar is a little more expensive at 32 l., and mercury at 27 l.

OTHER VEGETABLE PRODUCTS USED IN PIGMENT MAKING

This section deals briefly with some of the vegetable products used in painting and illuminating which were not colouring materials.

GALLS

Galls (oak apples) are excrescences on several varieties of oak. They are caused by the gall wasp which lays eggs on the plant
tissue, or by various other bacterial or fungoid infections which cause the plant to produce a growth. Oak apples or galls were used for making ink. They were also a major dyestuff and a most important commodity.

Although they can be found in the French Midi and Spain among other places in Europe, in the Middle Ages high quality galls came from the small oak of Asia Minor; in the XIVth-century, they came mainly from Turkey. At that period the gall trade was of primary importance and by 1398 the Genoese were exporting them direct from Chios to Outremont. Pegolotti says that galls must be heavy and large. The colour should be greenish and not yellow and the gall must be as free of dust and particles as possible. He lists them for sale at Constantinople, Adalia, Cyprus, Messina, Majorca, Venice and Naples.

Documentary Evidence

Galls seem never to have been very highly priced items of commerce. Despite the fact that both grana and galls were plant growths, galls were cheaper and it is interesting to make a comparison between the taxes they carried. In 1153 galls are taxed at 4 d. a quintal, while grana is taxed at 5 s. a quintal. By the XIVth-century Florentine gabella, grana di Romania is taxed at 5 lr. 11 s. 1 d. per 100 lbs. while galls for dyeing only carry a tax of 6 s. 11 d. per 100 lbs. Here, the tax on a 100 lbs. of galls compares with
that on a 100 lbs. of red lead. Woad, a major dye, is taxed at 9 s. per 100 lbs.

These galls, called *galla minuta*, were taxed among the *tintori*, but there is a second group, *galle d'arapresso* ("Cyprus" galls), taxed by the pound among the *ispeziali*. The tax per pound on the galls listed among the *tintori* is at 1/2 d. per lb. while among the *ispeziali*, "Cyprus galls" are taxed at 3 d. a pound. In the 1402 *gabella* at Florence there are also two types of gall: *galla minuta*, listed among the *tintori* at 8 s. for 100 lbs. while again *Galle di Cipresso* are listed among the among the *Speziali e Medici* and taxed at 4 d. Perhaps this second type of gall, taxed by the smaller quantity, was used in medicine and ink-making, while the first type was used exclusively for dyeing.

**GUM ARABIC**

Gum arabic and beaten egg white "glair", were the most important painting media used by illuminators. True gum arabic comes from *Accacia Senegal* Wild from East and West Africa. Artists used other gums such as cherry, almond and plum gums\(^{(31)}\)

**Documentary Evidence**

Pegolotti describes several different qualities of gum arabic, which probably came from different accacia trees. The pieces of gum had
to be white, clear and as large and dust free as possible. The bigger the gum, the better (32). He lists it for sale at Constantinople, Alexandria, Famagusta, Messina, Majorca, Venice and Naples. None of these are the more northerly markets. Gum arabic was extensively used, but not widely distributed. Despite this, commercial documents reveal that it was not among the most expensive commodities.

The first document in which I have been able to find gum arabic is a list of brokerage fees from Pisa, dated 1305. It is levied at 2 d. a centinaio. This is the same as a centinaio of lac, orpiment and verdigris. In the same list, a centinaio of dragon's blood is levied at 1 s. and brasil wood at 12 d. (1 s). The Paris tax of 1349 lists gum arabic among the items taxed at 4 d. a pound. In the XIVth-century gabella of Florence, gum arabic is taxed at 13 s. 4 d. per 100 lbs., the same as 100 lbs. of rock alum. In 1402 at Florence it is taxed at 15 s. 7 d. and may be compared with a cento of turpentine at 16 s. Despite its comparatively late arrival on the medieval markets and its distant origins gum arabic, like galls, is not too costly. This fact indicates that it was imported in quite large quantities, a fact borne out by the large units (at least 100 lbs.) by which it was taxed and sold.

Treatises and Recipes

Theophilus says that all colours may be painted on with cherry or plum gum, except minium, white lead and carmine which should be laid
on with glair (33) Peter of St. Audemar gives instructions for the preparation of gum. He says one should put a little plum gum or gum arabic into a linen cloth and submerge it in water for a day and a night. Peter repeats what Theophilus says about which tempera should be used with various colours, but now adds that azure must be ground with soap and mixed with glair. He also says that plum gum or apple gum will prevent ink from running (34).

The author of *De Arte Illuminandi* recommends that gum arabic should be clear and white. It was broken into small pieces, ground and put in two fingers' depth of water for a night. Later it was dissolved over hot ashes, strained and kept (35).

**GLAIR**

Glair is beaten egg white which has been left to stand until it is clear again. Probably the most detailed account of making glair is in the XIIth-century *De Clarea* of the so-called "Anonymous Bernensis". The author says that glair may be made in two ways; either by pressing egg-white through wool or cloth, or by beating it with a whisk. Thin glair is a mixture of half egg white and half water, but the medium can be made as thin or as thick as needed. It can be kept in an egg shell.

The author of *De Clarea* also makes some interesting observations about the qualities of parchment available. Vermilion may be mixed with glair if it is to be painted onto parchment from the author's
own country, probably Flanders or Normandy. If, however, Burgundian
parchment was to be used, the glair should be mixed with a little
egg yolk. The yolk had to be whipped with water until it was almost
like glair itself and then strained through a medium cloth. It
should be mixed with white glair to make it stick to the parchment.
Egg yolk is too fragile to be used on its own; it makes the paint
smudge, but a little will make the red shine(36)

Cennini's instructions on making glair differ little from those of
the De Clar-ea, although they were written about three hundred years
later. He beat egg white with evenly cut branches until it was like
snow. Then he poured water over the froth and left it to stand all
night(37) At about the same date, the author of De Arte
Illuminandi, like the "Anonymous Bernensis", makes a distinction
between two types of glair. For illuminating, "broken" glair was
made by squeezing egg white through a sponge until the froth
liquified. Glair beaten with a bristle brush or a split reed was
used for gilding(38)

GUM TRAGACANTH

Documentary Evidence

Although gum tragacanth looks like gum arabic, it is not a
secretion, but comes from an incision made in the bark of the
astragalus(39) Gum tragacanth seems not to have been used as a
medium for illuminating; in fact, the author of De Arte Illuminandi
writes that it was of little use to illuminators. However, it probably played some part in pigment manufacture as the Liber de Diversis Artibus of Montpellier gives a recipe for making blue with tragacanth.(40)

Although I have not been able to find tragacanth in commercial documents before 1305, there are medical recipes which include it before that date(41) Pegolotti writes that it is like a stone. Its appearance should be mixed white and dark citrine yellow (mescolati bianchi e giallo cetrino scuro) the colour of fish glue or a little lighter. The whiter the gum the better. He says it comes from Setalia (Adalia) in Turkey (see map 2). In Turkey, Cyprus and Catalonia, it was called chittirra(42)

Tragacanth seems comparatively rare. It is also among the items taxed at a higher rate. At Pisa in 1305, which seems to be the first time it is mentioned in commerce, tragacanth is only charged at 2 d. a centinaio, but in the XIVth-century gabella of Florence it carries a tax of 3 d. a pound. This tariff is higher than that for gum arabic at 1 3/5 d. a pound, vernice cotta (see below) taxed at 2 1/2 d. a pound or vernice soda (see VARNISH below) taxed at 2 d. a pound. It compares exactly with a pound of lapis lazuli and it is less highly taxed than a pound of second quality indigo at 5 d. a pound. In the 1393 valuta from Venice it is also more expensive (at 6-7 ducats per 100 lbs.) than gum arabic (at 4-41/2 ducats per 100 lbs.). In the 1408 gabella of Pisa, tragacanth is taxed at about double gum arabic, the former at 15 s. a cento and the latter at 6 s. a cento.
VARNISH AND SANDARAC

Varnish or sandarac is the resin from a Moroccan plant, *callitris quadrivalus*. When dissolved in a solvent like linseed oil, it makes a varnish. Evans, in his notes to *La Fratica della Mercatura*, quotes the *Speculum Naturale* which describes *vernix* thus: *Bernix...est gummi cuiusdam arboris...pictores supra, colores alios eam ponunt, ut lucescant, aliosque colores conservet....* In the XIlth-century Platearius calls it *sandrac*, *verniz* or *berniz*. He writes that it is the gum of a tree and that there are three types: citrine, red and yellow. Regardless of the colour, the *vernix* must be clear. Like the *Speculum Naturale*, Platearius says that artists put it on paintings to protect and lighten them.

The terminology of the product "varnish" is very complex. The clearest description comes in the XVIIth century in Pierre Pomet's *Histoire Générale des Drogues* which may summarize earlier knowledge. He writes that there are seven sorts of varnish and that most of them contain a mixture of turpentine, mastic, linseed oil and spirit of wine, but one contains sandarac. According to Pomet, *sandarac* came from the juniper tree. In his time it was brought to France from Africa and he says that this was called *sandarac* or *verniz* by the Arabs. The XVth-century *Segreti per Colori* gives a recipe a *fare vernice liquida* which begins *...tolle gumma de ginepara*. In medieval times at least, it was probably this juniper gum rather than any combination of turpentine, spirit of wine or linseed oil that is the *vernice* listed in *gabelle* and *valute*. According to
Pegolotti, vernice could be bought at Alexandria, Majorca and Venice.

Documentary Evidence

Varnish is among those commodities which can be traced continuously from the XIIth century. In the early Middle Ages, varnish seems to have been called glassa (see glossary for a discussion of this term). As early as 1153 glassa is included in the tax at Narbonne where it is taxed at 4 d. a quintal (a pound of saffron is also taxed at 4 d.). In the 1349 tax at Paris, vernis en glas is included among those goods taxed at 4 d. a pound. The Italian documents refer to vernice and the word glassa or glace is not used. In the XIVth-century gabella of Florence, it is divided into two categories, vernice cotta and vernice soda(46) Vernice cotta is taxed at 20 s. 8 d. per 100 lbs. High quality alum is taxed at 20 s. and mondiglia de verzino is also taxed at 20 s. 8 d. per 100 lbs. Varnish is thus placed among the medium taxed commodities. It is less highly taxed than second quality grana or second quality indigo at 2 lir. 13 s. 4 d. and 40 s. (2 lir.) respectively, but more highly taxed than galls at 6 s. 11 d. per 100 lbs. Vernice soda o intera is less highly taxed at 16 s. This tariff compares with that of orpiment also 16 s. Brokerage fees of 1436 also for Florence call vernice by two different names, vernice liquida and in grana. These are both charged at 4 s. a cento which compares with a cento of verdigris.
BLACK

Black is clearly an important colour in the medieval palette, but recipes are surprisingly rare. Although ink was used as a black, other blacks were needed and made. In the XIIth-century addition to Mappae Clavicula, black made from vine charcoal is considered one of the pigments that are "thick and clear on parchment", but there is no recipe. Theophilus often mentions black, but again gives no recipe. Peter of St. Audemar made a black suitable for panels and walls from a mixture of charcoal and ink:

According to Cennini there were several kinds of black. He describes a black stone from Piedmont which could be sharpened with a penknife and was very soft. He goes on to tell the reader how to prepare it. A piece the size of a nut must be ground with clear water for at least an hour; then, with a thin wooden slice, he scraped the slab and put the black with some water in a covered jar.

One of Cennini's black pigments was "fat", certainly a black earth, and he only used it as a bole for gilding. Another black was made by "burning" vine twigs and then throwing water over them. This black was "lean" and he considered it among the "perfect" colours. Another high quality black, according to Cennini, could be made from burned peach stones or almond shells. He also describes how to make
lamp black. He filled a lamp with linseed oil and placed a dish over the lit flame so that the smoke could cover the bottom of the dish and leave a deposit. This black dust was very fine and needed no grinding (49).

*De Arte Illuminandi* gives recipes similar to Cennini's for vine charcoal black and lampblack. Le Begue explains that charcoal should be ground with water or wine and tempered with oil or garlic. He goes on to say that the best black is *atramentum* made from iron filings boiled with oil (50).

**INK**

Two types of ink were known in the Middle Ages, carbon and iron gall. There are many recipes for ink, especially in later treatises (51).

Theophilus' recipe for making ink, *inaustum*, which includes wood bark and iron, is fairly representative. In April or May, before the leaves appeared, Theophilus cut hawthorn wood and put it in the shade to dry for two to four weeks. Then he removed the bark by pounding the twigs with wooden mallets, and put them into barrels of water. The barrels stood for eight days until the sap from the wood had been absorbed into the water. He reduced this liquid by two thirds, transferred it to a smaller pan and reduced it again until it became black and thick. As the mixture began to thicken, he added a third part of wine and transferred the liquid to new pots. The
boiling continued until a skin formed. At this point the pots could be taken off the fire and placed in the sun until the black ink separated from the red particles which formed part of the mixture. The black liquid was put into bladders and dried. To write or draw, Theophilus took some of the mixture and tempered it over the fire with wine and added green vitriol (ferrous sulphate; see glossary).

If the ink was not sufficiently black, a piece of heated iron could be quenched in the ink. Hawthorne and Smith explain that the products extracted from the bark were iron tannate or gallate acids and that iron oxide could be added to make the ink blacker. The iron oxide might be in the form of iron filings, but Theophilus' red hot iron would have had the same result (52). Peter of St. Audemar gives a similar type of recipe for making ink from blackthorn. This was also made by reducing the bark sap over a fire. He says that if the ink is not black enough, atramentum or incaustum could be added (53).

Among Alcherius' recipes are four for ink. They all call for galls and vitriol. Three need Roman vitriol (see glossary) which in one place is described as blue (coelesti). One needs green vitriol (ferrous sulphate). They all need gum, wine or vinegar. One recipe dated 1409 is interesting. Four bottles of good wine were mixed with one pound of slightly bruised galls which were left to stand in the wine for twelve days, being stirred every day. Then they were strained into a jar and heated almost to boiling point. When the liquid was nearly tepid, four ounces of gum arabic and half a pound of Roman vitriol were added. The mixture was stirred until it
cooled. Alcherius remarks that ink made with wine is good for books because it will not fade and cannot be scraped off (54).

CHAPTER TWO has shown what other raw materials apart from those used as colouring agents were necessary to illuminators and artists. These "secondary" raw materials were as important in the process of manufacturing pigments as the colouring agents themselves. To conclude PART ONE, the last chapter discusses briefly the traders and shopkeepers who sold ready-made pigments, colouring agents and "secondary" materials to artists and artisans.
1. Charles Singer in his book on the history of alum describes it as: "...a colourless crystalline non-poisonous substance. It may be seen in solid semi-transparent blocks, or as a white powder, or in granular form, or in large crystalline masses. Its smooth surface has a soapy feel ... By ancient usage, and long standing scientific practice, the name of alum is attached primarily to a double sulphate of aluminium and potassium or of aluminium and ammonium, or again a mixture of the two..." (Singer, The Earliest Chemical Industry, p.xvii).


3. Heyd II, p.565-566. From the end of the XIIIth century the opening of the Flanders/Orient shipping route increased the volume of alum that was exported to the cloth manufacturing areas in England and Flanders. By the XIVth century the alum trade was controlled by the Genoese and was one of the mainstays of their economy. In the mid-XIVth century ships went only rarely from Turkey to Genoa, they mainly sailed directly to Flanders and from 1358 all alum was sent direct to Flanders from Asia Minor. However, despite its importance as a commodity, the alum trade seems to have declined in the second half of the XIVth century (Liagre, Les Relations Commerciales, p.cxxxviii; Heers, Genes, pp.278, 394).

4. "Cord" or "pit" alum was found at the bottom of the vat in which alum was prepared. Allume corda and allume fossa (another alum from the bottom of the vat) were the finest grained alums and were both called minuto by Pegolotti (Pegolotti, pp.369-370 & 411 n).


6. There is confusion in Pegolotti's manual because he says: Allume di Castiglione che si dice in Firenze allume di piuma si viene di Barbaria... Thus he thinks that allume de Castiglione and allume di piuma are the same thing (Pegolotti, p.370).


8. The extensive commerce in bullion is verified by the Genoese customs registers which nearly always include gold; it was exported in coins or ingots (gruppi) in verghe or in bags (Heers, Genes, p.69).

9. Lane, Venice, p.61.

10. Silver from the Goslar regions was exhausted at the end of the XIIIth century and that from central and Eastern Europe diminished or ran out in the XIVth century and XVth centuries
(Postan, "Trade in Medieval Europe: The North", pp.195, 211; Nef, "Mining and Metallurgy", p.435). However, in the XIVth and XVth centuries, silver was mined around Trebizond at Sinope, Sisemoss and Samastri (see map 1) (Heyd II, pp.93-4). In Greece, gold and silver were probably mined by the Venetians in the early XVth century (Heyd II, pp.282, 390).

11. Drouet-d'Arcq, "Tarif des marchandises", p.224. Item la douzine d'or en canon...; see also: Lopez and Raymond, Medieval Trade, p.134 who translate a Narbannese document "spun gold, sample of twelve reeds..." (see NOTES TO APPENDIX 3 no. 8).

12. Cennini, Il Libro dell'Arte, p.84.


14. M.C. pp.33, 40, 46, 50 & 225. One recipe tells the reader to mix tin with silver which would facilitate filing and extend the silver. Another tells the artist to grind gold with mercury and heat it; the mercury was evaporated, the gold ground and the resulting powder mixed with verdigris. Theophilus describes in detail a mill for grinding gold, but he does not suggest adding salt or honey or amalgamating gold with lead or mercury except for gilding (Theophilus, pp.25-28).

15. Theophilus, pp.22-23. One of Peter of St. Audemar's recipes tells the reader to mix brown earth with gypsum and glue (Merrifield, I, p.152). Although a coloured bole was usually laid, this is not always the case. For example in B.L. Ms. Additional 1228 f.59 a silver grey, uncoloured bole has been laid.

16. In Theophilus' recipe, the glue is kept warm and therefore tacky in the hand. The XIIth-century addition to the Mappa Clavicula suggests that the work should be done beside the fire (M.C., p.28). Peter of St. Audemar says that gilding ought to be done in a damp place as hot weather is injurious to the gilding process (Merrifield I, p.154).


18. De Arte Illuminandi, pp.10-12 & 51 n.100.


20. Merrifield I, pp.296, 302-304. In one, the instruction is to grind gold filings in a mortar made of three parts copper and one part tin or lead. No addition is made to the gold, but the recipe instructs the reader to be careful not to burn the gold. Perhaps the mortar was heated so that the gold became amalgamated with the metal of the mortar and was easier to grind.
21. Merrifield II, pp. 462-476. When glair is beaten it will froth, but if allowed to stand it becomes still. In grinding colours, the glair again becomes frothy again and tends to leave holes in the dried colour. Ear wax will stop these bubbles forming (Thompson, Materials, pp. 60-61).

22. Ashtor, The Levant Trade, pp. 126, 156, 158. Venice was the major copper importer into the Levant. That city became the outlet for copper from Saxony and Bohemia which was bought there by the Nuremburg merchants.

23. Refined copper was made into sheets in Venice (Pegolotti, p. 381). Bolla means stamped.


28. The Libelle of Englyshe Polycye, ed. Warner, pp. 4, 11.50-60: ...Knowe welte all men that proffites is certayne/ Commodytes called commynnge oute of Spayne/ And marchandy, who so wyll wete what that is,/ ...Saffron, quicksilver; wheche Spaynes marchandy/ Is into Flanders shypped full craftylye... By the XVth-century mercury was a Genoese monopoly; it was transported in barrels and valued in "bogiole" of 60 kg. (Heers, Genes, p. 490).

29. A parallel observation can be made about ultramarine. In the undated XIVth-century Florentine gabella, the raw stone, lapis lazuli, was taxed at 3 d. a pound while azzurro sottile o gabbadeo is taxed at 10 4/5 d. a pound.


31. Pegolotti, p. 420 n; M.C., pp. 43 & 65; Theophilus, p. 24; Merrifield I, p. 155 (treatise of Peter of St. Audemar); The Strasburg Model Book, p. 42.

33. Theophilus, p. 24; Mappae Clavicula has no instructions on the specific uses of gum, but it does say that every kind of gum is cooked from pine and fur. The writer also included maple and cherry gums. Only the later introduction specifies the types of colours that can be tempered with glair (M.C., pp. 55-56, 27).


36. De Clarea, pp. 9-19 & 70-81. Heraclius gives a similar recipe. He squeezed egg white and water through a filter until the mixture became like water and did not make threads (Merrifield I, p. 232).

37. Cennini, Il Libro dell'Arte, p. 79.


39. Gum tragacanth comes from the Astragalus, especially the Astragalus versus gummifera Labill., of Asia Minor, the Astragalus versus Oilv., of Western Persia and the Astragalus Creticus Lamk., of Candia (Larousse, Grande Encyclopedie).


41. Tragacanth was used in medical recipes to make a medicine called diatragacante or diadragagantum. Platearius includes it in a medicine in the XIIth century, but he makes no comment on its nature or origin (Platearius, p. 190).

42. Pegolotti, p. 376.

43. Pegolotti, p. 433 n; Platearius, pp. 30-31.

44. Pomet, Histoire Général des Drogues, pt. I, bk. VII, (pt. II) ch. LIX p. 290 and pt. I, bk. III, ch. XIII, pp. 117-8; interestingly, the E. B. 1984 (Index) calls varnish the product of the Japanese varnish tree, the Lacquer tree or wood oil tree, but that varnish was also the term applied to the sap of an oriental relation of the poison ivy, perhaps the ivy gum (see IVY GUM) listed in commercial documents.

45. Merrifield II, p. 489.

46. Evans thinks that vernice cotta, was refined sandarac, probably the raw resin fused into bigger pieces and perhaps refined. The process of refining seems to have added a little to the price (Pegolotti p. 433 n). Sodo, according to the Collins-Sansoni Italian Dictionary, means solid.

47. M.C., p. 27; Theophilus, pp. 8, 9, 10.

49. Cennini, *Il Libro dell'Arte*, pp. 20-23. Piedmontese stone is understood by Thompson to be charcoal. In his introduction Thompson discusses his use of the terms "fat" and "thin" which are intended to be evocative translations of *grasso* and *magra* (Cennini, *Il Libro dell'Arte*, p. xii).

50. *De Arte Illuminandi*, p. 2; Merrifield I, p. 300. *Segreti per Colori* gives another variation. Some *sumach* (see glossary) is boiled down by one quarter, mixed with some grindstone grit and further reduced. Three ounces of powdered Roman vitriol and three ounces of galls are added and the whole reduced again (Merrifield II, p. 454 & n. 4).

51. Mitchell, *Inks*, pp. 6-8. Carbon inks were in used in antiquity, but the calligrapher of the Lindisfarne Gospels used an iron-based ink. Roosen-Runge thinks that carbon was probably added to intensify the colour of ink (Roosen-Runge "The Pictorial Techniques of the Lindisfarne Gospels", p. 270). On iron gall ink, see also: Gettens and Stout, *Painting Materials*, p. 122.


53. Merrifield I, p. 152. Hawthorne and Smith *Theophilus*, p. 15 n. identify *atramentum*, as green vitriol. *Incaustum* is ink in Theophilus' work, so presumably Peter added old ink to blacken the new ink.

By the XIVth century, and even before, many painting pigments were sold prepared or partially prepared for painting. As early as 1228 red lead appears in a Marseilles tax list and verdet (almost certainly verdigris) in a XIIIth-century Narbonnese document (see APPENDIX 3). By the XIVth century both were widely available.

A little information on the commercial distribution of pigments and raw materials can be gleaned from technical treatises. Cennini says that vermilion should be bought from a druggist and Jean Le Begue writes that lapis lazuli could be bought from apothecaries. The Strasburg Manuscript says that mosaic gold was also bought from an apothecary. De Arte Illuminandi does not give the recipe for red and white because, the author says, both could be bought everywhere (1).

Although limited, this evidence is enough to show that artists went mainly to the apothecary or at least a merchant concerned with drugs and spices to buy colours (2). In the Florentine gabelle, many of the raw and ready-made materials for making colours came into the category of speziali. Statutes of the Florentine Arte dei Medici e Speziali specify which goods those merchants were allowed to sell; these include most colours and
painting equipment. The few extant lists of the contents of French apothecaries' shops point in the same direction.

Already in the XIIth century, Platearius' Livre des Simple Médicines shows the close links between drugs and painting pigments. Numbered among this doctor's remedies are: vitriol (see GLOSSARY), gum arabic, silver, lapis armenicus\(^3\) sal ammoniac (ammonium sulphide), vinegar, azur, sandarac/verniz, honey, Armenian bole, white lead, wax, tragacanth, copperose (see GLOSSARY), dragon's blood, incense, mercury, tin, soap, galls, lapis lazuli, litharge, (folium), mastic, minium, orpiment, realgar, parchment, lead, madder, saffron, sulphur, sugar, turpentine and vermillion\(^4\).

There is no evidence that all these goods were always found in a doctor or apothecary's shop. However, unless Platearius was slavishly following the works of other, earlier writers who came from places where these commodities were available, he knew of their existence and was prescribing medicines containing plants, herbs and metals that he was able to obtain. The list contains neither brasil wood or indigo, both of which appeared in the West in the XIIth century. They may be omitted not because Platearius did not know of their existence, but because he had no use for them.
Apothecaries and Épiciers in France

It is possible that as early as the VIth century some doctors, that is practitioners of medicine, ceased to sell the spices from which drugs were made and let this specialized, but manual and therefore menial task be performed by another merchant. Information for Italy is more extensive, but sources for France are not entirely lacking and both point in the same direction.

In France, the separation of apothecary from doctor happened at about the end of the XIIth century. The terms épicier and apothicaire seem initially to have been synonymous and to apply to merchants who sold condiments for cooking and medicines. However, the "apothecary" probably attached more properly to the merchant who was concerned with the material for making drugs and the épicier to the merchant who sold cooking spices.

An early account of the contents of an apothecary's shop in Paris comes from Jean de Garland's description of Paris. He lists the goods for sale by a XIIIth-century apothecary. Among them were sugar, wax and diadragagantum, a drug made from gum tragacanth. There is more information about goods sold by apothecaries dating from the late-XIV and XVth centuries and many of the materials used by artists are included.

Philippe Wolff, in his study of the commerce of Toulouse, cites the post-mortem inventories of two épiciers, Guilhem del Pont (1369) and Jean Capelle (1387), who both had saffron among the
goods in their workshops. Wolff goes on to say that in the stocks of an épiciere one would find incense, wax, soap, sugar and pepper (8). At Reims, the inventory of Bishop Richard Picque in 1389 lists his medicines and demonstrates the close links between common drugs and painting materials. The following commodities were by painters (9).

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Une lib. tourbentine</td>
<td>iii s.</td>
</tr>
<tr>
<td>Une once de safran</td>
<td>vii s.</td>
</tr>
<tr>
<td>Une once de sang de dragon</td>
<td>i i s.</td>
</tr>
<tr>
<td>Une livre d'encens</td>
<td>xii s.</td>
</tr>
</tbody>
</table>

More extensive information comes from the Livre du Tarif des Gabelles of Avignon, drawn up in 1397. This document records the goods used by apothecaries in that city (see APPENDIX 5). The gabelle contains no azur, vermilion or orpiment, but it does have realgar, arsenic and malachite (Auricolla). There is no white lead, but minium and litharge are included. The cheap dyes, woad and madder are not listed, but there is brunil, indigo and dragon's blood; there is no gum lac or grana. There are many of the other materials needed by artists: gum arabic, Greek pitch, tragacanth and galls, but no gold, silver, lead or copper.

From Dijon, an inventory dated 21 July and 17 November 1439 records the goods of Guillaume Lefort, apothecary (see APPENDIX 5). This inventory reveals most strikingly that by the mid-XVth century there is almost nothing, except lead, copper, grana and woad that a Dijon artist could not buy from this apothecary. Among the goods available were red and white lead, litharge, verdigris, blue, tin leaf, gold leaf and silver leaf,
gum arabic, tragacanth and sandarac. There were galls to make ink, and paper, but not parchment. Although they were probably used in medicine and cooking, the apothecaries must have stocked the leaf metals for craftsmen. In the gabella of Florence, beaten gold and silver are part of the commerce of the speziali e medici.

Surprisingly enough one of the most fruitful sources of information on the mid-XIVth-century pharmaceutical trade comes from a French Mystery play La Passion de Notre Seigneur. After the Crucifixion, the three Marys come to an épicer to buy unguents to anoint Christ's body. In poor verse, the épicer proudly lists all the goods in his shop. Among them are:

Poudre de saffran bien nouvelle,
. . .
J'ay trop bon sucre violat,
. . .
Amandes, ris et verdegrice;
. . .
J'ay sire jaune et sire vierge;
. . .
J'ay bon candit gros et brisé (candy sugar)
. . .
J'ay poudre de sucre à cassons
Et alun plus cler que glassons;
. . .
J'ay blanc de flour et rouge mine
. . .
J'ay vermeillon et tainture Inde
. . .
J'ay brésil, miel et errement.

This merchant already specialized in luxury goods. He sold the more expensive colours, vermilion, verdigris, saffron, red lead, indigo and brasil, but no gold and silver. The sale of precious
metals must have been a very expensive undertaking, not within
the scope of many merchants.

In 1498 a list of the droits de courtage (brokerage fees) to be
paid on certain merchandise coming into Paris contains both
pharmaceutical and épicière goods (see APPENDIX 5). Included are
madder, "flower" of woad and the base metals copper and lead, the
ready-made pigments red and white lead, verdigris and vermilion
and the exotic dyes, brasil and indigo. However, there is no
gold, silver or lead. They were probably sold by another trader,
most likely the mercer (see below).

Merçers in France

Some of the materials used by artists came from the mercer who
apparently dealt in miscellaneous items. From the beginning of
the XIIIth century mercers probably sold snuff, haberdashery,
toiletries, pearls and sometimes gold and silver. A XIIIth-
century Dit des Marcheazn (B.N. Ms. français 837) tells how the
goods sold by mercers come from all countries "toz pais".
Another poem of about the same date, the Dit d'Un Mercier also
includes some commodities used by artists and craftsmen. In this
poem mercury, silver leaf, soap, incense and saffron are
listed(12)
Medici e Speziali and Mercatore in Italy (Florence)

In Florence traders were separated into several guilds or Arte. From the XIIIth-century Arte della Porta Santa Maria there emerged three groups forming one Arte. These were the medici, speziali and mercatore. There was a certain fluidity about what each Arte could sell; for instance the speziali and members of the Arte della Lana sold alum. The medici e speziali, mercatore and the Arte della Lana could sell madder and ashes; the Lanaiuoli and Cambiatori both sold drugs. However, as a general rule, the Arte dei Medici e Speziali sold those things concerned with medicine and painting. The mercatore sold other non-perishable goods that the artist might require, like alum and parchment.(13)

The statutes of the Arte dei Medici e Speziali were drawn up in 1314 (initially in Latin) and reformed in 1349 (in Italian). They include lists of goods which merchants in these arte were allowed to sell in Florence and colours form quite a considerable part of their commerce. The medici e Speziali did not sell cheap dyes which were the preserve of the mercatores, but they dealt in the exotic dyes and madder. The goods used by artists were saffron, honey, wax, sugar, rock and Castilian alum, gum arabic, incense, uncooked and cooked lac, indigo, brasil wood and mandiglia verzino, glue, all sorts of blue, sinopia, minium, white lead, pitch, all sorts of soap, cinnabar, pezzuole(14), grana, madder, worked and unworked tin and lead, all sorts of
sulphur, gesso, and everything for painting miniatures and paintings(15)

The same statute lists the goods for sale by the mercers, who apparently sold the other materials needed by an artist: beaten gold, silver and tin, book covers, paper, parchment, capretto (see glossary), paper and parchment books (old and new, written and blank), legal books, galls, scales, gessoed panels and varnish(16)

From this it is possible to conclude that artists addressed themselves to apothecaries for most of their painting equipment. In all probability, some merchants specialized in drugs and others were in fact artists' colourmen. It was possible to buy the prepared pigments, minium and white lead, blue and the raw dyes like lac and indigo. Apothecaries also sold the common media, gum arabic, alum and gesso, but not gum tragacanth and turpentine. Lead and tin are mentioned, but not gold and silver. In addition, the medici e Speziali sold "ogni cosa da dipingere; e ancora e dipintori e miniaturi...", everything for painting and pictures and miniatures.

In the Florentine gabelle, goods are divided into categories according to which Arte sold them. The XIVth-century gabella is the most detailed and almost all the equipment used by painters and artists comes into the category Dell'Arte Delli Spezieria e Libri di Medicina e Dicretali. Here are all the colours: vermilion, blue, red lead, white lead and verdigris, and the
exotic dyes brasil, lac, grana, indigo and saffron. However, woad, madder and galls come under Dell'Arte de'Tintori. Among the Tintori galls are taxed by the soma (a large quantity). It seems that a higher quality of gall was sold by the pound in the "spices" category and was probably used for making drugs and ink rather than in the dyeing industry.

Worked, old, spun and good quality silver and gold comes under the heading Dell'Arte di Porta Santa Maria e Orafi, but beaten silver and gold for painting were the province of the Spezieria. Clearly the gold and silver sold by the Arte di Porta Santa Maria e Orafi, as its name implies, was the concern of the goldsmiths; while once again, the equipment for painters (da dipintori) is found among the merchandise of the Arte delli spezieria, which included the mercers.

The same divisions appear in the 1402 Florentine gabella. Woad, madder and galls are among the Tintori but the exotic dyes, grana, lac, brasil and indigo are listed as Speziali e Medici. Galls are again taxed by the pound when they come into the category of spices and by a larger quantity (100 lbs.) when taxed as dyes. The Porta Santa Maria dealt in gold and silver, but among the spezieria are beaten silver and gold for painters, sold by the leaf. Some other goods are described as being especially for artists. Both Florentine gabelle have nero and rancho da dipintori (see GLOSSARY) and giallolino da dipintori appears in the 1402 gabella.
Possibly a large atelier, such as the Boucicaut workshop, made its own pigments, but this is almost certainly not true of the artist or scribe working on university or more functional books. It is possible to deduce that many of the pigments requiring manufacture, for example vermilion, verdigris and the lead colours, were prepared and could be bought from a merchant. A well-stocked apothecary or épicier sold an artist almost everything required and the rest of the equipment was bought from the mercer. Dyes were probably not already made up into painting pigments as they did not require complicated preparation. The manufacture of red and white lead, verdigris, vermilion and mosaic gold, was a time consuming, skilled and very dangerous occupation. It would have been in the best interests of an artist to leave this task to an expert.

However, the raw materials to make the pigments were always available: lead, copper, mercury and sulphur. For a well equipped workshop it may have been more advantageous to buy the necessary equipment and still make the pigment in the workshop. In this way the atelier would be able to maintain continuity and the standard it required.
CHAPTER THREE: NOTES

NOTES

1. Merrifield I, p.317; Cennini, Il Libro dell'Arte, p.24; Borradaile, ed. and trans., The Strasburg Manuscript, p.26; De Arte Illuminandi, p.3.


3. The editor Dorveaux translates this as lapis lazuli, but it is probably Armenian stone, that is, azurite (Platearius, p.222).

4. Platearius, passim.


6. There was certainly a confusion of nomenclature and both the apothicaire and épiciers were concerned with the sale of a wide variety of goods. "Apothecary" appears in Perpignon in 1207 and Rouen in 1214 while in Paris the XIIIth-century Livre des Métiers mentions apothecaries in 1270. In Marseilles apothicaire are mentioned in the Statutes of the Republic 1200-1268 (Bouvet, Histoire de la Pharmacie, p.43, Baudot, Études Historiques, p.37,69). In XIVth and XVth centuries in Burgundy the épiciers specialized in large-scale groceries and a few simple drugs while the apothecary sold goods for making drugs, aromatic water and sugar. In Marseilles the épiciers offered gold, drugs, sweets, alum, colours and wax while the apothicaire also sold wax. Eventually the "French" drug and spice seller was either the apothecary or the épicer. The distinction between the functions of the épiciers and apothicaire in France was only made clear officially in an edict of Charles VII in 1484 (Baratier and Raynaud, Histoire du Commerce du Marseille, p.775-77; Bouvet, Études Historique, p.64).

7. Scheler, Lexicographie Latine, p.28.


10. Cited in: Jubinal, Mystères Inédits, pp.300-301; Dorveaux, L'Épicier du Mystère de la Passion, pp.4-8; Runnels, Le Mystère de la Passion Nostre Seigneur, pp.255-6. I would like to thank Dr. Runnels for his help on this play and his advice on the yellow robe of Judas in the medieval theatre.

11. Godefroy, Dictionnaire de l'ancienne langue française, vol.IV, p.32 gives flour as indigo (in fact probably "flower" of woad). Dorveaux, L'épicier, translates this as white lead, which is probably correct.
12. "Dit des Marcheanz:— Et revienent de toz pais,/ Por la mercerie achatier/ Et servent mout bien demandier/ Et trouessevache et qui qu'en poist;/ Or escoutez, si ne vous poist,/ Iuec pueint il bien trouver/ Toutes choses à achatier/ Qui à la mercerie apent; "Dit d'un Mercier:— J'ai vif argent, el mont n'a tel/ Que ge mis en cuir de posson/ Et un sac palu de taisson (badger)/...Argent pel por metre en esclices (silver leaf for ornamenting various mounts)/...J'ai savon de Paris/ J'ai bon coffres où il est mix (boxes of Paris soap)/...Si ai l'ençans et ençassier/...J'ai blanchet don eus se font blanchet (I have white for women to bleach their hands)/...J'ai saffren à mettre en viandes/...J'ai fil d'argent à mazelin. (Both texts cited by Crapelet, Proverbs et dictions populaires, pp.149-154 n.8, 153 n.3 & 161).

13. For a detailed discussion of the arte, see: Ciasca, L'Arte dei Medici e Speziali, pp.1-16, 447-455.

14. Perhaps pezole (pieces of dyed cloth which the artist put into alum to make transparent lake colours) (De Arte Illuminandi, pp.41-3 n.60 & 55 n.123; Thompson, Materials, pp.141-145). This word in modern Italian means handkerchiefs (see glossary).

15. E gli speziali, e quali debbono iurare e essere sottoposti all'arte e a' consoli della arte, come di sopra si dice, sono questi, cioè: tucti e ciascuni vendenti o vendere faccenti in grosso o a minuto nella città o contado di Firenze ... gurgo o vero zafferro, mele, cera, zucchero, polvere di zucchero, ... allume di roccia, o di castiglione, ... gommerabica, incenso, lacca cruda e cotta, e ognia altra groma ... (trefola), indaco, verzino, mondiglia vera, colla, azurro d'ogni ragione, sinopia, minio, biaochia, pece, sapone d'ogni ragione ... cinabro, pezzuola, grana ... robbia, ... stagno e piombo, lavorato e non lavorato ... zolfo di qualunque ragione, ...gessa, ... e ogni cosa da dipinere; e ancora e dipintori e minimaturi, o aluna o alcune della predette cose, e ogni altra cosa aspetante e apartenente agli speziali o all'arte degli speziali, o alcuna delle dette cose.... (Ciasca, Statuti dell'Arte del Medici e Speziali, pp.131-2). The details are taken from the reforma of 1349 because it is fuller than the 1314 Latin text.

16. Merciai sieno et essere s'intendino e quali giurare et essere sotto posti debbono a'consoli e all'arte predetto, come di sopra si dice, sono questi; cioè ... e faccenti o vero vendenti... oro, o vero ariento battuto ... e tucti e ciascuni, e quali aranno lavorato, facto, (b)venduto, o tenuto, o servando in o nella bottega, o altrove, gl'infrascripti lavorii o cose, cioè... coperte di libri ... e chi arà facto o venduto, o a vendere tenuto carte di papero, o pecorini, o di capretto, o carta da stracciare, libri di carte bamabigne o pecorini o di capretto, si nuove come vecchie, si scripte, come none, e d'esse libri legati; e ancora vendenti ... tavolacci e simili cose, forzerini si grandi come piccoli, dipinti o figurati, di cuio o colati, ... e filo ... di rame, galla, ....bilance ... tavole ingessate ... vernice di marcella ... e faccenti, vendenti, o vero
bactanti stagno ... oro, ariento e simili ... e ancora tucti color che vendono cervelliere vecchie o alcun'altra cosa, che sotto nome di merciaria si contengha, et che per la forma degli statuti del commune di Firenze non sono alcuna altra arte conducte (Ciasca, Statuti dell'Arte dei Medici e Speziali, pp.133-135).
PART TWO
If many medieval painting treatises are partly alchemical, they all give a real insight into the working practices of craftsmen. Commercial material confirms the evidence from the treatises that the basic palette of the XIIth-century was the same in the XIVth-century. Nevertheless, both treatises and commercial documents confirm what can easily be seen in the manuscripts themselves, that at the end of the XIVth century new colours were available to painters. While not entirely explaining the change that takes place in the late-XIVth-century Parisian palette, these factors indicate that technical as well as stylistic influences were at work.

The two late-XIVth-century treatises (Il Libro dell'Arte and De Arte Illuminandi) have certain marked differences from those written in the XIIth and XIIIth centuries. They mention new colours, most notably the chemically-produced giallorino and mosaic gold. Furthermore, De Arte Illuminandi in particular shows that illuminators were looking for less corrosive pigments than those based on lead and copper. In part this may have been to fulfill a growing need for a wider range of greens and yellows for painting, in particular, landscapes. New plant-based colours were more transparent and if their introduction reflects a search for translucency, they were certainly cheaper and easier to use than the traditional metal-based pigments.
Of the two new chemically-produced colours, *giallorino* and mosaic gold, the former is only mentioned in passing, except in *Segreti per Colori*. It seems to have been lead-tin yellow, a pigment almost certainly resulting from developments in glass making. Despite the existence of one recipe in *Segreti per colori*, it is unlikely to have been manufactured by painters themselves. Mosaic gold, on the other hand, may initially have been made in the workshop, but by the time the *Strasburg Manuscript* was written (mid-XVth century) this too could be bought ready prepared.

Artists obtained most of their raw materials from colourmen who probably bought their goods, especially chemically-produced colours, from artisans who prepared pigments in relatively large quantities. How early the colourmen emerged as independent merchants is not known, but repeated references in Countess Mahaut's building accounts to purchases of pigments made from one Robert Aurri show that they were well established by the beginning of the XIVth century. The handing over of the difficult and dangerous processes involved in making chemical colours to specialized craftsmen probably raised the general standard of pigments. A study of the origins of colours and painting materials shows how expensive many of them must have been; it would have been wise to entrust this task to experts.

Freed from the need to manufacture their own pigments, artists could become specialists in painting. The expansion of European commerce and parallel commercial specialization increased the
availability of a varied palette of reliable and often ready-made pigments. Individual artists, if they so desired, could be released from the artisanal aspect of their craft to devote themselves to painting and illuminating. With the problems of incompatibility between chemically-based pigments lessened, the illuminator was now able to manipulate a wide range of colours with facility.

PART TWO of the thesis examines colour use and, in the light of an understanding of what pigments were available, examines the way colours were used during the early-and mid-XIVth century in Paris and the change that takes place in the palette at the end of the century. It will then discuss the exploitation, in the first part of the XVth century, of the "new" palette introduced at the end of the XIVth century.
PART TWO: COLOUR AND PAINTING TECHNIQUES IN PARISIAN MANUSCRIPT

ILLUMINATION c.1320-c.1420

PART TWO of this thesis discuss ways in which colour was used by Parisian painters during the periods c.1320-c.1380 and c.1380-c.1420. PART ONE has suggested the potential range of colours available to XIVth-century artists. PART TWO will attempt to demonstrate how XIVth and XVth-century illuminators exploited those colours. There were two main colouristic developments in Parisian manuscripts in the period c.1320-c.1420. At the beginning of the XIVth century (c.1325), Jean Pucelle introduced a fashion for grisaille. His followers took up this technique and expanded and exploited it so that it became a restrained decorative painting technique. Grisaille miniatures were painted predominantly in grey or brown with the light parchment left to act as highlight. Many of the most elaborate and luxurious manuscripts of the period c.1330-1380 were painted in this sober and elegant technique. Where miniatures are fully coloured there tends to be a rather sombre overall tonality, itself influenced by the muted tones of grisaille.

The second important development in the way that colour was used takes place at the end of the XIVth century in the period c.1380-c.1390. Parisian colour, from having been muted and frequently related to the grisaille aesthetic, becomes suddenly vibrant and
brilliant. In Paris illuminators had previously, for the most part, avoided saturated bright red, yellow and green, but from c.1380 artists used all those colours and many other transparent hues, most notably mauve, transparent yellow, rose red and beige.

Medieval artisans had three different sorts of material from which to create painting pigments: stone ground or mineral colours, chemically produced colours and plant-based pigments. To resume the information presented in PART ONE it suffices to remind the reader that the painting pigments available in the XIVth century can be divided up into colours as follows.

There were two types of blue mineral pigments, ultramarine and azurite. Both of these were used throughout the whole medieval period, although it seems likely that ultramarine was not extensively employed until the XIVth century. Blue lakes (plant-based colours) were from ancient times made from indigo (either true Indian indigo or indigo made from woad) and there were also always some other plant blues, for example blue folium.

Red pigments were made from red lead and vermilion, both chemically produced and used throughout the Middle Ages; in addition vermilion could be ground straight from the mineral cinnabar. Artists used red earth, most often sinopia and from at least the XIIth century, they had several red lakes available to them of which the most important were grana and brasil wood. Again they also may have used a red lake made from folium.
For as long as azurite had been available as a blue pigment, its green equivalent, malachite, was also available. However, the extent of the use of malachite is difficult to judge; it seems to have been employed fairly rarely. The most important green pigment throughout the Middle Ages was verdigris. Green earth, also used from ancient times, was employed mainly for face and general underpainting. From the late-XIVth or early-XVth century more plant-based greens became available, for instance buckthorn green.

Among the yellow pigments, the mineral orpiment, which contains arsenic, provided a bright clear yellow. Unfortunately orpiment is very corrosive and acts adversely with other pigments like red and white lead. In the late-XIIIth or early-XIVth century another bright, clear yellow was invented which is now called lead-tin yellow, but which in medieval times went in all probability under the name of giallolino or giallorino. Artists may also have used yellow lead as a pigment, but this is doubtful. There were some plant-based yellows, most notably saffron, and perhaps also gamboge and dyers' weld; from the late-XIVth or early-XVth-century a yellow lake was also probably made from buckthorn berries. In addition to mineral, chemical and plant based pigments artists used gold and silver. From the late-XIIIth or early-XIVth centuries there was also a chemically-produced gold substitute called "mosaic" gold.

It has not yet been possible to take samples for spectrometric or chemical analysis from manuscripts of such historical importance.
as those under discussion in this thesis. Therefore, it is only possible, in the light of an understanding of the pigments potentially available to XIV\textsuperscript{th} and early-XV\textsuperscript{th}-century illuminators, to speculate about the Parisian palette. I would suggest that technical changes and commercial expansion introduced some new colours into western Europe in the XIV\textsuperscript{th} century. The two new chemical colours, mosaic gold and lead-tin yellow were seemingly the result of improved techniques, most probably in the glass industry. Lapis lazuli, on the other hand, may have found its ways to the west in larger quantities than had previously been the case, due to stimulated trade with the East. In addition, new techniques for extracting the colour certainly made what was available more useful to the artisan who could make more pigment from each stone.

Guided by a detailed and exhaustive examination of the manuscripts with the naked eye, it is possible to deduce that the Parisian artist of the early- to mid-XIV\textsuperscript{th} century used azurite (and or ultramarine), indigo, red and white lead, most of the red lakes, verdigris, red, green and yellow earths and sometimes vermilion and malachite. For intermediate tones illuminators used several degrees of brown apparently made with ink and some earth browns. They probably also used a limited number of green lakes and perhaps a yellow lake. It seems that they did not use bright yellow or mosaic gold until the late-XIV\textsuperscript{th} century and early-XV\textsuperscript{th} century respectively.
The change that takes place between early- to mid-XIVth-century and late-XIVth and early-XVth-century Parisian colour although difficult to define is based upon several fundamental elements. In the period up to c.1380 blue, whether ultramarine or azurite (it is not possible to determine which by the naked eye) was extensively highlighted with white. Parisian illuminators frequently used an orange red rather than the strong bluish red of vermilion, although the two pigments were probably sometimes mixed to modify the rather stark tone of red lead. Rose pink was extensively used and was probably made with brasil lake. As the century progressed, artists used more brownish yellow, almost certainly yellow ochre. However, Parisian illuminators did sometimes introduce brighter colours, even bright yellow and green, in the period up to c.1380.

The colours of late-XIVth and early-XVth-century illumination differ from those of miniatures painted earlier in the XIVth century in two ways. The range of colours is somewhat wider and combinations and mixtures between colours are new and experimental. Of the new colours introduced into Paris in the late-XIVth century, yellow is the most important in several respects. First of all, it is of itself a strong, bright colour and immediately adds brilliance to the whole palette by vibrating with other strong colours introduced at the time, most notably red, green and blue. Furthermore, the artist could use yellow as a substitute for gold, thus lowering the cost of the palette. Most important, this new yellow was a stable colour, apparently unaffected by the chemicals in verdigris, red and white lead.
Consequently artists not only had a new colour that they could use pure for costumes, but they were also able to make new colour combinations. For instance, red lead could be mixed with yellow to give it a warmer, softer tone and added to green it gave new variety to landscape colours.

Although the exact nature of the new bright yellow seen at this period in Parisian illumination can as yet only be a matter for speculation, the strong stable yellow of lead-tin yellow was a late-XIII\textsuperscript{th} or early-XIV\textsuperscript{th}-century invention. It has been identified in a mid-XIV\textsuperscript{th}-century Italian panel by Nardo di Cione and, more important for this thesis, in an early-XV\textsuperscript{th}-century French manuscript\(^{1}\).

Another change in the colour of late-XIV\textsuperscript{th} century Parisian manuscripts is the introduction of very dark, vibrant blue. In this case, as with the introduction of lead-tin yellow, the change may result from an advance in techniques of pigment manufacture. Blue becomes darker and generally more saturated. Furthermore, it is less highly modelled than it had been in the earlier XIV\textsuperscript{th} century as if to let the beauty of the colour be fully appreciated. In all probability blue made from lapis lazuli, that is ultramarine, was used throughout the XIV\textsuperscript{th} century by Parisian and Italian illuminators and panel painters. However, it is not until the end of the century (c.1380) that western technical treatises give recipes for the pastille method of extracting blue pigment from lapis lazuli and artisans were
probably thus able to use a poorer quality material to make a purer blue.

If, as seems to be the case, a method of extracting pure, deep ultramarine only came to the west in the XIVth century, it is not surprising that very strong, deep blue only makes its appearance in the late-XIVth century Parisian manuscripts like the Très Belles Heures (B.N. Ms. nouv. acq. latin 3093) and the second group of miniatures in the Bible of Jean de Cy [sl. 8] (B.N. Ms. français 15397; see: CHAPTER EIGHT below).

The third major colour, or in this case material, to be introduced was mosaic gold which made its appearance in Italy (and England) before the end of the XIIIth century and from the mid-XIVth century was used in Italian manuscripts (2). There is no information on the origins of mosaic gold, but once it was adopted by Parisian illuminators, most notably the Boucicaut workshop, it was used extensively. Not only was mosaic gold a cheap substitute for real gold, but it was also easy to use in suspension and required no grinding. Mosaic gold's gritty, sparkly quality was admirably suited to the Boucicaut workshop's reflecting distances. It could also be mixed with more mundane materials such as brown earth to make the latter sparkle. Furthermore, the material itself could be used to enhance the overall decorative quality of the palette. Often it was used to replace gold or it was mixed in with gold. In part this modified the real gold, making it appear more muted and less shiny, but it also varied the texture of gold and made it appear less flat.
Two other colours which made their appearance in late-XIV<sup>th</sup> century Parisian illumination seem to have been on the whole avoided as unsuitable rather than not to have been available. These are bright green and vermilion red. Both colours do appear from time to time in the XIV<sup>th</sup> century, most notably in the Hours of Jeanne de Navarre<sup>3</sup>. Vermilion and malachite are the most likely candidates for this strong red and bright green and they had been available since ancient times. Malachite was mined along with azurite and so could have been used as frequently as azurite, although when prepared as a pigment it is more friable than azurite. Furthermore, a mixture of yellow and azurite or ultramarine and orpiment or even yellow ochre would also have provided as bright a green as malachite and all of these colours had been available throughout the century. However, from the beginning of the XV<sup>th</sup> century, especially in paintings by the Boucicaut workshop, strong bright green becomes a basic colour in the palette. It is possible that this bright green is not malachite, but the new strong, stable yellow mixed with azurite or ultramarine.

Vermilion was available throughout the Middle Ages, yet as far as XIV<sup>th</sup>-century Parisian illumination is concerned, a vermilion red colour is very seldom used until the paintings by Pseudo-Jacquemart in the Petites Heures [sls. 132-141] and the Parement Master in the Très Belles Heures [sls. 146-154] (see CHAPTER EIGHT below). Even during the early-XV<sup>th</sup> century vermilion red is fairly rare, except in the work of the Luçon workshop [sl. 194].
The very saturated and intense red of vermilion might have been considered too strong to harmonize with other colours and thus liable to unbalance the whole composition. It was never as much favoured as the orange of red lead.

Other, intermediate colours appear at the end of the XIVth century. For example, in his late miniatures in the Petites Heures, Le Noir used blue shaded with brown in the "Carrying of the Cross" (f.86v) and a rather muted orange shaded or mixed with yellow. However, mauves and beiges only really appear in any quantity in the work of the Pseudo-Jacquemart in the Petites Heures [sl. 138]. Yet mauves and beiges were in all probability made from readily available blue and red lakes or ink and ochre which had always been to hand.

If one wishes to find influences, direct or indirect, on Parisian manuscript illuminations and, in particular, to explain or at least comment on the changes that take place at the end of the XIVth century in Paris, there should be some discussion on the possible influence of panel painting and tapestry. The vibrant colour which makes its appearance at the end of the XIVth century in Parisian illumination is also seen in the rare extant "French" panels from the end of the XIVth and beginning of the XVth centuries, most of which come from Dijon and were painted for the Burgundian court. As in many manuscripts of the period in Paris, these panels show a taste not only for rich and saturated colours, especially blue and purple, but also for exotic costumes and gold ornaments.
Although many of the "new" colours found in miniatures by the Parement Master in the Très Belles Heures and by Jacquemart and Pseudo-Jacquemart in the Petites Heures can be seen in these "French" panel paintings, the panels do not, of themselves, seem to be colouristically very advanced; it may be that they were influenced by contemporary manuscript painting (4).

An intense dark blue like that used already in the 1390s in the Petites Heures and Très Belles Heures was used in the large Louvre tondo (attributed to Jean Malouel c.1400) (5). Furthermore, the very distinctive colours used by the Boucicaut workshop, which developed from the "new" palette of the late-XIVth century, comprise among others a distinctive mauveish blue which I have called "Boucicaut blue". Artists probably made it by layering blue over red. While this colour might show an Italian influence, in Italian examples it seems to be somewhat pale and pinkish whereas "Boucicaut blue" leans more towards blue than pink (6). The origins of this colour, like those of all the colours discussed here, can only be a matter of speculation, but perhaps this purply blue came not from Italy, but from Burgundy (7). It is also interesting to observe that the artists of these fine panels, like those of some contemporary Parisian manuscripts, far from using the "new" yellow to its full potential, rather avoided it as too strong and liable to spoil the equilibrium of the entire image (8).
Without a doubt one of the most astonishing recent discoveries in terms of XIVth-century Parisian colour is the backs of the Angers Apocalypse. However, although the strong yellows, reds, deep blues and varied greens that mark the palette of early-XVth-century Parisian illuminations are used, in fact the tapestry's colour should be compared to that of the later hands of the Bible of Jean de Gy. I would suggest that the whole colour organization of the Apocalypse is profoundly rooted in the mid-XIVth century. As will be discussed in greater depth (see: CHAPTERS FIVE and SIX below) mid-century manuscripts tended to emphasise muted and restrained tones. The Apocalypse represents a kind of bridge. Its colours show the direction that manuscript painting will take, but despite the surprising variety of colours, there remains a muted overall tonality. Much emphasis is still laid on cool greys and blues (sls. 9-10). Furthermore, while the weavers have made very exciting experiments with contrasting and complementary colours, the panels do not have the close modelling of miniatures by the "modern" painters, the Parement Master and Jacquemart(9).

It seems likely that late-XIVth-century illuminators had some influence from Italy either directly from the peninsula or via Bohemia(10). From about 1320 Italian artists painting in manuscripts, on fresco and on panel used a much more daring and brilliant assortment of colours than their Parisian contemporaries.
While the treatment of colour in Italy differs from school to school, the basic palette could not exceed the limitations imposed by the available raw materials. Blue in all media is often highlighted with large areas of white in Italy as it is in Paris. Even on the finest Italian panels of the mid-XIVth century, blue pigments rarely had the intensity and brilliance of the blue of the Petites Heures and the Très Belles Heures of c.1380. In most schools green is rather muted until the end of the XIVth century. There are some exceptions to this, particularly in fresco painting. Both Simone Martini in his frescoes in the lower Church at San Francesco at Assisi(11) and Matteo Giovannetti in his frescoes at the Palais des Papes at Avignon and at Villeneuve-lès-Avignon use a bright "minty" green [sl. 16], later found in some pages of the Très Belles Heures and the Petites Heures, but apparently not before that time in Paris.

Although in the late-XIVth century in Paris red is still rather orange in colour, it is now more often modelled with yellow or white. These two highlighting colours are used with red in earlier Italian painting. "Barna" (worked: Siena, Pisa and San Gimignano) used yellow to highlight orange in a panel of St. Mary Magdalene (Musée du Petit Palais, Avignon, c.1340) [sl. 17](12) White is used to highlight red in a fine panel of St. John the Baptist and St. Mary Magdalene (also in the Musée du Petit Palais at Avignon) by Agnolo Puccinelli (worked: Lucca in the second half of the XIVth century). Furthermore, throughout the century in Italian panel painting there are areas of strong, bright red
which tend much more towards the colour of vermilion than the 
reds of their Parisian contemporaries\(^{13}\)?

Nevertheless, in their general treatment of red, blue and green, 
Italian masters differ little from their Parisian contemporaries. 
The greatest difference, however, is that by the 1320s some 
Italian schools, but not all, used bright yellow which does not 
appear in Paris until miniatures by the Parement Master and 
Pseudo-Jacquelart. It found general favour in the panel and 
manuscript illumination of Florence and Siena and Bolognese 
manuscript illumination\(^{14}\) As a consequence of the introduction 
of bright yellow, all the colours of these paintings appear 
generally brighter than those of contemporary Parisian books.

Southern French artists working at Avignon in the mid-XIV\(^{th}\) 
century were more directly influenced by their their Italian 
companions than were their Parisian contemporaries. The fine 
Annunciation and Nativity painted by an artist of the Avignon 
school under Italian influence, manifests colouristic and 
stylistic associations with Sienese paintings (Musée Granet at 
Aix-en-Provence, c.1343) [sls. 27-29]. The colours of these 
panels differ from anything seen in Paris at this time\(^{15}\)? The 
Annunciation shows this artist's preoccupation with space; the 
scene takes place in a deeply recessed building, although it is 
set against an abstract gold ground [sl. 27]. The Nativity is 
less three-dimensional in concept and furthermore recalls more 
closely contemporary Parisian illumination in its colour, 
although its style and iconography are quite different.
Nevertheless, in the foreground of the Nativity (sl. 28-29) one of the handmaidens wears green highlighted with bright yellow, a colour combination not seen in Paris until miniatures in the Trés Belles Heures painted about forty years later.

Another artist closely associated with the Avignon court, and almost certainly of Italian origin, is the Master of the Codex St. Georges (sls. 20-21). In manuscripts and panels painted, in all probability, for Cardinal Stefaneschi (d. 1343) at Avignon, the artist used not just touches, but large, dominant areas of bright yellow contrasted with green, and areas of "pastel" blue and pink. While it is certain that both late-XIVth-century Parisian illuminators and Burgundian panel painters treated yellow with a certain amount of deference, it is found extensively in these Italianate paintings done for the Avignon court. It is not impossible, therefore, that later-XIVth century Parisian painters saw these or similar manuscripts and panels from Avignon and were inspired by them to include yellow, powder blue and rose red in their illuminations.

Despite undoubted links with Italian and Avignonese colour, Parisian attitudes to colour are quite different from those of their Italian contemporaries. There is, for example, a much less rhythmic approach in the Italian schools and more experiments with mixtures and complements. The close harmony and decorative discipline of Parisian illumination is absent from both Italian panel painting and manuscript illumination. Throughout the period under discussion in this thesis, colour in Parisian
illumination is used rhythmically, that is artists take the spectator's eye around the image from side to side and up and down by an organization of colours that has an internal abstract and decorative harmony quite unrelated to the use of colour to describe an object (yellow hair, black shoes, blue dress).

While the approach to colour differs radically between 1320 and 1420 in Paris, both Le Noir in the mid-XIVth century (see CHAPTER FIVE and SEVEN below) and the Boucicaut Master in the early-XVth century (see CHAPTER NINE below) use touches of one colour to carry the eye to another patch of the same colour. I will argue that the function of this internal decorative rhythm is to arrest the eye on the surface of the miniature and prevent it perceiving too great a depth within the scene. It also seems to be the case that artists gave the miniature itself an inherent decorative unity, unrelated to the subject matter, which makes of the image an ornamental unit within a series of ornamental units on any given page.

Related to this interest in decorative rhythm is the mid-XIVth-century Parisian passion for alternating red and blue. Most frequently backgrounds alternate with the coloured borders which surround them, for example a blue background bordered in red. Sometimes the pattern of alternation applies throughout the manuscript as a whole, each background colour alternating with the next background and each background alternating with its own border colour. With very rare exceptions, the most notable being the Parement Master, Parisian artists from the XIVth and early-
XVth centuries maintained a fairly even distribution of colours over the image even if at the end of the XIVth century they abandoned alternation. There is in all this alternation and decorative discipline a passion for order that is not found in Italian panel painting or manuscripts. (17)

An interesting observation can be made about different approaches to colour. In the Palais des Papes at Avignon there are two fresco cycles by the Italian Matteo Giovannetti and by southern French artists in the Chambre du Cerfs (1343). In the Chambre du Cerfs, except for the robe of the main figure fishing and the edge of the pond which are yellow, there is a great deal of red and blue which seems to alternate (sls. 30-33) (18). In fact, the southern French artist(s) used the same alternating and rhythmic patterns of colour found in mid-XIVth century Parisian illumination. Thus although in these frescoes clear Italian influence can be seen in the approach to figures, costumes and indeed in the very technique of the fresco itself, the artists were also aware of Parisian colour use and decorative conventions.

New colours first made their appearance in Italy in the early-XIVth century and eventually made their way to France about half a century later. At the same time, the old established colours and most especially the major dyes, indigo, grana and lac were available in greater volume. Furthermore, the rise of the independent pigment merchant would certainly have made the range of traditional pigments more widely available to all. In the
analysis of colour use in the XIVth and early-XVth centuries in PART TWO it will be possible to see how the palette was manipulated to create the rigorous aesthetic systems of XIVth and early-XVth-century Parisian illumination.
NOTES

1. Gordon et al., "Nardo di Cione", pp.31-32; Delhaye et al., "La microsonde Raman", pp.119-124; see also: PART ONE, CHAPTER ONE, note 75.

2. For example, two Bolognese manuscripts Justinian, Digestum novum cum glossa Accursii, (B.N. Ms. latin 14341, dated c.1330 ff.33v & 94) and a Luca Manelli, Compendium moralis philosophiae (B.N. Ms. 6467, dated c.1345-1350, f.2). On these manuscripts see: Avril et al., Dix Siècles d'Enluminure Italienne, pp.79, No.64, 83, No.68. Mosaic gold also seems to have been used in an Avignon manuscript a Missal of Clement VII (B.N. Ms. latin 848 ff.7, 20). See also: Morgan, "Aspects of Colour", p.114.

3. On occasions there is a bright green that seems not to have the transparent quality of verdigris. This colour may be malachite, but it could also be a mixture of azurite or ultramarine and orpiment, for example, in the Hours of Jeanne de Navarre (ff.97, 99 & 100v).

4. One painting from this group, dated to the late-1380s or 1390, and certainly painted for an austere Carthusian (Carthusian Monk at Prayer before the Crucifix) (sl. 7) seems to mirror the more restrained and sober colours of mid-XIVth century Parisian manuscript paintings. On this painting see: Thiébaut, "Peintures", pp.376-7, no.326.


6. In the Musée du Petit Palais at Avignon in a panel of the Virgin and child with St. John the Baptist and St. Anthony of Padua by the Master of Saint Verdiana (Florence third quarter of the XIVth century) the Child wears mauve and He also wears a mauveish blue in a panel in Ajaccio of the Mystical Marriage of St. Catherine with St. John the Baptist and St. Dominic by Niccolò di Tommaso (known Florence and Pistoia 1343-c1376).

7. This type of colour is used in the Entombment (Paris or Dijon, beginning of the XVth century) (sl. 4) and the Small Tondo (Paris or Dijon, beginning of the Xvth century) (sl. 5) in the Louvre (Sterling, Les Peintres du Moyen Age, p.9; Sterling and Adhémar, Peintures, pp.4-5, plates 15-20).

8. In the large Louvre tondo (sl. 3) there is a small patch of yellow in the foreground on an angel's wing (this might be gold), otherwise in the Small Tondo (1390-1400) (sl.5) and Entombment there is no yellow (sl. 4). On these panels see: Sterling, La Peinture française, pp.9-10; Sterling and Adhémar, Peintures, p.5, plates 28-37; Thiébaut, "Peintures", pp.377-8, no.327. In the Lamentation at Troyes (c.1400-1410) yellow is used in the angel's hair (sl.6) (Ring, A Century of French Painting, p.197-8, Cat.52).
9. For the reverse of the Angers Apocalypse see: Cailleteau, Salet, Muel, Ruais, de Mérindol, *La Tenture de l'Apocalypse d'Angers*. There are very strong contrasts, for instance blue shaded with red lines [sl. 11] and the startling combinations of red and yellow [sl. 12]. Among the new complements are green shaded with yellow [sls. 13-14] and yellow shaded with red [sl. 15]. These combinations are found from c.1380 in Parisian manuscript illumination.

10. Meiss argues that the Parement Master when painting in the *Très Belles Heures* may have reflected influences from Bohemian painting and that the artist was inspired by the fusion of Italian and northern elements to be found in that art. I have not seen enough mid-XIVth-century Bohemian paintings that are not printed illustrations in books to make any kind of judgement on this idea from the point of view of colour. The stylistic associations are interesting and Meiss' arguments about ornamental details are convincing (Meiss I, pp.130-132).

11. For example, St. Martin shares his Cloak of the 1330s (for an illustration see: Cole, *Sienese Painting*, colour plate 3).


13. Areas of bright red may be seen in in an *Virgin and Child with St. John the Baptist and St. Michael* by a student of Barnaba da Modena (Liguria) from the second half of the XIVth century [sl. 18] and a *Crucifixion* by a Sienese master from the second half of the XIVth century (Musée du Petit Palais at Avignon) [sl. 19]. It is difficult to establish the extent to which vermilion was used in panel painting. For example, an examination of Paolo Veneziano's *Virgin and Child* c.1354 in the Louvre revealed no vermilion (Bazin, Hours, Petite, Rudel, "Une palette du XIVe siècle", p.7).

14. It is not possible to state the exact date of the discovery of a stable bright yellow. Cimabue [sl. 23] and Duccio seem not to have used bright yellow and it may be assumed that the colour was discovered in Italy c.1320 and used by the most advanced artists after that date. It is seen for example, in two paintings in the Louvre: the *Virgin and Child Enthroned* by the Master of the Codex St. Georges (c.1320-40) [sls. 20-21] and *Carrying the Cross* by Simone Martini (c.1320-1340, Avignon period) [sl. 22]. There is yellow in a *Coronation of the Virgin* by Puccio di Simone (known: Florence from 1349 and in the Marches 1353-4) [sl. 24] and a panel of *St.Peter* by Taddeo di Bartolo (both in the Musée du Petit Palais at Avignon, 1362-1422) [sl. 25] and in the borders of B.N. Ms. français 12235 (a Florentine version of Seneca's *Epitres à Lucilius* in an anonymous French translation c.1320-1330). There is a considerable amount of yellow used in Bolognese manuscript painting, for example, in B.N. Ms. latin 14339, Justinian's *Digestum vetus cum glossa Accursii*, c.1345 [sl. 26]. (For these manuscripts see: Avril et
However, the yellow found in Paolo Veneziano's Virgin and Child was difficult to analyse, but it might have been dyer's weld, a plant-based pigment (Bazin, Hours, Petite, Rudel, "Une palette du XIVe siècle", p.7). In another Venetian panel in the Louvre, Madonna and Child by Lorenzo Veneziano (active 1356 to 1372), there are no areas of bright yellow, although yellow is used as a highlight on green.

15. Dated 1343 they are roughly contemporary with the Psalter of Bonne of Luxembourg [sls. 71-72]; see CHAPTER FIVE below (Thiébaut, "Peintures", p.367-8, no.320; Laclotte et Thiébaut, Ecole d'Avignon, p.22 and Thiébaut, L'Art Gothique Siennois, pp.184-186, no.61 & 62).

16. For example in B.N. Ms. latin 15619 (a Pontifical made for the Cardinal in Avignon c.1320-1330) and a small panel in the Louvre of the Virgin and Child Enthroned [sls. 20-21] (Avril et al., Dix Siècles d'Enluminure Italiennes, pp.60-62, no. 47; Laclotte et Thiébaut, Ecole d'Avignon, pp.10-12).

17. It is particularly noticeable in mid-XIVth-century Italian manuscripts like B.N. Ms. latin 8500 (Fulgence, Ausone, Prudence, Cassiodorus etc., c.1330-1340) from Northern Italy, perhaps Mantua (Avril, et al., Dix Siècles d'Enluminure Italiennes, pp.85-86, no.71). Border and background colours change half way down the miniature or half way along the border and so are to some extent treated like Parisian French borders and backgrounds, but no attempt is made to alternate the colours.

18. Red and blue alternate in the scene to the right of the door Chambre, a painting in good condition and so quite easy to judge, but the same seems to be true of more damaged scenes [sl. 31]. Interestingly these artists appear not to have used red sinopias, but a greyish underdrawing [sl. 33]. A similarly restricted range of colours can be seen in late-XIVth century (c.1380-90) murals from a house in the Sorgues (in the Vaucluse). These murals are now in the Musée du Petit Palais at Avignon. On the Chambre des Cerfs see: Laclotte and Thiébaut, L'Ecole d'Avignon, pp.28-33 and on the Sorgues murals see: Thiébaut, "Peintures", p.375-6, no.325; de Loë, Mognetti, Thiébaut and Bergeon, Avignon, Musée du Petit Palais, p.94.
PARISIAN MANUSCRIPT ILLUMINATION c. 1320-c. 1380

The manuscripts cited in this section on illumination c. 1320-c. 1380 are representative of Parisian illumination from the first to the last quarters of the XIVth century. Examples of miniatures from the very end of the XIIIth century and the beginning of the XIVth century are taken from miniatures by the so-called Maître Honoré in *La Somme le Roy* (London, B.L. Ms. Additional 54180) and the *Breviary of Philippe Le Bel* (Paris, B.N. Ms. latin 1023) (1). A *Missal for the Use of Paris* (Paris, B.N. Ms. latin 861) and the *Bible of Jean de Papeleu* (Paris, Bibliothèque de l'Arsenal Ms. 5059) are considered to be by his followers (2). The fine *Vie de Saint Denis* (1317) (Paris, B.N. Ms. français 2090-2) is important because it is a dated representative of a rather different early-XIVth-century style (3). The *Belleville Breviary* (Paris, B.N. Ms. latin 10483-84) and *Les Miracles de Notre Dame* (Paris, B.N. Ms. nouv. acq. français 24541) along with the *Hours of Jeanne d'Evreux*, (New York, Cloisters Museum), are quoted as the main examples of Jean Pucelle's painting (4).

Examples of Jean Le Noir's work have been taken from the *Hours of Jeanne de Navarre* (Paris, B.N. Ms. nouv. acq. latin 3145), the *Psalter of Bonne of Luxembourg* (New York, Cloisters Museum), the *Hours of Yoland of Flanders* (London, B.L. Ms. Yates Thompson 27), the *Evangeliary* (London, B.L. Ms. Yates Thompson 34) and
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Epistolary (Paris, Bibliothèque de l'Arsenal Ms. 161) of the Ste. Chapelle, the frontispiece of the Bible Historiale of Charles V (Paris, Bibliothèque de l'Arsenal Ms. 5212, vol. I) and the Petites Heures (Paris, B.N. Ms. latin 18014) (5)

François Avril has identified fifteen illuminators working on a large grisaille Bible Moralisée (Paris, B.N. Ms. français 167) (6). Examples have been taken from the Bible itself and from the Oeuvres de Guillaume de Machaut (Paris, B.N. Ms. français 1586), in particular the Remède de Fortune whose illuminator appears in the Bible. These manuscripts are interesting because they demonstrate a mid-century taste for grisaille. The Bible is in pen and ink; the Oeuvres de Guillaume de Machaut in true grisaille.

There are many examples of miniatures by the Boqueteaux workshop. The most interesting manuscripts were those produced for Charles V. Examples have been cited here from the Tite-Live (Paris, Bibliothèque Ste. Geneviève Ms. 777), Les Grandes Chroniques de France (Paris, B.N. Ms. français 2813) and the Bible Historiale of Charles V (Paris, Bibliothèque de l'Arsenal Ms. 5212). The first is in colour, the second in grisaille and colour and the third in pen and ink. Another copy of the Oeuvres de Guillaume de Machaut (Paris, B.N. Ms. français 1584) demonstrates well the transition from sketched landscapes to fully painted views of the countryside. La Pèlerinage de Vie Humaine (Paris, B.N. Ms. français 823) shows the culmination of
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the XIVth-century passion for both grisaille and alternation (see below ALTERNATION).

CHAPTER FOUR ends with a comparison between the early and late work of Jean Le Noir in the Hours of Jeanne de Navarre and the Petites Heures. Here the changes and similarities between two closely related cycles, separated by thirty years, are examined. The chapter concludes with an examination of the grisaille miniatures in the Psalter of Jean de Berry. They will be considered as transitional miniatures linked both to the sober mid-XIVth-century taste for grisaille and to the "new", brilliant palette of the Très Belles Heures (Paris, B.N. Ms. nouv. acq. latin 3093) and the Petites Heures (Paris, B.N. Ms. latin 18014).

MAITRE HONORE AND THE ARTISTS OF LA VIE DE SAINT DENIS

Clear generalizations about the changes in colour use in XIVth-century Parisian illumination are difficult to make. It is possible to say, however, that in comparison with both the late-XIIIth century and the late-XIVth century, colours in the early-to mid-XIVth century tended to be paler. More colours were used than in the XIIIth century, but they are less varied than they became at the end of the XIVth century. The image is often painted in "pastel" (that is pale blue and pale pink) shades with some sharp notes. Colours are fairly saturated with few transparent areas. Even when the artist used a lake, it is mixed
with white to give it opacity. There are also quite large areas of brown, dark grey and black, especially in Pucelle's miniatures.

Throughout the century artists used a rather dark, acid green often with light colours foiled against it. Orange is the sharpest colour and strongest in tone. It contrasts starkly with the "pastel" shades and frequently fails to harmonize with the other colours, so unbalancing the composition. Blue was generally applied with a lot of highlight and seldom balanced the orange in intensity.

Highlights appear in miniatures by Honoré and his followers at about the end of the XIIIth century. Broad areas of contrasting highlight and shadow in mid-XIVth-century manuscripts derive, in all probability, from a search by these earlier artists to achieve modelling in light and shade. They laid strong highlights over shadows. The main colour acted as highlight and shadows contrasted against it. Divisions between light and dark are thus strongly defined. In miniatures by Honoré (sls.34-36) and the painters of La Vie de Saint Denis (sls.37-44), most conspicuous are pinks, blues and greys contrasted against bright orange.

Regardless of any logical fall of light, highlights usually shine full onto the front of the figure, while the shadow is picked out with dark lines. In Honoré's system of modelling highlights make some parts come further forward than others. He highlighted
towers of buildings to give the effect of one part projecting more than another. This technique gives an impression of roundness, but the firm outlines and the juxtaposition of light and shade also prevent architecture and figures from appearing truly three dimensional. Outlines at the edges of towers stop light and shade from merging and detract from a sense of depth. There is similar lighting on the architecture of La Vie de Saint Denis. Here highlights are used logically on towers and give a sense of forward projection. They also appear on a flat wall where there should be no such projection. Here the effect is probably intended to be primarily decorative. Nevertheless, it demonstrates an interest in light fall, albeit in a still simplified and unsophisticated way.

Although as a general rule, in the work of Honoré and La Vie de Saint Denis, highlights fall straight onto the figures, something of the principles of recession was understood by La Vie de Saint Denis artists. They have modelled their characters by placing one arm in shadow and one in full highlight. By painting forward parts of the body and buildings lighter than the back parts, they have arrived at a sort of three dimensionality. These artists are not yet successful in terms of the whole miniature, because even if some parts of the scenes are shown in front of others, this understanding does not spread to all colours or all elements in the picture plane. Treatment by these artists of specific factors within the illuminated page will be discussed below in relationship to Pucelle's development of these particular elements.
Jean Pucelle was probably the most influential Parisian illuminator of the XIVth century. Nothing is known of him before 1319 and he died in 1334(11). His work is of such an innovatory nature that its origins can only be a matter for speculation. Some of his artistic roots are found in the workshop of La Vie de Saint Denis and he was clearly inspired by Honoré's rather light colours(12). However, he made his colours darker and strongly contrasted light and shade, adding many top highlights in white. In Les Miracles de Notre Dame the technique is very complex and no other Parisian artist achieved such detailed modelling of drapery and facial structure in light and shade [sls. 47-48]. Nevertheless, Pucelle's most influential work was the Hours of Jeanne d'Evreux. The grisaille of this little book struck a chord with other Parisian artists and its technique, far more than its style, fascinated other XIVth-century illuminators.

Since there are such undoubted signs of Italian influence in Pucelle's work, it has been suggested that he visited Italy and returned with several important ideas. Pucelle assimilated the way that Italian masters painted figures so that they should appear solid in space and he applied his interest in volume to both architecture and figure painting. The Italian paintings most influential on his style were Duccio's Maestà and perhaps Giotto's grisaille dado paintings in the Arena Chapel [sl. 45](13).
At the same time, his style has the elegance of the followers of Honoré found in the workshop of Richard of Verdun and he is certainly associated with the stronger, more monumental style of La Vie de Saint Denis. Pucelle was influenced by the broad areas of colour and bold designs found in this remarkable manuscript. He too used architectural motifs, but his constructions are more sophisticated than the rudimentary architectural surrounds and flat crenellated towers and walls of La Vie de Saint Denis. Pucelle goes beyond that manuscript in elaborating drapery patterns and simplifying compositions.

On f.17 of the second volume of La Vie de Saint Denis, (français 2091 [sl. 40] there is an historiated initial of Saint Denis writing. Avril associates this figure with the Pucellian style, but does not think that Pucelle himself worked on the miniature. The turned back sleeve of the Saint's robe, the highly modelled face with a little reddish brown added for shadow colour and the clearly defined eyes do recall the style of the Belleville Breviary.

If Honoré and the artists of La Vie de Saint Denis attempted to show round towers projecting forward by using centrally placed patches of light, Pucelle understood that light fell to one side and shadow to another. For example, in the Hours of Jeanne d'Evreux f.154v [sl. 58] ("The Miraculous Return of Saint Louis' Breviary") he has appreciated, unlike Honoré, that shadow and
light merge where the light on the round of the tower joins the flat wall.

Pucelle assimilated his predecessors' experiments with light, adding bright highlights and strongly marked shadows to his figures. At the same time, his softer outlines and greater sense of volume show if not direct influences from, at least a good grasp of, Italian principles of three-dimensional painting. Pucelle synthesizes in his paintings the new experiments with pale colours and light of his immediate northern predecessors with the experiments with volume of his Italian contemporaries.

Outlines and Drapery

In Honoré's paintings and in the La Vie de Saint Denis, drapery falls in flat, angular folds, often with very strong highlights and usually with a firm line separating one area from the next. Pucelle's drapery is not quite like that of other Parisian painters of the period; it is most like the rather soft, heavy fabric painted by the school of Richard of Verdun in the Missal for the use of Paris ff. 1 & 147v [sl. 46].

While Pucelle simplified the overall effect of a composition, he elaborated drapery painting techniques beyond those of his predecessors. In this Pucelle may have found inspiration in Duccio's complex drapery, elaborately folded, to give a decorative effect without losing a sense of weight. In Duccio's
Maestà, drapery falls in complicated folds defined by coloured shadows (for example, the Entombment of the Virgin, and Saint Peter in Christ Before Caiaphas). Pucelle avoided inked outlines to differentiate one area of drapery from another, and used instead a highlight or shadow. Although he did not use it in all the miniatures attributed to him, Pucelle exploited this technique to make his figures rounder and softer. A harder line either around the figure or within the division of draperies, flatten the figure against its background.

Protagonists wear an undergarment in one colour, a cloak in a second, twisted over to show a third in its lining. Drapery in three colours was not invented by Pucelle; it appears in La Vie de Saint Denis and the Bible of Jean de Papeleu. However, the loops and knots of Pucelle's voluminous and fluid drapery are more advanced than those of his predecessors and even more complicated than those of Duccio.

The drapery of drolleries is animated, but clothes on the main figures usually retain a certain solidity and do not curve into the complicated, abstract patterns found in paintings by his successors. Pucelle preferred a static pose. In particular he used a forward seated figure to give an increased sense of monumentality. If he visited the Arena Chapel, Pucelle might have appreciated Giotto's simple but coloured outlines and massive forms and he may have imitated the frontal views of the dado figures (for example, like Injustice [sl. 45]). This Vice faces full forward, knees covered with voluminous material. By
allowing the drapery to fall in heavy folds and hiding the exact shape of the body, Giotto gives the figure solidity. A similar figure type is used by Pucelle for Delilah in the Belleville Breviary (f. 37 [sl. 51]). Although her pose is different and more lively, the same sense of monumentality is evoked by the drapery. The broad outlines of her knees and legs are drawn, but the exact shape of her body is obscured.

Face Painting

Maître Honoré and the artists of La Vie de Saint Denis left faces very simple; a few lines indicate eyes, nose and mouth, with perhaps a darker shadow showing the eye sockets or line of the chin(20). Pucelle, on the other hand, models faces, in light and shade, as he does for figures and architecture, using in many cases pale washes instead of lines to indicate shape. He intensifies the expression and structure of the face, differentiating ages and sexes by colours(21). This articulation applies most particularly to male faces. Cheekbones and foreheads are highlighted, but the eyes and jowls often fall into shadow.

Pucelle was particularly interested in the modelling of the neck. In the Hours of Jeanne d'Evreux, "Christ Before Pilate" (f. 34v) [sl. 54] the figure immediately to the right of Christ has his face in shadow which is shown clearly by his dark skin colour, while his jaw line is indicated by a shadow. Christ himself is
relatively pale in colour, but his thin neck and shadowed cheek are clearly shown. The young man behind Pilate has a less modelled face consistent with his youth: the women of the "Visitation" (f.35) also have relatively pale faces [sl. 54].

Like Honoré, Pucelle leaves hair and beards largely uncoloured. Although in most miniatures in Les Miracles de Notre Dame Pucelle coloured hair, in the Belleville Breviary and the Billyng Bible it is mostly left light, although still painted(22) He does not use the saturated hair-painting techniques of the two full-page miniatures in the Missal for the Use of Paris (ff.147v [sl. 46] & 148) by Richard of Verdun; his style is less mannered with slightly straighter hair and fewer contrasting highlights and shadows. It is somewhat closer to La Vie de Saint Denis, with less exaggerated curls at the side of the head, but the styles of La Vie de Saint Denis, Honoré, the Missal for the Use of Paris and Pucelle are closely linked.

Architecture and Landscape

In La Vie de Saint Denis there is a great deal of purely decorative architecture painted in predominantly "pastel" shades: blue, pink and white with gold added for roofs. Similar colours were used by Honoré for architecture(23) However, Pucelle favoured somewhat darker colours for buildings: palish brown or yellow with dark brown shadows(24)
He also developed a distinctive landscape style with the ground divided into little sections like steps. It is a much reduced version of the type of landscape found in Duccio's Maestà (for example, "Three Marys", "Harrowing of Hell" and "Noli Me Tangere") where the mountainous terrain rises high above the scenes. Pucelle turns these extensive heights into rocky planes. His landscape colours tend to brown or green in keeping with a naturalistic approach.

Background and Border Decoration

Early XIVth-century Parisian illuminators continued to use the diaper backgrounds of some XIIIth-century illuminations, for example, a Missal (Paris, B.N. Ms. latin 830 (after 1253) f.125) and a Martyrology with Calendar for Saint Germain des Prés (Paris, B.N. Ms. latin 12834, (1278-1279?) f.36 bis). With this type of background, the figure is not foiled against a flat colour, but against an articulated surface that catches the light at many different angles and offers abstract, decorative planes. Diapers can be seen in paintings by Honoré, and his followers in the Missal for the Use of Paris. The artists of La Vie de Saint Denis developed this technique, making the squares smaller and more elaborate. Nevertheless, in many, but not all his miniatures, Honoré continued to use gold backgrounds also found in the XIIIth century. However, the flat, unburnished grounds of the Saint Louis Psalter (Paris, B.N. Ms. latin 10525) have
disappeared and where there is gold, it is decorated with tooling(30).

Pucelle continued to use diaper, but he also introduced new backgrounds. His most imaginative are in the Hours of Jeanne d'Évreux where he has used a coffered background on f.34v [sl. 54], rinceaux on f.159v [sl. 59] and faces on f.154v [sl. 58]. Although most backgrounds in the Belleville Breviary are fairly ordinary diaper, on f.321 of vol. II, blue faces, squirrels and rabbits are painted against a darker blue background(31). Backgrounds and border ornament are essential to the overall unity of the page.

Pucelle followed the earlier artists of La Vie de Saint Denis, La Somme le Roy and the Bible of Jean de Papeleu in using gold and coloured rinceaux in the borders(32). But he is more ambitious in ornamenting the text, the central column and the outside of the entire ensemble, where drolleries and marginalia increase the overall decoration and enhance the written text. Drolleries cling to the margins in the Belleville Breviary(33). Although these fantastic or hybrid creatures have no narrative function, they do have a specific purpose. On f.24v [sl. 51] of vol. I of the Belleville Breviary a drollery strays over the edge of a room in which Saul is sitting. At one moment the artist directs the eye into a deep, square room, at the next, the decorative hybrid recalls the abstract quality of the painted page upon which the apparently three-dimensional room is situated. These carefully drawn, but fantastic figures link the apparent depth of the
miniature to the abstract border ornament within which the text is situated, reminding the onlooker that text and miniature form a whole.

In the Belleville Breviary, the illustrations concerned with the moralizations of the text are in the bas-de-page (for example, f. 53 [sl. 52]). These refined and restrained paintings are an integral part of Pucelle's sophisticated perception of page construction. They are laid out with a sense of order and are never crowded, but tell a story simply and clearly. The uncoloured backgrounds of the bas-de-page enable the artist to articulate figures, which are unencumbered by superficial decoration and seem rounded and solid.

Alternation

In Les Miracles de Notre Dame Pucelle, like Honoré's workshop and La Vie de Saint Denis uses a system of alternating border and background colours. In the alternation schemes employed by XIVth-century Parisian illuminators, orange, red and pink function similarly and are used in contrast to blue. In this thesis, I will call the colour "red". The general principle of red/blue alternation is that if the background is "red", then the border is blue and vice versa. The system can, of course, be more complicated. In Les Miracles de Notre Dame f. 72 [sl. 47] there is an alternating blue and red border with a red background. The largest area of red background contrasts with
the blue border which runs along the side of the miniature. The red part of the border thus runs along the top so that at the top the red border would encounter the red background. Here, however, the artist has been very subtle; he has interspersed an area of blue cloud between the red background and the red border so as to retain the alternation of colours.

Pucelle's elaboration of the basic, medieval red/blue alternation scheme, will become, as time progresses, an integral part of the whole concept of page decoration. It develops through the work of Le Noir and reaches its culmination in the *Grandes Chroniques de France* (B.N. Ms. français 2813) (see below).

**Colour**

The very dark, vibrant colours of the XIIIth century to a large extent consisted of wide areas of red, blue and gold. In comparison with XIIIth-century miniatures, the colours of *La Vie de Saint Denis* and of Honoré seem lighter and brighter. Artists use pale blues, pinks, greys and mauves as well as green, dark blue and orange. Although the transparent brownish colours of the *Saint Louis Psalter* (B.N. Ms. latin 10525) are still used, they have been augmented by pinker lakes and mixtures to make pale mauve. It is from this augmented range of colours that Pucelle derived his inspiration.
Coming from the tradition of *La Vie de Saint Denis* and the workshop of Honoré, Pucelle inherited a range of light and bright colours with highlights falling onto pale colours, especially pink and blue, but leaving red, green and white relatively unaffected. He took his predecessors' palette and intensified it, especially in *Les Miracles de Notre Dame*, where bright green, perhaps malachite, bright orange and a little vermilion red are used in conjunction with ochre, grey and brown. While Pucelle uses the same basic colours, they appear darker and more saturated. Blues and pinks are essentially the same, but blues in particular are somewhat darker. In many cases the highest light is the main colour, not a lighter colour painted on top of the main colour.

As PART ONE demonstrated, the actual pigments used by Pucelle were unlikely to differ much from those of his predecessors, but he used them to make his colours appear muted. He favoured quite a lot of brown and yellow ochre and a pale blue shaded with grey or dark red, while also using the more usual colours, orange, green and blue.

Pucelle used quite a wide variety of blues. Many of these may be lakes, but either ultramarine or azurite and perhaps both are used throughout. A very dark blue, probably made from a blue lake colour derived from indigo or woad, often appears. In the *Belleville Breviary* (vol. I, f.6) the Virgin holds a blue flag painted in a colour so dark that it is almost black, a quality of indigo or woad.
Because of the problems of incompatibility, Pucelle adds white highlights on some colours, but not on others. Blues, pinks, greys and mauves were all highlighted with paler versions of themselves, but highlights were almost never added to the orange which is probably red lead. Pucelle usually shows red lead in terms of shadow with the main colour acting as highlight\(^{(39)}\). There may have been a tendency for the lead colours to react adversely together, for there are many pinks and pale reds made almost certainly by mixing red lakes with white.

Judging only by an optical examination of the paintings, manuscript artists of this period used very little pure vermilion. Some of this cool, bright red was used for the specific purpose of painting cardinals' hats in \textit{La Vie de Saint Denis}\(^{(40)}\). Otherwise the chief reds are almost certainly red lakes and red lead often with a red lake shadow colour. Shadows on pink are pure red lake which is very dark, but transparent. Throughout the \textit{Belleville Breviary} there are what must surely be pure red lakes and red lakes mixed with white\(^{(41)}\).

The transparent brownish colours in the \textit{Belleville Breviary} may be earths, but are more likely to be ink which is transparent\(^{(42)}\). The same colour in a more dilute form was probably used for face painting. In \textit{Les Miracles de Notre Dame}, Pucelle has concentrated increasingly on more sombre tones. The range of colours in this book is more elaborate than that of the \textit{Belleville Breviary} and possibly the artist was experimenting
with dark, coloured lakes. On f. 59 the mouth of Hell is painted in a dark reddish brown with very deep, almost black shadows (43).

It is reasonable to assume that at this date the green of La Vie de Saint Denis is verdigris. Although it is rather acid in colour, it is always strong and dark (44). Pucelle's greens are fairly standard. There is a darkish green, more intense than in La Vie de Saint Denis.

Mixture greens made from yellow and ultramarine or azurite seem a strong probability in Pucelle's painting. They were probably used in conjunction with verdigris and a little black. In Les Miracles de Notre Dame the artist often used a colour that might be malachite (45). It is bright and friable and the book is sufficiently opulent to merit its use, but it is also possible that he used a stone-ground blue mixed with yellow to make a thick, bright green (46).

Dark green, when made with verdigris, was difficult to highlight, although occasionally Pucelle employed white (47). Very dark greens are used as shadow colours on otherwise pure green drapery (48). The darker green may be the main pigment mixed with a little dark blue lake or black while the highlights are the main colour laid on thinly and unmixed. Most of the pigments have a shiny surface and are probably applied with glair, but the green in the Belleville Breviary (vol. I, f. 6v [sl. 49]) has a mat finish perhaps confirming the treatises' instructions to lay on verdigris with vinegar or wine. In early XIVth-century
manuscripts there is an ochre-like yellow\(^{(49)}\). This is not the strong yellow found at the end of the century in the *Petites Heures* and *Très Belles Heures*, but almost certainly an earth. It is known that yellow ochre was used as early as the *Lindisfarne Gospels*, and the brownish yellow seen here is probably an earth colour\(^{(50)}\). In the second volume of *La Vie de Saint Denis* (f. 117) it is used to highlight green, presumably verdigris.

Pucelle used a brownish yellow throughout the *Belleville Breviary* and the *Hours of Jeanne d'Evreux*\(^{(51)}\). This yellow is probably also a yellow ochre. It is usually shaded with brown, perhaps ink or an earth colour. From time to time Pucelle used strong yellow on its own, but only rarely. He did, however, use a brightish yellow for the palest leaves of trees (vol. I. ff. 7 & 37 [sl. 51], vol. II ff. 12v & 255). If the tree is painted in ultramarine or azurite mixed with orpiment or ochre to make green, the bright yellow may be orpiment. It would not react with these colours and its extremely limited use points in this direction. There is also a very pale, transparent yellow in the *Belleville Breviary* (vol II f. 2v) which has been used, along with grey, to shade a pair of bellows held by a drollery\(^{(52)}\). This might be buckthorn yellow, but is more probably saffron\(^{(53)}\).

As a general rule, in Paris, manuscript illuminators used yellow sparingly and although it plays an important role among the colours of some late-XIVth and early-XVth-century Parisian illuminators, its use is nearly always limited. Even the muted ochre yellow is not used very frequently. On the other hand, in
Italy yellow was used extensively in both manuscripts and panel paintings (see INTRODUCTION TO PART TWO above). The reason why Parisian illuminators were slow to accept bright yellow into their palettes can only be a matter for speculation. There is insufficient panel painting in France at this period to draw any conclusion about the use of yellow in this technique, but what is known of panel paintings at the end of the century shows the same reluctance to use wide areas of yellow.

Two yellows are used in French stained glass at this period, silver stain and an ochre-coloured glass (for example, Bourges, Musée de Berry, panel showing a Crucifixion and St. Margaret, pls.60-62), but the aesthetic of stained glass is entirely different from that of manuscript illumination. In glass painting, artists play with degrees of transparency, while in manuscript painting they play with degrees of opacity. Because of the transparency of glass, yellow-stain glass is nearly equal in intensity to blue, red and green, while ochre coloured glass is less brilliant. The yellows available for use in books or on panels were not transparent; and yellow is more intense than other colours when it is opaque.

It is not until the late work of Le Noir in the Petites Heures that orange is mixed with yellow (54). This may be the result of the invention of a bright yellow sufficiently stable to mix with red lead and vermilion (see above PART ONE, CHAPTER ONE: GIAL-LORINO).
The general tonality of the miniatures in Pucelle's *Belleville Breviary* is quite dark; figures are densely coloured and foiled against intensely coloured backgrounds. However, the overall effect of the page is relatively light, because the darkness of the miniatures is relieved by the uncoloured backgrounds of the bas-de-page. But *Les Miracles de Notre Dame* (for example, f.172, [see Avril, pl.13]) gives an overall impression of sombre, almost lowering colours. Pucelle set most scenes in squares, so that attention is concentrated entirely on the action of the miniature and not tempted to wander over the page. In the scene mentioned above, a farmer tills a ploughed field painted with grey, brown and black areas which have some pale highlights. The farmer wears a brown and dark orange robe with dark brown boots. The brown and green tree is placed against a blue diapered background adding to the overall impression of darkness, relieved by some areas of highlight.

The basic pigments are in all probability no different from those of *La Vie de Saint Denis*, that is the range of colours is more or less the same. All the same, the overall effect achieved by Pucelle is of very strong, dark colours, quite different from the "pastel" shades of *La Vie de Saint Denis* and Honoré.

In his use of colour, Pucelle seems to have undergone two main influences. The palette of Honoré and the artists of *La Vie de Saint Denis* seems to have been the strongest. Pucelle approaches these artists in his treatment of face and hair painting and in his use of fairly large areas of light highlight. On the other
hand, if he did indeed go to Italy, he may have been impressed by the strongly contrasted colours of the Maesta, the overall result of which is darker and more vibrant than anything seen in Parisian illumination at this date. These darker, stronger tones may have influenced Pucelle to reduce the areas of light colour in his own palette.

Highlights and Shadows

When Pucelle used highlights, he created a third dimension. The difference between his approach and that of both his contemporaries and his successors is well demonstrated by the following example. Miniatures in the second volume of La Vie de Saint Denis (f. 89 [sl. 41]), Belleville Breviary (f. 37 [sl. 51]) and Les Miracles de Notre Dame (f. 72 [sl. 47]) all show boats (55). The artist of La Vie de Saint Denis used pale and dark brown to indicate the planking of the ship and arranged these colours as highlights and shadows in strips without showing how the boat curves outwards towards the observer. In both his miniatures, Pucelle uses exaggerated highlights where the side of the boat projects forward, but allows the far side and parts which bend away from the viewer to appear to be in shadow (56).

In his attempt to model in light and shade, Pucelle often exaggerated the relationship between a colour and its shadow and as a result scenes often have an overall muted tone. For example, in the bas-de-page scene of "Judith and Holophernes" in
the *Belleville Breviary* (vol. I f. 45v), the general lies in a tent with red hangings. The dark folds in the red hangings are strongly painted with black lines and an impression of a dark interior to the tent is created by black cross-hatchings.

In the same bas-de-page the Virgin, seated at a table, has breasts clearly defined both by shadows and by white highlights, giving an impression of roundness to her form. However, despite the areas of highlight, her blue robe contrasted against her bright orange cloak evokes a feeling of sobriety. Pucelle uses strong contrasts between light and dark to show his figures as solid and to enhance the internal depth of his scenes. As a result his dark colours, even when there are marked highlights, often throw the whole scene into a rather subdued light.

**Painting Technique**

With the exception of the *Hours of Jeanne d'Evreux* Pucelle's washes are opaque. Some miniatures, especially in *Les Miracles de Notre Dame* (for example, f. 70v) have densely coloured areas with exceptionally thick impastos. These impastos are also used on hands, hair and faces which in many later manuscripts are left uncoloured. In the *Belleville Breviary* (vol. I, f. 6v [sl. 49]) Pucelle used what might be called an "impressionistic" technique. On top of a medium base colour he painted both the shadow and highlights. The highlights on the relatively dark green of the prophet's robe are streaked on in yellow ochre.
Pinks have been approached in a similar, bold way with brownish red lakes used as shadows and strong, white highlights added on top. Despite this broad treatment, the brush strokes have been juxtaposed in such a way that the whole is unified.

Most remarkable is Pucelle's treatment of the paint surface in Les Miracles de Notre Dame. In some miniatures interlocking layers of colour build a shimmering, constantly shifting vision. On f. 65 an executioner raises his sword to a hanging man, but the Virgin intervenes. The colours used for this murderous figure range from a very dark brownish green to a blue/grey highlight. The artist has streaked on several layers of paint and except for the general shape of the body, all the outlines are shown in terms of light and shade. Although the overall impression is green, very little of the garment is painted green. There are touches of blue, pale blue/grey and brown. Brown is used for shadow and the other colours for highlight. Pucelle has finished the miniature with some single brush strokes of white highlight. This play of light over the figure, more than any development in the palette itself, was Pucelle's greatest achievement.

The painterly approach of Pucelle to the miniature is more closely allied to tempera panel painting than the gouache techniques of manuscript painting. If, as seems quite probable, Pucelle came under the influence of Italian panel painting, he may also have seen English or North French painting as well. Although the iconography and painting techniques of Duccio's masterpiece were clearly understood by Pucelle, the Sienese
artist's brilliant and varied colours were not the inspiration for Pucelle's more muted tones.

Pucelle paints thick layers of colour, one on top of the other in a way that evokes the XIIIth-century English Westminster retable [sl. 63]. Here St. Peter, to the left of the retable, recalls some of the miniatures in Les Miracles de Notre Dame. For this figure, the Westminster artist has added lights by scraping away the top layer of paint to create a highlight, but for some of the other figures, the painter has used small white highlights in the final paint layer. This technique seems to be reflected in Pucelle's approach to the executioner in Les Miracles de Notre Dame.

Grisaille

The Oxford English Dictionary describes grisaille as "a method of decorative painting in grey monotone to represent objects in relief". This definition serves well to explain the technique, particularly when it applies to late medieval paintings like the wings of the Ghent Altarpiece, but during the XIVth century its function was more purely decorative and less concerned with representing relief. Until the paintings of André Beauneveu in the Psalter of Jean de Berry, in the mid-1380s, only Pucelle used the technique to make figures seem three-dimensional.
Grisaille is theoretically a painting in grey. In practice grey was sometimes used, but in manuscripts artists generally used a brownish wash. With some exceptions, grisaille miniatures had coloured backgrounds and only the figures were in grisaille. Kathleen Morand postulated that although the style of the two artists is very dissimilar, Pucelle may have been influenced by Giotto's grisaille paintings in the Arena Chapel (sl. 45). Pucelle, she says, realized that a solidly painted figure in front of a coloured background produces an effect comparable to that of a sculptured relief.

If Pucelle was indeed influenced by Giotto, he adapted the grisaille technique to his own medium. The Arena chapel figures tend to be grey and white or greyish brown and white against a coloured "marbled" background; none of the faces are painted. Pucelle's grisaille is less light and more brown, harmonizing perfectly with the beige of the parchment itself. Unlike Giotto, Pucelle kept a light colouring for flesh and accessories, so that only costumes are in grisaille. The whole may be intended to emulate ivory rather than stone or marble sculpture. Many French ivories of this period are uncoloured, but have coloured accessories so that, as in grisaille miniatures, white figures with coloured accessories are foiled against a coloured backdrop.
Grisaille in The Hours of Jeanne d'Evreux

Grisaille enabled Pucelle to create a monumental style. Although he seems to have sought a balance between three-dimensionality and ornament in all his miniatures, the entire layout of the Hours of Jeanne d'Evreux implies sculpted reliefs. The sculptural feeling is enhanced by little tabernacles which surround the scenes. Although some ornament and colour remains, it seems that to Pucelle the uncoloured figures, albeit in a coloured, or semi-coloured setting, would give a general feeling of three-dimensionality (sls. 53-59). Backgrounds are placed within the architectural surround in most miniatures so that the whole composition sits on the page, as if the tabernacles were set into the parchment.

In the Hours of Jeanne d'Evreux, Pucelle concentrates the eye on the action by reducing the number of figures which are also rounder and more clearly defined within their space than had previously been seen in Parisian manuscripts. The visual effect of the entire composition is hence simplified and either deliberately, or by chance, linked in the mind's eye with sculptured relief.

Solidity and depth of modelling associate Pucelle with the Giottesque style and like Giotto, Pucelle leaves large areas of the miniature uncoloured. Although the figures are very small, it is the broad treatment of drapery, perhaps inspired by Giotto, that creates the impression of largeness and bulk. Like Giotto,
Pucelle uses coloured backgrounds, although these do not imitate marble like Giotto's backgrounds. In contrast to the broadly treated figures, Pucelle is clearly concerned to make his coloured backgrounds act as a foil to the inherent depth of the miniatures; their rôle is to recall the flatness of the page, rather than to emphasize the roundness of the figures. There is thus a dichotomy between the strongly modelled figures and the abstract coloured backgrounds which challenges the viewer to look at the miniatures carefully and appreciate the play between perspectival depth and surface ornament.

Grisaille in the Belleville Breviary

Pucelle apparently painted no other grisaille books, but the calendar of the second volume of the Belleville Breviary, of which only one page is extant (ff. 2 & 2v), is also in grisaille. Skin colour is brownish and contrasts with the grey grisaille of the drapery. On f. 2v February, striking in his monumentality, has drapery painted in a slightly stippled technique, softening the line. Except for a small amount of white used as highlight, the rest of the grisaille on this folio has parchment as the highest light. A grey ink wash seems to have been used for the shadows.

On f. 2 Aquarius' pitcher and the water, as well as the jug and covered cup on the table are all shaded blue. Blue is a typical adjunct to the grey or brown of later grisaille miniatures, but
Pucelle seems not to have used it in the Hours of Jeanne d'Evreux. Artists seem to have considered blue a special exception and it subsequently became an integral part of the grisaille palette. In the Belleville Breviary grisaille, the backgrounds are very intense blue which contrasts with the paleness of the grisaille (62). The frames of these two miniatures are lightly coloured, unlike the plain, uncoloured frames of the Hours of Jeanne d'Evreux (63). It seems as if already, in these beautiful little vignettes, Pucelle is elaborating the decorative possibilities of the grisaille technique.

The Technique of Grisaille

Pucelle obviously used a pen for some outlines. In most cases, a line defines the figure or an area, but sometimes outlines are based on absence of line and presence of highlight. He apparently used brownish ink in the Hours of Jeanne d'Evreux, while in the Belleville Breviary the outline seems rather more grey (64).

Outlines are grey or brown with the same colour washed onto the figures. Pucelle left the highlights as blank parchment. For shadows he painted on a light wash, stronger or weaker as required. Very dark areas took an intense, probably undiluted ink wash. In the Hours of Jeanne d'Evreux there is a little colour for faces, perhaps just a touch of brown or red and almost nothing for hair. Backgrounds are generally coloured washes,
probably yellow ochre, blue and red lakes with the same colours applied to some, but not all the accessories (65).

Pucelle makes a distinction between miniatures painted in grisaille and line drawings. The border tabernacles of the Hours of Jeanne d'Evreux are drawn in pen and ink with no colouring, but in a miniature like the "Miracle of the Breviary" f.159v [sl. 58], the artist has given some areas dense colour in contrast to the relatively uncoloured figures. Nevertheless, Pucelle generally kept colours to a minimum. Those colours that have been used are sombre and in general keeping with the low tonality of the book. On f.62 "Annunciation to the Shepherds" [Avril, pl.5] the grass and trees are blue, not green, linking the scene with the facing miniature f.61 "Carrying the Cross" which has a blue background.

Decorative, abstract backgrounds, in keeping with late Gothic manuscript painting traditions, act as a foil to the depth of the composition. They increase the ornamental effect of the miniatures and relate them both actually and by association of ideas, to the tradition of flat book painting (66). However, some miniatures, notably the "Betrayal" f.15v [sl. 53] and "Crucifixion" f.68v [Avril, pl.6] are set against uncoloured backgrounds with the purpose, surely, of showing figures more clearly in an uncluttered composition.

Whatever the individual sources of the grisaille technique and painting style of the Hours of Jeanne d'Evreux, the result is a
synthesis that is exactly suited to manuscript painting. Pucelle balances the three dimensionality created by the highly modelled figures against areas of decorative colour.

Important too is the fact that Pucelle has designed the page so as to include lines of text at the bottom of most miniatures, thus enhancing the link between the image and the text it is intended to illustrate. For a problem presents itself when an artist establishes depth in a scene painted on the page of a book. If a miniature apparently penetrates too deeply into space, something of the continuity of the whole page is lost. A page is flat; writing and border ornament do nothing to detract from this flatness. If the painting is also treated in a flat way, with uninterrupted areas of colour and abstract decoration, it will harmonize visually with the writing and border ornament. Once the miniature painter makes the image recede, inevitably the illustration is set apart from the rest of the page decoration. While such a technique can be used successfully to illustrate a written text and at the end of the history of book painting will be the general rule, it is essentially contrary to the concept of uniting text and image on a single plane which up until this period appears as one of the leading concerns of Parisian text illuminators.

This chapter has discussed the generally pale colours of early 14th-century Parisian illuminators. They used predominantly rose pinks, pale blues and ochre yellows and so give their
miniatures an overall feeling of lightness. Nevertheless, many areas of each miniature have colours that are both dark and strong, in particular green and orange. As yet, artists have not achieved a balance between these two colouristic elements so that there is often a tendency towards lack of overall harmony, with areas of strong colour overpowering the "pastel" shades.

Honoré and the artists of La Vie de Saint Denis used large areas of pale pink and pale blue with wide highlights which serve to lighten and brighten the scenes. Gold and diaper flicker and shine so that with the movement of the page the scenes shimmer and reflect the light. Pucelle in his coloured miniatures emphasized rather more sombre, darker hues which he modelled with highlights and shadows to give a strongly three-dimensional effect. His grisaille miniatures, however, are necessarily lighter in tone and he uses the technique to enhance an overall impression of depth rather than light. In the work of his successor Jean Le Noir, who almost certainly trained in Pucelle's workshop, the older artist's interest in form and depth is lost in a renewed interest in decoration and ornament which has little place for the three-dimensionality with which Pucelle had so successfully experimented.
NOTES

1. This artist is often called Maitre Honoré, although the evidence for this name is limited. Millar popularized the name in his book on Honoré (Millar, The Parisian Miniaturist Honoré, pp.11-15. But see also: Lacaze, The "La Vie de S. Denis" Manuscript, p.183 who follows: Kosmar, "Maitre Honoré", pp.63-68. These scholars prefer to call him the "Somme Master". For the purposes of this thesis, which deals more with general than specific stylistic trends, the artist will be called "Honoré" bearing in mind that this may not have been the name of the artist in question.

2. Avril, Manuscript Painting, p.43.

3. Avril, "Manuscrits", pp.286-287; see also Lacaze, pp.245-248.

4. The Billyng Bible (Paris, B.N. Ms. latin 11935) is chiefly by assistants and not of such great interest. The major work on Jean Pucelle is: Morand, Jean Pucelle. However, the artist has been extensively studied. See also: Avril, Manuscript Painting, pp.13-20, 44-65; Avril, "Manuscrits", pp.291-296; Baron, "Enlumeurs, peintres et sculpteurs parisiens", pp.77-115; Blum, "Jean Pucelle", 211-217; Deuchler, "Jean Pucelle, Facts and Fictions", pp.253-256; Haight Flinn, "A Magnificent Manuscript" - A Historical Mystery", pp.257-260; Hoffeld, "The Image of St. Louis and the Structuring of Devotion", pp.261-267; Morand, "Jean Pucelle: A Re-examination of the Evidence", pp.206-211. For a full facsimile see: Rorimer, The Hours of Jeanne d'Evreux, Queen of France.


7. For example, La Somme le Roy f.97v [sl. 36].
8. For example, français 2090 (f.46v [sl. 37]), français 2091 (f.125 [sl. 42]) and français 2092 (f.37v [sl. 43]).

9. Throughout the manuscript there are highlights in the borders. The inner border colour fades to a lighter colour in the centre, creating what is, in fact, a highlight. It then returns to the darker colour.

10. For example, français 2090 (f.50v), français 2091 (ff.99 & 125 [sl. 42]) and français 2092 (ff.55v & 72v).

11. Dr. Morand quotes an item in the accounts of the Paris confraternity of Saint Jacques-aux-Pèlerins for the years 1319-1324... A Jehan Pucelle, pour pourtraire le grand scel de la confrérie III s. This is the first documentary reference to the artist (Morand, Jean Pucelle, p.31). On the death of Pucelle see: Baron, "Enlumineurs, peintres et sculpteurs parisiens du 14ème et 15ème siècles", pp.87-88 & 112.


13. Dr. Morand assumed that Pucelle visited Italy in the early 1320s going to Florence, Siena and possibly Rome. The association of the Hours of Jeanne d'Evreux and the Belleville Breviary with Duccio indicate a Sienese visit, while the coffered ceilings in the Belleville Breviary (vol.I, ff.17v, 24v & 100v, vol. II, f.12v) suggest the influence of Cavallini in Rome. Dr. Morand suggests that Pucelle heard of Giotto's monochrome figures in the Arena Chapel at Padua and she further postulates that the allegory of Virtues and Vices leading to Hell on the dado inspired the iconography of the Belleville Breviary. She does not think that Pucelle saw the figures himself as they are so dissimilar (Morand, Jean Pucelle, pp.6-8, 12).

14. Morand, "Jean Pucelle: A Re-examination of the Evidence", p.208. François Avril noticed a hand in this manuscript which shows Pucellian characteristics. Even if Pucelle did not himself work on the book, his stylistic roots may be seen here (Avril, Manuscript Painting, p.12).

15. For example, Belleville Breviary, vol. I, ff.6 & 6v [sl. 49].

16. For example, Les Miracles de Notre Dame ff.72 [sl. 47] & 93 [sl. 48].

17. Often, a great deal of the lining is allowed to show. In the Missal for the Use of Paris (B.N. Ms. latin 861, f.147v [sl. 46]) much of the inside of John's robe is showing. Pucelle seems to have developed this technique further. In the Belleville Breviary (vol. I, f.6v [sl. 49]) Matthew's cloak is turned in such a way that the lining is almost as exposed as the outside.
18. See for example, français 2090 (ff. 46v [sl. 37] & 50v), français 2091 (ff. 1 [sl. 39] & 80v) and français 2092 (ff. 20v & 53v [sl. 44]), and for the Bible of Jean de Papeleu (Paris, Bibliothèque de l'Arsenal, Ms. 5059, f. 1 & 260).

19. For example, the Hours of Jeanne d'Evreux (ff. 102v [sl. 57]), the Belleville Breviary (vol. I, ff. 31, 37v & 407), Les Miracles de Notre Dame (ff. Av, 51v & 231v) and the Billyng Bible (ff. 5, 577 & 627v).

20. For example the Missal for the Use of Paris f. 147v [sl. 46].

21. For example, Hours of Jeanne d'Evreux ff. 34v & 35 [sl. 53].

22. In the latter work it is often painted white with dark blue lines (for example, ff. 62v, 293v & 601v).

23. For example, La Somme le Roy f. 36v.

24. For example, Belleville Breviary (vol. I, ff. 37 [sl. 51], 164 & 376, vol. II, ff. 32 & 272), Les Miracles de Notre Dame (ff. 63, 93 [sl. 48] & 214v) and the Hours of Jeanne d'Evreux (ff. 102 [sl. 56] & 154v [sl. 58]). In the Billyng Bible the architectural colours are still saturated and tend to be grey; for example, f. 174 (grey with an yellow ochre door) f. 411 (grey with an orange roof) and f. 470 (grey with an yellow ochre door and red and blue roofs). On f. 22v the building is pale green. There is also grey architecture in the Belleville Breviary (ff. 6 & 6v).


26. These rather sombre landscape colours became particularly popular in the Boqueteaux workshop and can be seen in the Titelive, (Paris, Bibliothèque de Ste. Geneviève, f. 7 [Avril, pl. 32]). The Boqueteaux workshop may have found inspiration in Pucelle's landscapes, for some of the trees found in the Belleville Breviary (vol. I, ff. 37 [sl. 51] & 314, vol. II, f. 255v) have the bushy appearance of later Boqueteaux trees. See below CHAPTER SIX).

27. For Paris, B.N. Ms. latin 830, Missal (after 1253) f. 125 see Branner, Manuscript Painting, p. 229 & colour plate XX and for Paris, B.N. Ms. latin 12834 Martyrology with Calendar for Saint Germain des Prés (1276-1279?) see Branner, Manuscript Painting, p. 279 and colour plate XXII.

28. For Honoré see, for example, La Somme le Roy f. 97v and the Breviary of Philippe le Bel, f. 7; for the Missal for the Use of Paris, f. 147v [sl. 46].

29. Flat gold backgrounds can be seen in, for example, Österreichische Nationalbibliothek, Vienna cod. 2554, Bibel,
fol. 14 ("God Creates the Universe"), London, B.L. Ms. Sloane 2435, Manual of Aldobrandino of Siena, f. f. 44v ("Cellarer Drinking"). Honoré favoured a punched gold background like that found in the Breviary of Philippe le Bel, f. 7 (top) [sl. 34] or La Somme le Roy f. 5v [sl. 35].

30. For example, the Breviary of Philippe le Bel (f. 7 [sl. 35]) or La Somme le Roy (f. 5v [sls. 35]).

31. Although these drolleries have been badly handled, they do not appear to have been added later. They are not by the hand of the master.

32. There are exceptionally fine examples in vol. I ff. 6 & 6v [sl. 49] of the Belleville Breviary and more ordinary examples in the rest of the book.

33. For example ff. 6, 6v [sl. 49] & 24v [sl. 51].

34. For examples see La Somme de Roy (ff. 97v & 107), Vie de Saint Denis (français 2091 f. 85v and français 2091, ff. 17 & 89) and La Miracles de Notre Dame (ff. 72 & 93). In a few cases in the Belleville Breviary (for example, vol. I, f. 203), there is a red top and blue side, and on vol. II, f. 282 there is a blue top and pink sides.

35. Pale blues may be made from ultramarine or azurite, ground fine and mixed with white. The pinks are probably red lakes made most likely from brasil wood.

36. For example, ff. 45v, 59 & 172.


38. Some of the blues have a slightly different, greenish tone and they are placed in contrast with the more intense, pure blue of what is probably ultramarine. In the first volume of the Belleville Breviary (for example, ff. 6 & 6v [sl. 49]), the blue lettering is a very intense colour and the surface dense and finely ground, probably ultramarine. On f. 7 the background gives a blue light when seen from behind and although the surface is rather encrusted, it is probably also ultramarine. However, in the borders of this folio, the blue gives a green light when seen from behind and the artist may have used azurite as a contrast. The artist quite often used a pale blue (for example, vol. I, ff. 6, 7 & 17v, vol. II, ff. 25 & 255v). This pale blue also gives a green light, but if it is azurite, it has probably been mixed with some blue lake.

39. Sometimes Pucelle used white to highlight orange for example, the Belleville Breviary (vol. I, ff. 45v, 176 & 258v, vol. II, f. 272). In this last (vol. II, f. 272), white is also used in the robe of the Pope in the very fine main miniature (perhaps by the master), but not on the robe of the same figure.
in the bas-de-page. White is used against orange in the *Bible of Jean de Papeleu* (for example, ff.19 & 79v) for a cloud effect rather than a highlight.

40. *Paris, B.N. Ms. français 2091* (ff.70v & 80v) and *français 2092* (82v). The red letters of the *Belleville Breviary* (for example, vol. I, ff.6 & 6v (sl. 49)) may be vermilion because the book is very luxurious. The paint has good covering power, is rather thick and has the unified surface that one would expect of vermilion, especially in the dots. There are only touches of vermilion red in *Les Miracles de Notre Dame* (ff.60v, 70v & 179).

41. For example, *Belleville Breviary* (vol. I, f.6), *Les Miracles de Notre Dame* (ff.4, 60v & 63). *Brasil wood* was available to artists from at least the XIIth century. Although there are more recipes towards the end of the XIVth century and the beginning of the XVth century, there is no reason to suppose that it was not extensively used in the early XIVth century. (See *BRASIL WOOD* in PART ONE, CHAPTER ONE).

42. For example, vol. I, f.37 [sl. 51].

43. This may be a red lake with some black ink.

44. Its flaky quality can be seen in *La Vie de Saint Denis* (for example, *français 2091* (f.125, [sl. 42]) and *français 2092* (f.37v [sl. 43])).

45. For example, ff.72 [sl. 47], 73, 84v & 119.

46. *Il Libro dell'Arte*, pp.29, 30, 32, 33, recommends mixing orpiment with indigo, arzica (see glossary), azurite and *giallorino* and ultramarine with orpiment.

47. It is unusual that the artist has highlighted green with white; the fact that it was mainly confined to drolleries might indicate that it was not considered a standard method of highlighting green. It certainly gives a rather dominant contrast. A very small amount of white has been used to highlight green in vol. I, f.29 & 45v. In the *Bible of Jean de Papeleu* (f.260), white is used on top of green which is pale and seems to be verdigris. Presumably the white is white lead. If this is so, it indicates that the artists could mix verdigris with white lead if they chose, but in general they thought it an unsuitable combination. They are apparently used together in the Westminster Retable, dated c.1270-80 (Alexander and Binski, *Age of Chivalry*, p.341, cat. no.329.


49. For example, *Paris, B.N. Ms. français 2090* f.85v [sl. 38].

51. For example, Belleville Breviary (vol. I, f.6v [sl. 49] & 24v [sl. 50], vol. II, ff.12 & 330) and the Hours of Jeanne d'Evreux (ff.34v [sl. 54], 68v [sl. 36] & 102v [sl. 57]).

52. A colour that can also be found in the Greek key pattern in the tent in vol. II, f.40. Only in vol. I, f.7 is the yellow truly strong. In other places it looks as if it may have oxidized or in some way been damaged.

53. For a discussion of the possible use of buckthorn yellow at this period see PART ONE, CHAPTER ONE note 165.

54. For example, Petites Heures, ff.76 [sl. 134], 79v, 92v & 182. What is probably red lead shaded or mixed with yellow is found c.1335-1340 in a painting by "Barna" of Mary Magdalene [sl.17] in the Musée du Petit Palais in Avignon. The saint wears a rather pale orange robe with yellow highlights. On this painting see: L'art gothique siennois, pp.142-144, no.43.

55. Lacaze, The "La Vie de S. Denis" Manuscript p.204. Dr.Lacaze cites the exceptional miniature on f.37v of français 2092 ("Sisinnius Showing the Bodies of Other Martyrs to Saint Denis and his Companions"). Here there are boats and waterwheels facing forward, towards the viewer. These have the light falling onto the forward-projecting parts and the back parts are shown in shadow. This page, and Français 2091 f.17 [sl. 48], which shows a lectern and Français 2092 f.53v [sl. 44] which shows a sarcophagus, have a perspective that is much better understood than in the rest of the manuscript and seem to link the manuscript with a "Pucellian" artist. See on this subject: Nordenfalk, "Maitre Honoré and Maitre Pucelle", p.362. Nordenfalk thought that the sarcophagus of français 2092 (f.53v) was a later Pucellian addition, made when Pucelle was employed to copy the book from Paris, B.N. Ms. latin 5286, another Vie de Saint Denis. Nordenfalk was able to show that there was a non-perspectival underdrawing for this sarcophagus in Français 2092. Dr. Lacaze points out, however, that this view is no longer tenable as Paris, latin 5286, which Nordenfalk believed to be a copy of français 2090-92, is now considered to be a draft for it (Lacaze, The "La Vie de S. Denis" Manuscript pp.201 & 355).

56. Post-Pucellian artists did not or could not repeat this experiment. Boats and ships in the Les Grandes Chroniques de France (B.N. Ms. français 2813, ff.4 [sl. 103 & 281 [sl. 103]) and the Tite-Live (ff.7, [Avril, pl.32], 289v & 378v) are more closely allied to most of the boats in La Vie de Saint Denis than to those in Pucelle's paintings.

57. In the Belleville Breviary, for the uncoloured parts of the hair, the artist may have added some white to make it stand clear of the parchment and hence increase the opacity (for

58. In this miniature the green appears blueish when seen from the back. The artist probably used a shadow colour containing blue.

59. On the saint's blue/green robe, the artist has scraped away the top surface to reveal the pale blue (probably azurite) underneath.

60. It is quite possible that Giotto wished to evoke sculpted reliefs in paint. The success of this impression lies in Giotto's very light highlights which recall the whiteness of marble. He used a "marbled" background which enhances the effect of sculpted marble figures and it looks like real marble. The figures and their backgrounds are apparently made of the same material. If anything, the coloured "marbling" seems to throw into relief the very light figures ranged against it.

61. It is not impossible that Pucelle was inspired by the fashion for ivories then current in France. If this was indeed the case, it seems more likely that he was influenced by the monumental polyptychs which contain three large figures rather than the groups which contain whole scenes. There are several fine groups; for example, at Angers, Musée des Beaux Arts Triptych of the Virgin and Child with Two Angels [sls. 64-66]; Paris, Louvre Scenes from the Life of Christ [sls. 67-69] and a fragment of a polyptych [sl. 70]. In all these the main figures are left in their natural colour, ivory, but the Virgin's robe in the Louvre "Life of Christ", group is lined with vermilion and there are bright red cusps in the architecture.

62. The backgrounds of the Hours of Jeanne d'Evreux are quite often lightly painted, perhaps due to the smallness of the miniatures which would be overpowered by areas of dominant colour.

63. In the *Belleville Breviary* there is a small amount of yellow lake used in the border with red and blue painted into the polylobe.

64. I have not handled the Hours myself, but reproductions, especially the excellent Cloisters Museum postcards, give a clear impression of brownish washes.

65. For example, ff. 16 34 & 102v.

66. For example, "Christ Before Pilate" f. 34v [sl. 54] and "Education of St. Louis" f. 103 [sl. 57] *Hours of Jeanne d'Evreux*.

67. See on this problem: Pächt, "Giottesque Episode in English Medieval Art", pp. 52-53; Pächt, *The Master of Mary of Burgundy*, pp. 24-25, 32.
Jean Pucelle captured the imagination of XIVth-century Parisian artists. Although his output was comparatively small, Parisian manuscript painting up to c.1380 was suffused with recollections of his style. However, Pucelle's preoccupation with volume and three dimensionality was not that of his successors. The illumination of text remained the essential concern of book painters in the XIVth century. Despite an increased interest in "naturalism" and "realism" within miniatures, pattern, calligraphic line and page ornament remained of primary importance to artists attempting to unify text and image on the page.

After his death in 1334, Pucelle's workshop flourished until the end of the XIVth century under the direction of Jean Le Noir. While much influenced by Pucelle, Le Noir was not a mere copyist, but an artist of imagination and refinement whose homogeneous style spans the mid-XIVth century. The preeminence of Pucellian influences in book illumination throughout the mid-XIVth century must in part be due to Le Noir's great ability. His workshop clearly specialized in small devotional works, painted apparently for exclusively royal and ducal patrons. Possibly Le Noir's known associations with Pucelle encouraged royal interest, but his own talent certainly ensured his continued employment.
Le Noir took over Pucelle's workshop and many of his compositions are closely related to, if not copied from, the master's paintings. However, the younger artist had a stronger sense of drama than Pucelle who liked calm poses and gestures. In Le Noir's miniatures, the protagonists make violent movements and have strongly characterized faces. Limbs, faces and drapery of the animated figures are active and agitated. This motion of material tends to abstract the line of the drapery and mark more strongly its decorative and calligraphic qualities. Traces of this dramatic style already appear in the Belleville Breviary where faces turned away or contorted with anger and cruelty may be early work by Le Noir.

Pucelle tended to limit the numbers of figures in any scene, but Le Noir crowded his characters onto the page. He filled his compositions with ranked heads and miniatures are often cut off at the sides. Even in Pucelle's most crowded composition (the "Betrayal" of the Hours of Jeanne d'Évreux f.15v [sl. 53]), no figure is obscured by the halo of another. In a similar, later composition by Le Noir, in the Psalter of Bonne of Luxembourg (f.246v [sl. 72]), the artist has added large gold haloes and the heads of many figures are only partially visible.

Pucelle used the frame not only to surround the miniature, but to guide the eye into the scene. This device can be seen well in the box-like buildings of the Belleville Breviary and Les Miracles de Notre Dame. The front walls of the buildings make an inner frame, and as the little rooms fill almost all the
miniatures, the eye sees into a three dimensional space uninterrupted by abstract decoration. For Le Noir, frames were not for containing miniatures and encapsulating the story within; he placed the frames on top of the scene, while the story continues behind.

Palette and Approach to Colour

Le Noir's workshop favoured the pale tones of Honoré and the artists of _La Vie de S. Denis_. Even when several artists worked on one manuscript, which is especially the case in the _Hours of Jeanne de Navarre_, the choice of colours remains much the same throughout all the miniatures. Less stress was laid by Le Noir on the stronger colours used by Pucelle in miniatures like "Judith and Holophernes" in the _Belleville Breviary_ (vol. I, f.45v) and in _Les Miracles de Notre Dame_. Although Le Noir lightened his range of colours and concentrated on pale blue, pale pink and grey, his approach to colour is distinguished by a contrapuntal use of hues, with emphasis throughout on the juxtaposition of pale colours with dark areas. Thus, even if large areas are painted in pale hues, one dark colour will frequently tend to give an overall dark tone.

Le Noir's distinctive colour is already obvious in his early work in the _Hours of Jeanne de Navarre_. His style is best demonstrated by miniatures in the "Hours of the Cross" (ff.108v-117) where he is immediately recognizable by his sober tones (for
example in the "Betrayal" on f.109 [sl. 73]. He uses a yellow often tending to brown, bright orange and, for landscape, a gloomy, darkish green with brown shadows. The leggings of the man pulling Christ are blueish green while Christ wears a blue robe extensively highlighted. By using this pale blue rather than a darker, more intense colour, the artist reduces the intensity of the entire palette. The strong orange stands out unharmoniously alone and the cool blue clashes against it.

Le Noir's low key colours with pale figures ranged against highly decorated backgrounds are related to the aesthetic of grisaille. This semi-grisaille technique is most evident in the relatively uncoloured figures in the calendar pages of the Hours of Jeanne de Navarre. Colours are not so much pale as gently touched on and lightly shaded to leave quite large areas uncoloured. For example, on ff.5 & 8, the blue is thickly painted, but because it is laid on in patches and not all over the drapery, the effect is light. This technique is not intended to show the figure better in space, but to show it decoratively. That Le Noir considered the robes as an area of pure decoration seems borne out by ff.4v & 5 where prophets wear gold under robes. This use of gold is purely ornamental and contrasts strikingly with otherwise light colours.

Although the figures are lightly coloured, the architecture is densely painted. These saturated colours contrast with the light figures. It is possible to see in these miniatures what is apparent throughout the mid-XIVth century, that grisaille, or in
this case lightly coloured semi-grisaille, was chiefly reserved for figures rather than buildings and objects.

Despite the considerable damage to the *Hours of Yolande of Flanders* (London, B.L. Ms. Yates Thompson 27) Le Noir's distinctive range of colours is well seen in the the bas-de-page which are in good condition. In the "Last Judgement and the Resurrection of the Dead" (f.107v [sl. 80]) figures have lightly touched faces and brownish pink skin colour with a little darker shading. Drapery is white shaded with blue/grey. Foiled against these pale colours is the dark robe of a bishop, a Pope's vermilion red hat and one black monastic habit.

In the main miniature ("Last Judgement"), the colours are also in something like their original state. The overall pale tonality has touches of bright colour. Christ's robe and John's cloak are painted in neutral grey while the Virgin and an angel are dressed in pale blue. Le Noir visually links the historiated border and the main miniature by using bright orange for the robe of the infant Christ in the border as well as for an angel's wing and a supplicant's robe in the main miniature.

The same distinctive tones are used by Le Noir in the *Epistolary of the Ste. Chapelle* (London, B.L. Ms. Yates Thompson 34). The "Adoration" (f.15 [sl. 81]) is set against a deep ultramarine blue background which is itself incorporated into an initial S of yet a different blue. The Virgin sits on a pale yellow seat, wearing a pink cloak over a light but opaque blue robe. Ochre
yellow in the Virgin's seat reflects the under robe of the young king and his pink cloak matches her pink cloak so that these figures balance each other at either side of the scene. Pink is picked up again in the robe of the middle-aged king, but in contrast to these light colours, he has a dark green cloak lined with strong orange which is reflected in the Child's robe. Marking a central point in the composition, these strong areas of colour draw attention to the Child(10)

Throughout his work, Le Noir used orange to emphasize a figure or area of the miniature. In the "Annunciation to the Shepherds" in the Hours of Yoland of Flanders (f.70v, [sl. 77]) a seated shepherd wears orange, drawing the eye to the centre bottom of the miniature. He used this device again in the "Betrayal" of the Petites Heures (f.76 [sl. 134]) where at the centre bottom Malchus is also dressed in orange. While orange often dominates the middle of a miniature, in the "Betrayal" of the Hours of Jeanne de Navarre (f.109, [sl. 73]), the man on the right who pulls Christ towards him wears orange. Although this strengthens the pulling gesture and draws the eye towards the side where Christ will be taken away, the strong righthand pull is balanced on the left by John's orange underrobe.

Colour Combinations

Several colour combinations are distinctive of Le Noir, most particularly green/orange and blue/orange. Good examples can be
seen in the initial on f. 74v Hours of Yoland of Flanders [sl. 79]. In this scene a figure wears an orange tunic with green leggings while below in the bas-de-page "Crucifixion", another figure wears a green tunic with orange sleeves over his armour. In the scenes of "Flight" and "Entombment" (f. 86v [sl. 78]) the colours are juxtaposed again; the figure at Christ's feet wears orange and the woman behind him has a green cloak.

Blue and red or orange is a traditional medieval colour combination. In the XIVth century, and especially in paintings by Le Noir, it is given a particular flavour by an emphasis on pale blue and orange rather than the dark red and deep blue used in the XIIIth century. In the "Resurrection" of the Epistolary of the Ste. Chapelle (f. 84 [sl. 81]) a soldier on the left wears a bright orange tunic over blue armour and his companion to the far right rests his blue-armour-clad arm on an orange shield.

Pale blue and orange are used together in the Hours of Yoland of Flanders on three figures within the scene of the "Annunciation to the Shepherds and the Way to the Cross" (f. 70 [sl. 77]). St. Martin has a blue cloak with orange leggings, the last of Christ's followers has a blue cloak with an orange lining; so does the Virgin. In the "Flight into Egypt and Lamentation" on f. 86v [sl. 78], the dark blue robe of the Virgin is contrasted with the strong orange in the figures immediately behind her and to her immediate right.
CHAPTER FIVE: THE MID XIVth CENTURY

Faces and Hair

Although Le Noir was certainly aware of Pucelle's interest in facial modelling using light and shade, he does not develop the older artist's techniques. In the Hours of Jeanne de Navarre "Adoration" (f.55v [Avril, pl.16]), the face of the middle-aged king has highlights on the projecting parts while the rest of the face is in deeper shadow. Compared with Pucelle's interest in facial structure, however, Le Noir's modelling is rather schematized.

A reddish brown ink line defines faces and hands rather than the black ink used by Pucelle in some of his miniatures (11). This paler ink gives lightness to Le Noir's facial features and prevents them from becoming harsh. In the Breviary of Charles V Le Noir uses a red line in a nervous and expressionistic way to avoid a hard, clear outline (12).

Like Pucelle, Le Noir painted young people's hair brownish yellow (13). This characteristic colour is probably worked up from yellow ochre with the brown lines painted in ink or in mixtures of minium and ink or dark red lake and ink. Like in La Vie de St. Denis, old men have their grey hair painted in blue and white (for example, the Psalter of Bonne of Luxembourg on f.246v [sl. 72]) (14).
Landscape

Le Noir seems to have been more interested in the overall decorative possibilities of the miniatures than any individual representation of landscape, nature or architecture. However, for the several scenes that were traditionally set out of doors, he uses a simple form of Pucelle's "stepped" landscape\(^\text{15}\) Le Noir divided the ground into clear planes. The first was a highlight, sometimes at the side, but usually at the top of a rock. A shadow painted either in the main colour or mixed with something darker described the side of the rock. In the *Bible Historiale of Charles V* f.1 [sl. 83], it is easy to see these divisions as the miniature is in grisaille. The shadows at the side of the rocks are green, while the highlight on the top is left blank.

Unlike Pucelle's sober landscape colours in the *Belleville Breviary*\(^\text{16}\), in the *Hours of Jeanne de Navarre* and the *Petites Heures* Le Noir used quite light greens\(^\text{17}\). Compared to those painted at the end of the century, Le Noir's mid-century landscapes were paler and less intense. Le Noir's green is rather sombre, pale and not very brilliant. Usually he shaded it with brown\(^\text{18}\) but in the *Hours of Yolande of Flanders* (f. 86v [sl. 78]) he used a completely brown landscape. The rocky area around the "Entombment" is a pale brown shaded with darker brown, reflecting the sobriety of the scene.
At the end of his career, Le Noir's landscape colours become softer. In the *Petites Heures* "Annunciation to the Shepherds" (f.40 [sl. 132]), the landscape is toned down from the quite strong green of the *Hours of Jeanne de Navarre* on f.53 (Avril, pl.15) to a pale beigeish yellow. Colours in the *Petites Heures* "Entombment" (f.94v [sl. 137]) are softer than in the same subject in the earlier manuscript (f.115) where the ground is a strong grey, clearly marked into areas of highlight and shadow. (For a further discussion of this problems see below CHAPTER SEVEN).

**Backgrounds and Decoration**

A type of background that might be described as "perspective" became popular in the post-Pucellian period, although it had not been used by Pucelle himself. Le Noir adopted three-dimensional diamond-shaped patterns that appear to stick out from the back of the page. Of course, this type of design, serving as a backdrop, has no real perspective and the figures seem even flatter in contrast to their three-dimensional backgrounds. In architecture and sculpture, diamond-shaped ornaments give depth by articulating an otherwise flat surface and revealing one element to be further forward than another, but as background ornament, these projections have no perspective function; they are merely ornamental.
Le Noir also adopted Pucelle's backgrounds of faces, animals and drolleries, mixing images from the real world like monkeys and squirrels with the fantastic world of drolleries and hybrids. These highly ornamental backgrounds are usually in two colours, pink and white, or blue and white, a monochromatic treatment similar to grisaille painting systems. Sometimes the artist added gold, as in the Hours of Jeanne de Navarre "Adoration" (f.55v (lion heads) [Avril, pl.16]) or the "Annunciation" (f.39). In "Queen Jeanne with the Virgin and Child" (f.118v) and "Queen Jeanne before the Flagellated Christ" (f.215v) Le Noir painted heraldic background decorations not unlike those that later adorn the Boucicaut Hours.

Pucelle's use of the bas-de-page to extend the area of page available for narrative design found plenty of followers, both in the Le Noir and Boqueteaux workshops. As was explained above, Pucelle ranged his figures against an uncoloured ground making them stand out from the setting. However, his followers treated the space differently. They used the bas-de-page as another space available for ornamenting the page. It became less an area on which to place little three-dimensional scenes, than an extension of the decorative unity of the page. In the bas-de-page scene of the "Flight" in the Hours of Jeanne de Navarre (f.61), the surface is treated as densely as the miniature, but often these areas are painted in a lighter and more impressionistic way.
Throughout the period c.1330-1380, in miniatures both by Le Noir and by the Boqueteaux workshop, there are touches, if not large areas, of blue, red and white even in grisaille and semi-grisaille illustrations. The repeated use of these three colours in borders is therefore not random, but intended to unify the overall decoration of the miniature and to pick up the colours most likely to play some part in the page decoration.

Le Noir abandoned Pucelle's simple frames and his highly ornamental borders are among the more decorative features of the *Hours of Jeanne de Navarre*. These are an early form of the tricolour border which became popular with many mid-XIVth-century illuminators. They are at their most elegant here. For example, an outer border line starts with blue at the top left-hand corner; it continues along the outside left-hand side until it reaches the half way point on that side. Then the colour changes to red and continues along the left-hand side until it reaches the centre bottom, where it changes back to blue. The blue continues up the right-hand side until it again meets the central side point where it changes back to red and reaches the original blue line at the centre top. The inner line starts red at the top left-hand corner side and alternates with the outside line. The central band remains white.

Most of the "Hours of the Trinity" (ff.11-38 of the *Hours of Jeanne de Navarre*) and the "Hours of St. Louis" (ff.85v-108v [sl. 74]) have elaborate tricolour borders in which the colours change half way along each side. Throughout the manuscript, background
colours alternate, one page blue, the next red. According to the
collection, backgrounds should also alternate with the innermost
colour of the three border colours. This alternation cannot be
maintained when the border colours change half way along the
side, with half the inner border painted red and half blue. In
order to separate the border from the background colours (in
addition to heightening the decorative effect of the whole page)
the artist has inserted a gold band between the tricolour border
and the background. The function of the gold band is optically
to disassociate the tricolour from the background so that the
border alternation can continue regardless of the background
colour. However, in the "Hours of the Cross" (ff.108v-117), the
artist uses a tricolour border which alternates with the
background, but has no changeover of colour within the border
itself. In this case, backgrounds are the same as the outside of
the three border colours and alternate with the framing square of
the whole miniature.

Grisaille

It was not Pucelle's voluminous figures, but the grisaille
technique of the Hours of Jeanne d'Evreux which had the greatest
influence upon subsequent XIVth-century Parisian painting. Not
only was it adopted by Le Noir and his workshop, but by the other
major XIVth-century Parisian workshop, the Boqueteaux workshop
(see below CHAPTER SIX).
There is no way to establish how soon after the death of Pucelle the fashion for grisaille became general in Paris, but it ceased immediately to be a way of showing a figure rounded in space and became, rather, a decorative technique. Although Pucelle's *Hours of Jeanne d'Evreux* is essentially an uncoloured book, most of the miniatures have some type of decorative backdrop. However, in two miniatures, Pucelle completely eliminated the coloured background, the borders and, in one, the bas-de-page also.

Such a page, denuded of ornament was a daring experiment in design that was not repeated, perhaps because it eliminated the idea of abstract decoration from the illuminated page. As will be shown, decoration, always important to manuscript illuminators, became in the post-Pucellian period such a major preoccupation that even grisaille was appropriated as a decorative technique. Grisaille quickly developed into a style of clothing figures in white or light coloured clothes often acting against a coloured background. It is a style essentially opposed to naturalism.

Although grisaille appeared early in Le Noir's oeuvre, his approach to this technique is quite different from that of Pucelle. His first large grisaille miniature that can be identified is the frontispiece of a *Bible Historiale* in Geneva (Geneva, Bibliothèque Publique et Universitaire Ms. français 2, fol. 84v) (24). This miniature is one of the first Parisian grisailles painted after the *Hours of Jeanne d'Evreux* and the change of approach is noticeable at once. Le Noir added gold to
haloes, architecture and, most important, to the page decoration. The wash colours which Pucelle used to enhance his grey-toned miniatures are here, in Le Noir's painting, stronger and contrast quite sharply with the monochrome dress of the figures.

Only Christ and the Evangelists are in true grisaille. Angels in pale pink and blue drapery support Christ's mandorla although monochrome angels fill the spandrels and spaces. Strong yellow seats support Christ and the Evangelists and their scrolls fall over coloured lecterns. Below Christ's foot Le Noir has painted one of his typical green terraced grounds. All the figures are set against alternating red and blue backgrounds, but faces and hair remain unpainted.

The figures are less monumental than in Pucelle's Hours of Jeanne d'Evreux and Le Noir's grisaille here enhances the rather elaborate and frenetic drapery style that becomes more mannered as his style matures. Solidity is no longer an essential preoccupation; instead, grisaille shows off the artist's drawing technique rather than the roundness of his figures.

Even more typical of the way in which grisaille developed during the XIVth century is the style used by Le Noir's workshop in the Psalter of Bonne of Luxembourg (for example, f.246v [sl. 72]). The grisaille figures are foiled against highly coloured backgrounds and the whole technique is reduced so that only clothes are white and everything else, including a nude body, is
A Comparison Between the "Betrayal" in the Hours of Jeanne d'Evreux (f. 15v) and in the Psalter of Bonne of Luxembourg (f. 246v)

The difference in approach to grisaille of Pucelle and of Le Noir can best be seen in a direct comparison between two "Betrayal" scenes in the Hours of Jeanne d'Evreux (f. 15v [sl. 53]) and in the Psalter of Bonne of Luxembourg (f. 246v [sl. 72]). Composition and iconography being closely related, differences are easier to analyse. Pucelle's figures are grouped less horizontally than those of Le Noir and his scene rises to the right-hand side of the miniature. The figures, although not restrained inside a frame, are contained within the composition, with some objects projecting into the margin. (This margin is not decorated, but merely implied by the script bounding line). In the Psalter of Bonne of Luxembourg the figures, apparently similarly grouped, are cut off at either side by the painted frame which gives the composition a frieze-like appearance. Furthermore, Le Noir's abstract patterned background increases the overall decorative effect and stresses visually the figures foiled against the page of a book.

Despite the upwards thrust of the lantern and the strong gesture of the man who pulls Christ in the Hours of Jeanne d'Evreux,
Pucelle's composition as a whole is quite calm and static. The protagonists have restrained gestures and their faces express little passion. The later artist gave his scene more movement; Christ makes a wide gesture with his hand, Malchus screams and Peter leans towards him. Judas's embrace is more tender and his face more evil. Figures in Le Noir's miniature are no longer static, but animated and expressive. Drapery is active and falls in loops. Although the drapery is not unlike that found in the Hours of Jeanne d'Evreux, it is more elaborate. In the Psalter of Bonne of Luxembourg, the characters are arranged in a straight line while Christ, although still visible in the middle, is less emphatically the central subject.

The grisaille itself is treated differently by the two artists. For Pucelle, the parchment is the base colour with a greyish brown wash for the grisaille. Figures towards the back are more shaded than those at the front. Some areas are quite dark and shadows are graded in tone from dark to very light, giving roundness to the forms. A feeling of solidity is created by this use of graduated painting and by the substantial drapery. Pucelle attempted, by reducing colour, to model the figures in space. In this composition he has almost eliminated all colour. Le Noir, on the other hand, has merely dressed his figures in white.

In the Psalter of Bonne of Luxembourg, the grisaille is not unlike Pucelle's in that the parchment, of which quite large areas can be seen, acts as the highest light. Shadows are graded
in a greyish-brown wash, but these gradations are not as fine as in the *Hours of Jeanne d'Evreux*. Even though shadows themselves fall in the correct places, the sense of depth is lost. The figures seem to stand with less conviction upon the ground and Christ's body is turned at an impossible angle. In the *Hours of Jeanne d'Evreux*, the tautness of the material at Peter's left shoulder is shown by a shadow falling along the line of his left arm. Le Noir repeated this area of shadow in the figure of Peter in his miniature in the *Psalter of Bonne of Luxembourg*, but although the shadow is no less well conceived, the final effect seems flatter.

Unity in the *Hours of Jeanne d'Evreux* is, if not created, at least enhanced by the lack of decorative detail in the border. Furthermore, in his grisaille miniatures, Pucelle gave hair and faces almost no colour which links the heads to the bodies and unifies the image. In the *Psalter of Bonne of Luxembourg*, Le Noir treated these elements quite differently. For the most part, he coloured hair pale brown; Peter and his companions have white hair, painted in blue and white. Faces have brown shadows and stand clear of the rest of the composition no longer being at one with the drapery. Different too, is the attitude of Le Noir to the page as a whole. The design of the miniature is verging on the abstract and is now closely related to the overall flatness of the page. He placed his figures in a coloured frame and surrounded both miniature and text with rinceaux and birds, linking the miniature and the text one to another and to the page as a whole.
The Bible Moralisée (Paris, B.N. Ms. français 167) is painted in a pen and ink technique rather than in true grisaille [pls. 85-90]. It was a large undertaking with 5112 miniatures, painted by about fifteen artists. Pen and ink drawing, lightly applied colours in small areas, uncoloured frames and backgrounds indicate quite an inexpensive technique offset by the cost of employing fifteen illuminators over a period of three years(25). The Bible, commissioned by Jean Le Bon who was at that time Duke of Normandy, was paid for between 1349-1352, a short time in which to produce so many miniatures of a generally high quality(26).

Some of the artists in the Bible Moralisée recall the Pucellian school, but many belong to a different tradition. François Avril has specified two in particular of whom one is the artist he calls "Le Maître du Remède de Fortune". He has also identified this artist's hand in the Pontifical of the Bishop of Senlis (Paris, Bibliothèque Ste. Geneviève Ms.148) and the Missal of St. Denis (London, Victoria and Albert Museum, Ms. 1346-1891) [sl. 91]. The artist's most extensive work, however, is in
"Remède de Fortune" [sls. 92-97] in Les Oeuvres de Guillaume de Machaut(27)

As fifteen artists are involved in the Bible, it is only possible to make generalizations about the book as a whole here. However, quite clearly, the illuminators of this magnificent manuscript, like Le Noir, were influenced not so much by Pucelle's actual painting style, as by the monochromatic concept that grisaille represented. Pucelle did not make the outline of his figures too strong, but always gave them a certain ambiguity and softness, using light and shade rather than line to define shape. Compared to the Hours of Jeanne d'Evreux, figures in the Bible Moralisée have a "cut-out" appearance. They are cleanly outlined against their backgrounds and there are large areas of highlight. Shadows are marked out in lines and less subtly moulded into the highlight so that the figures seem flat(28).

As in the Hours of Jeanne d'Evreux, the miniatures in the Bible Moralisée have architectural surrounds; but here only every alternate miniature is framed by a pen and ink tabernacle. The artists reduced the three-dimensional effect of the architecture by adding small amounts of colour which make the tabernacles more ornamental and painterly than in the Hours of Jeanne d'Evreux [sl. 53-59]. Although the background is uncoloured, as in the "Betrayal" f.15v and "Crucifixion" f.68v of the Hours of Jeanne d'Evreux, the artists' aim was essentially different. Pucelle surely used a parchment background to give his miniature an uncluttered appearance and concentrate attention on the action.
The artists of the Bible Moralisée, on the other hand, almost certainly left the background uncoloured for speed; a blank background also serves to unify a manuscript that might otherwise seem heterogeneous because so many artists were involved.

**Technique**

The pen and ink style of the Bible is enhanced by transparent washes of blue, green, brown and red while the basic colour is almost certainly ink. Figures were drawn in ink, then coloured lightly in ink washes to give body. The parchment is the highest light with no added highlight. Faces are quite densely coloured relative to the rest of the figures and outlined in a brownish red colour, perhaps a combination of ink with red lead or red lake. Highlights on faces are often painted in white mixed with the outline colour.

Like in the Psalter of Bonne of Luxembourg, hair is usually painted yellowish brown with blue and white used for old men's hair. Following François Avril's system of designating the various artists by letter, it can be seen that artist G used a skin colour which contrasts strongly with the grisaille of the costumes; the same is true of some miniatures by C and B. Artist K also paints strongly coloured faces and has quite a heavy grisaille technique.
In most miniatures there is a small area of sky, generally painted blue, but in some cases a little purple has been added. Although the sky is usually a small symbolic area at the top of the miniature, artists often left spaces to represent clouds. This is, in fact, a naturalistic approach to the sky, for by leaving the parchment in reserve as a highlight, the artists have managed to give the sky its actual uneven quality.

For landscape there are areas of green, and green and brown, although some landscapes are uncoloured while architectural details are coloured; for instance, roofs have been picked out in red and blue. Blue has often been touched on to armour and drapery and there many gold statues, haloes and crowns.

The monotony of the alternating uncoloured quatrefoil and architectural surrounds is relieved by an almost imperceptible transparent yellow wash which draws the eye to the frame. By using ink in the miniature, the surround and the written text, the artists have unified the overall appearance of the extremely complex page structure of this book. This overall unity is particularly important as text and image are closely related in a Bible Moralisée; the text explains the pictures and the pictures illustrate the text.

It is clear that the artists were seeking an overall impression that was both unified and ornamental. The pen and ink drawing technique is calligraphic and flowing, so that the miniatures are
strongly associated with the finely written text. Furthermore, the book, although reduced in colour, is made opulent by a relative abundance of gold which enhances the overall decoration of the page, while having a flattening and unrealistic effect on the miniatures. Patches of sky and grass nod to a growing understanding of landscape, but symbolize rather than represent it.

LES OEUVRES DE GUILLAUME DE MACHAUT (*PARIS, B.N. Ms. français 1586*)

The most important work of the artist who illuminated ff. 285 & 290 [sls. 89-90] of the *Bible Moralisée* is found in "La Remède de Fortune" in the *Oeuvres de Guillaume de Machaut* (c. 1340) [sls. 92-96] (39). This imaginative artist shows a love of costume, dancing and elaborate architecture. All the paintings in the *Oeuvres de Guillaume de Machaut*, which contains the work of several artists in addition to the Maître, are in a grisaille which is applied to buildings, costumes, musical instruments and table accoutrements. Borders and rinceaux are uncoloured with touches of grey (probably ink) painted onto the leaves. However, throughout the manuscript, coloured backgrounds alternate red and blue and almost all of the grounds are green. These areas of colours brighten the scenes and enhance the overall decorative effect.
Grisaille

The artists have conformed to the now established principles of grisaille. It is applicable to people and here also to buildings, but not to animals or landscapes. Thus on f.103 [sl. 97] there is a large building painted, like all the buildings in this manuscript, in grisaille, but set in a coloured landscape. As almost the whole miniature except the building is concerned with landscape, the scene seems to be entirely coloured. The building simply looks like a stone building. In this way, the grisaille, essentially a non-"naturalistic" technique, has become "naturalistic" within the context of this miniature.

Architecture is mostly painted in shades of a grey which is probably made from ink, but the artists have conceivably used a weak mixture of black and white. As a general rule the architecture has no white highlights, but some may have been used on ff.103 [sl. 97] & 107v as there seem to be areas of oxidization. Blue, often an adjunct to grisaille, has been added to the undersides of the window frames on f.23 [sl. 92] and some roofs (ff.23, 52 & 55 [sl. 96]), although on ff.103 [sl. 97] & 271 the roofs are the same grey as the rest of the building.

Once again figures are like "cut-outs" against a coloured backdrop. Their firm, dark outlines detract from any sense of three dimensionality (for example, f.47v [sl. 94]). Like in the Bible Moralisée, the artists favoured a dark grey grisaille possibly with a brownish tinge. Parchment is used for large
highlights although there is some white for small costume details such as sleeve decorations. The outline of the figure is drawn in ink, with ink washes probably painted on with a brush. Any decorative detail is added in ink on top. This was a usual technique in grisaille painting and its effect is surely intended to be purely ornamental. Decorative detail of this sort was not used by either Pucelle or Le Noir and represents a new interest in secular costumes.

As has been seen in this chapter, it would be unjust to say that Jean Le Noir was unaware of Pucelle's experiments with space, but he seems to have been more preoccupied by decoration. He developed those aspects of Pucelle's style which enable him to increase the decorative aspects of a page. Le Noir's rhythmic compositions show a preoccupation with overall design rather than with any individual element within a miniature. He conceives the page as a unit and incorporates all elements into that unit: rinceaux, bas-de-page, line endings, drolleries and main miniature. The frame, unimportant in Pucelle's miniatures, now plays a vital rôle in the whole ensemble; it is wide and brightly coloured.

Le Noir makes few experiments with the existing range of colours introduced by Honoré and La Vie de St. Denis and expanded by Pucelle, but he uses it to different ends. Strong, rather acid colours are contrasted against pale, but saturated hues, while areas of highlight and shadow are used mainly for decorative
effect. Despite his light, bright palette, he tends to allow some areas of dark to dominate the light. This tendency diminishes towards the end of his career, as will be observed in CHAPTER SEVEN.

Cold pink and pale blue play a major part in the now almost semi-grisaille technique used in many miniatures. The onlooker is constantly reminded of the grisaille aesthetic by areas of very pale colours or areas where colours have only been touched on, as is seen in the calendar of the *Hours of Jeanne de Navarre*. Indeed, the whole cool and sober colours of many miniatures in that book recall the reduced palette of grisaille. Furthermore, rhythmic distribution of colour and reiterated colour combinations serve to unify not only individual folios but the whole manuscript, so that turning the pages one is aware of a decorative homogeneity.

Pucelle's grisaille was probably the most important stylistic development of the early and mid-XIVth century. However, later artists who used this technique were, like Le Noir, much more concerned with decorating the page than with attempts to represent three-dimensionality. As a result, grisaille becomes a decorative convention with certain colours, most notably blue and gold, being added to increase the decorative effect of the technique and act against any tendency there might be for a scene to appear three-dimensional.
The grisaille technique is an integral part of the sober mid-XIVth-century palette, but it is relieved by areas of colour used in a decorative, abstract rather than naturalistic way. The comparison between miniatures in the Hours of Jeanne d'Évreux and the Psalter of Bonne of Luxembourg showed the extent to which Le Noir distanced himself from Pucelle's concrete realism in order to create an ornamental image which plays an integral rôle in a decorative whole. Manuscripts by different mid-century workshops, like the Bible Moralisée and the Œuvres de Guillaume de Machaut show how other artists apart from Le Noir were influenced by Pucelle's grisaille techniques. These illuminators also felt the need to reduce the three-dimensionality of Pucelle's grisaille in order to create a more ornamental, flat image. To this end, they used additional colour and highly painted faces and hands. These painters also, when using colour, preferred to add to the already chilly aesthetic of grisaille with cool blue. Mid-century artists, unlike Pucelle, also used gold to enhance the decorative ensemble.
CHAPTER FIVE: NOTES

NOTES

1. Meiss calls him the "Passion Master", but for the purposes of this thesis, following François Avril, the artist will be referred to as Jean Le Noir (Avril, Manuscript Painting, pp. 20-23; Meiss I, pp. 167-168).

2. Jean Le Noir was in the employ of Yolande of Flanders, Charles V and Jean de Berry. He and his daughter Bougot worked for the king in December 1358. In 1372 he received a gift of cloth from Jean de Berry and in 1375 he was living at Bourges and is described as enlumineur du roy et de mon dit seigneur”. He also received payments from Jean de Berry (Meiss I, pp. 167-168).

3. The presence of pattern books in the atelier and the participation of the artist himself in some of Pucelle's work can be assumed. Le Noir continued to use Pucelle's "stepped" landscapes (Hours of Jeanne de Navarre ff. 31v, 81v & 125v, the Psalter of Bonne of Luxembourg ff. 83v-84 [sl. 71], Bible Historiale of Charles V (f. 1 [sl. 83]) and drolleries, (Hours of Jeanne de Navarre ff. 53 & 55v). The bas-de-page which Pucelle exploited to such advantage in the Belleville Breviary and the Hours of Jeanne d'Evreux remained part of the artistic vocabulary of the workshop (for example, Hours of Jeanne de Navarre ff. 53 [Avril, pl. 15], 55v & 186, the Psalter of Bonne of Luxembourg) culminating in the uncompleted bas-de-page of the Petites Heures, used on ff. 53 & 76, but not on f. 89v. The incomplete bas-de-page may, of course, be due to the death of the artist or because he wanted to concentrate attention on the main scene. Jacquemart de Hesdin and his followers did not use them although there are spaces for them on ff. 183 & 217.

4. Miniatures which show the type of angry, contorted faces found so often in Le Noir's miniatures (for example, in the "Mocking" and "Flagellation", ff. 82, 83v in the Petites Heures) can be seen in the Belleville Breviary for example, vol. I, ff. 97, 188v & 190, [sl. 75] vol. II, f. 364 [sl. 76].

5. The Belleville Breviary (vol. I, ff. 24v [sl. 50], 100v & 385) and Les Miracles de Notre Dame (ff. 4 & 63).

6. In Evangeliair of the Ste. Chapelle (Paris, Bibliothèque de l'Arsenal Ms. 161, f. 10v "Nativity") the green landscape, and especially the green wicker fence, have an intensity that makes the miniature seem dark.

7. François Avril attributes the Procès de Robert d'Artois (B.N. Ms. français 18437) and two manuscripts of Thomas Aquinas (Florence Bibl. Laurenziana Ms. Fiesole 89 and Bibl. Vaticana Ms. Lat. 744) made in Paris in 1343 for the Dominican Parisius de Dyna, to the artist of the St. Louis Cycle of the Hours of Jeanne de Navarre (ff. 85v-108v [sl. 74]) (Avril, "Manuscrits", pp. 314-315). The examination in this thesis of the Hours of Jeanne de Navarre, which has many miniatures and three distinct hands,
deals with Le Noir's illuminations rather than those of his associates. Although the illuminator of the "Hours of St. Louis" was an artist of great ability, the style belongs generally to the workshop of Le Noir. The two artists clearly worked in collaboration and shared the same general palette. However, the St. Louis cycle illuminator used a more brilliant palette than Le Noir, with bright green, perhaps malachite, and vermilion red, for example (ff.97, 99 & 100v). In this, the colours come closer to painters of the later-XIVth century.

8. For example, yellow and blue for the Virgin's building and grey, blue and yellow for the collapsing synagogue on f.4.

9. It is difficult to be sure which pigment has been used without a chemical or spectrometric analysis, but the border blue is greener than the blue of the background. The artist may have been making a deliberate contrast between azurite and ultramarine.

10. Although the old king also wears pale drapery (grey over pale blue), the orange lining of his cloak continues the line of colour towards the bottom of the miniature. This line is carried from the central figures of the middle aged king and the Child to include the old king.

11. Kathleen Morand shows that Pucelle had several ways of modelling heads: a black outline with no internal modelling, a dark line with dark stippling to give a sculptural effect and a red outline with "sanguine" shadows (Jean Pucelle, p.12).

12. For example, ff.219, 261 & 320v.

13. For example, the Epistolary of the Ste. Chapelle (ff.15, 84 & 99v [sl. 83, 71 & 76]).

14. This use can also be seen in the Evangelical of the Ste. Chapelle (f.10v).

15. For example, the Evangelical of the Ste. Chapelle (ff.1, 10 & 132) and the Hours of Jeanne de Navarre (ff.44 & 109).


17. For example, the Hours of Jeanne de Navarre, f.53 [Avril, pl.15].

18. For example, the Hours of Jeanne de Navarre (f.109 [sl. 73 & 115] and the Petites Heures (ff.76 & 94v [sl. 134, 137]).

19. Pucelle used a three dimensional diamond design in Les Miracles de Notre Dame (f.97) and the Bilyng Bible (f.539v), but on an architectural façade and an altar frontal rather than in a background.
20. For example, Psalter of Bonne of Luxembourg (ff. 45 & 65) and Hours of Jeanne de Navarre (ff. 55v [sl. 74] & 131).

21. For example, Les Miracles de Notre Dame (ff. 169 & 232) and the Belleville Breviary (vol. II, f. 321v) and the Hours of Jeanne d'Evreux (ff. 35 [sl. 54], 54 & 159v [sl. 59]).

22. For example, blue in the Psalter of Bonne of Luxembourg (ff. 322 [sl. 71]) and red in the Petites Heures (f. 76 [sl. 134]).

23. On f. 53 (Avril, pl. 15) "Annunciation to the Shepherds" the figures are lightly painted, like the calendar figures. They reflect the colours of the main miniature, but are less densely painted with more light highlights.

24. Dr. Morand suggests a date soon after 1330, but she thought the book was by Pucelle himself. In any case, a mid 1330s date seems plausible. This manuscript has been dated c. 1330 and the frontispiece now attributed to Le Noir (Avril, Manuscript Painting, p. 66; Morand, Jean Pucelle, p. 40).

25. See note 26 below. Observation leads one to believe that the palette was medium-priced. There are touches of what might be vermillion on ff. 65v & 76v. The blue used throughout seems mostly to have the clear blue colour of ultramarine, but on ff. 12, 194, 194v & 257v the blue may be azurite. There are coloured lakes, especially the curious purple sky colour on ff. 81v & 88 which is probably red lake mixed with a dark blue lake. The landscape colours are ink and verdigris which can often be identified because it has soaked through. On ff. 285 [sl. 89], 285v, 290 [sl. 90] & 290v there is a bluish green probably made with indigo and green earth. This colour has not soaked through.

26. Avril believes that a Bible mentioned in Jean Le Bon's inventories can be associated with B.M. Ms. français 167: La très belle Bible toute historiée, que fist faire le roi Jehan, couverte de drap d'or d'Agnus Dei. The inventories show that large sums were spent by Jean just before he came to the throne. According to the treasury accounts, in 1349 the illuminator Jean de Montmartre was paid seven instalments of the sum of 320 livres parisis (400 livres tournois). In the following account for 1349-50, a supplementary payment of 40 livres parisis was paid to the same Jean de Montmartre. The accounts of the treasury of Jean Le Bon do not survive for the following years. An annotation in the margin of the account of 1349 seems to indicate that the bible was finished in 1353 (Avril, "Manuscrits", p. 325-6, 323-324, 329-331; Avril, "Un Chef d'Oeuvre de l'Enluminure", pp. 120-122).

27. Avril, Manuscript Painting, pp. 26-28; Avril, "Manuscrits", pp. 319-321. He thinks that the second artist may have been a Netherlandish illuminator who painted some miniatures in la Pèlerinage de Vie Humaine (New York, Pierpont Morgan Library Ms. 772).
28. Comparison can be made, for example, between The Hours of Jeanne d'Évreux, f. 15v, and Bible Moralisée, f. 59.

29. Some white highlights can be found in the work of artist "M" who worked only on f. 62v (L1 & 2) & (R.1 & 3).

30. For example, ff. 49, 124, 148 & 285v.

31. For example, ff. 112, 112v & 125.

32. C f. 115v and B for example, ff. 5, 5v & 8.

33. For example, f. 59 [sl. 86].

34. In the Bible Moralisée, the background is blank between the figures. This blankness does not concentrate attention on the figures, but splits up the design so that the sky is suspended at the top and the figures act underneath. The uncoloured backgrounds underline the homogeneous nature of the manuscript (for example, ff. 81, 82 & 88).

35. Green on ff. 52, 162 & 285v; green and brown on ff. 8, 8v, 49 & 127; uncoloured on ff. 59, 77 & 86v.

36. For example, ff. 76, 76v & 117.

37. For example, ff. 10v & 90v.

38. For example, ff. 63, 65, 65v, 68, 76, 76v, 101, 124 & 219 & 255.


40. For example, f. 23 [sl. 92].
Charles V patronized a group of artists who now go under the general heading of the "Boqueteaux" (little tree) workshop after the distinctive umbrella-like trees found in their miniatures. These artists played an important part in mid- to late-XIVth-century book illumination. Although their popularity was more short-lived than that of the Pucelle/Le Noir workshop, they dominated book production during the reign of Charles V. A Bible Historiale (London, B.L. Ms. Royal 17 E VII, dated 1357 [sl. 98-101]) is the earliest dated work of the Boqueteaux atelier and very little of their work falls after the Grandes Chroniques de France c.1375-9 [sls. 102-111]. However, during these twenty odd years, the group was extremely prolific.

The origins of the Boqueteaux style are generally considered to be found in the Bible of Jean de Cy (B.N. Ms. français 15397) of 1355-7. The workshop seems also to be associated with the king's artist Jean Bondol, but how many miniatures he actually designed or painted is difficult to judge. He seems to have joined or become associated with the Boqueteaux workshop whose inspiration was the Maître aux Boqueteaux and whose style was already established; the two artists are not synonymous. It is known that Bondol contributed to two major works dating from the third quarter of the XIVth century. In 1371 he painted the
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frontispiece to the Bible of Jean de Vaudetar (Hague, Museum Meermanno-Westreenianum, Ms. 10 B 23, f. 2) which he signed and in 1378 he designed the Angers Apocalypse.

The Boqueteaux style is fairly homogeneous throughout its period of popularity (c. 1357-c. 1380). The main manuscripts to be discussed here are: Charles V's Tite-Live (Paris, Bibliothèque Ste. Geneviève, Ms. 777, c. 1370), a coloured manuscript; the first volume of a two-volume Bible Historiale, also belonging to Charles V (Bibliothèque de l'Arsenal Ms. 5212, c. 1370-75), a grisaille book; the Grandes Chroniques de France (Paris, B.N. Ms. français 2813, c. 1375-1378), partly in colour and partly in grisaille; two introductory miniatures to the Œuvres de Guillaume de Machaut (B.N. Ms. français 1584, c. 1377, ff. D & E) in grisaille. The chapter concludes with an examination of La Pèlerinage de Vie Humaine (B.N. Ms. français 823, dated 1393). Although this last manuscript is painted later than the majority of the Boqueteaux workshop manuscripts, its style is generally related to their miniatures. It is included in the discussion here as an example of a virtuoso but arid display of alternating colour and grisaille painting techniques. Three different techniques, colour, grisaille and pen and ink were apparently used with equal facility by the Boqueteaux workshop. The decision to order a manuscript in grisaille or colour was clearly a question of the taste of the buyer or person who commissioned the manuscript.
A lively narrative style is typical of the Boqueteaux atelier; miniatures are often crammed with small, active figures. The artists conceived their compositions differently from those of the Le Noir workshop and the artists of the Oeuvres de Guillaume de Machaut. The Boqueteaux painters seem to aim at a more "realistic", or perhaps it might be more accurate to say "quotidien" appearance to their miniatures so that there are many horses, trees, landscapes and animals. As in the miniatures of Le Noir, scenes are cut off at either side so that figures disappear behind the frame. There is a sense of activity as characters march in and out of the stories. Despite the stocky figures, the impression is not so much one of three-dimensionality as of solidity. Quite a lot of attention is paid to modelling, but firm outlines still cut the figures off from their backgrounds and make them appear to be stuck onto it.

Buildings are relatively small in proportion to the figures which often swarm all over or crowd inside them. They seldom take up more than part of the subject, the rest being filled by landscape, warriors, boats and horses. This over-crowded technique is contrary to the experiments with space made by Pucelle and later by the master of the "Remède de Fortune".

Technique

Brown or reddish brown ink usually defines figures in these manuscripts; a blurred edge and an undefined outline was not
generally popular. However, a distinctive feature of the style of Jacquemart de Hesdin (see CHAPTER EIGHT below), which sets him apart from his Parisian predecessors, is a very soft dotted technique which blurs the outline to make figures seem rounded. Although Jacquemart considerably develops this technique, something akin to it can already be seen in the very best miniatures from the Boqueteaux shop. Particularly fine examples are to be found in the Tite-Live bas-de-page landscapes and the Bible Historiale de Charles V.

In the Tite-Live, the artist added green to trees in small dots, but let the colour disappear to show highlights and the hazy edges of objects. This is a subtle variation on the type of tree painting more generally found in the Boqueteaux workshop. Usually areas of shadow and highlight are clearly defined, being painted on with a pen or brush in small, but distinct streaks rather than blurred and muted by dots.

Architecture in the Boqueteaux Workshop

Architectural colour among the Boqueteaux artists is much less positive than in paintings by either Pucelle or Le Noir. The pale, almost grisaille buildings found even in coloured Boqueteaux miniatures are quite in keeping with their particular palette based on pink, blue and blueish green. The relatively uncoloured buildings, like the figures, contrast with the often deeply coloured backgrounds. An example of this is Tite-Live,
CHAPTER SIX: THE BOQUETEAUX WORKSHOP

(f.7 [Avril, pl.32]) where the buildings are in tones of beigeish grey with white highlights (15).

However, even in the grisaille books buildings have some definite colour even if that colour is pale. In the Oeuvres de Guillaume de Machaut (B. N. Ms. français 1584, f.D [sl. 128]), the exterior is pink and blue while the interior is green. Even in the predominantly grisaille Bible Historiale de Charles V on, for example, f.47 there is a pink building with a green interior. Although the front is pink, the building does have a grey side and porch and a blue roof. Thus, this piece of coloured architecture remains linked with the grisaille technique of the manuscript as a whole (16).

In Les Grandes Chroniques de France (B.N. Ms. français 2813 f.3v [sl. 102]): introductory miniature) the Coronation Master (see below) has differentiated the grisaille architecture from the grisaille figures by using brown shadows on the architecture and grey on the figures. In the same artist’s miniatures on f.4 [sl. 103], grisaille is used for the main architectural features, but the roofs are orange with white pennants.

Architecture was clearly considered to be different from the figures, and could be coloured within a grisaille composition. Nevertheless, it was not differentiated from the generally sober tones by very bright colours, but was treated with restraint. It retained its association with grisaille when that was
appropriate, or added a patch of colour if the composition required more brilliance.

TITE-LIVE OF CHARLES V (Paris, Bibliothèque Ste. Geneviève, Ms. 777)

In all the books from the Boqueteaux workshop to be discussed here, figures wear either stark orange or "pastel" shades, blue, pink and grey. The Tite Live is no exception. There are areas of pale colour for buildings, animals and drapery with some brown for the landscape and dark green trees with strongly contrasted highlights. The darker, stronger colours from the Pucelle workshop, bright green, ochre yellow, deep red, "rose" pink and black are less in evidence. In all, the tone is rather subdued with stress laid on action, gesture and facial expression.

Relatively pale tones and strongly coloured outlines define the figures and make them stand out from their backgrounds. There is little attempt by artists of the Tite-Live to show some parts of the miniature in shadow; all the important pictorial elements are evenly lit while costumes fall in conventionalized folds. However, despite the rather flat appearance given by the strong outlines, some of the little figures are rounded and often the perspective of buildings is well understood.

Highlights in this workshop tend to fall into patterns and they are used on animals and armour regardless of any theoretical fall
of light. Artists made no attempt at the type of modelling in light and shade used by Pucelle in the Belleville Breviary (vol I ff. 31 "Absolom" or f. 142 "St. Paul Blinded"). In these miniatures, the highlights fall full onto the flanks of the horses, throwing the parts further away from the viewer into shadow and giving a sense of movement and shimmer. In the Boqueteaux workshop however, pinks, pale blues and reds are relatively even with little attempt at articulation and the strong contrast between very light and very dark areas found in Pucelle's finest miniatures like "Judith and Holophernes" in the Belleville Breviary (f. 45) is not used.

Architecture in the Tite Live is shown in terms of some sort of light and shade and, although recession is usually inaccurate, the porches, turrets, gables and towers show that the workshop was interested in architectural form. Curved shadows and highlights, especially on towers, give a feeling of roundness and solidity to the building. Nevertheless, interiors are seldom visible and buildings are invariably too small for their occupants. Shadows on many of the turrets and roofs are shown on both sides implying exclusively frontal lighting (17).

In the Tite-Live, and most Boqueteaux manuscripts, "naturalistic" or "realistic" colours are popular for landscape and architecture. Landscapes play a prominent rôle in many miniatures. They enhance the overall subdued tones and lay stress on dark green and grey hues. There are very few areas of bright colour. The artists have perhaps used small quantities of
vermilion on the tricolour borders (18) Otherwise the main red is orange, probably red lead. Like artists in Le Noir's workshop, the Boqueteaux painters may have contrasted ultramarine and azurite, exploiting a difference in tone. A strong pure blue is used in the Tite Live, especially for the backgrounds, and a greener blue for the borders.

The choice of colour is sober. Greens are muted and one may suppose that the artist used green earth, possibly mixed with verdigris, rather than much brighter malachite. Ink seems to have been used for brown and possibly also a brown earth (19). Typical examples of this pale yet sober range of colours are seen on f.33v. The background is very dark red, some figures wear greenish blue armour and the restrained colour is continued into the clothes which are pink, orange or blue/grey.

Bas-de-Page

On f.7 [Avril, pl.32], the colours of the bas-de-page are much lighter than the colours of the main miniature. This very pale composition comes close to grisaille in concept and may be considered to be a sort of semi-grisaille like the calendar pages of the Hours of Jeanne de Navarre. Although the same colours have been used in the bas-de-page as in the main miniature, the impression is quite different. Highlights are much stronger and the colours less densely applied. The landscape is a paler version of the landscapes in the main miniature, but trees are
treated in a delicate "pointillistic" technique, with the parchment as the highest light. A greater sense of three dimensionality is felt in the bas-de-page figures, especially those dressed in blue. They seem to have light falling on them, throwing parts of their robes into deep shadow.

Parchment rather than white is used to highlight pale blue. Interestingly, the figures dressed in pale pink, whose robes are lightly shaded, appear less successful in three dimensional terms. The legs of all the figures are convincingly modelled with a pale brownish colour touched onto a skin which is otherwise left uncoloured. Stockings are painted in grey, associating the bas-de-page paintings with grisaille painting techniques. However, as in the main miniature, outlines are clearly defined by ink outlines, flattening the figures against their uncoloured backgrounds.

The Tite-Live is a coloured manuscript, but the artists of the first folio (f. 7) have actually used two techniques: full colour and semi-grisaille. By doing this they have demonstrated the extent to which the grisaille aesthetic was important to mid-century illuminators. The artists may have thought that colours as strong and varied as those of the main miniature would have laid too much stress on the illustrative aspects of the page and so detracted from the importance of the text. If fully coloured the bas-de-page which is quite extensive, might have played too strong a rôle in comparison with the text. In using semi-grisaille the illuminators have reduced the visual importance of
the bas-de-page in relation both to the text and to the main miniature. Although the bas-de-page thus recedes from the eye and does not intrude, the artists still had the maximum possible page surface for illustration and decoration.

LES GRANDES CHRONIQUES DE FRANCE (Paris, B.N. Ms. français 2813)

Some of the Grandes Chroniques de France is painted in true grisaille, but many of the miniatures are in what might more accurately be termed semi-grisaille and still others are in colour. As a general rule, miniatures differ according to the group of artists concerned; they do not alternate as they do in La Pèlerinage de Vie Humaine (see below). All the backgrounds are coloured, there are coloured areas in most of the miniatures and there is also gold and some silver.

The coloured miniatures include some scenes concerning the "Life of St. Louis" (f. 265 [sl. 107]) and the visit of the Emperor Charles IV to the French court (ff. 467-480 [sl. 100]). Of especial interest in this group is the large miniature on f. 473v [sl. 110] of the banquet given by Charles V for his uncle (20).

Why some miniatures should be in colour and others in grisaille is difficult to determine. In the case of the scenes of Charles IV's visit, it may be in order to emphasize the pomp and magnificence of the occasion and the colours perhaps bear a resemblance to those worn by the protagonists. The artist of the
"Visit of the Emperor Charles IV" uses a range of bright colours with a great deal of red, gold, blue and green, unlike the usually pale tonality and grisaille aesthetic of most mid-century manuscripts. Nevertheless, the sumptuous banquet scene on f.473v [sl. 110] still has grisaille elements. Armour is painted in white with blue shadows, one of the attendants' tunics is actually in grisaille and so is the Emperor's robe. This mainly coloured miniature thus recalls, but does not imitate, the grisaille which dominates the rest of the book.

The "Life of St.Louis" f.255 [sl. 107] miniatures are similarly treated, but while they are fully painted there are even more relatively uncoloured areas. In addition to blue, red and green the artist uses grey, grey/blue, brownish grey and pale browns. Large areas of light foreground enhance the pale colours and the ensemble recalls grisaille paintings.

It is indicative of the far-reaching influence of the grisaille aesthetic during the mid-XIVth century, that even within miniatures that show a more strongly coloured style than the rest of the Grandes Chroniques, the artists have incorporated grisaille elements. These reminders of grisaille also serve to unify these brightly coloured miniatures to other miniatures, both grisaille and fully coloured, painted by the many different artists of the book.
The Image of the King of France

Since the Grandes Chroniques is a history of France, it is hardly surprising that images of the king of France occur throughout. The way in which the king is dressed is not, however, consistent and the royal iconography of the Grandes Chroniques shows the extent to which artists considered grisaille to be entirely decorative. Sometimes the king wears grisaille robes, but more often he wears a blue fleur-de-lis robe, sometimes with a red under-robe, or an under-robe left in grisaille (sl. 105). By dressing the king in a fleur-de-lis robe, whether or not his tunic was in grisaille, the artist sets him apart from other characters(21) Most of the artists obviously placed more value on showing the king as a ceremonial figure, dressed in expensive blue and gold clothes, than on the strict rules of grisaille painting. Grisaille was arbitrary and ornamental, so it could be altered or removed at will. Where a colour was needed to enhance a composition, it was added. There is no sense that these figures are in relief or in any way sculptural.

Grisaille

The overall appearance of the Grandes Chroniques is very opulent. As well as coloured backgrounds, many miniatures have large areas of colour, including both figures and landscapes. Grisaille is heavily painted; clearly it has been used for preference, not economy. The technique is the same as that found in other
grisaille manuscripts of this period. Artists drew an outline in ink probably with a pen and then added shadows, also in ink, with either a pen or fine brush. Shadows are quite dense at the sides, but the ink is touched on less and less frequently until the parchment is left blank towards the middle of a figure or object where highlights nearly always fall.

Artists are in no way consistent about what they considered merited colour in an otherwise grisaille miniature. On f. 41v two bishops wear grisaille cloaks, but their white albs are painted white. Thus the artist differentiates the white albs from the grisaille copes, and so in fact colours them. Cardinals wear red hats on ff.202v, 208 & 442, although the rest of the miniature is in grisaille, while on ff.90v, 154v & 313 cardinals have grisaille hats to match their robes.

The Boqueteaux workshop used a convention within their grisaille technique whereby the grisaille of hard, shiny armour is painted in blue and white while the soft parts of clothes are painted in grey or brown and white (22). Thus, there are often two types of grisaille in the same miniature: white with blue shadows to show shiny steel and true grey grisaille for tunics made from soft material. However, on ff.63 & 70v the king of France wears a fleur-de-lis tunic and white, not blue or grey armour. Here, as in so many other cases, he is set apart from his soldiers who wear blue armour and grey grisaille tunics.
In a scene very representative of this curiously inconsistent and entirely decorative use of grisaille (f.140), Charlemagne wears a fleur-de-lis cloak and pink robe while his son wears grisaille. The artist obviously considered Charlemagne more important than other characters and dressed him in coloured ceremonial robes. His son is in everyday clothes, so he wears grisaille. Shiny armour is again painted in blue and white to differentiate it from soft drapery. A tent and other clothes, made from soft material, are also shown in grey and white. However, the artist has introduced an inconsistency. The grey grisaille tent is supported by brownish yellow guy ropes. One might suppose that the guy ropes, being made of soft material, should be painted the same colour as the tent, but this is not the case; they are painted in the natural colour of rope, brownish yellow.

Towards the end of the Grandes Chroniques de France, grisaille and coloured painting become even more closely allied and in a sense conflated. The most representative miniature of this merging between colour and grisaille can be seen in the "The Coronation of Jean Le Bon" (f.93). Some parts of this miniature are in strong colour, orange, blue and green, but the artist kept the image partially in grisaille. Jean Le Bon wears a fleur-de-lis cloak, but a grisaille inner robe. The archbishop has an orange cope and a grisaille inner robe. One attendant has a green tunic and orange cloak lined with grey; behind him a figure wears a grey tunic and an orange cloak. Ceremonial robes are coloured, but under robes and tunics link this partly coloured miniature with the other grisaille paintings in the book.
Most of the faces in the *Grandes Chroniques* are painted with a small amount of pinkish brown and a little white and stand clear of the grisaille. In some cases old people's hair is painted in blue and white (23) but this is not always so. On f. 4 [sl. 103] one old figure has white hair left uncoloured while the rest have grey hair painted in the blue and white technique. The angels at the bottom of this folio also have coloured hair, but their robes are just indicated by outlines.

In the *Grandes Chroniques* grisaille and coloured techniques almost melt into one another. So strong was the influence of grisaille on the whole aesthetic of mid-century illumination, that even a wholly coloured miniature has elements that are drawn from the grisaille technique. At the same time, as the century progressed, and this is clearly seen in the late-XIVth-century miniatures of the *Petites Heures* and the *Très Belles Heures* (see CHAPTER EIGHT below), the whole range of colours became brighter. The influence of the brighter palette is seen in some of the grisaille miniatures of the *Grandes Chroniques* which are losing their entirely grisaille quality to become partially coloured.

*Alternation*

In a book as large as the *Grandes Chroniques de France*, where many artists participated, red/blue alternation is not maintained throughout the backgrounds of all the miniatures. Although in
some manuscripts of the period red and blue backgrounds alternate with fairly strict regularity, to maintain alternation within the miniature appears to have been more important to the artists of the Grandes Chroniques.

Much of the alternation of the Grandes Chroniques de France is subtle and elaborate. In a scene on f.281 (sl. 108) men in a boat attack a tower. The background is red; the inside of the tricolour border, blue. Where on the left of the miniature, the blue border meets the blue river, the border changes from blue to red on the inside and from red to blue on the outside. However, the artist has failed to make the changeover where the blue border touches the blue river on the other side; instead, the artist has made the changeover a little higher up, where the border meets an armed man.

It is curious that this artist considered there to be enough blue in the armour to merit the changeover in this case, but not on the other side where a blue-shaded arm also touches the border. It is true that the area here is smaller, just a small part of elbow not, as in the case of the armed man on the other side of the miniature, the whole body. It may, however, be the case that the artist never planned to make the changeover at the point where the border met the blue-armed man, but rather planned the blue part of the river to start much higher up on the right hand side and changed the design after the border artist had painted the border. Clearly the border was painted first in this miniature as the arms of the defenders are painted on top of it.
In a similar miniature on f.385v the battle is set against a red background. The blue inner border changes to red where it passes a blue river. At the top of the miniature, the border changes again where it meets a blue helmet. The helmet is in fact virtually white with almost no blue, but perhaps the border artist did not know what colour the armour would be. At the left where a grey tunic touches the border, the blue moves outside again. At the bottom left, the border again changes to red on the inside, although it only encounters green grass. Conceivably the artist originally intended the river to reappear.

Border/background alternation are at their most elaborate and are indeed somewhat exaggerated in this manuscript. Not in every case did the medieval artist consider alternation sufficiently important to go to the extent of changing over the border colours, but this was undoubtedly meant to be a virtuoso performance. This particular miniature suggests that alternation was planned in advance, that the painter of the miniature was different from the border maker and that this last would have been given precise instructions as to where the alternations were to appear.

*The Coronation Master*

The work of the Coronation Master must be included in a discussion of the Boqueteaux workshop as this artist's hand is
found in both the *Bible Historiale de Charles V* and the *Grandes Chroniques de France*. This artist painted the large introductory grisaille f.3v [sl. 102] at the beginning of the *Chroniques* and the four miniatures on f.4 [sl. 103] (24) Like the other miniatures, these scenes are painted in full grisaille, not the pen and ink style of the *Bible Historiale de Charles V*, and have coloured backgrounds and ground planes.

The Coronation Master is essentially an ornamental illuminator who abandons all sense of depth on f.3v [sl. 102] to create an elegant and well-balanced composition. There is almost no recession in the miniatures and the pale grisaille is merely a device for sophisticated ornamentation. Outlines drawn against decorative grounds, coloured faces and skins stand in marked contrast to the rather white grisaille. Although the miniature is in grisaille, the white of the costumes is contrasted with large areas of flat decorated gold and patterned blue and red backgrounds. The king is dressed in his blue cloak of state, but with a grisaille under-robe. His coloured clothes set him apart from the other characters who are dressed in white. Grisaille is again used arbitrarily in both the architecture and the drapery.

The gold arcade at the top of f.3v [sl. 102] is certainly not treated as architecture, but as another decorative element. It is flat and gives no sense of the third dimension. With its decoration drawn onto the flat gold, it recalls the architectural surrounds used during the XIIIth century in, for example, the *St. Louis Psalter*, and may perhaps be considered to form part of the ornamental hangings and decorations behind the king.
Furthermore, behind the monarch hangs a plain gold backcloth denying any space behind him. Although the king is supposed to be on some sort of raised throne, the flat gold hangings make him appear to float. There is no depth in the staircase or the bay behind the king. In fact, the whole design has been abstracted and the artist has concentrated on areas of decorated backgrounds and elaborately patterned gold.

The Coronation Master is recognizable by "fresh-faced" characters; faces and hair are densely painted. Characters have white faces with a few brown shadows with what seems to be some red lead for cheek colours. On f.3v [sl. 102] hair is transparent yellow, probably a lake colour, and there are some brown shadows. However, an old gentleman at the top left has white hair shaded with grey or black lines. On f.4 [sl. 103], the pointing king's hair is painted in blue and white. In the large introductory miniatures on f.4 [sl. 55] the Coronation Master has retained the complex alternation found in the main part of the book with alternating red and blue diaper backgrounds. The miniatures have gold surrounds and medallion decorations at the corners. Inside the surrounds, tricolour borders alternate with the backgrounds. So, for example, an inside red border line alternates with a blue background.
BIBLE HISTORIALE OF CHARLES V (Paris, Bibliothèque de l'Arsenal Ms. 5212)

The Bible Historiale de Charles V demonstrates the versatility of a group of artists who were able to paint both in colour and in grisaille, with all their refinements, and the taste of a patron who knew how to appreciate both [sls.121-127]. For surely, by commissioning such a luxurious book as this two volume Bible, volume one of which is in grisaille and volume two in colour (Hamburg Kunsthalle Ms. Fr. 1), Charles V intended to show his esteem for the different techniques of illumination. The Paris volume (vol. I), painted in grisaille, will be discussed here.

As a general rule, Boqueteaux artists followed the usual Parisian practice of decorating initials in abstract red, blue and gold designs and adding vine leaf in the borders. From this point of view, the Grandes Chroniques, despite its grisaille miniatures, is essentially a coloured manuscript with each page containing rinceaux, tricolour borders and backgrounds. However, the Paris volume of the Bible Historiale has only one decorative background and no coloured surrounds. There are coloured initials, but no rinceaux and the miniature surrounds are uncoloured. As in the Oeuvres de Guillaume de Machaut (B. N. Ms. français 1586), the tendril decoration is in grisaille. Scenes are painted with only a few colours. The technique concentrates more on a pen drawing style with some washes rather than the gouache-like technique found in the Grandes Chroniques de France(25).
As in other grisaille manuscripts, blue is used in the *Bible Historiale* as an adjunct to grisaille. For the most part, figures wear grey grisaille tunics, so that again grisaille is painted in two different ways. White and blue is used for polished metal while soft cloth is painted in the grey grisaille of drapery.

Much of the landscape is painted a distinctive blueish green (for example, f.91v [sl. 122]). The artists have perhaps used a blue lake mixed with green earth, rather than verdigris. It is not a stone-ground colour like malachite or a mixture of azurite or ultramarine and yellow; the colour is liquid and transparent. On ff.4v & 6v trees are quite dark green, perhaps green earth with white highlights painted on top. Aside from brown ink, the artists seem to have used another brown, probably an earth.

Contrasting with the overall pale appearance of the book, some of the faces are strongly coloured in brown. Adam's nude body on f.6v is also quite coloured and the artist has picked up the same colours in the semi-nude caryatid in the border. Hair of the figures on, for example, f.113 are transparent reddish colours perhaps made from a mixture of ink and red lake. The same colour is found in the faces. These relatively strong colours used on the bodies contrast with the grey of their clothes.

There are some small areas of red for which the artist probably used lake and minium rather than vermilion. Artists emphasize the transparency of their pigments which are lightly touched on
and can be seen as a natural adjunct to the pen and ink style. They seem to have used a variety of lake colours, emphasizing the transparency of the pigments. In some miniatures, for example, on f.30v ("Abraham and Isaac"), the artists diverged from the usual palette of grisaille to paint the border angel's wings and the ram in the main miniature purple. This colour was probably a mixture of indigo and a red lake. On f.31 there is a yellow seat, also probably a lake colour.

Grisaille

In the finest miniatures of both Les Grandes Chroniques de France and the Bible Historiale of Charles V, the artists have achieved a soft effect which contrasts pleasingly with the coloured backgrounds of the Grandes Chroniques and equally well against the plain backgrounds of the Bible Historiale. The technique of both manuscripts is similar, but the ink seems greyer in the Bible Historiale and harmonizes more closely with the ink of the writing; such was undoubtedly the artist's intention.

In those places in the Bible Historiale de Charles V where artists have used the "dotted" technique, it gives the scene great softness. While figures do not appear exactly three dimensional, their edges are blurred against their background; the demarcation between figure and background becomes somewhat obscure. Where no colour was needed, the parchment was left blank. The artists have also varied this technique. On f.57v
where the artist has faded a tree green so as to show highlight, the colour disappears to almost nothing. However, on f.147 the artist added white to create the same effect. Shadows for buildings on f.91v are also dotted on. The painter of f.233 (sl. 127) had a more linear technique and did not stipple, but painted on the colour in little lines.

Despite the soft and rounded painting style used by some artists of this book and the reduced number of colours which give an almost tinted drawing effect, the artists also used gold. The metal is ornamental, and because it is by its nature flat, gold detracts from a sense of depth in the miniature by introducing an unmodelled area into a three-dimensional image.

LES OEUVRES DE GUILLAUME DE MACHAUT (Paris, B.N. Ms. français 1584)

Two important illuminations by the Boqueteaux workshop are the introductory miniatures to the Oeuvres de Guillaume de Machaut (ff.D [sl.128] & E [Avril, pl.29]). Figures are dressed in gold with grisaille clothes on top, an approach recalling the calendar figures of the Hours of Jeanne de Navarre. Landscapes are painted with all the delicacy of the softest miniatures of the Bible Historiale de Charles V, where tree highlights are allowed to melt to nothing at the edges. The artist probably did not use a earth green with its rather dull, blueish tone, but a green made perhaps with indigo or even black. It is, in any case, a
pigment which gives a deep colour. The most impressive feature of these landscapes is the sky. Its uneven quality makes it look windblown and small red streaks seem to foretell a storm.

These miniatures might be considered as semi-grisaille; quite large areas are lightly coloured. The artist used the parchment as the highest light on buildings, costumes and landscapes. There are little half-shaded turrets and rounded towers like those in the Tite-Live(30)? Some of the architecture is left in grisaille, but some is painted in a range of colours reduced to pink, blue and some green and colours that become quite light in the highlights. Blue and white have been touched onto the costume details. Guillaume's chair may have been painted in azurite (f.E) for the artist seems to have exploited its slightly greenish colour to contrast with the purer blue found in the costumes (especially on Love's wings on f.D [sl. 128]).

By adding patches of colour and elaborating the clothes of the uncoloured figures, the artist has exploited the decorative possibilities of grisaille. There are several large areas of gold in both miniatures, giving a startling effect and adding to the overall ornament. Figures are well placed; characters are not overrefined and have strong faces. The artist painted the long, elegant drapery gracefully, but retained a sense of solidity common to the Boqueteaux group. However, despite merging shadow into highlight, the artist gives the figures definite outlines and so separates them from their backgrounds.
Despite the obviously wide variety of artists working within the Boqueteaux workshop, there is overall homogeneity. This homogeneity is achieved both by a generally unified style and by the predominance of grisaille, or the grisaille aesthetic, in the miniatures. Some miniatures, like those of the "Visit of the Emperor Charles IV" are brightly coloured, but still retain elements of grisaille. Some are entirely grisaille like those in the Bible Historiale, but still have light touches of colour. The soft shading of many miniatures points the way to the elaborate shading techniques used by Jacquemart (see CHAPTER EIGHT below) while the evident interest in physiognomy prefigures the "portraits" of the early XVth-century (for example, f.96 of the Grandes Heures B.N. Ms. latin 919).

LA PÉLERINAGE DE VIE HUMAINE (Paris, B.N. Ms. français 623)

Before turning to a discussion of the early miniatures in the Petites Heures with which the first section of PART TWO concludes, it is interesting to look briefly at La Pèlerinage de Vie Humaine [sl. 129] dated 1393. This is a manuscript of high quality and technical beauty, but in a retardatory style. It belongs neither truly to the Pucellian tradition, nor to the Boqueteaux style, but is perhaps more closely related to the second. It was undoubtedly illuminated in Paris, and the name of an artist called Remiet is found on an unfinished miniature(31). The chief interest of this manuscript is the strict alternation
between coloured miniatures and grisaille miniatures throughout the manuscript. It is entirely a display of virtuosity with no apparent reference to subject matter or artist.

The alternation begins with the large introductory miniature on f.1 and continues throughout. At the top left of f.1 the author, Guillaume de Digueville, writes at a desk, with a book cabinet and curtain painted behind him. Figure, curtain and book cabinet are all in grisaille. However, the author is seated in a brown chair with a reddish brown lectern, the ground is green and the books in the cupboard are red, yellow, green and orange. The painter used grisaille for robes, figure and cupboard, otherwise the miniature is coloured. The overall appearance is rather muted, dominated by green and brown, but there are touches of bright colour for the books.

At the top right ("Guillaume de Digueville in Bed"), is a coloured scene. Once again, however, there is a grisaille tonality. The bedspread is dark grey, slightly blue in tone. Behind the figure is a green curtain whose colour is reflected on the ground. At the foot of the bed a glass shows a little town with coloured roofs. This small element of the miniature marks a direct link with the miniatures beside and below it; the artist has used the same ink for this tiny town and for the grisaille miniatures. This second scene is technically coloured, but its rather sombre tones are close to those in the coloured areas of the grisaille miniature next to it. All four scenes on this folio have a dull green ground linking them together. They are
also linked by the darkish colours and sober tones in both coloured and grisaille miniatures.

The grisaille technique is much the same in this manuscript as in others of the period. Hair and faces are coloured. Grisaille is quite a dark grey, parchment is retained as the chief highlight and there are some white highlights. Foiled against a deeply coloured background, the technique makes the miniatures dark. On the bottom right of f.1, the building is dark grey, but as in Boqueteaux workshop miniatures, architectural details are often coloured; here the building has red turrets.

The Boqueteaux artists, painting in the mid- to late- XIVth century, used the two painting techniques popular throughout that period, colour and grisaille; they were equally adept at both. Within the framework of these two techniques, the major decorative convention with which the workshop can be associated is alternation. Artists alternated between red and blue backgrounds and between these backgrounds and their red and blue borders; they also alternated grisaille and coloured miniatures. The *Pélerinage de Vie Humaine* represents the epitome of alternation between colour and grisaille miniatures and between red and blue backgrounds. Alternation takes on so much importance that the whole manuscript appears arid and dull. Nevertheless, the elaborate alternations of the Boqueteaux workshop shows the interest of these artists in purely decorative uses of colour to emphasize the abstract rather than the
naturalistic rôle of colour on the whole page. Alternating tricolour borders play a part in the decoration of the folio and act as a bridge between the two essential elements on an illuminated page: the miniature with its painted scene and the text with its rinceaux and line endings. The predominant red and blue of both the tricolour borders and the page decorations provide a link between the painted areas and the written text.

Figures are stocky and active with strongly modelled features. Faces are characterized which gives the figures a greater realism than their position in the painted space might otherwise suggest. For characters are still placed against a sharply rising background without true recession. Nevertheless, in their finest manuscripts, most notably the Bible Historiale of Charles V, the artists introduced a soft modelling technique by using little dots. Such soft painting enables the artists to make more ambiguous the line between areas of a figure or object and to soften it against its background. Most figures, however, still remain clearly defined against the backgrounds.

The workshop's colours are distinctive. As in Le Noir's paintings, pale tones are contrasted against dark and strong colours. However, the Boqueteaux workshop lays greater emphasis on pale colours for architecture which often takes up a large part of the miniature. Landscape too, with its wide areas of muted greens and browns, adds to the paleness and sobriety of the whole miniature. The Boqueteaux workshop makes increasingly ambiguous the division between grisaille and coloured techniques,
each seems to seep into the other. In many grisaille miniatures, especially in the Grandes Chroniques de France, there are large areas of colour. The artists used colour to designate the king of France, for landscape or for other accoutrements (like the guy ropes in the Charlemagne miniature). In coloured miniatures there are areas, more or less large, that recall grisaille techniques or the grisaille palette, without turning the miniature into a grisaille miniature (a tunic in the "Banquet for Charles IV" or the bas-de-page on f. 7 of the Tite-Live). In this way the Boqueteaux artists retain throughout their entire oeuvre a distinctive range of colours which is recognizable in a book as lightly and delicately painted as the Bible Historiale of Charles V or as heavily painted as the Tite-Live.
NOTES

1. "Maitre aux Boqueteaux" is the name given by Henry Martin to the first artist of the Bible of Jean de Cy (B.N. Ms. français 15397). For this manuscript see: note 3 below and for several other manuscripts with the same distinctive little trees. In fact the "Boqueteaux" style is certainly the work of a whole group of artists, and the name can be used to designate the entire workshop (Martin, La Miniature Français, pp.36-45).


3. There were two campaigns on this manuscript. The first is usually dated c.1355-57 and attributed to the Maitre aux Boqueteaux, the second (dated c.1380-90) is by a later hand whose colours are related to those of Pseudo-Jacquemart (see CHAPTER EIGHT below). For this manuscript see: Avril, "Manuscrits", p.325-6 and Stratford, "The Manuscripts of John, Duke of Bedford", pp.333-335.

4. Although the Hague Bible contains paintings by followers of the Maitre aux Boqueteaux, François Avril does not think that the artist of the frontispiece (that is Jean Bondol) and the artist of the Bible of Jean de Cy are one and the same person (Avril, "Manuscrits", p.332). See also: Avril, Manuscript Painting, p.110; Panofsky, Early Netherlandish Painting, p.38; Muel et al., La Tenture de l'Apocalypse d'Angers, p.11.

5. Avril, Manuscript Painting, p.102.

6. The second volume (Hamburg Kunsthalle Ms. Fr. 1), a full-colour manuscript, is not discussed here (Avril, "Une Bible Historiale de Charles V", pp.45-76; Avril, "Manuscrits", pp.333-334).

7. Avril, "Manuscrits", pp.329-331. A Grandes Chroniques, very closely associated with this manuscript, was sold at Sotheby's (London) in December 1981, lot 94. This second Grandes Chroniques is also in grisaille and colour [sls. 112-116].


10. For example, Tite-Live (ff.100 & 316), Bible Historiale de Charles V (ff.20v, 168v, 253 & 372) and the Grandes Chroniques de France (ff.4 [sl. 103] & 281).

11. In the Les Oeuvres de Guillaume de Machaut on f.23 [sl. 92] there is a large free-standing house and on f.55 [sl. 93] a big hall, where figures can walk about and stand. These buildings generally fill all the miniature or at least a large part of it.
12. Panofsky sees the style of the Boqueteaux workshop as "Franco-Flemish". If this assumption is correct, the dotted modelling technique may have been a northern French technique or innovation as Jacquemart de Hesdin was also an artist who perhaps originated from northern France (Panofsky, *Early Netherlandish Painting*, pp. 35-36, 42).

13. *Tite-Live* bas-de-page (f. 7 [Avril, pl. 32] & 316) and the *Bible Historiale de Charles V* (ff. 57v [sl. 121], 91v [sl. 122] & 104 [sl. 123]).

14. For example, Royal 17 E VII vol. II, f. 1 [sl. 99] or the main miniature of the *Tite-Live* (f. 7 [Avril, pl. 32]).

15. Even the Master of the *Coronation Book of Charles V*, who could only loosely be considered as belonging to the group, uses an almost uncoloured architecture for the first two scenes of the manuscript (ff. 35, 43 & 44v [sl. 117]).

16. On f. 33v the building is grey with a blue roof and on f. 205 grey with a pink roof. However, it is not wise to generalize about specific colour patterns; on ff. 87 & 289 the buildings are pink with blue roofs.

17. Although shadowed areas are usually fairly arbitrary, on f. 7 of the *Tite-Live* [Avril, pl. 32] in the middle left miniature, the artist has shown the three-dimensional tower effectively. Light falls on the right of the tower, but the back left tower and left-hand side of the facade towers are in shadow. However, the figure on the left is in full light and the shadows on the roofs correspond to a different fall of light; they are chiefly in shadow, while the walls and figures beneath them are mostly in full light.

18. For example, ff. 29v, 42v & 156.

19. In particular in the introductory miniature (f. 7 [Avril, pl. 32]), the wolf in the central top miniature seems to be painted in a mixture of ink, earth and perhaps white to give the colour some body.

20. Avril, *Manuscript Painting*, p. 107. In addition, there are two miniatures by the master of the *The Coronation Book of Charles V* (f. 480v [sl. 111]) (B.L. Ms. Cotton Tiberius B VIII [sls. 117-120]). This artist's brightly coloured style can also be seen in the *Bible of Jean Le Bon* (B.L. Ms. Royal 19 D II).

21. In another scene Charles the Bald's wife wears a grisaille robe with red edging, while the king himself has a blue fleur-de-lis robe over a grisaille tunic (f. 149 [sl. 104]). In a coronation scene on f. 85v, all the figures are in grey, but the king wears a blue fleur-de-lis robe with a startling red lining. On f. 90v the king wears a fleur-de-lis robe, here with a
grey/blue under-robe, while the same robe in the previous miniature (f.90) is painted in grisaille.

22. For example, ff.237, 246, 299v & 385v.

23. For example, ff.41v, 109v & 132v.

24. Avril, "Une Bible Historiale de Charles V" p.57-59; Avril, "Manuscrits", pp.332-333. Folio 4 forms part of the first gathering and the Coronation Master probably worked within the group of artists who illuminated the book, although the Coronation miniature itself is added. The rinceaux is different on the Coronation miniature from the rest of book, except f.265 "Life of St. Louis" [sl. 107]. The fact that the rinceaux on f.265 matches that found on f.3v [sl. 102] and is not found elsewhere, leads one to suppose that the Coronation Master made some additions or alterations to this folio when working on the initial miniatures. The St. Louis scenes are similar in style to the majority of the other miniatures. On both f. 4 and f.265 there are two grisaille angels holding a fleur-de-lis shield. The blue has been scraped off the shield and it may also have been scraped off the clouds. The manuscript was in the royal collection from the XVIth century. Although the colour may have been removed in a fit of republican fervour, the remaining fleur-de-lis designs are intact. It seems that some type of vandalism has taken place as the gold and blue have both gone, perhaps for their value. The other possibility is that the artist might have used an ultramarine that was liable to flaking or was badly mixed with its medium.

25. For example, blue (ff.57v & 95v) with red dots (ff.24 & 107v) or green (ff.110v & 119) or pink (ff.116v & 159).

26. In several of the folios, God has a bright blue aureole which contrasts strongly with the grisaille composition (for example, ff.95v, 108 & 233 [sl. 127] 156v); there are several blue hats (for example, ff.98v, 176 & 321), there is a blue sheep on f.98v and typical blue armour on ff.18, 119, 157 & 158.

27. For example, ff.5, 156 [sl. 126] & 195v.

28. For example, ff.12 & 233 [sl. 127].

29. For example, the large miniatures ff.57v, 91v [sl. 122], 147 [sl. 125] & 300.

30. For example, f.7, 205 & 316.

THE LATE WORK OF JEAN LE NOIR IN THE PETITES HEURES (B.N. MS. LATEIN 18014) AND THE GRISAILLE MINIATURES IN THE PSALTER OF JEAN DE BERRY (B.N. MS. FRANÇAIS 3093)

THE LATE WORK OF JEAN LE NOIR

In the first part of this chapter, the discussion returns to the work of Jean Le Noir and considers his miniatures in the Petites Heures. There then follows a discussion of André Beauneveu's use of grisaille in the Psalter of Jean de Berry and the way he employs it to show his massive figures in a sculptural context.

There is no doubt that the artist who illuminated the "Hours of the Virgin" and the "Hours of the Cross" in the Hours of Jeanne de Navarre, also illustrated the "Hours of the Passion" in the Petites Heures; it is now assumed that the artist was Jean Le Noir. The aspect of his painting to be discussed in this chapter is the change that takes place in Le Noir's use of colour, perhaps as a result of his collaboration with his younger colleague, Jacquemart de Hesdin. As one of the most innovatory artists of the century, Jacquemart de Hesdin, like Pucelle, understood the implications of space within the miniature. He does not crowd his compositions and uses rather simple, bulky masses to give an impression of rotundity in a composition that now seems truly deep.
At the end of his career Le Noir still perceives the page as a decorative unit and the illustrated composition integral to that page, not separate from it. He keeps his own very individual sense of crowded drama, retaining the link to the flat page with drolleries, bas-de-page, historiated initials and ornamental borders. Little interested in pictorial space, Le Noir is a supreme creator of pictorial theatre. But, in the Petites Heures, his last work, Le Noir's colours do not so much lighten as darken and his colours become more vibrant. Dark blue is contrasted with golden brown and orange loses its acid tone and becomes more yellow often with a yellowish highlight. Instead of fragmenting his image with areas of contrasting light and dark, figures are now suffused with a unified, soft light. Characters wear heavy drapery painted in single, subtly modelled colours which give figures a sense of volume and solidity.

Simplification

As was seen in CHAPTER FOUR above, Pucelle introduced elaborately folded drapery which he exploited to solidify his figures. One layer of cloth lies on top of another giving each individual figure a sense of weight and volume. As the century progressed, the Pucelle workshop followed this method of drapery painting, but it became more calligraphic and complicated and less concerned with evoking volume. It is even possible that in his later work, Pucelle appreciated that a single area of colour
could make for even better unity and a greater sense of monumentality.\(^3\)

Jacquemart, in the *Petites Heures*, also reduces the number of colours for each figure and so directs attention away from the decorative qualities of the draped figure to its realization in spatial terms.\(^4\) Jacquemart belongs to a generation of artists whose miniatures begin to pierce a hole in the page to show the world beyond. At the same time, as the next chapter will demonstrate, he composed his miniatures so that they would continue to retain a coherent relationship with the decorative unity of the page. Nonetheless, he was certainly more concerned with pictorial space than with decoration. Although Le Noir does not take simplification as far as his successors, it does seem that he was to some extent influenced by Jacquemart's large, uninterrupted areas of colour. Is it possible that Le Noir was influenced by the younger man to introduce a greater sense of space into his compositions?

In the *Petites Heures* Le Noir sometimes reduces the elaborate intertwining drapery to one colour. He uses larger areas of single colours than he had done before, allowing one to dominate a composition. In reducing their number and in grading and modulating all areas of colour he creates a simplified composition in which figures appear voluminous. Such simplification detracts from the abstract, decorative qualities of a miniature. Le Noir is now less concerned with ornament; instead, by limiting colours within each figure, he achieves a
monumental effect. Decoration is somewhat sacrificed in favour of compositional unity.

Comparisons

The differences between two periods of Jean Le Noir's artistic career and the evolution from his earlier style are best demonstrated by a comparison between miniatures with very similar iconography in his early work in the Hours of Jeanne de Navarre and his last paintings in the Petites Heures.

"Betrayal"  
Hours of Jeanne de Navarre f.109 [sl. 73].
Petites Heures f.76 [sl. 134].

The first striking difference between the Hours of Jeanne de Navarre and the Petites Heures is Le Noir's expanded and mellowed palette, the second is the grace of gesture. Christ's movement, in particular, is more elegant and less contorted; the kiss of Judas is more tender. Figures are taller in proportion to the size of head, and Peter who, in the Hours of Jeanne de Navarre, was a young man, is now, in the Petites Heures, grey-haired and balding.

The "Betrayal" demonstrates well the change in Le Noir's range of colours between his early paintings in Hours of Jeanne de Navarre and his mature miniatures in the Petites Heures. For example, he has used hard "pastel" shades, blue, yellow ochre and pink, for
CHAPTER SEVEN: 
LE NOIR'S LATE WORK AND THE PSALTER OF JEAN DE BERRY

the soldiers' armour and helmets, while in the Petites Heures he used what is probably gilded tin(5). More important, however, and perhaps related to the use of gilded tin, golden yellow plays a much more important role in the Petites Heures. Both colours enhance the impression of a glowing, light-suffused scene. 
Malchus' yellow-ochre coloured robe at the bottom of the miniature in the Hours of Jeanne de Navarre represents a relatively small area of colour. In the Petites Heures this area of yellow has moved up the miniature, to become much larger and more dominant in Judas' robe(6). Le Noir used yellow not only for Judas, but also for a helmet, armour and hair among the right-hand figures. While there is certainly yellow in approximately these areas in the earlier manuscript, the colour is stronger in the Petites Heures. Furthermore, in the Petites Heures yellow plays a very important role: Le Noir uses it in several scenes in a sense that might tentatively be called symbolic(7). Although it is not as bright as it later became in the work of his successors in the book, particularly the Pseudo-Jacquemart, Le Noir stresses this colour throughout his miniatures. Le Noir's yellow is a mellow, muted tone.

Le Noir's overall treatment of colours has become more subtle, with fewer stark contrasts between different tones and light and shade. White highlights are not so marked on the "pastel" colours so that they are not as pale as they were in, for example, the robe of Christ in the Hours of Jeanne de Navarre(8). He has abandoned large areas of grey drapery so that colours are warmer in the Petites Heures, less exposed and white. While in
the Hours of Jeanne de Navarre few highlights are pure white, there are some white highlights and a considerable amount of white has been used in the pale blue. In the Petites Heures, the light highlights seem to have been created by leaving the main colour in reserve and adding darker blue shadows; instead of adding highlights to a dark colour, Le Noir moulded shadows into a medium base colour. Furthermore, he contrasted highlighted areas less strikingly with the main colour. Nonetheless, compared to Jacquemart, Le Noir used relatively light blues. Noticeable too are Le Noir's expanded landscapes when compared to the Hours of Jeanne de Navarre, painted with colours that are not only softer and subtler, but more brilliant. His grey/greens and browns may also show the influence of Jacquemart's less harsh tones. It should, however, be remarked that most of the miniatures attributed to Jacquemart have under-drawings and even partial areas of painting by the older artist, a fact which can be explained in one of two ways. Either Jacquemart and Le Noir worked simultaneously on the manuscript, or Le Noir was dead when Jacquemart took over, but had left the manuscript well advanced. In the former case, Le Noir saw the new, soft landscape colours of his young assistant and adapted them to his own technique. In the latter, the miniatures were mostly designed and even partially painted by Le Noir, and the younger man had to adapt what he found, including the half-finished landscapes. In this case it was Jacquemart who was influence by Le Noir's hues. Whatever the chronology, Le Noir's range of colours has lost its sharp edge, perhaps under the influence of
Jacquemart or as a result of many years' experience, experiment and advancing age.

Material in the *Petites Heures* seems to be heavier. The stiff fluted folds of the *Hours of Jeanne de Navarre* have been replaced in the *Petites Heures* by a fabric that, although it has a multiplication of folds, is soft and weighty. This softness is especially visible in Christ's robe, but also in the robes of Judas, Peter and John. Le Noir has not totally abandoned a multi-coloured drapery system, but it is reduced in the *Petites Heures* and in particular, both Christ and Judas wear single colours. Although Peter's robe in the *Hours of Jeanne de Navarre* is painted in two colours, the folds of his short blue/grey cloak contrast starkly with a large area of (ultramarine) blue in his under-robe. In the *Petites Heures* his robe is, in fact, painted in a three-colour system, but now only a small amount of his green under-robe and the blue cloak lining are visible, thus unifying and mellowing the figure.

The crowded figures of the *Hours of Jeanne de Navarre* make the scene frieze-like. As in much of this artist's work, the general feeling of the miniature is one of horizontal pull. Figures move in a flat landscape cut off at the sides by the frame. Lanterns and pikes are raised to the same height above the heads and add to the horizontality of the composition. Malchus' flat pose, stretched out along the bottom of the page, enhances the frieze-like impression.
The horizontality of the miniature in the Hours of Jeanne de Navarre is emphasized by a man on the right, wearing strong orange, who pulls Christ towards him. It is not only a rearrangement of colours that is involved here, but a rethinking of the internal balance of the miniature. The very forceful rightwards pull in the Hours of Jeanne de Navarre is resisted by Christ, in blue, who pulls to the left; the eye looks right because of the strength of the orange relative to the rest of the miniature. The logic is clear, Christ is to be pulled off towards his fate on the right. These figures pulling away from each other fill the entire miniature with a sense of panic. In the Petites Heures, on the contrary, Le Noir has given the scene a new dignity and tranquillity. Now all the figures lean inwards and concentrate on the kiss of Judas. Frenetic activity has been replaced by calm reflection.

Le Noir achieved compositional containment in the Petites Heures. Although the protagonists still crowd in at the sides, they strengthen the centralization of the miniature as a whole, now dominated by Christ in his dark blue robe. Raised lanterns mark more distinct high points and emphasize the stronger verticals of this later scene. In addition, the pikes on the right give the whole scene a downwards slope towards the left. Nevertheless they too, like the figure in orange in the Hours of Jeanne de Navarre, draw the attention to Christ's ultimate destiny on the right; but this dramatic aspect of the story is less emphatically marked. The important area of orange has not been lost in the later manuscript, but it is now used for the crouching Malchus
who draws attention to the centre bottom of the miniature and increases the scene's verticality.

Although the composition of the *Petites Heures* is in fact taller and narrower than in the earlier book, the effect is emphasized more by the painting of the miniature than its physical dimensions. A reduction of ornament is applied to the whole page decoration. Le Noir reduced the borders to fix attention clearly on the figures inside. In the *Petites Heures* he limits the complex tricolour borders of the *Hours of Jeanne de Navarre* to a design which recalls the earlier tricolour quatrefoil, but is much simplified. It has become more elongated and much thinner, with additional side cusps. The elaborate alternation of red, blue and white within a blue or pink border has gone. Instead, there is a fine gold frame with a thin pink and white line running through it, outlining the cusps and joining a thin line of the same colour, outside the gold border.

In the early work the top and bottom of the composition are cut off by the border, enhancing the flatness of the miniature in relation to the page. The border is dominant, lying on top of the scene and jutting into it. It negates an impression of depth because the scene appears almost crushed and confined by its frame. In the *Petites Heures* the border comes down lower and appears further away even if the figures still crowd into the scene from the edge. The space above the figures is higher, so that none of the characters is truncated by the top of the frame.
While some of the figures are cut off at the bottom, more of the ground shows than in the *Hours of Jeanne de Navarre*.

Up until the *Petites Heures*, many of the miniatures painted by Le Noir had diaper backgrounds. Now Le Noir, and also Jacquemart, used drollery backgrounds. These are less harsh and angular than diaper grounds and, despite their complexity, are in reality less obtrusive. Drolleries fade away from the eye to allow the viewer to concentrate on the scene. These backgrounds are no less abstract than diaperwork, so the artist retains a strong sense of two-dimensionality. At the same time, they give a softer feeling than the harsh swirls and sparkling diaper designs of the *Hours of Jeanne de Navarre*. In addition drollery backgrounds bridge a gap between realism, because they include accurate drawings of animals and birds, and abstraction because they also contain fantastic hybrids.

"Carrying the Cross" *Hours of Jeanne de Navarre* f.111. *Petites Heures* f.86v [sl. 136].

In this miniature Le Noir emphasizes the simpler composition and solemn sentiments by reducing the number of protagonists in the later miniature when compared to the *Hours of Jeanne de Navarre* (13). The overall feeling in the *Petites Heures* "Carrying the Cross" is lighter than it is in the *Hours of Jeanne de Navarre*. However, if the overall tonality of the *Petites Heures*
is somewhat paler, the colours are also softer and the entire palette more restrained.

In both manuscripts the artist has used a similar blue, probably a mineral pigment which has an intense, sparkling tone, but it is paler with darker shadows in the *Petites Heures*. The colour is more even, with less complex shadows than in the *Hours of Jeanne de Navarre*. In this miniature, as in the *Petites Heures* "Betrayal", Le Noir reduced the number of colours in each figure. For instance, in the earlier work the Virgin wears a green under-robe and pink over-robe with a grey lining, but in the *Petites Heures*, although the robe is still pink, it has no coloured lining. Behind the Virgin, in both scenes, is a woman in blue. In the *Petites Heures* the artist has distinguished her from Christ, also dressed in blue, by the different tonality of her dress. It is shaded with brown; a combination seen from time to time in Italian painting, but unusual in Parisian miniatures(14).

To some extent the landscape in the *Petites Heures* is less articulated than it is in the *Hours of Jeanne de Navarre*. While it still falls into conspicuous areas of light and shade, there is very little added highlight. In the *Hours of Jeanne de Navarre* "Carrying the Cross" the landscape is quite a bright green, possibly even painted in malachite or a mineral blue mixed with yellow. In addition, the artist mixed in white for highlights and a darker colour, perhaps ink, for the shadows. In the later work landscape is a paler green, perhaps painted in an earth green mixed with blue(15). It is very sparingly applied with only
a small amount of white in the highlight. The brown used for the shadows may be an earth, a mixture made from red and black or even ink. This subdued colour harmonizes with the more mellow tones of all Le Noir's œuvre in this manuscript.

One of the more remarkable developments of Le Noir's style in this scene in the Petites Heures is the increased momentum that he gives to his characters. Gaps left between the figures in the Hours of Jeanne de Navarre give the whole miniature a static feeling. But in the Petites Heures, an empty rise of land at the right draws the eye towards it while a crowd of people on the left evoke an image of Christ as a figure propelled forward by a surging mass. As most of the figures are on the left, behind Christ, the entire composition moves strongly rightwards. Contrary to his centralizing techniques in the "Betrayal", Le Noir achieves a startling sense of movement in the Petites Heures "Carrying the Cross", animating the scene so that the mourning figures move along towards the execution rather than up a steep hill, as they do in the Hours of Jeanne de Navarre.

As he does in the "Betrayal", in this scene too Le Noir allows more space above the figures in the later manuscript than in the Hours of Jeanne de Navarre. In the earlier work the frame cuts off almost all the figures at the bottom and sides. In addition, in the Petites Heures some ground is allowed to show between the figures and the frame.
Once again, in the *Petites Heures*, Le Noir softened his choice of colours and used more yellow which is lighter and brighter, a less brownish ochre than he used in the *Hours of Jeanne de Navarre*.

Le Noir reduced the numbers of colours for the Virgin in the *Petites Heures* "Entombment". In both books the Virgin wears blue, but it is less light in the later work. Furthermore, in the *Hours of Jeanne de Navarre* she wears a blue cloak with a pink under-robe, but in the *Petites Heures* her blue cloak comes up to her neck hiding any other clothes. The man holding Christ's left arm wears orange in the *Hours of Jeanne de Navarre* while in the *Petites Heures* he is replaced by a figure wearing a soft yellow undergarment and a pink over-robe. Le Noir has not abandoned areas of bright orange in the *Petites Heures*, for instance it is worn by John at the head of Christ and a woman beside him, but it is made warmer by deep red lake or vermilion shadows.

The pale green ground colour of the *Hours of Jeanne de Navarre* is difficult to identify, but it may be an earth colour mixed with white, giving a rather soapy appearance. Contrasted with this pale tone are dark brown shadows and white highlights. In the *Petites Heures* there is a greater impression of barrenness, but the grass is a softer, greyer hue(17). By painting much smaller highlights, Le Noir has unified the entire landscape which breaks
less easily into separate areas of highlight and shadow and merges into an impression of greyish green with some articulations of light and shade.

The artist has changed the yellow ochre coloured coffin of the Hours of Jeanne de Navarre to a simplified green tomb with less decoration. This simplification is in keeping with the fewer contrasts in drapery colours and the abandonment of background diaper in favour of drollery decoration in uniform colours. Here, in the Petites Heures there is a typical background of blue drolleries against blue, while in the Hours of Jeanne de Navarre there is diaper work.

In all Le Noir's later scenes the composition undulates more than in the Hours of Jeanne de Navarre where figures are arranged in a more or less straight line along the page. In the Petites Heures "Entombment", like in the "Betrayal", figures slope down towards Christ's head, concentrating attention upon him. As in the other miniatures Le Noir has moved the frame away from the figures, so that the partially obscured woman at the bottom of the scene in the Hours of Jeanne de Navarre is entirely visible in the Petites Heures. Nevertheless, both here, and in the "Betrayal", Le Noir alerts the viewer to the existence of the frame by allowing a small piece of material to touch the edge of the scene. There is also more space above the figures.

It is possible that in the Petites Heures, his final work, Le Noir abandoned bas-de-page in some of his designs, in order to
concentrate attention on the substance of the main miniature, now larger in proportion to the entire page. In every respect, the artist turns his viewer's mind to the action of the miniature rather than to the overall page. Strong colours are now reserved for areas where Le Noir wishes his viewer to look: the centralized figure of Christ in the "Betrayal", the mourning John holding Christ's head in the "Entombment". Colour and composition are arranged so that sacred drama takes precedence over the decorative whole.

While it may be suggested that Le Noir's quieter composition was the product of a long career and that his rigorous choice of colour was the result of a new understanding of how to organize an image for maximum dramatic effect, there are some aspects of his colour which may point to influences from younger artists. Noticeable in the work of his immediate successors, like Pseudo-Jacquenart in the late XIVth-century, are a strong bright yellow, pale pinkish mauves and a generally wider range of transparent colours. Deep, ultramarine blue begins to take precedence over all other blues and vermilion red is found more often. There are also paler, grassier greens probably made with yellow lakes. In his Petites Heures miniatures Le Noir also used mauve and quite a lot of yellow, although it is a more subdued ochre-like colour than that used by his successors. It is not, however, so much a matter of specific colours as a broadening of the whole range to include softer colours and more intermediate tones.
There will be two discussions of the Psalter of Jean de Berry [sls. 142-145]. The first concludes the discussion of grisaille continued throughout the first section of PART TWO and looks at the way the sculptor André Beauneveu treated the twenty-four grisaille miniatures which precede the Psalter. The second discussion, at the beginning of the second section of PART TWO (CHAPTER EIGHT), discusses the contribution of both Jacquemart and Pseudo-Jacquemart to this manuscript.

André Beauneveu worked in the mid-1380s on a psalter commissioned by Jean de Berry. He seems only to have painted the twenty-four introductory miniatures of prophets and apostles; the remaining miniatures are painted in a quite different style. The points to be discussed here will be Beauneveu's treatment of the figure in space, using a grisaille technique, rather than his role as a stylistic innovator.

Beauneveu's treatment of grisaille in the Psalter is quite different from that of other XIVth-century artists. The design of the miniatures is itself innovatory. His monumental figures seated on great coloured thrones are quite unlike anything seen before. The figures are substantial, with large areas of uninterrupted colour or grisaille, and recall Pucelle's paintings in the Hours of Jeanne d'Evreux. However, Beauneveu's perspective architecture and even broader treatment of cloth achieves a greater sense of depth.
Post-Pucellian grisaille was predominantly used for decorative effect, not to show volume. In the Psalter, however, the artist uses grisaille to show the figures as rounded. If these miniatures are indeed by André Beauneveu, a sculptor, he may have considered grisaille to be a suitable technique for representing marble figures. With softly curling hair, the whole appearance of the figure is plastic, but monumental. However, as in other XIVth-century grisaille miniatures, the technique is treated as if it only applied to hair and clothes. Faces and hands are lightly coloured, but not as heavily as in some previous grisaille manuscripts. Colour is touched on and in this respect the style is again more reminiscent of the Hours of Jeanne d'Evreux than the grisaille of Le Noir and of the Boqueteaux workshop. Parchment is used as highlight; the artist has apparently used no white. Drapery fades very softly, an effect often achieved by defining edges not with line, but with shadow or highlights, as did Pucelle. The outline of figures is thus softened and appears rounded.

The "pastel" shades of the thrones are not in themselves unusual as architecture was often shown in pale colours during the XIVth century. However, in the Psalter, architectural thrones are even more pale and less dense in colour than had been usual up until this time. They harmonize well with the grey figures. Beauneveu used smaller areas of wash than had been found in earlier grisaille. His grisaille colours themselves are a delicate brownish grey, and the technique looks forward to that which
became fashionable in the later-XIVth century, with tiny lines dotted on with a soft pen or very small brush (see above CHAPTER SIX).

Decoration has not been abandoned, however, for the artist included highly ornamental backgrounds and ground planes. In particular, the tessellated floors are a new and highly decorative motif. Nevertheless, not only are Beauneveu's figures larger in scale than any painted before by Parisian illuminators of the period, but their whole appearance is massive and in keeping with a sculptural impression. For the thrones, Beauneveu added white to the main colour while darker areas are painted in the main colour unmixed.

Millard Meiss considers there to be two styles among the twelve miniatures; the most ornamental miniatures being the earlier. These have diaper grounds and tessellated floors. In one of the more beautiful miniatures in the early group (f.13v [sl. 144]), the background, throne and ground are united by colour. The background is blue and pink diaper, the throne pink and the ground orange squares with dark red circles and gold decorations. The overall impression gained from these varied patterns is one of unity, while the light grisaille stands apart. The second group of miniatures, for example ff.19 & 23v [sl. 145] have less densely coloured grounds and backgrounds which one would have supposed would harmonize with the pale grisaille and the relatively pale thrones, to unify the whole. In fact, such is not the case. If anything, the overall tonality of the
miniatures becomes darker with greater areas of shading on the grisaille figures which also become more linear as the work progresses.

Backgrounds and Borders

In many backgrounds the artist has used diaper patterns which recall those used throughout the mid-XIVth century, but they are minute and very fine, some of the most elegant of the century(22) In the "old-fashioned" miniatures, the brightly coloured backgrounds contrast strongly with the pale figures on their stone thrones, throwing into relief the fine quality of the decorative diaper work.

In some but not all of the "modern" miniatures f.23v (sl. 145) the decorative effect is less intense. These settings are quite different from any seen before in this century. The artist abandoned all gold and for the background often used one colour against a darker version of that colour. For the grounds he used little landscapes with grass in browns, greys and blue/greys. Solid areas of colour in the swirly backgrounds and grassy grounds serve as uniting elements so that the image has become more balanced, but the ornamental effect is reduced.

Among the earlier group, alternation is more rigidly maintained. For example, on f.8 (sl. 142) a thick red border, drawn like a picture frame, alternates with a predominantly blue diaper
Late paintings by Le Noir and Beauneveu's grisailles have been chosen to demonstrate a transition between Le Noir's own mid-XIVth-century miniatures and those of the Boqueteaux workshop, to the later, more brilliant style of Jacquemart and his followers. Le Noir makes no great innovations as far as his palette in the Petites Heures is concerned, but colours are treated in a more tightly meshed fashion. The way in which Le Noir uses his colours points towards the work of his successors (or colleagues) in the same manuscript. He emphasizes warm, glowing tones, and has nearly abandoned the icy colours of the Hours of Jeanne de Navarre. It is already possible to see a few new colours like mauve and deep blue whose use will be developed in the next chapter.

Beauneveu in his grisaille painting also closely knits each area of colour into the next. His figures show a renewed interest in three-dimensionality. At the same time, his introduction of little landscape ground planes points towards a quite new interest in landscape, or at least the representation of exteriors. His wide variety of pale colours washed onto the thrones, foiled against areas of strong, dark colours in the
background matches the aesthetic found in paintings by Pseudo-Jacquemart who, as will be shown in the next chapter, contrasted areas of pale, transparent colour against intense and saturated hues.
NOTES

1. See CHAPTER FIVE above.

2. See CHAPTER EIGHT below.

3. For example, the seated author on f. 4 of Les Miracles de Notre Dame.

4. For example, on ff. 17, 42 & 211 all the figures wear a single colour.

5. It may not be gilded tin, but silver glazed to give it a golden shine.

6. The colour is too thick to be a lake colour, it is probably the ochre-like yellow used by Le Noir throughout his career.

7. A figure in the "Battering" f. 82 and another in the "Flagellation" have yellow faces. In these cases the yellow may be intended to show the wickedness of these figures. Nevertheless, its use in the "Betrayal" of the Petites Heures seems more related to the brilliant and intense colours of this scene than to the evil nature of Judas.

8. For example, for Peter and in the right-hand figure carrying a lantern in the same miniature in the Hours of Jeanne de Navarre.

9. For example, ff. 17, 42 & 97 [Thomas, pl. 15].

10. Avril, Dunlop and Yapp, Colour in the Petites Heures, forthcoming.

11. The figure behind Peter in the Hours of Jeanne de Navarre has a large area of under-robe visible, while in the Petites Heures, most of his under-robe has disappeared revealing only a small amount of brownish pink.

12. In the Hours of Jeanne de Navarre the miniature is 5 cms. high and 8.5 cms. wide, while in the Petites Heures the miniature is 5.5 cms high and 7.2 cms. wide.

13. On the right of the scene in the Hours of Jeanne de Navarre is a figure carrying nails, but he has been removed from the miniature in the Petites Heures.

14. If, as has been tentatively suggested, Le Noir worked alongside a team of younger colleagues, these subtle and soft colour combinations may reflect those used by Jacquemart's followers. Typical of their range of colours is mauve and mauveish pink (for example, ff. 11, 119v & 211). See CHAPTER EIGHT below.
15. The colour being pale and uneven may even be made from lakes.

16. Changes of height in the Hours of Jeanne de Navarre are marked by the upwards gesturing hand of the hammer carrier and by the additional figure of the nail carrier walking up hill to the right. But in the Petites Heures, there are fewer alterations of height. In the Hours of Jeanne de Navarre, the hammer carrier's head is level with Christ's head. Now it is below Christ's supporting arm. This man's feet are now also on a level with those of the other figures, not climbing the hill as in the earlier work.

17. Although he may have used a pure green pigment, the colour seems rather a greenish blue.


19. Panofsky, Early Netherlandish Painting, p.37 claims that Bondol, a Flemish artist (see CHAPTER SIX), introduced the tessellated floor, probably derived from a similar motif used by Ambrogio Lorenzetti (see: Muel et al., La Tenture de l'Apocalypse d'Angers, panels 16 & 29). While the floors give a sense of depth, the background diaper sometimes comes below the place where the back of the throne ought to be, denying the depth of the apparent space in which the large thrones stand (ff. 8 [sl. 142] & 13v [sl. 144]).

20. Beauneveu may have coloured the thrones to enhance the ornamental effect of the miniatures or, as a sculptor, it may have been his custom to paint such architectural props, or to make them in coloured stone.


22. The decorative squares ff. 7v & 8 [sl. 142] are new. Otherwise the ground pattern conforms to the type found in the Coronation Book of Charles V, for example ff. 64, 68 & 68v.

Colour in late-XIVth and early-XVth-century Parisian manuscript illumination retains a function that is both decorative and abstract. A structured image has an inner tension to which the spectator responds. This tension is often created by the rhythmic arrangement of colour which, in a painted book, extends from the miniature to the written page, uniting the two. In many miniatures, artists placed colours in counterpoint to create an internal structure (1)

In spite of growing naturalism, book pages retain their ornamental borders and line endings. However, textual illustration becomes more standardized and page decoration is simplified. Many miniatures are now more or less square or oblong; quatrelobes are abandoned and artists no longer paint drolleries so that they overlap both the illumination and the rest of the page (2). In the XIVth century, Parisian illuminators used rigorous systems of alternation, both between colours, most usually red and blue, and between grisaille and colour. A choice of any particular colour was thus almost arbitrary as alternation is a strictly ornamental and non-naturalistic method of painting.
It was suggested that when Jean Le Noir painted the central figure of Christ in the "Betrayal" of the Petites Heures (f. 76 [sl. 134]) in a uniform colour, he was moving away from an entirely decorative picture surface to a more unified, less ornamental image. Furthermore, it was postulated that he may have been influenced by another artist, perhaps Jacquemart or Pseudo-Jacquemart. In this miniature, colour is more tightly meshed with subtler gradations of tone between each area of highlight and shadow, concentrating attention on Christ.

Perhaps the most important observation to be made about late-XIVth-century colour is that it becomes more saturated and vibrant. Among the first miniatures in which a new range of colours becomes obvious are those by the second artist of the Bible of Jean de Cy (c. 1380) (B.N. Ms. français 15397) [sl. 81] (3). Here are the mauves, pale ochre browns and most particularly the deep blues that become an integral part of the late-XIVth and early-XVth-century palette (4). There are also new shadow colours; for example, on f. 27v Sarah has a brown robe with grey shadows (5). Colours are more softly modelled than had ever been seen before in Paris (6). Diaper is replaced by a deep blue background against which the luminous figures shine.

The major manuscripts to be discussed in this chapter are the Très Belles Heures (B.N. Ms. nouv. acq. latin 3093) [sls. 146-154] and the Petites Heures (B.N. Ms. latin 18014) [sls. 146-154]. However, there are two other major manuscripts, the Psalter of Jean de Berry (B.N. Ms. français 13091) and a Bible Historiale
CHAPTER EIGHT: THE LATE XVth CENTURY

(B.N. Ms. français 20090), illuminated at about the same time. These two books show advanced painting techniques and uses of colour that demonstrate how "new" colours are not confined to the Trés Belles Heures and Petites Heures.

The next chapter (CHAPTER NINE) will discuss how the "new" palette seen in these manuscripts develops. Moving into the early-XVth-century it will be shown how some artists continued to use grisaille and semi-grisaille, but with an even greater emphasis on decoration than their XIVth-century predecessors. At the same time, other illuminators were introducing more and more precious metals and disparate patterns to enhance an increasingly ornamental image.

THE TRES BELLES HEURES

Although indications of a "new" palette can be seen in the Bible of Jean de C7, much more revolutionary colour was used in the Très Belles Heures (B.N. Ms. nouv. acq. latin 3093), reputedly painted by the Master of the Parement of Narbonne (c.1380 [sl. 146-154]). The manuscript is quite unlike any illuminated earlier in the XIVth century either in style, or in brilliance and intensity of colour. Colours, although at first glance unrelated to any used before in Paris, are, in fact, mostly the same colours used differently.
The *Très Belles Heures* retains bas-de-page which are perceived as part of the overall ornament of the manuscript. However, as will be shown below in the section on the *Petites Heures*, they were already becoming rather an outmoded decorative convention. These bas-de-page are painted in a much more old-fashioned style than the main miniatures, but their colours are similar to those used in the main miniatures and their degree of saturation is nearly equal; their technique is, however, different. Artists of the bas-de-page have a range of colours related to the lighter colours of the earlier XIVth century. In the main miniature there is green or grey face modelling, but in the bas-de-page the artists kept the red and black outlines and undefined modelling of an earlier style. As it is in Le Noir's paintings, hair is generally yellow ochre colour with highlights mixed with white while shadows are mixed with what is probably ink(8). However, the bas-de-page artists have adopted some of the Parement Master's colours. Yellow, an integral part of the more advanced artist's palette, is extensively used by these retardatory artists.

**New Colour**

It has not been possible to establish clearly whether any colour symbolism was used in Parisian manuscript illumination for this period. In fact, except that the Virgin is almost invariably dressed in blue, colour symbolism as such, that is one character always wearing a special colour to symbolize a psychological
state or spiritual idea, does not seem to have played a rôle in
the colour arrangements of Parisian artists of the period c.1320-
c.1420.

Some miniatures at this period show Judas in yellow, and it might
be possible to suggest that he wears this colour as a symbol of
evil. However, yellow is apparently associated not so much with
the evil of Judas, but with his Jewishness (9). In the bas-de-page
of "Judas Throwing Away the Money" in the Très Belles Heures
(p.194 [sl. 154], of the group of Jews dressed in yellow one is
indeed Judas but the others, although they are Pharisees, cannot
be directly described as evil. Furthermore, throughout the Très
Belles Heures the Virgin's blue mantle has a yellow lining,
surely only a decorative use of the colour (10).

Nevertheless, the "Betrayal" (evil epitomized) is dominated by
yellow. Judas has a yellow cloak, reflected in the legs of the
soldier who pulls Christ. Malchus wears a red and yellow parti-
coloured tunic whose yellow half actually overlaps Judas' cloak
(sl. 152). To the right of Christ is a figure with a yellow
sleeve and a helmet edged in yellow; on Judas' left, only
separated from him by a helmet, is a man in a yellow turban.
This scene thus shows how yellow would develop into a colour
which symbolized betrayal, while at the same time its general use
throughout the Très Belles Heures shows that at this point, at
least, any potential symbolic use was secondary.
In the *Trés Belles Heures*, bright yellow becomes a dominant colour for the first time in Parisian manuscript illumination. The introduction of yellow changed the overall tonality of miniatures and they now seem much brighter. What is more, the Parement Master treated yellow in several different ways. In the "Annunciation" (p.2 [sl. 146]), the lining of the Virgin's robe is yellow shaded with reddish brown and highlighted with white while Gabriel's yellow sleeve is shaded with green. In God's robe the combination is used in the reverse; green is highlighted with yellow. In both bas-de-page and the main miniature, yellow is also often used with green to create a third colour, greenish yellow. The use of two or three colours in different combinations to create related, but separate effects is also new to Parisian illumination, although it had been used by the Italians in panel painting and in Paris in the Angers Apocalypse. Yellow has a warmer tone and appears brighter when it is shaded with red rather than green, and as a general rule yellow in both the bas-de-page and the main miniatures has red shadows.

Documentary evidence shows that vermilion was always available, and it was often used as a wall painting colour and indeed in panels during the XIVth century, but the blueish red of vermilion is rarely seen before this time in Parisian manuscript illumination. The *Trés Belles Heures* appears to be the first manuscript where there are large areas of vermilion red in the main miniatures. Often just one area is picked out to draw attention to it; for example in "the Marriage at Cana" (p.68),
the central figure of the bride wears a vermilion red dress, otherwise the reds tend to orange, and are probably red lead.

As will be discussed below, Pseudo-Jacquemart also uses a "new" palette with many pale washes and transparent lake colours. However, the Parement Master did not do so. On the contrary, what distinguishes the Parement Master's colours in the Très Belles Heures from the muted mid-century style and from the cheerful, brightly coloured style of Pseudo-Jacquemart is both their degree of intensity and saturation and their juxtaposition.

The deep blue which appears in Paris quite suddenly towards the end of the XIVth century is an integral part of the Parement Master's palette. Although a deep blue was used in manuscripts throughout the Middle Ages, during most of the XIVth century illuminators, and often also panel painters, used a blue with strong highlights added in degrees of paler blue\(^1\)\(^6\) From about the 1380s, illuminators often modelled blue leaving the main colour very dark and painting shadows in degrees of darker blue going sometimes to nearly black\(^1\)\(^7\)

There are other elements in the Parement Master's choice of colours that are quite new in Parisian illumination. The artist had, for example, two greens. One, a dark green, is found throughout the XIVth century, the other, a "mint" green, seems not to appear before in Paris. In the Très Belles Heures, this minty green only appears on p.155 [sl. 151], "Man of Sorrows"\(^1\)\(^8\)
Among the other "new" colours are dark brown and ochre which up to now had mainly been used to represent wood; now they have become costume colours in the main miniatures and the bas-de-page (19). Black can also be considered to form part of the "new" palette. Of course, black as a painting colour was always used in small areas and for outlines. At this point it has not yet become a fashion colour, as it does in the next century. Black was always available, but the Parement Master employed it in a new way. Not only do the monks in the "Office of the Dead" (p.104) wear deep, modelled black, but one of the angels supporting Christ in the "Man of Sorrows" (p.155 [sl. 151]) wears a very fine black hairband which stands out against his fair hair. The intensity of this black is striking. The colour doubtless signifies mourning, but it is also being used for an accessory to the angel's costume.

The "Man of Sorrows" p.155 [sl. 151] is the most original expression of this artist's palette. While it might be argued that the essential paleness of the colours in this scene recall miniatures painted in the earlier XIVth century, in every other respect they are quite different. Large areas of yellow on the robe of one angel are contrasted with a pale "mint" green and pale blue. Bright, light colours are ranged against a deep blue abstract background, but these pale colours are saturated; that is they are given their full value by an absence of marked highlight or shadow.
Much of the originality of the Parement Master's choice of colours lies in combinations which become much stronger and brighter. Elizabeth's cloak in the "Visitation" (p.28) is yellow on the outside and pale blue on the inside. Very dark colours are contrasted with bright colours that are sometimes also dark. In "Christ Before Pilate" (p.194 [sl. 154]), the man pushing Christ has a yellow leg; Christ's blue robe is equal in intensity to these yellow leggings and to the orange leggings of the figure pulling Him. The blue of His robe is both dark and bright, while the yellow and orange are bright and strong.

Such combinations had already been seen in panel paintings, particularly from Siena and Florence where it is possible to see yellow and pink or pink and green combined. While the Parement Master's choice of colours is very personal, it may be possible to see a recollection of the vivid palette of Siena. The use of colour in the Très Belles Heures, like no other manuscript of this period, recalls the saturation of panel painting.

Nevertheless, even if the colours in this manuscript are far more intense than in any other XIVth-century Parisian book, some figures still wear the paler colours found in the earlier XIVth century, in particular pale blue/pink combinations. The priest in "Christ before Caiaphas" (p.189 [sl. 153]) wears a pale blue/grey robe and pink cloak. Although the figure pushing Christ has bright yellow leggings, he wears a grisaille tunic whose subdued
tones reflect those of Caiaphas' vestments on the other side of the miniature (21)

A "new" palette could perhaps be defined as being made up of bright yellow, a strong, vermilion red and deep, intense blue. There is also a new light, bright green and strong, definite black. In addition there are more neutral colours like brown. These colours may be considered to be related to the strong and vibrant tones found in contemporary Italian panel paintings, although they are adapted by the Parisian illuminators to the small scale of a miniature.

Ornament

In a medieval manuscript, the illuminator considers the page as an ensemble and links the didactic miniature with the purely ornamental aspects of page decoration. This linking is frequently created by the use of colours which appear both on the page and in the miniature. In the Très Belles Heures, the strong recession of the miniatures gives them a certain air of little panel paintings. Nevertheless, the pages are still conceived as ornamental units. Many of the decorative conventions of mid-XIVth-century manuscripts remain: there are bas-de-page, historiated initials, text and illustration.

However, in the Très Belles Heures the main illustration has now taken over most of the page so that a new and different unity is
lent to the miniature in relationship to the page as a whole. The folio is now almost entirely given over to a large miniature devoted to a single theme; there is much less space for either text or border ornament. Furthermore, the colours used in the miniature are so varied that the eye is pulled from side to side and never allowed to rest; each miniature lacks colouristic unity and hence internal harmony. So large is the miniature in relation to the whole page that the page itself becomes fractured and incoherent in appearance. This varied distribution of colours sets the Parement Master apart from other late-XIVth or early-XVth Parisian illuminators, most notably Jacquemart and the Boucicaut Master (see below), who reduced the palette to a limited group of colours which creates decorative harmony within the miniature. It is thus possible to speculate that they restricted the palette in order to link each area of the miniature to each other area of the miniature and so unify the illumination. Such colouristic unity creates a calm and harmonious image(22). This internal harmony makes of the miniature a decorative element in itself which is then situated as a decorative unit within the page conceived as a decorative whole.

In contrast to this internal harmony the Parement Master's fractured image recalls Italian panel painting techniques. It seems that an equal distribution of colour is less important on a panel which exists as an independent entity, unrelated to any other decorative element. The designer of the Très Belles Heures was clearly less preoccupied by abstract ornament than his
earlier XIVth-century colleagues. There is, for instance, no consistent alternation of colours. Sometimes backgrounds in the main miniatures and initials are the same colour and sometimes they alternate; no attempt was made to alternate border colours. The artist has, nonetheless, retained some elements of mid-XIVth-century page decoration. Initials are all on decorative diaper or foliage. Now, although most miniatures have abstract backgrounds, there is usually only a small area visible. Exceptions are those miniatures that are not "historical", that is their subject matter does not take place on Earth, for example the "Coronation of the Virgin" (p.78) or "the Man of Sorrows" (p.155 [sl. 151]).

Precious metals are rarely used in costumes; on the other hand, the artist added gold ornaments in the form of lozenges or diapered roundels to the front of many buildings. This use of gold on the now increasingly naturalistic architecture is particularly interesting. Gold is by its nature flat and cannot be modelled to appear three dimensional. By incorporating gold shapes into three-dimensional reliefs, the artist links the main miniatures with the gold rinceaux in the page and border ornament. The Très Belles Heures shows an increasing ambiguity between abstract decoration and realism. Such ambiguity is well demonstrated by a gold curtain painted with coloured designs hanging below the figures in the "Man of Sorrows" (p.155 [sl. 151]). Particularly fine gold cloth, patterned with coloured lakes, is found in the highly ornamental Coronation Book of Charles V of 1365. In that book flat pieces of patterned cloth add ornament in a highly decorated book telling the story of an
elaborate ceremony. Their function is purely decorative. The Parement Master's treatment of gold cloth in the *Très Belles Heures* is different (26). This artist has shown a decorated golden cloth, falling in realistic folds. Its function here is partly abstract, an area of ornament, and partly naturalistic, a folded cloth.

The *Très Belles Heures* is apparently the first Parisian manuscript in which there is a systematic use of contemporary costume which is often painted in one colour (for example, the bride in the "Marriage at Cana" p. 68). However, in many other cases the Parement Master does not abandon the practice of allowing the costumes to enhance the overall ornament and continues to use the multi-colour system for drapery; figures are often dressed in two or three colours (27).

However, except for the predominant miniature, the *Très Belles Heures* shows that traditions of page organization were strongly entrenched. The decorative elements of bas-de-page, historiated initial, border angels and rinceaux, not altogether abandoned by the Parement Master, demonstrate that the artist, if not a Parisian by birth, was working within an entirely Parisian context.
Landscape and Architecture

The Très Belles Heures has architectural settings that are not only tall enough to contain their occupants, but deep enough. Most of the scenes have tessellated floors or receding roof-struts or both. These squared floor and ceiling tiles have a double function: while they certainly create recession, they are also decorative and add to the overall confusion of the image. Architecture itself is usually lightly coloured and plays a role in the overall ornament of the miniature.¹

In addition to large buildings, the Parement Master introduces a new technique for painting windows as if they are made of stained glass.² For these windows the artist mostly used a pale green, but in the scene of "Christ Among the Doctors" (p. 62 [sl. 150]) there are white panes with blue and red decorations and black cross lines.³ Once again, although this particular type of window seems not to have been used before in Parisian illumination, light-filled, if not stained-glass, windows can also be seen at about the same period (1380s) in the Angers Apocalypse.⁴

Despite the advanced techniques used by the Parement Master in architecture painting, landscapes in the Très Belles Heures are rudimentary. Evidently, they did not interest the artist. Behind the "Nativity" p. 42 [sl. 148] there are large grey, green and brown rocks sprinkled with evenly spaced cuttings, perhaps even copied from the retardatory bas-de-page artists. There is a
similar setting, even more simplified, behind the "Adoration" p.50. Otherwise the outdoor settings do not have the sophistication of even the relatively simple landscapes used by Le Noir.

Technical Observations

Throughout the Très Belles Heures, there are indications that the artist was familiar both with the way that colours were used in panel paintings and with the actual painting techniques involved. The manuscript reveals to the naked eye quite a lot about the way in which it was painted. The main miniature artist used techniques quite unsuited to book painting and not seen before in Parisian illumination. The paint was laid on too thickly and in several places has chipped showing the underpainting and even the parchment underneath. Flesh painting seems to have been particularly vulnerable.

Clearly the whole book is not by one hand. It may be that the main artist, the so-called Parement Master, used Italian panel painting techniques, including green-earth face shading. The artist may, however, have had assistants unfamiliar with Italian painting systems. They might have followed the basic principle, but not used exactly the same techniques.

Some, but not all miniatures have green underpainting or modelling. Chipping shows green underpainting on the Virgin's
neck p. 28 [sl. 147] and on Joseph’s hand p. 42 [sl. 148], but in the miniature on p. 62 [sl. 150], particularly in the Child’s face, the modelling is chalky grey rather than green (34). In the "Man of Sorrows" (p. 155 [sl. 151]), the main body colour is grey. The shadows have been painted on lightly, probably in ink, and the scourge marks are dark grey. These skin colours have not been seen before in Paris and even the magnificent dead Christ in the large Pietà Tondo in the Louvre (early XVth-century) does not have this lifeless, tomblike colour [sl. 3].

These rather particular methods of painting and modelling may be the result of training in panel painting techniques where it is usual to lay several layers of colour one upon the other. In many cases, especially in Italian panel painting, a green undercolour was common for faces and hair. Like the Parement Master’s whole painting style, these techniques were rather unsuitable for manuscript illumination and are not seen again in Parisian manuscripts.

A most remarkable feature of this manuscript is the artist’s colour continuity. The same figure wears the same clothes wherever he or she appears. Such colour continuity, not apparent in any other Parisian manuscript, may be a technique taken over from panel painting (35).

The Très Belles Heures stands alone among late-XIVth-century manuscripts. Its colours are bright, vibrant and saturated.
Miniatures in the *Petites Heures* and *Psalter of Jean de Berry*, painted at about the same period, also have bright and saturated colours, but the Parement Master's style is quite individual. The artist's brilliant colours leaping from side to side of the miniature are the antithesis of Jacquemart's restrained harmonies in the *Petites Heures*. Such large figures filling substantial buildings may have seemed too unfamiliar to the artist's contemporaries. It is not until miniatures by early-XVth-century illuminators like the Limbourgs and the Boucicaut Master that such large scenes are again painted on an illuminated page.

**Later Miniatures**

Some brief comments should be made on the group of miniatures by later artists in the *Très Belles Heures* for their use of colour is unusual, and in the same way that the miniatures by the Parement Master found no followers, this later style stands alone in its period (early XVth century). These later painters also seem to have been unfamiliar with miniature painting techniques. In many instances they simply ignored the difficulties of painting in a water-colour medium. Each layer of paint is too thick in relation to that underneath and much of it has, like in miniatures by the Parement Master, chipped off. Buildings were painted on top of the already thick background, and have consequently chipped off. This chipping is particularly noticeable in the little castle at the top left of p.62. It seems almost as if the artists changed their minds or failed to
plan the miniatures, but possibly they took over partially finished pages with the backgrounds already painted in.

Colour in these later miniatures is quite different from that of the earlier miniatures. For example, on p. 178 yellow is shaded with blue and another distinctive powder blue is shaded with grey. In the same miniature the artist has achieved a very pale, highlighted mauve by washing a mauve shadow onto white, not by painting a mauve base colour with areas of highlight. Green is used as an undercolour for faces and beards (for example, p. 178), which are even more heavily modelled than in the work of the Parement Master. These unusual mixed hues are certainly the result of a more easily manipulated palette.

Meiss assumes that these artists came from the North of France and while their rather smudgy style seems indeed to point to a northern origin, there are no equivalent northern miniatures or panels with which to make comparisons (37). However, the soft brightness of the colours does somewhat recall the style of Lorenzo Monaco, who makes similar experiments with unusual combinations and mixtures. A fine panel in Avignon from the school of Lorenzo dated 1407 has the rather delicate tones that recall, but are not more than reminiscent of, the later paintings in the Très Belles Heures.
Millard Meiss has established that three main artists or groups of artists worked on the Psalter of Jean de Berry (B.N. Ms. français 13091), André Beauneveu, Jacquemart and Pseudo-Jacquemart, all of whom have painting styles and colour-uses that are both advanced and old fashioned. This section concentrates on the miniatures by Pseudo-Jacquemart and Jacquemart. For a discussion of the miniatures by André Beauneveu see the section devoted to his grisaille painting at the end of the previous chapter.

All three artists of the Psalter of Jean de Berry use the same intense dark blue found in the Très Belles Heures. There is a little vermilion red and some yellow, but it is mainly rather pale, perhaps a yellow lake. Possibly as a result of the much brighter palette, compared to the muted tones of mid-XIVth-century artists, the painters of the Psalter of Jean de Berry had more difficulty in defining the figure against a background which is still mostly multi-coloured. Consequently, in several miniatures the artist used a firm outline and created "cardboard cutout" figures. Jacquemart, however, in his miniature of the "Fool" (f.106), defined the figure against its background and against its pale loincloth with colour rather than line following techniques used by Pucelle fifty years earlier.

One of the more competent artists working in the Psalter of Jean de Berry is Pseudo-Jacquemart. This artist's miniatures are of
particular interest because the artist used both old colour combinations and new. In a scene of "Monks singing" (f.177), the lining of one monk's white cope is bright orange. This white cope is shaded with blue. Foiled against bright orange, it becomes a much stronger colour contrast than that seen in the monk behind who wears blue, pink and orange recalling earlier XIVth-century aesthetics.

New too in the Psalter are methods of modelling and painting faces. In the earlier XIVth century, faces had little modelling and just the outlines were sketched in with a red or ink line. However, in the Psalter the faces in the miniature on f.177 are quite highly modelled and heavily painted. The whole impression is immediately more rounded and three dimensional. There are different approaches to hair; the monks' hair is grey with dark grey lines, while God's hair seems to be painted in white over a grey undercolour. Each character is different and shows how artists are now using faces, hair and beards to develop each figure's independent personality.

Both Pseudo-Jacquemart on f.177 and Jacquemart on f.106 used the dotted shading technique employed so effectively by the Boqueteaux workshop. It was a technique that continued to be popular well into the XVth-century probably because it gives softness to a miniature.
The date of B.N. Ms. français 20090, a large Bible Historiale, is somewhat disputed, but the manuscript can probably be placed in the entourage of Pseudo-Jacquemart towards the end of the XIVth century (c. 1380-1390). This manuscript is of particular interest because, like the Psalter of Jean de Berry it represents a transition between new and old painting techniques and colour uses. Borders and backgrounds alternate less frequently, although a certain amount of red/blue opposition remains. Although backgrounds to the scenes in the full-page Solomon miniature (f. 290) alternate blue and red with their tricolour borders, there is a general move away from standard alternation of the mid-XIVth century. Like many XIVth-century Bibles the miniatures are surrounded by tricolour borders, but one feels that this has become a mere convention and is no longer an integral part of the decorative whole. Artists seem to have lost interest in the rigorous rhythm of alternation; new concerns with colour and pattern are emerging.

Artists in this book have clearly been influenced by Beauneveu's lightly coloured, elaborate architectural stonework. There are also other pale areas which hark back to the grisaille aesthetic. Now, however, tones are brighter and less dominated by areas of grey, gloomy green and sombre orange. Both Jacquemart and Pseudo-Jacquemart made more marked contrasts between pale and strong colours than earlier XIVth-century artists. One of the ways in which the late-XIVth-century palette
differs from the intense, dark contrasts of the XIIIth century and the pale/pale contrasts of the early and middle of the century, is in its variety. The "new" colours, mauve and powder blue are representative of the now often vivid, light and glittery tones\(^{(46)}\). In \textit{français 20090}, these sparkling colours are frequently used beside the deep, saturated tones that form an integral part of the basic palette of early-XVth-century Parisian manuscript painting, epitomized by the Boucicaut Master\(^{(47)}\).

There are also unusual and vibrant colour combinations in this \textit{Bible Historiale}. In the "Creation" (f.3), God's mauve robe is lined with orange, an opposition of colours quite unknown before in Parisian illumination. His robe in the bottom right scene is in a more old fashioned combination, pink and blue, but the blue is shaded with green. In another new contrast on f.35, one figure wears dark blue, but two others wear pale blue and pale yellow. These combinations were, however, as was discussed in \textit{INTRODUCTION TO PART TWO}, not so unusual in Italian, and in particular, Sienese paintings\(^{(48)}\).

The yellow in \textit{français 20090} is less bright than the yellow of the \textit{Très Belles Heures}, but as in that manuscript there are now many greenish yellows and yellowish greens. In some cases (for example, f.290), there are even two yellows, a pale yellow for the costumes and a darker yellow for the floor. There may have been initial resistance to using such a dominant colour. If the artists of the \textit{Très Belles Heures} used it liberally, others approached the colour with more timidity and may even have
considered it more suitable for decorative details than for costumes.

Although one might perhaps wish to set the Très Belles Heures a little apart from other manuscripts painted in Paris in the 1380s and 1390s, it plays a very important role in the development of the late-XIVth-century palette. In it are found the first uses of yellow on a large scale, an expanded range of greens and reds and a much more detailed interest in facial modelling. Perhaps it is possible to associate the technique and indeed the style of the Très Belles Heures with panel painting. At the same time, it would be difficult to link this artist's style to a specific school, either Italian, or as has been suggested, Bohemian. Nevertheless, there are associations, at least in terms of general principles with panel painting techniques. The Parement Master stands apart from the rest of late-XIVth-century manuscript illuminators in completely disregarding the internal colour harmonies usually found in miniature design and the basic techniques of miniature painting.

While it is clear that the style of the Très Belles Heures did not influence subsequent Parisian miniature painting, the brightness and clarity of the palette is symptomatic of a change. The tones and colours used by Pseudo-Jacquemart in the Psalter and français 20090, are quite different from, but perhaps inspired by, an artist already experienced in the more saturated and glossy style of panel painting. All these artists are moving
towards a stronger and more varied palette echoing, but not imitating, mid-XIVth-century Italian colour combinations.

THE PETITES HEURES

Le Noir

According to Millard Meiss, there are five distinct styles in the Petites Heures: Le Noir (the Passion Master), Jacquemart, Pseudo-Jacquemart, the Trinity Master, the fifth master and there is one miniature by the Limbourgs (f.285v). It is usually thought that the manuscript was painted in two separate campaigns which Avril would date between 1375-80 and 1380-90, but I would be inclined to believe that there was no interruption in the production of the book even though Le Noir certainly died before the manuscript was completed.

One of the most striking differences between the earliest style in the Petites Heures, represented by the paintings by Jean Le Noir (see above CHAPTER SEVEN) and the style of the later artists is in the treatment of blue. In the later miniatures, blue is both much darker and more intense, having fewer highlights. Furthermore, Le Noir's orange is generally more intense than his blue, but the second group of artists had an orange (probably red lead) that balances better in intensity with the darker and more vibrant blue used by them.
Le Noir's yellow is very much in keeping with his overall choice of colours and is more ochre than the strong, lemon yellow used by the later artists. Although Le Noir may have been influenced by the other artists in the extent to which he used yellow, Pseudo-Jacquemart and the other minor artists working on the book used the much brighter yellow also seen in the Très Belles Heures (51).

Close observation with a high magnification magnifying glass has revealed the extent to which the Petites Heures miniatures were prepared by Le Noir, even if they were finished by later artists (52). Many of the miniatures generally believed to have been painted by Jacquemart were drawn and in some cases even partially painted by Le Noir (for example, the figure of Christ in the border miniatures at the top of the "Annunciation" miniature). However, there are several colours in miniatures earlier attributed to Le Noir, that seem not to belong to his usual palette.

For example, the stockings of the left hand shepherd in "Annunciation to the Shepherds" on f. 40v [sl. 132], the hood of the shepherd above him and the sheep leaning on the rocks, are painted pink with blue shadows giving the impression of mauve. There is a "new" beige in the clothes of the standing front shepherd and the hood of the seated front shepherd. Neither of these two colours, pink shaded with blue and light beige appear in Le Noir's earlier works, but they are found in the paintings
of Jacquemart's assistants working on other parts of the book. Magnification shows that a large part of the miniature, especially the face of the central shepherd, has been painted by a later hand, perhaps Jacquemart or the Trinity Master. It may be then that almost none of this miniature was painted by Le Noir even though he did the underdrawing. On the other hand, it is possible that he did indeed paint some of the miniature in pale and translucent colours reflecting the palette of younger colleagues.

Relationship with the Tres Belles Heures

Although the Tres Belles Heures and the Petites Heures date from about the same period (c. 1380-90), they look quite different and at first glance seem to bear no relationship to one another. However, close examination reveals some essential similarities. For example, there are iconographical associations which indicate that the artists may have known each other's work and in some places the artists used the same colours for a particular figure (53). Nevertheless, the books are related not so much by what colours were used on each figure, as by the fact that both books contain the "new" colours, in particular yellow and dark blue.

There are similarities in the two "Visitations" (Tres Belles Heures p. 28 [sl. 147] and Petites Heures f. 32). The architectural layout is generally the same, both have green
buildings with brown wooden openings on either side, but the artists treated the image differently. Jacquemart's simple range of colours in the Petites Heures unifies the page design and prevents the fractured and dissipated image of the Très Belles Heures. While both "Visitations" have tessellated floors, in the Petites Heures the colours are reduced to blue and brownish yellow and those of the Très Belles Heures are brighter with a more varied selection of colours, orange, brown and green. A bright pink cloth hangs behind the scene in the Très Belles Heures, but in the Petites Heures the whole is set against the green architecture. Compared to Jacquemart's sober and rhythmic choice of colours, the Parement Master's bright colours, spread over the whole page, are almost garish.

Baptist Miniatures not by Jacquemart and the Trinity Master

At the end of the Petites Heures there is a series of miniatures which deals with the life of John the Baptist (ff.207-214). Some of these miniatures could be seen as providing a sort of transition between Le Noir's style and that of Jacquemart and his assistants. This transition is seen most particularly in the "Birth of the Baptist" f.207 and "the Dance of Salome" f.212v [sl. 139]. These scenes lack the restraint and balance of Jacquemart's painting and were probably designed and partially executed by Le Noir. However, while some of the colours clearly come from Le Noir's own palette, others recall that of Pseudo-Jacquemart and the artists of français 20090. In the "Birth of
the Baptist", there is a sparing use of yellow; clothes are still pale, but are painted in "new" colours, mauve, pale yellow, beige and touches of bright green. Orange is still shaded with dark red lake, now sometimes in broad strokes pointing to new modelling techniques. Faces are sketched in red, but the strongly perspectival rooms have become wood brown rather than stone coloured and have ornamental curved beams.

Particularly noticeable are contrasts between blue and pink in the "Salome Dancing" (f.212v [sl. 139]). Salome wears a pinkish dress shaded with blue, giving a purple shadow, a convention not found in Le Noir's paintings. Behind the scene of "Salome Dancing" hangs a pink curtain with blue shadows, colour combinations that recall the earlier XIVth century. But there is such a change; colours are soft and moulded into each other to give subtle half tones and "new" mauves and purples.

Jacquemart de Hesdin's Miniatures

Jacquemart de Hesdin's contribution in the Petites Heures is limited to a few miniatures. Many of these seem to have been painted over miniatures already prepared by Le Noir and he only undertook major scenes and no minor miniatures. His paintings are remarkable for their harmony and restraint in terms of both colour and composition.
The close association between the paintings of Jacquemart and Le Noir can best be seen in the "Annunciation" because it is easy to see that the miniature was begun by Le Noir and finished by another hand. Jacquemart's main contribution is in the border, but it is possible that a later artist also coloured the robe of the angel in the main miniature. The colours in the main miniature and the border figures differ noticeably. However, Jacquemart's range of colours in the border is not nearly so restricted as it is in, for example, the "Visitation". Some of the little scenes surrounding the main miniature, previously considered to be by Jacquemart, can now be seen to have been prepared by Le Noir. It may be that as Jacquemart could not or would not match the palette of the main miniature, and so could not unify the whole image, he felt a greater license to use a more varied palette than was his usual practice.

It appears from observing the miniatures with a high-magnification magnifying glass and indeed a hand-held magnifying glass, that most of the "new" colours are made from mixtures. On either side of the central top figure of Christ there are touches of a green probably made from a mixture of dark blue and yellow. The colour is shaded with blue which seems to have been painted on first. The green was laid lightly on top. The figure at the top left wears mauve drapery highlighted with white, an effect
created by washing mauve into white rather than highlighting the mauve. On the right hand border, second from the bottom, a figure wears yellow. Such a use of yellow is particularly interesting because Jacquemart employed it very seldom. Could this colour have been already in place when Jacquemart reached the book, or did he feel, in this rather fragmented scene, at liberty to expand his normally limited palette?

"Visitation" f.32v

The "Visitation" is an excellent example of Jacquemart's restrained and sober palette. In fact, the colours are not very different from those of mid-XIVth-century artists, but now blue is much darker and the way that Jacquemart uses it is revolutionary. The colour is bright, strong and nearly unmodelled so that it becomes a block of rich and vibrant colour, quite unlike the restrained, highlighted blue of Le Noir and the Boqueteaux workshop. The colours of each miniature are reduced to four or five, giving harmony and strong internal structure to the miniature. Jacquemart is alone among Parisian illuminators in simplifying his range of colours in this way and it is quite unlike that of the Brussels Hours.

The scene is set in a green room. The Virgin wears pink, with a dark pink line at the hem of her dress; otherwise the edges are gold. Elizabeth wears a very pale pink cloak, but the eye is drawn to the top of her bright orange underdress whose colour is
reflected in the small roof to the right. In keeping with the general sobriety of the scene, the door to the left and the ceiling beams have been painted beigeish brown, a restrained but naturalistic colour. Jacquemart has not included blue in the general palette of the miniature, but saved it for a small area in the floor. The artist thus concentrates attention, not on the beauty of the colours, but on the subject of the miniature.

"Nativity" f.38

The layout of the "Nativity" (f.38 [sl.133]) is more conservative than that of the "Visitation" and Meiss suggests that the miniature and border were planned by Le Noir(57). His observation is borne out by close examination of the "Nativity" with the stereomicroscope which reveals underdrawings by Le Noir. The so-called "snow-capped peaks" are more likely to be the result of Jacquemart completing a landscape planned and indeed partially painted by Le Noir than an attempt to show a snowy landscape. This pale scenery is reminiscent of Le Noir's other landscapes in the book (for example the "Entombment" on f.94v) and reflects mid-century landscape painting practices; the main colour is parchment shaded with blue. Despite close links with earlier landscapes, Jacquemart has altered the scene with softened modelling which includes quite large areas of light and shade becoming darker in the background and so giving an impression of distance.
The Virgin's cushion also reflects older painting traditions and may even have been painted by Le Noir. It has been treated as grisaille, painted white and shaded with grey. Jacquemart contrasts very deep blue in the Virgin's robe against the pink of her bed covering. Independent colours, not reflected elsewhere, are seen in the brown hut roof touched with blue shadows, Joseph's red tunic and his lemon yellow chair shaded with dark red which shines alone in this sober scene.

"Adoration" f. 42v

The "Adoration" has one of the most varied palettes of all Jacquemart's work in the Petites Heures. Although like the "Nativity" this scene shows evidence of a preparatory drawing by Le Noir, it is a much more complex image than the "Nativity" and Le Noir's participation in the latter seems to have been greater. The eye is carried from one colour to another, but Jacquemart uses isolated colours to draw the eye. Dark red, a rare colour for Jacquemart, is used only for the king's attendant; this colour may be vermilion, but seems to have the transparency of red lake. The Virgin's orange cushion is reflected in the hat of the figure beside her and her cloak is lined with Jacquemart's distinctive muted green. The lining of the middle-aged king's blue cloak is a pale "minty" green; under his blue cloak he wears a very pale pink robe. With the old king in pale pink, these figures contrast with the very vibrant tones of the rest of the miniature. Vivid contrasts of light pink and green with
strong and brilliant blue and red epitomize the new, late-XIVth-century aesthetic.

"Berry Before the Virgin" f. 97

The devotional scene of "Berry Before the Virgin" [Thomas, pl. 15] has a range of colours quite in keeping with the rest of Jacquemart's miniatures. There are large areas of very intense blue for the Virgin's robe, while Berry is dressed in a fairly standard pink. However, the interest of this image lies in the curious treatment it has received.

Perhaps the manuscript was meant to be left open at this miniature. The whole page was treated quite differently from any other in the book; it seems to have been varnished. There is a strange thick and shiny surface visible even in the text where the ink has gone brown and cracked. Berry's pink robe is particularly shiny. The drollery on the left, painted as part of the earlier, Le Noir, campaign has cracked. This seems to suggest that it was painted onto an unsuitable and shiny surface rather than that the shiny surface was applied on top. When the book was first planned, or at least during the initial campaign, the page may have been prepared in some way before anything was painted on it. Examination with the stereomicroscope showed, once again, preparatory drawings by Le Noir (59)
Millard Meiss considered that some of the miniatures in the
Baptist Cycle (see above) not painted by Le Noir were illuminated
by Jacquemart working with a closely related artist called by
Meiss the Trinity Master. The Trinity Master was clearly an
independent artist whose style is recognizable by the use of very
limited colours. In a fine miniature (f.33) the artist paints
two monumental figures of Christ and God dressed in deep, intense
blue, standing against an equally intense red background. The
Trinity master has a soft, dotted modelling technique and the
influence of this artist's very restricted palette is seen in
miniatures where the Trinity Master combines with Jacquemart in
the Baptist Cycle. These miniatures have a very particular
system of colour organization.

The finest miniature in this group is "the Baptist before Herod"
(f.211 [sl. 140]) where orange and deep green are the dominant
colours. To John the Baptist's right is a soldier in a green
tunic with orange decorations; to his left is a soldier entirely
dressed in orange with a green sleeve. Herod is somewhat set
apart both by his position to the left of the scene, and by his
pink robe. Nevertheless, he remains optically linked to the
soldiers by his orange boot and orange seat while from under his
pink robe emerges a green and orange sleeve. Orange, pink and
green are all found again in the fringe of the baldachin over
Herod's head while the baldachin itself is painted in sober
grisaille tones. However, John, the central actor, is visually
emphasized and, indeed, separated from the other actors by his pale blue cloak. He springs to the eye in this pale colour, while his captors, the soldiers, are dressed in forceful colours which nevertheless melt into the overall colour structure of the miniature. Herod, in cooler tones, is set apart, judging. These vibrant and careful harmonies between emphatic orange and green and luminous pink and blue are foiled against a deep blue background.

In the final miniature of the Baptist cycle "Beheading" (f. 214 [sl. 141]), green and pink rather than green and orange are the dominant colours. Salome wears a dark rose pink robe with a green sleeve and John's body falls forward out of a pink building whose green turrets are reflected in the colour of the ground. The executioner also wears green. Once more, the illuminator introduces an isolated colour to stimulate the eye and emphasize the overall colour harmony. In this case the executioner has blueish leggings.

Jacquemart's colours, especially when working with the Trinity Master, are distinguishable from those of his colleagues by their harmony. His pages are of an extreme elegance and he treats each scene with a rigour which anchors the image firmly to the overall decorative unity of the page. There is no riot of colour. Instead his artistic personality is one of discipline and restraint. Each colour is chosen for both its didactic and decorative function. At the same time, Jacquemart manipulates what is now a much larger palette and includes a strong dark red
and a bright green as well as some small areas of yellow. He did not, however, favour the more varied lake-like colours from which Pseudo-Jacquemart made degrees of mauve and purples.

_Pseudo-Jacquemart_

As he did in the _Psalter of Jean de Berry_, Jacquemart collaborated with Pseudo-Jacquemart in the _Petites Heures_. The most characteristic aspect of the latter artist's technique is the brightness and intensity of the palette. Strong colours, for instance orange and blue, are juxtaposed with luminous pale colours. The contrast between these brighter tones and Jacquemart's more restrained choice of colours can be seen in a folio where both artists worked (f.8). At the beginning of the _Petites Heures_ there is a series of moral or didactic miniatures. The scene on f.8 is in two tiers. God and His angels are in the top tier, while below, a Dominican monk addresses a prince. Pseudo-Jacquemart worked in the upper scene and the artist's style is immediately distinguishable from that of Jacquemart by the varied, brilliant colours: pink, yellow, grey and pale mauve. These colours are quite different from those used by Jacquemart to paint the sober Dominican and prince below.

As soon as one opens the _Petites Heures_, the brilliant colours of the calendar, painted by Pseudo-Jacquemart, distinguish the manuscript. The whole effect is brighter than in any other
XIVth-century Parisian manuscript to date except the Très Belles Heures. Now, the colours vibrate; they are intense, saturated and varied. Particularly noticeable are dark blue, pale yellow and mauve. Pseudo-Jacquemart was far more interested in variety than in creating internal decorative harmonies. Although there are some attempts to link the colours across the opening in the top miniatures and perhaps a rather more consistent attempt to do this at the bottom, there is nothing like the overall decorative unity of Jacquemart's miniatures(65).

Particularly noticeable in Pseudo-Jacquemart's range of colours is the introduction of yellow as a major colour. This artist uses two yellows in the calendar. One is pale and transparent while the other is bright and strong. For example, on f.3v, St. James the Less has a pale, transparent yellow robe, quite different from the bright yellow found in St. Matthew's drapery on ff.5 & 6v.

While miniatures by Pseudo-Jacquemart do not have the restraint and elegance of Jacquemart's paintings, many are very decorative. In the top miniature of two on f.104, a group of angels wear brilliant cloaks in a full range of "new" colours. The central angel has a blue cloak lined with yellow and a pinkish orange under-robe; another has an orange cloak lined with blue over a lemon yellow robe and yet another has a grey cloak with a white under-robe shaded in blue. Two green wings highlighted with pale yellow show above the heads. All the figures have gold haloes.
Like Jacquemart, Pseudo-Jacquemart also uses single colours to draw attention to a figure or area of the miniature. In the left miniature on f. 104v (sl. 133), among the figures dressed in pink, blue, orange, grey and yellow is a single background figure in vermilion red, probably Berry’s patron, John the Baptist. This identification seems plausible as the book is particularly devoted to the Baptist and vermilion is a rare colour and so calls attention to this major figure.

Modelling and Technique In the Petites Heures

Because there was such a variety of artists working on the Petites Heures, face and hand modelling was not consistent. For faces, Le Noir continued to use the simple line drawing popular during the earlier part of the XIVth century, albeit with an elegance all his own. His faces have very little painting although there are some exceptions; for example, on f. 89v (“Flagellation”) one of the flagellators has a yellow face. Le Noir’s figures have opaque hair which makes a clear distinction between hair and face.

CHAPTER SIX showed how some of the more competent artists of the Boqueteaux workshop modelled faces or drapery with small dots. However, this technique was mainly used in grisaille painting. Now, at the end of the century, Jacquemart exploits this technique in coloured miniatures, most particularly for modelling hair and faces, but also for areas of cloth and architecture (66).
Both Jacquemart and the Trinity Master used the dotted technique extensively (67).

Most distinctive of Jacquemart’s techniques is his way of painting hair and face colour so that they are almost indistinguishable. One face on f.17 is of extraordinary quality: turning away, it is dark, modelled in a mixture probably of ink, minium and white with areas of shadow dotted on in ink. Feature outlines are painted in a darker colour; eyebrows, hair, eyes and mouth are still darker. The brown hair is lightly dotted on giving an impression of a shaven and now balding head. Berry’s face in "Berry Before the Virgin" (f.97 [Thomas, pl.15]) has areas of grey shadow dotted on, but Berry was a man in his middle years. For the face of the young Virgin, the artist used almost no modelling. Her faintly orange hair and pale face are nearly indistinguishable. Features are indicated by grey lines and there is some modelling beyond the nose and under the chin; otherwise the face is blank.

While the faces of women and children are lightly painted, old men and peasants have stronger modelling. In the "Nativity" (f.38), just a little pink is added to the Virgin and Child’s faces. But Joseph, as an old man, has a brownish face with darker cheeks. The old king in the "Adoration" (f.42v) has a very articulated face, although the cheeks are quite pale. Again Joseph and, in this scene, the Shepherds, have browner faces as befits their age and status; the Virgin and Child have almost white faces.
Such sophisticated face modelling techniques were not used by Pseudo-Jacquemart who, like Le Noir, makes a greater distinction between hair and faces. In addition, in some miniatures this artist, or a close associate, used green or grey\(^68\). In others, for example the upper part of f.8, angels' faces are painted in a more old fashioned technique with very little modelling and red outlines\(^69\).

On the whole, the *Petites Heures* is executed to the highest standards of technical excellence; gold has not flaked and most colours have remained stable and have not darkened or fallen off. However, in some cases it seems as if the artists were attempting new techniques or using colours that had been manufactured in a new way. Several miniatures by these artists are rather rubbed. These pages may have been rubbed because they were well loved, kissed and handled, but it may also be that Jacquemart and his assistants were using new techniques or colours which were ill-adapted to their task. For example, some colours, especially blue and black, look rather "fragile" and as if they might rub, but not chip off\(^70\). The bright blue on ff.1v & 2 has flaked and on f.239 the deep blue worn by the Virgin has smudged onto f.238v. These miniatures are by the later artists, Jacquemart and his assistants, who seem to have encountered more difficulties with blue pigment than Le Noir in his miniatures.

Black, as it is in the *Très Belles Heures*, is used quite extensively and is treated like blue (for example, on f.8). This
black is dark and intense and has been laid on thickly with very little modelling. A good example is seen on f.217 where one of the figures wears black ecclesiastical robes with small red decorations. The red ornament has fallen off, most probably because the black underneath was unstable or friable.

Greens too at this period begin to become more varied and are treated differently from the standard verdigris of the earlier part of the century. When closely inspected the green on f.211 is rather blotchy and immediately calls to mind modern water colours. At the same time, like the blue and black mentioned above, the colour seems "fragile", as if its adherence to the parchment were in doubt. It may be a mixture made with the blue, perhaps even the new, dark and "fragile" blue.

Borders

Most particularly in miniatures by Jacquemart and the Trinity Master, but also as a general rule throughout the Petites Heures, there is a move towards simplification. This simplified image was enhanced by the abandonment of alternation in the borders. A plain pink line surrounds the miniatures on ff.211 & 214. However, in those miniatures that, as was discussed above, were prepared by Le Noir and completed by Jacquemart, borders are a little more elaborate. For example, on f.38 ("Nativity"), the border is blue at the top and sides and pink at the bottom; on f.207 (the "Birth of John the Baptist"), the background is red
while the border is blue at the top and sides and pink at the bottom.

Other artists continued to use more elaborate and old-fashioned border alternation. For example, in the "Crucifixion" (f.239) by Pseudo-Jacquemart there is a fine, pink outer band along the top, left, bottom and top right. It turns blue along the rest of the right hand side. The inside border is blue except on the right, where it crosses a figure in dark blue and becomes pink.

Conclusion

The Petites Heures is a manuscript of outstanding quality and beauty. Despite the lack of stylistic homogeneity, even those miniatures by relatively minor artists are painted with delicacy and attention to technical detail. Paintings by Le Noir are the summit of his career while the work of Jacquemart shows that the older artist left his workshop in the hands of a young and talented illuminator. Pseudo-Jacquemart, while not perhaps having the same grasp of painterly techniques as Jacquemart, has a range of colours that is as varied and brilliant as it is experimental. Nevertheless, perhaps the greatest fascination of the Petites Heures is that it represents a transition between an old style, epitomized by Le Noir, and a completely new approach to painting in the work of Jacquemart and his assistants.
Two important points need to be made about this transition period between the late-XIVth century and the early-XVth century, which are well demonstrated by the miniatures in the Petites Heures. First, although Jacquemart's painting style and colour arrangement is radically different from that of his mid-XIVth-century predecessors he constructs his palette from within the same framework. On the other hand Pseudo-Jacquemart's painting style is more closely linked to that of earlier artists, most notably Le Noir, but Pseudo-Jacquemart's palette is revolutionary in its brightness and vibrancy.

Jacquemart's painting style is distinguished by its softness. By modelling in light and shade the artist is constantly introducing ambiguities between one area of a figure and another, most notably between head and hair. Protagonists also stand firmly in a clearly defined space. For example, the room of the "Visitation" (f.32) recedes strongly, while the women do not dominate their environment. Nevertheless, Jacquemart's range of colours as such has not advanced very far from that of his immediate predecessors, in particular Le Noir. The choice of colours is simple, based on pink, green, black and above all, deep, dark blue. For it was in his arrangement of colours that Jacquemart was revolutionary and not in his choice of colours. Each hue balances another and plays a rôle in the drama of the scene. Such careful arrangement of colour gives a feeling of calm reflection, a total contrast from the frenetic passion of Le Noir.
However, while the other "modern" artists like Pseudo-Jacquemart had a range of colours that was quite distinct from earlier XIVth-century Parisian illuminators, their painting style retains much of the insubstantial and uncertain relationship with the ground plane and internal planes within a figure that are found in paintings by Le Noir and his contemporaries. Pseudo-Jacquemart's painting style is more modelled and has greater concentration on face-painting techniques than Le Noir's. There are still clear distinctions between face and hair, and between colour and colour within the drapery. Nevertheless, Pseudo-Jacquemart's "new" mauves, yellows, reds and blacks are quite unlike any colours seen in Paris to this date even if they had already been used in mid-century Italian painting on both panels and manuscripts (see INTRODUCTION TO PART TWO above). Both Pseudo-Jacquemart and the Parement Master's colour combinations are peculiar to late-XIVth-century Paris, even if these illuminators drew some inspiration from Italy.

Jacquemart's collaboration in this manuscript with artists who were, if not of equal ability, at least illuminators of distinct artistic personality, may point towards a freer association between painters than had previously been the practice.

The late-XIVth century thus represents a change from mid-century palette and painting techniques. Hints of the "new" palette can be seen in the second group of paintings in the Bible of Jean de Cy (c.1380-90) [sl. 8], but the revolution in colour and style is seen in the Très Belles Heures, the Psalter of Jean de Berry, the
Bible Historiale (français 20090) and the Petites Heures. In all these manuscripts, artists experiment with new, softer styles and luminous colours. There are links with the older mid-century style, most particularly in page arrangement, but artists are certainly seeking a new approach to the image. As they begin to stretch the internal perspective of miniatures backwards, away from the onlooker, artists strive at the same time to anchor the scene to the flat page in new ways. Indications of these new interests are seen in Jacquemart's rigorous colour arrangements. Experiments with much brighter, more saturated colours are made by the Parement master whose concern with decoration was clearly less than that of, for example, Pseudo-Jacquemart.

Both the Parement Master and Pseudo-Jacquemart use a varied and cheerful palette at the expense of an internal harmony of colour composition. These experiments in colour use are of vital importance as the early steps towards a painting style, as epitomized by the Boucicaut Master, in which internal colour harmony and three-dimensional space are used in delicate balance to hold a deep image on a flat page.
NOTES

1. This technique was handled with extraordinary competence by the Boucicaut workshop where a restricted range of colours distributed around the picture establishes a harmony based on the repetition of one colour contrasted against another of equal value, most often red and blue (for example, Cotton Nero E II f.103 [sl. 2081, see CHAPTER NINE below). Such rhythm enhances the ornamental effect of the miniature.


3. Meiss I, p.141 and INTRODUCTION TO PART TWO.

4. For example, f.14.

5. The soft colours extend to the landscape where, for example on f.27v, they are saturated greyish green, painted quite thickly and highlighted. It is possible to see in a miniature in the earlier style (for example f.35) that the artist has used much paler and broader highlights.

6. Softly modelled in this context means that the distinction between highlights and shadow is very small so that each area of colour is carefully merged into the other.


8. For example, the Virgin's hair pp.2 & 28 [sls. 146-7].

9. Le Noir painted Christ's flagellators in the Petites Heures with yellow faces (see CHAPTER SEVEN above and note 7). In the Très Belles Heures and in some other works of this period, Judas wears yellow, for example in the Petites Heures (f.76) and the Grandes Heures (f.67 [sl. 155]). On the subject of Judas' costume see: Melinkoff, "Judas' Red Hair and the Jews", pp. 31-46.

10. Joseph of Aramithea on p.215 also wears yellow, again perhaps symbolizing his Jewishness. Both Joseph of Aramithea and St. Peter appear to have been quite often dressed in yellow in Italian panel paintings of the period. In a panel in Tours from the Florentine school of the second half of the XIVth century Joseph of Aramithea wears yellow. In a series of four panels by Cecco di Pietro (Pisa c.1349-1438) St. Peter wears yellow. In the Louvre there is another figure of St. Peter by Lippo Memmi who also wears yellow. Michel Pastoureau discusses yellow as a colour to signify Jews, but stresses that yellow can have other symbolic meanings as well (Pastoureau, "Les Couleurs Medievales", pp.41-42).
11. Although on one occasion (p. 28) the yellow has not dried quickly enough and has caught on the next folio, its general handling does not seem to have posed problems. Yellow is used beside or mixed with most of the other colours. As the manuscript cannot be subjected to chemical or spectrometric analysis, it is only possible to speculate on the type of yellow used. Obviously the pigment is fairly stable and has spoiled very little, thus it is almost certainly not orpiment. On some of the bas-de-page patches of yellow and of red lead have oxidized, pointing perhaps to a use of yellow lead, although this seems unlikely (see YELLOW LEAD AND LEAD-TIN YELLOW in CHAPTER ONE above). As this is the period when lead-tin yellow is introduced into panel painting, it may be that the yellow in the Très Belles Heures is lead-tin yellow. As yet this suggestion is only tentative.

12. In a panel in the Musée du Petit Palais at Avignon bright yellow is used to highlight green in a panel by Taddeo Gaddi (known Florence 1327-1366+), Virgin and Child (sl. 1571). In another by Puccio di Simone (known Florence from 1349 and in the Marches 1353-4) Coronation of the Virgin (sl. 24), the artist has shaded green with red and green highlighted with yellow. Both combinations, yellow shaded with red and with green can be seen in the Angers Apocalypse, (sls. 111, 113) and panel 26 (Muel et al. La Tenture de l'Apocalypse d'Angers, pp.122-3).

13. For example, "Betrayal" p.181 (sl. 152) and "Coronation" (p.78). More sober, green shading is seen in some, but not all of the bas-de-page miniatures (p.42 "Annunciation to the Shepherds" and p.68 "Feeding of the Five Thousand"), but on pp.178 & 197 the artist has, like the Parement Master, shaded yellow with red. Later artists in the book also used yellow, but considerably toned down with shadow colours. On p.176 one yellow is shaded with green and another with red.


15. For example, p.2 (sl. 146); there is still none in the bas-de-page.

16. In many panel paintings dark blue has gone black; this implies that the artist used azurite, for example in the Musée du Petit Palais at Avignon in a panel by Niccolo di Pietro Gerini (known Florence, 1368-1414/15+), Madonna of Humility (sl. 158); and Louvre, Bernardo Daddi, (Florence first half of the XIVth century), Annunciation (sl. 159). However, some artists used a deliberate contrast between what must once have been a more sober blue of azurite and a more highlighted blue of ultramarine, for example in a Virgin and Child with Cherries, attributed to Cecco di Pietro (Pisa, end of the XIVth century, Tours, Musée des Beaux Arts) (sl. 160). In this scene the Child wears a much lighter blue than His mother.

17. As was noted in PART ONE, CHAPTER ONE, the indications from documentary evidence and painting treatises point to new
techniques becoming available in the West and perhaps to greater availability or variety of blues during the XIVth century. Possibly the raw blue pigment or the method of making it arrived in Paris only at the end of the century. Artisans may still have been uncertain as to the technique of manufacturing the colour. A similar treatment of blue is seen in the large Louvre Tondo (sl. 3), an early-XVth-century panel which is probably Burgundian. It is very difficult to make comparisons between panel painting techniques and manuscript painting techniques. However, the changes in the treatment of blue seem to run parallel in both panel painting (Italian and Burgundian) and manuscript illumination.

18. The appearance of the colour on p. 155 when seen close to is rather gritty and may be made from a stone ground pigment. A slightly different green was used by the artist of the "Crucifixion" (p. 209) perhaps not painted by the Parement Master (Meiss I p. 134). It is also gritty and may be made from a mixture of yellow and a stone ground blue. In this example it is shaded with greenish brown. Again, this mint green is a colour that appears earlier in panel and fresco painting. A similar colour, probably not the same pigment, is used by Matteo Giovannetti in the Palais des Papes at Avignon (1353) and in the Chartreuse at Villeneuve-lès-Avignon (1354-5) (sl. 16). A related colour was used by Pietro Lorenzetti in the scene of St. Sabinus before the Governor (c. 1355, London, National Gallery) and in an altarpiece by the school of Orcagna (c. 1370, London, National Gallery).

19. For example, pp. 62 (sl. 150) & 68. An ochre brown can also be found in the Bible of Jean of Cy for example, ff. 14 (sl. 8) 20v & 27v. Dark brown was probably made from a mixture of red lake and yellow.

20. From about the last third of the XIVth century these combinations become popular in Italy. Yellow and pink are used together for a figure in the National Gallery Orcagna altarpiece (c. 1370); yellow and pink are used in the Coronation of the Virgin by Agnolo Gaddi (1380-88) (on this painting see: Cole, Agnolo Gaddi, p. 29); and in the St. John the Baptist panel in the group of four panels in the Musée du Petit Palais at Avignon by Cecco di Pietro (1386, Pisa) (sls. 161-162). They can be seen together in Tadeo di Bartolo's St. Peter (Siena, 1363/1363-1422) also in the Petit Palais at Avignon. A green/pink combination is seen in a painting in the Louvre by Bernado Daddi (Florence, first half of the XIVth century), in the Three Saints altarpiece by Nardo di Cione in the National Gallery and it used to its fullest advantage in a XYth-century panel by Sassetta of the Madonna and Child Surrounded by Six Angels with St. Anthony of Padua and St. John the Evangelist (1437/44) also in the Louvre.

21. Pilate, in the next scene (p. 194 [sl. 154]) wears pale colours, in this case a pale blue tunic with a pink cloak. A range of pale colours is retained throughout for the bas-de-page.
22. In the way that the Parement Master distributes colour, the artist foreshadows the Bedford Master. Both these artists paint with a wide variety of colours, often applied in small areas unrelated to any other area. The lack of internal colour organization in the miniature may be another indication that the Parement master was primarily a panel painter.

23. On p. 28 (sl. 147) the backgrounds of both miniature and initial are red. On pp. 169 & 173 the main miniature background is blue. Although the outside of the initial is red, the background of the initial is blue.

24. These scenes have large abstract backgrounds: gold angels for the "Coronation" (p. 78), blue angels and leaves for the "Man of Sorrows" (p. 155).

25. Some gold is found on the straps of the bespectacled doctor's robe, "Christ among the Doctors" p. 62 (sl. 150) and some was used for haloes and on p. 194 (sl. 152) for one sword pommel. On p. 189 (sl. 153), Caiaphas' seat is gold.

26. For the Coronation Book of Charles V, see for example, ff. 64 & 68v.

27. For example, Malchus' parti-coloured clothes p. 181 (sl. 152). The right-hand seated doctor on p. 62 has a pink robe, with a yellow cloak thrown over his shoulder to reveal a blue lining.

28. For instance the building p. 2 (sl. 146) is salmon pink with a dark green roof. The setting for the "Visitation" p. 28 (sl. 147) is pale green, decorated with gold lozenges.

29. On pp. 62 (sl. 150), 104 & 194 (sl. 154). There are dark green and red squares along the inner band of a pale green window on p. 194 (sl. 154).

30. In the Petites Heures f. 102 ("Berry Before the Virgin") the scene is divided in two; behind Berry there are small windows, painted dark green like those of the "Visitation" f. 32v, but behind the Virgin there are pale blue/green windows with the panes marked out implying entry of light. These are certainly the forerunners of the silvered stained glass windows found in the Boucicaut shop.

31. There are yellow and green windows and a grey/green window with black panes. They do not however imitate stained glass (for example, panel 29, Muel et al. La Tenture de l'Apocalypse d'Angers, pp. 158–9).

32. See, for example, the face of the Virgin p. 28 (sl. 147), Joseph's hand p. 47, the Virgin's face p. 50 and the junction of the faces of Christ and Judas p. 181 (sl. 152).

33. Different face painting is particularly remarkable in two sets of frescoes in the Palais des Papes at Avignon. In those
scenes painted by the Italian Matteo da Giovannetti, faces are shaded with green, but the southern French artists of the frescoes in the Chambre des Cerfs used no green face painting.

34. The chalky appearance seems to be made by mixing white and minium with some brown or even black added in.

35. In a series of four panels in the Musée du Petit Palais at Avignon by Ambrogio di Baldese (?), (Florence, 1352(?)-1429), Scenes from the Life of St. Lawrence, the Saint wears a blue robe with a pink cloak lined with yellow in all four scenes (sls. 163-166).


37. This soft technique is seen in paintings by other "Northern" (or rather Flemish) illuminators, in particular by followers of Bondol in the Boqueteaux shop and by Jacquemart de Hesdin (Panofsky, Early Netherlandish Painting, p.36, 42). The main miniature on p.62 is painted by later artists (Meiss I, p.136), but the background pattern of the miniature and of the initial belong to the first campaign.


39. Red on f.177 and yellow on ff.63 & 201. On f.63 the colour has spoiled, either because it is a lead colour or perhaps because it was mixed with white and oxidized, or simply burned by a candle.

40. For example, ff.31 & 85.

41. For the "Fool's" body there is an unobtrusive grey outline and the legs are painted in fine brown shading. The arm raised against the background remains unshaded, but where the body comes into contact with a white loincloth there is a dark shadow. Pucelle used similar techniques in Les Miracles de Notre Dame, for example, f.172.

42. On f.177 it is used on one of the monks' copes. The artists painted the cope white and then added the blue in dots so that the cope appears blue.

43. Meiss believed that the book corresponds with a Bible in Berry's 1402 inventory and can be dated 1383 (Meiss I, p 141).

44. The artists may have chosen to retain the old fashioned decorative motif because the patron associated it with the proper layout for a Bible.

45. For example, a pale green bench on f.281.

46. A pale colour mixed probably from red and blue lakes, which may be called mauve, is found throughout français 20090 for
example, ff.143, 263 & 290. It is a "new" colour, not found before the period c.1380.

47. For example, the Boucicaut Hours (Paris, Musée Jacquemart André Ms. 2) f.90v or the Hours of Etienne Chevalier (B.L. Ms. Additional 16997) f.21.

48. Pale blue and yellow are used together by Simone Martini for the soldier beside Christ in the Louvre Carrying the Cross [sl.22], for a figure in a Crucifixion, by Taddeo di Bartolo (Siena 1362/1363-+1422) [sl.25] and for an angel in Puccio di Simone's Coronation of the Virgin in the Musée du Petit Palais at Avignon [sl.24].

49. Meiss I, pp.130-133.

50. Meiss I, p.192-3 gives a clear division of hands. For Avril's dating see: "Manuscrits", pp.343-344; Avril, Dunlop and Yapp, Les Petites Heures, forthcoming.

51. Although yellow ochre appears before in Le Noir's work, he used it somewhat more in the Petites Heures (for example, ff.78v, 82 & 83v). On f.83v ("Flagellation") it is used not only to colour a wooden whip handle, but also the hair and face of the right hand figure. In the next scene f.86v ("Carrying the Cross") the front figure carrying the nails wears yellow [sl. 136]. Yellow is not exclusively associated with evil in this miniature. In the "Crucifixion" (f.89v) neutral figures have yellow drapery: John's under-robe is yellow. Holy figures in other Passion scenes wear yellow. In the "Entombment" (f.94v), the woman with raised arms, the figure kissing Christ's hand and the figure holding His feet all wear yellow.

52.François Avril, Marie Thérèse Goussset, Claude Coupry and I examined the Petites Heures through a stereomicroscope (WILD M5A PC). We were able to see the extent to which many of the miniatures had been prepared by an earlier (Le Noir's) hand. This was particularly revealing in the case of miniatures previously attributed to Jacquemart. For a further discussion of this and the whole problem of style and colour in the Petites Heures see Avril, Dunlop and Yapp, Les Petites Heures, forthcoming. See also Meiss I, pp.164-165 & 172.


54. The colour of the Angel's robe appears rather darker than anything yet seen in Le Noir's palette. It seems possible to speculate on the intervention of yet another artist who also coloured some of the Baptist miniatures. The angel's dark pink robe is similar in colour to the robe of Herod's wife and Salome's dress. It is also related to the Baptist's robe in "the Baptist in the Desert" f.208, but in that miniature, the colour is somewhat darker.
55. The robe held by the Angel on f.67 "Baptism" and Joseph's tunic in the "Flight" f.45 are painted white first, providing the white highlight, then the mauve shadow was washed on.

56. It is now rather dirty and seems to have spoiled. The yellow may originally have been paler. Yellow appears in two other miniatures in which Jacquemart painted some if not all the scene, for example in Joseph's chair in the "Nativity" (f.38) and in the border of the "Annunciation".

57. Meiss sees this landscape as a forerunner to the snow landscape of Torre dell'Aquila in Trento, but it is certainly only a lighter version of other XIVth-century landscapes, for example the "Betrayal" (f.76) in the Petites Heures or Les Miracles de Notre Dame, f.172 (Meiss I, p.169).

58. The pink is so faint that it may only be an undercolour or have faded.

59. Both the Virgin's robe and the blue initial are not shiny. Possibly the surface was scraped to receive the blue.


61. The miniatures attributed to Pseudo-Jacquemart may not actually all be by the same hand. However, for the purposes of this discussion, Pseudo-Jacquemart will designate the "modern" style in the Petites Heures that is not that of Jacquemart, the Trinity Master or the "fifth" master. Remarks made here can be applied to the style as a whole.


63. Meiss I, p.192 and vol. II, fig. 86.

64. The lower tier is probably by Jacquemart. The Dominican, of course, wears black and white and the prince wears pink and orange.

65. For example, St. Simon's cloak on f.5v is pale pink lined with pale blue while the prophet, Malachi, has an orange robe and a blue cloak lined with pink. St. Thaddeus on f.6 is linked to f.5v by his pink and blue cloak. He has a beige robe and his prophet, Ezekiel, has a beige lining to his mauve cloak.

66. For hair and faces, examples can be seen in Joseph's beard in the "Flight into Egypt" f.45 and parts of the "Baptism" f.67. In this last miniature, John the Baptist's blue robe is so detailed in its modelling that it is not possible to see if the artist has used dots, but they are used for Christ's body colour and the mauve robe held by the angel.

67. For example, the grey beard of the left hand soldier "St. John the Baptist Before Herod", f.211 [sl. 140] and the
executioner's grey beard in "the Death of St. John", (f. 214) [sl. 141].

68. For example, f. 5v.

69. The prince and the Dominican's faces have a thicker layer of paint, rather grey and modelled in the dotted technique. The Dominican's face and hair are nearly indistinguishable.

70. The word "fragile" is used quite specifically here. I do not mean that the paint is friable and likely to crumble, but that if one were to rub it, one might leave an indentation or find a fine powder on the finger. Generally the paint has adhered well, but in some cases it has fallen, not chipped off.
The way in which early-XV<sup>th</sup>-century illuminators developed the "new" palette introduced in the Petites Heures and Très Belles Heures is the subject of this chapter. Central to the discussion is an examination of aspects of colour use to show ways in which experiments with palette and painting techniques made in the late-XIV<sup>th</sup>-century were adopted by early-XV<sup>th</sup>-century Parisian illuminators to create a three-dimensional, but still decorative image.

After an examination of the Brussels Hours, which is generally considered to have been painted by Jacquemart de Hesdin, this chapter will discuss the return to grisaille in the early-XV<sup>th</sup>-century. There will then be a discussion of selected early-XV<sup>th</sup>-century manuscript workshops in terms of general colouristic issues rather than manuscript by manuscript. The workshops selected are: the "Netherlandish" artists (authors of Berry's Clères Femmes and the Coronation Master), the Cité des Dames workshop, the Luçon workshop, the Boucicaut workshop, the Bedford Workshop and the Rohan workshop.
Apart from the Psalter of Jean de Berry and the Petites Heures, the other major work generally considered to have been painted by Jacquemart de Hesdin is the Brussels Hours, Brussels, Bibliothèque Royale Albert Ier, Ms. 11060-11061. The date and authorship of this manuscript are much disputed. Millard Meiss and Marcel Thomas believe that it could be identified with an entry in Berry's inventories which would date it to before 1402 and place it in the oeuvre of Jacquemart.\(^1\) Taken only from the point of view of colour, the main artist of this book does not appear to be the same as the artist of the Jacquemart miniatures in the Petites Heures or the Louvre folio of the Grandes Heures (sl.271).\(^2\) These two latter works, on the other hand, do have similarities of style and colour which link them together. Most particularly, the artist uses little yellow and no silver, both extensively used in the Brussels Hours.\(^3\)

Like the Parement Master in the Très Belles Heures and Pseudo-Jacquemart in the Petites Heures, the artist of the Brussels Hours uses strong and saturated colours. However, although strong, colours in the Brussels Hours tend to be rather muddy and lack vibrancy (for example, the "Nativity" on p.72). The colours have nothing of the clarity of tone found in the Très Belles Heures or Pseudo-Jacquemart's miniatures in the Petites Heures. The Virgin's red cushion is an uncertain colour painted apparently in either red lead mixed with vermilion or red lake. The modelling lines, which either show through or are painted on
top, are drawn in lead or silver point and create an unfinished and dirty effect. Nevertheless, some miniatures have brighter colour combinations, or at least areas where the colours seem bright (for example the angels in the "Annunciation to the Shepherds" p.82 [sl. 156]). The angels' gold wings and haloes are brilliant against the flat blue sky. One of the angels on the right is dressed in yellow with a pinkish orange cloak, but this cheerful colour combination is again made dreary by dark shadows or drawing lines which show through. This type of colour combination, yellow and pinkish orange, is not found in the Jacquemart miniatures in the Petites Heures (for example, the "Visitation" on f.32).

While the rather untidy appearance of the Brussels Hours is not in itself an argument against Jacquemart being the author, it seems to negate the possibility of this artist being the same as that of, for instance, the "Death of St. Louis" (f.17) or "Berry Before the Virgin" (f.97 [Thomas, pl.15]) in the Petites Heures. In these miniatures, among other things, the artist has paid close attention to physiognomy and used a subtle gradation of tone to mould one area of the head into another. In the Brussels Hours, most of the faces are vacuous, unmodelled and bland.

**Initial Diptych**

The miniatures closest to those paintings in the Petites Heures generally considered to be by Jacquemart (for example, ff.8, 17,
97v) are the grisaille initial diptych paintings which show "Berry Presented by Sts. Andrew and John the Baptist" (p.10) and "the Virgin and the Writing Child" (p.11). In these two single miniatures it is possible to see the softly painted, dotted modelling which, as in the Petites Heures, shows hair and faces as almost the same colour. The grisaille here is quite different from that of earlier, XIVth-century, miniatures where, with the exception of the Hours of Jeanne d'Evreux, hair and face were usually distinguished from each other. However, Beauneveu used this closely modelled technique in the twenty-four introductory miniatures in the Psalter of Jean de Berry and Jacquemart used it in the Petites Heures(4). Quite unrelated to previous grisaille painting are the Virgin's bright blue eyes and red lips.

Colours

The colours of the Brussels Hours certainly reflect the "new" palette of the Très Belles Heures, Petites Heures and the so-called Netherlandish manuscripts of Boccaccio's Clères et Nobles Femmes (B.N. Ms. français 598 and français 12420 below). Among the "new" colours, as was discussed above in INTRODUCTION TO PART TWO, is a very intense blue, which in the Brussels Hours is used in backgrounds, sometimes without additional decoration(5). For figures, however, blue is more modelled than any so far found in paintings by, for example, the "modern" artists of the Petites Heures(6)
In the dedication miniature of the Brussels Hours (p. 14), colour combinations are varied and certainly recall, but do not imitate, the brighter colours of Pseudo-Jacquemart in the Petites Heures and later in the Grandes Heures. Most notably among the angels behind the throne in this scene appear the yellow, mauve, and dark red which are the hallmark of Pseudo-Jacquemart's palette. However, the artist has sketched blue on top of yellow, a technique seen in Italian panel painting and in the Très Belles Heures (see CHAPTER EIGHT above), but never in miniatures by either Jacquemart or Pseudo-Jacquemart in the Psalter of Jean de Berry or Petites Heures. Furthermore, there is none of the dark blueish green so typical of Jacquemart's colours and seen, for example in the "Visitation" (f. 32) and "Adoration" (f. 42v) of the Petites Heures. In the Brussels Hours, the artist has used a soft green, orange and blue with red shadows, as well as the "new" soft mauves and beiges of the Très Belles Heures, Psalter of Jean de Berry, Petites Heures and français 20090.

Although in the Petites Heures Jacquemart seems to have avoided vermilion red, some has been used by Pseudo-Jacquemart (for example, f.104v), but even this artist was sparing with it. The Parement Master tended to use rather more and it may once again, like bright yellow, be a colour considered to be more suitable to panel painting. Vermilion is one of the oldest colours in the artist's palette and there can be no reason, except aesthetic, for not using it. Nevertheless, there was a decided reluctance among early, mid and even later XIVth-century Parisian illuminators to use vermilion. In the Brussels Hours vermilion
itself, or a colour imitating it, is found throughout. As in the *Très Belles Heures* (for example, the bride in the "Marriage at Cana" on p. 68), it appears to have been placed to draw attention to specific items or figures; for example, it is used to paint a red tunic behind Christ in the "Betrayal" (p. 164).

In CHAPTER EIGHT the use of yellow and its function within the image were discussed and it was suggested that yellow might have been considered a colour unsuitable for manuscript illumination. Yellow in the *Très Belles Heures* has good covering power and is a strong colour. In the *Brussels Hours* the artist also used yellow, but here it does not have the covering power of yellow in the *Très Belles Heures*. It is sufficiently transparent to allow the grey drawing lines to show through. Perhaps a good strong yellow was not available, but it is not impossible that the artist preferred to attenuate yellow in order to reduce its dominant rôle in the image. Like the Parement Master, this artist used several yellows, shaded with green, grey or red. Most remarkable is the "Betrayal" (p. 164) where three different yellows have been used. Yellow also dominates the "Flagellation" (p. 182) which takes place in a room with yellow vaults. Again, the colour seems to have no evil associations and as in the *Très Belles Heures*, the Virgin in the "Annunciation" (p. 18) has a yellow lining to her blue cloak. Unusually, in the "Adoration" (p. 90), the middle-aged king wears a lemon yellow robe edged with gold and in the "Way of the Cross" (p. 186) Simon of Cirene also wears yellow.
Even in what is probably the finest miniature of the *Brussels Hours*, the "Way to the Cross" (p.168), where the colours are fairly light and bright, there remains a slight tendency to muddy the palette. Nevertheless, here more than in any other image in the book, colour structures the image. The eye is drawn to Christ by the figure dressed in strong yellow who looks into His face. At the very back is a woman also in a yellow robe, but in this case the colour is toned by a green shadow. The yellow tunic of the man who helps Christ is lightened by brown and red shading. Another strong colour, vermilion red, is used behind Christ in a neutral figure who turns away to a companion. He has no emotional role, but draws the eye once more to Christ. The Virgin, in dark blue, follows Christ and again directs the eye to Christ who wears relatively unimposing pink.

These figures reflect, but do not mirror each other. The eye is pulled forward by areas of blue which appear first at the back, then in the Virgin's robe and then in a tunic at the front. Three little figures in the foreground repeat the colours of the main miniatures and once more draw the eye to the central drama. These generally bright colours are foiled against light earth-type colours of the town walls. However, the roofs above the walls are also quite strongly coloured in pale pink, blue and green and put, as it were, a ceiling on the scene.

It does seem possible to link the "Way to the Cross" (p.168) in general terms with the Simone Martini panel in the Louvre, painted three-quarters of a century before (c.1320-40) during his
Avignon period [sl.122]. In both, Christ is dressed in red or pink rather than blue, but followed by a Virgin, inevitably in blue. The figure beside Christ (a soldier in the Simone Martini panel, and Simon of Cirene in the Brussels Hours) wears a combination of blue and yellow in both. Whereas the Italian has left most of his figure in blue, with only a small area of yellow, the artist of the Brussels Hours has permitted the yellow much more importance and so gives it a dominant role. Although the yellow of the Louvre panel is startling in its purity and intensity, Simone has placed the large areas of yellow at the back and front, but left the centre of the painting relatively free of it.

The Brussels Hours miniature also has a much stronger horizontal arrangement, while the Louvre panel is more vertical in design so that figures seem crushed together. In both images, the figures are cut off by the frame, a rather old-fashioned convention for the Brussels Hours artist painting in the early 1400s, but not surprising in the work of the earlier Simone. It is quite possible that the Louvre panel, which came originally from the Chartreuse at Champmol, or a similar painting, was seen by the artist of the Brussels Hours and could have served as a general inspiration. However, the Brussels Hours "Way to the Cross" is not a copy of Simone's panel although it could be considered to be an adaptation of that image. In keeping with an ornamental, flatter arrangement of colours in the Brussels Hours, the artist does not use colours in the same way as the panel painter. In
the manuscript, colours are rhythmically distributed around the image to give it an interior decorative harmony.

**Landscape and Architecture**

There is very little architecture in those scenes painted by Jacquemart in the *Petites Heures*, but in his most elaborate architectural setting, the "Visitation" (f. 32), he used rather muted browns and greens and not the pastel shades of the *Brussels Hours*. In the latter manuscript there is a varied treatment of architecture. The "Presentation" (p. 98) takes place in a complex architectural setting which is very tall and deep. It is, nevertheless, somewhat reminiscent of the grey, grisaille buildings of the mid-XIVth century. On the other hand, much of the architecture consists of little square, coloured rooms. In these, unlike in the beautifully modulated room of the *Petites Heures* "Visitation", there is no equality of colour intensity between the various architectural elements. For instance, in the "Flagellation" (p. 182) the room is pale speckled green, but its much darker red roof dominates and seems to crush it.

Unlike the *Petites Heures*, the *Brussels Hours* has fine landscapes although again colours tend to be muddy and indeterminate. In the "Visitation" (p. 54) the landscape is greenish grey, probably painted in earth colours, with ink shadows. In the whole approach to landscape, however, the artist looks forward to (or is influenced by) the Boucicaut Master. But the Boucicaut Master
has a much more clearly defined palette, even if more or less the same colours have been used as are found in the Brussels Hours. Trees in the Brussels Hours are also treated differently from those rare landscapes attributed to Jacquemart, most notably the "Fool" (f.106) in the Psalter of Jean de Berry. The artist of the Brussels Hours used quite strong highlights where Jacquemart used none.

Modelling and Technique

Some of the face painting in the Brussels Hours does indeed recall that of the Petites Heures. There are resemblances between the Virgin's face in the second "Dedication" (p.14) and her face in the "Visitation" (f.32) of the Petites Heures. Nevertheless, despite their resemblance to Jacquemart's painting techniques, the face highlights on p.14 of the Brussels Hours are less well handled than in some other miniatures (for instance the man looking at Christ in the "Way to the Cross" on p.186 [Thomas, pl.14]). It seems possible to speculate that in the "Dedication" (p.14) the artist was more influenced by the Italianate techniques of the Brussels Initial Master rather than any Parisian painting(12)

Face colouring is not consistent throughout the Brussels Hours. In some miniatures faces have green underpainting, while in others they are more pink flesh colour. Jacquemart has used no green underpainting in the Petites Heures or in the Louvre "Way
to the Cross". Green face painting was certainly used in Parisian painting at this period, because as was mentioned above, the Parement Master used it in some miniatures. However, in the Brussels Hours, for instance in the "Annunciation" (p.18), the green face painting is very dominant and the flesh colour is only laid lightly over it while in the "Betrayal" (p.164) some of the faces are so green that they are nearly the same colour as the landscape. On the other hand, several of the miniatures have no green underpainting(13). In the "Annunciation to the Shepherds" (p.82 [sl. 156]), a fallen shepherd's face is painted in a style not unlike that found in some miniatures in the Petites Heures where hair and faces are much the same colour, but such is not the case with the other two shepherds, whose faces are clearly drawn and not modelled. Such disparate approaches to facial modelling must surely imply the work of more than one artist.

By far the most sophisticated facial modelling is found in the "Way to the Cross" (p.168) where dotted shading is used to demonstrate a remarkable understanding of light and shade which is best seen in Simone of Cirene. Where the shoulder of this figure's yellow tunic is in shadow it is shaded with brown, but the brown gives way to red towards the bottom of his robe where it falls in full light.
Ornament

There is relatively little precious metal in the Brussels Hours, but as in the miniature of the "Man of Sorrows" in the Très Belles Heures (p.155), the artist of the Brussels Hours experimented with coloured patterns superimposed on gold cloth. In the "Annunciation" (p.18) a gold curtain is decorated with an orange pattern; but just as in the Très Belles Heures, gold has a double function. It is both decorative and naturalistic. The artist shows a golden curtain not with a combination of colours representing gold, but with gold itself and so uses precious metals to make the page more ornamental. Unlike Jacquemart in the Petites Heures "Visitation" (f.32), the Brussels Hours artist also picked out some architectural details in gold(14). While gold is used in an abstract and one would venture to suggest almost, if not completely, ornamental way in the gold curtain of the "Annunciation", precious metals at this period are also used to give an impression of increased naturalism. One of the major advances in naturalism in the Brussels Hours is the use of silver to give the impression of light filtering through windows.

Taken as a whole, the Brussels Hours has no overall unity of colour or style. While in general terms the palette is the same throughout, the treatment of the various colours is not consistent. Furthermore, face shading and the general treatment of the figure is so varied that even if the overall manuscript was designed by one person, it was certainly executed by several artists of varying ability. There are very few indications
within the main miniatures that Jacquemart, if he is indeed the artist of the *Petites Heures*, contributed to the *Brussels Hours*. Nothing in the approach to colour, treatment of drapery or face and hair painting techniques point in that direction.

Nevertheless, the *Brussels Hours* is extremely interesting as representing a major step in the development of Parisian illumination. Like the *Très Belles Heures*, the *Brussels Hours* cannot really be said to have had direct influence on other manuscripts. While the rhythmic arrangement of colours found on many pages, most notably the "Way to the Cross" (p.168) and the "Betrayal", indicate that the artist had, perhaps, worked as an illuminator, the whole page layout and the use of green underpainting for faces is once more reminiscent of panel painting techniques. The largeness of the figures vis-à-vis the page may also point in this direction. The general page layout is, of course, paralleled in the *Boucicaut Hours*, but the date of the *Brussels Hours* is so disputed that the *Boucicaut Hours* of c.1409 may even have been painted before the *Brussels Hours*. The arrangement of the figures in the *Brussels Hours* is, however, unlike that found in the *Boucicaut Hours* and other works by the Boucicaut Master.
THE CONTINUATION OF GRISAILLE IN THE EARLY XV\textsuperscript{th} CENTURY

Grisaille played an important role in the aesthetic of early- and mid-XIV\textsuperscript{th} century Parisian manuscript painting (see CHAPTERS FOUR, FIVE and SIX above). At the end of the XIV\textsuperscript{th} century the brilliant colours of the Très Belles Heures and of Pseudo-Jacquemart in the Petites Heures superseded the subdued range of colours of earlier manuscripts and grisaille went out of fashion in Paris\cite{15}. However, so strong had been the influence of this technique, that it reemerges at the beginning of the XV\textsuperscript{th} century in some luxury illuminated books. By far the most important of these is the Bible Moralisée (B.N. Ms. français 166, dated 1402-1404) painted by the Limbourgs at the beginning of the XV\textsuperscript{th} century\cite{16}. Other manuscripts to be discussed in this section are the Livre de Nerveilles (B.N. Ms. français 2810, dated 1413) which is painted by the Boucicaut Workshop in a style related to grisaille\cite{17} and some of the miniatures in the Salisbury Breviary (B.N. Ms. latin 17294, dated 1424-1435) by the Bedford workshop\cite{18}.

\textbf{The Bible Moralisée (B.N. Ms. français 166)}

In the Bible Moralisée, the Limbourgs use what is in fact semi-grisaille (sls. 167-173); the figures wear clothes that are mainly painted white, while the rest of the scene is in full colour. Grisaille framing architecture and quite large expanses of sky in some miniatures add to an overall lightness. While it
may well have been the artists' intention to imitate or rather recall the grisaille of français 167 (Jean Le Bon's Bible Moralisée, see CHAPTER FIVE above), they seem almost to have painted français 166 in grisaille in order to demonstrate that they knew how to use the technique. On f.12v at L.4(19) ("Synagogue complains to the Pharisees of Christ"), Christ's robe is parchment shaded with brown while his cloak is shaded with grey, the two classic grisaille painting conventions. A scene set against a complex pink and blue floor on f.12 (R.1) is dominated by a bed sketched on the parchment and shaded with ink. The under-sheets are shaded with grey, and blue with strong white highlights, the usual adjunct of grisaille, is used for the arms of one attendant. The other attendant's sleeves are blue shaded with red. In this scene the artists demonstrate their understanding of the conventions, but in other scenes they paint almost entirely coloured miniatures, for example, f.23v R.1 (sl.172) where three armed figures wear pink, blue and yellow armour.

Despite their evident concern with volume, the Limbourgs are among the most ornamental illuminators of the early-XVth century. Many costumes in the Bible Moralisée are decorated with gold and often the artists only nod to grisaille. For example, on f.24v (at L.1 & L.3 [sl.173]) figures have white robes decorated with gold and orange. What is more, much of the grisaille is painted white, that is, the technique is not built up of highlights and shadows on a parchment base, but coloured white. In contrast to the relative simplicity of the white clothes, on several folios, apart from gold, the artists have used ornamental costume details
indicative of the type of exotic attire found throughout the Limbourgs's oeuvre; their style is often distinguished by low slung waists and elaborate hats(20).

Face painting, although quite pale, is laid on much more thickly than in any XIVth-century grisaille book. Some of the faces are white and are of the type associated with the rather sophisticated, aristocratic style of the International Gothic period. These white faces are quite thickly painted, but others are less densely treated(21).

If the general intent of the patron or artist of français 166 was to produce a copy of the XIVth century français 167, only the general idea has been imitated. Not only is the treatment of drapery, hair and face completely different and the Limbourgs much more preoccupied by light and space, but the architectural frames also play quite different rôles in the two manuscripts. In français 167 the scenes are surrounded by architectural frames, touched in the lightest possible yellow wash, whereas the Limbourgs have alternated brightly coloured, ornamental frames with strongly three dimensional and often complex grisaille architectural surrounds(22). Even the basic line drawing is touched in some cases with white highlights.

The relationship between image and page is at its most tenuous in français 166. While in français 167 artists used the architectural frame as decoration, allowing its very flatness to anchor the image on the page, the Limbourgs introduced anomalies
to create spatial ambiguity. Not least of these are the perforations in the three-dimensional architecture which reveal the sky behind [23]. But in other miniatures the opposite is true: behind the architecture is another colour or a pattern [24]. In this case, the frame takes on a decorative role, denying the implication that the framing architecture stands in front of a scene and has an active part in that scene. Most curious of all on f. 11 (L. 2 & R. 2), the sky appears to show through the architecture, but there is a red dot on the blue sky. Is the artist showing sky, or is it decoration?

There are other devices for bringing the flatness of the page into question. On f. 4 (L. 4) "Betrayal" the Limbourgs have abandoned the bottom border, bringing grass to the edge of the scene so that the framing architecture cuts into it. Malchus is painted with his foot pressed against the architectural pillar at the left of the miniature, and his lamp actually comes out of the frame. The impression is that the figures could walk out of the miniature onto the page [25]. In some cases, an element in the miniature is visually linked to the border by colour, for example, f. 23 (R. 1 & 3) (sl. 172) where the roofs on a street of houses and the border are almost the same colour. On f. 16v (R. 1) the main figure has a pink hat and the colour is picked up by the pink in the border.

There are several fully coloured townscapes, in particular f. 23 (R. 1 & 3 (sl. 172)). Here, the green and beige of the buildings and the red roofs have nothing to do with what had previously
been the grisaille aesthetic. It is above all in the townscapes, so much an expression of the Limbourgs' urban and sophisticated style, that the brothers have completely abandoned the rather faded tones of français 167. Contrasted with the rather brittle elegance of the figures in their elaborate costumes and elegant hats, there is in many of the landscapes a delicacy of touch that is seen in the work of no other illuminator of the period. Green trees and landscapes are softly painted with the sky often painted in graded blues from very pale to nothing.

_Livre des Merveilles (B.N. Ms. français 2810)_

The _Livre des Merveilles_ is a collection of travellers' tales and includes the works of Marco Polo, John de Mandeville and Hayton. Despite close links with the Boucicaut workshop, the artists of the _Livre des Merveilles_ used colour in a way that is quite different from the vibrant tones of Boucicaut miniatures (sls. 174-183). The _Livre des Merveilles_ is painted in a sort of semi-grisaille; as in the calendar pages of the _Hours of Jeanne de Navarre_ (see above CHAPTER FIVE), pale colours are contrasted against some bright areas. Even in the most colourful miniature which introduces Hayton's book (f.226 [sl. 183]), although the Duke of Burgundy wears dark red and black, other figures wear pale grisaille-like colours.

Frequently partially-hidden or background figures wear fully coloured robes, while the main actors are in paler colours.
scene showing the Polos presenting their book to the Khan (f.5 [sl. 175]), most figures wear grisaille, that is, white shaded with grey and brown. However, an attendant in the background is dressed in dark blue under a paler green and a bright red cloth covers the Khan's seat. On f.168 a vermilion cloak is turned round to show the white inside and underneath it is a mosaic gold robe. In a scene showing the Khan supervising tree felling (f.47v [sl. 178]), the Khan is dressed in red, but the workmen wear white or white lightly shaded with colours, while the entire scene is set in a sparse brownish landscape which has, nevertheless, quite a strongly coloured sky.

As in many Boucicaut workshop books (see below), the artist used mosaic gold extensively. Mosaic gold, as was discussed above, was a colour or rather a metal mixture that made its appearance in Italian miniatures during the XIVth century and which became popular in Paris at the beginning of the XVth century. Its extensive use in this book may be explained thus. Artists may have considered mosaic gold to belong to the category of "metal" rather than colour and as was shown above (CHAPTERS FIVE and SIX), from the mid-XIVth century gold was considered a perfectly natural adjunct to grisaille. Clearly the artists of this semi-grisaille book felt that mosaic gold enhanced the pale tones without adding undue colour to a limited palette. Furthermore, mosaic gold could be considered neutral because it is neither a true metal nor a true colour.
As a general rule, more colour is concentrated on the landscape and architecture, which is often exotic and brightly coloured, than on the figures. There are pink, yellow and apricot roofs on f. 4 & 11v and a green building with a vermilion roof on f. 125. The upper part of the building in the background of the scene showing the departing Polos (f. 1 [sl. 174]) is strongly coloured in orange and green while the foreground architecture is pale pink and white. Here the Polos and Baldwin are dressed mostly in white with the shadows picked out in blue and pink, but among the landscape and sky colours are strong greens and dark blue.

The Salisbury Breviary (B.N. Ms. latin 17294)

A last example of early-XVth-century grisaille comes from the magnificent Salisbury Breviary painted by the Bedford workshop (1424-1435). Taken as a whole the book is very brightly coloured, but some of the marginal scenes are in grisaille or have figures in grisaille; all are set against diapered backgrounds and tessellated floors. Probably because there are so many miniatures in this book, the artists varied their painting techniques.

In an "Adoration" at the bottom right of f. 42 the kings, dressed in grisaille, kneel before a grisaille Virgin and Child. At the top right of the same page, Christ in grisaille confronts St. John the Baptist, also partially in grisaille. However, John wears a cloak with a red lining and holds a blue book. Two other
vignettes on the same page are in full colour. This approach to grisaille is entirely decorative, quite in the tradition of the mid- and later-XIVth-century miniatures. In no way could it be considered sculptural or three-dimensional; it relieves the generally bright palette and adds visual interest.

It appears that the popularity of grisaille with artists and patrons alike ensured its continuation as a decorative technique. Doubtless it had other advantages; even fairly elaborate grisaille miniatures like those in the Bible Moralisée must have been relatively quicker to execute than fully coloured miniatures. All the cases cited above are very grand manuscripts with many miniatures and grisaille or semi-grisaille may have been chosen because it reduced the time needed to produce the book. It has become however, especially in the Livre des Merveilles a very complex technique with infinite decorative possibilities and in that book, at least, semi-grisaille adds to the mystery and exoticism of the scenes which seem veiled in a softly shimmering light.

It is arguable that the Limbourgs particularly chose grisaille as a vehicle for their highly ornamental, but also three-dimensional painting style. Against the generally pale colours they were able to foil areas of strong pattern and deep perspective while keeping the overall impression relatively simple. Interesting too is the fact that in all the cases cited above, the artists were working in teams of several artists and, as in français 167, grisaille enhances the overall homogeneity of this manuscript.
Yet, in the case of the Salisbury Breviary, the artists were certainly seeking no more than decorative variety.

JEAN DE BERRY’S AND PHILIPPE LE HARDI’S CLERES ET NOBLES FEMMES
(B.N. Ms. français 598 and B. N. Ms. français 12420)

Of the several stylistic trends in Paris at the beginning of the XVth century, one of the most original from the point of view of colour is that found in the so-called "Netherlandish" books, in particular, français 598 (sls. 187-189) and français 12420 (sls. 190-192). These two books are copies of Boccaccio’s Cleres et Nobles Femmes made for Jean de Berry and his brother Philippe Le Hardi. Although these two manuscripts are by different artists, they have general similarities of style and colour and may be regarded as a pair. Iconographically linked, they date from about the same period (c.1404) and one may have been copied from the other (29). Marcel Thomas’ description of miniatures by the Coronation Master, who illustrated all but ff.33-48 of français 12420, as “elegant and slightly mannered, but with a bright and delicate palette” aptly sums up miniatures in these books, most especially those in français 12420 (30).

Miniatures in these two manuscripts have the brilliant colours found in the Très Belles Heures and Pseudo-Jacquemart’s miniatures in the Petites Heures, but they differ fundamentally from those manuscripts. Colours are very strongly contrasted and ornament plays a major, sometimes all encompassing rôle. Several
miniatures by the Cleres Femmes Master are also decorative [sl. 186], but in paintings by the Coronation Master there is an almost excessive amount of pattern and over-elegant costumes [sls. 190-193]. The artists have used a lot of precious metals to decorate costumes and make them shimmer [sls. 186, 190].

The artists of the two manuscripts had different approaches to colour. In français 598 figures are more monumental than they are in français 12420 and colour is more restricted. Furthermore, colours are somewhat stronger and darker with more pronounced contrasts. The Coronation Master has made several experiments with complements, unusual colour combinations and variations in français 12420(31) For instance, on f.18 pink is shaded with green, on f.24 orange is shaded with black and on f.26 a pink robe has black under-sleeves. Until the early-XVth century, only ecclesiastical figures wore black; now, as will be seen in many Boucicaut workshop manuscripts (see below), black had become a colour suitable for modish costumes. Strong, clear yellow plays an important part in the palette and lends brightness(32) but another yellowish green or greenish yellow was particularly favoured by these illuminators and is seen in other books of this period. It gives a strange tone to many of the miniatures(33)

Two versions of the same illustration in français 598 (f. 86 [sl. 188]) & français 12420 (f. 86 [sl. 191]), showing "Thamar Painting the Virgin" provide interesting points of comparison. The restricted range of colours in français 598 (f. 86) guides the eye
around the scene. Thamar, wearing dark pink, paints in a garden surrounded by a pink wall. These pinks are contrasted with her blue canopy, her blue hat, the blue robe of the Virgin she is painting and the pale blue building to her right. A slightly different note is struck by the bright, deep red hanging to the right of the canopy. With great subtlety, the artist has picked up the colours of the main miniature in her palette: blue, grey, white and red. An ochre working desk and chair offer a neutral balance against the strong colours.

A wider variety of colours was used by the artist in français 12420. The floor is tessellated red and yellow (34). In the foreground stands a brown table on which Thamar has placed her paints, once again the main colours of the miniature: pale yellow, red, black and white. The Virgin’s blue robe is reflected in the lighter colour being ground by her assistant. The artist’s pink dress sets her apart from the rest of the colours in the miniature (although a somewhat darker pink is used in the floor pattern). The red border colour is reflected in the assistant’s hat and legs, linking the illustration closely to the overall page decoration.

Both these artists use colour primarily to decorate the page, and only secondly as a vehicle for naturalism. Bright colour and equal distribution of colour within a scene give the miniatures in français 598 an internal harmony and prevent the now receding planes from moving too far away from the viewer into the distance. The Coronation Master, in français 12420, uses a
much more varied palette which plays a part in the entire page
decoration and harmonizes with the rinceaux and line endings so
that miniature and page decoration can be perceived as a whole.

Both in style and in choice of colour, the artists seem to be the
forerunners of the Boucicaut artists. It is indeed possible
to see in the restricted palette and rhythmic distribution of
colours (particularly in français 598) the influences that must
have worked on those artists. One particular landscape in
François 598 (f.56), where dark trees with yellow highlights
stand out against a pale blue sky flecked with darker blue,
points to future Boucicaut landscapes.

THE LUCON AND CITÉ DES DAMES MASTERS

Early-XVth-century Paris had an enormous number of manuscript
workshops which produced hundreds of books varying from the
Limbourgs' superb Très Riches Heures to the frankly ugly.
These many workshops had different styles and approaches to
colour, but the range of colours, once established initially in
the Très Belles Heures and expanded by the Coronation Master and
the Master of Berry's Clères Femmes, remained essentially the
same. Two representative workshops, the Cité des Dames and Luçon
shops will be discussed in this section of the thesis. The Luçon
workshop is named after the Pontifical of the Bishop of Luçon
(B.N. Ms. latin 8886) and the Cité des Dames workshop is named
Both workshops produced elegant and over-sophisticated manuscripts full of graceful, swaying figures with bland faces. It should, however, be pointed out that although the Luçon workshop produced some very uninteresting books (for example B.N. Ms. latin 1082), the Master, or chief artist of the group, was also responsible for many miniatures in the Terence des Ducs (Bibliothèque de l'Arsenal 664 [sl. 194-197]), on which the Cité des Dames workshop also worked. The Terence is certainly one of the finest and most elaborate books of the early-XVth century.

The Luçon Master, like other early-XVth-century illuminators (for example the Master of Berry's Cleres Femmes) used a limited range of colours. Typical examples are found in latin 1082 where scenes are often painted entirely in pink, red, blue and perhaps green or a neutral earth type colour. Certain characteristic colours can be seen in miniatures by this artist, most notably vermilion red, perhaps shaded with a little red lead or red lake. Hair painting is also distinctive being thickly painted, while old men's white hair and beards are usually shown in a combination of blue or black streaked with white. Distinctive too are the Luçon Master's shading techniques. The artist bought the late-XIVth-century dotted painting system to its highest degree of sophistication and exploited it to its optical limits [sl. 194-195].
Some of the best work from the Luçon shop is to be found in the "Terence de Ducs" which was illuminated for Philippe Le Hardi (before 1415) (41). In this manuscript miniatures are almost unbordered; the image is now becoming nearly independent of the page with its text. However, the balanced and restricted colours of both the Luçon and Cité des Dames workshops gives a strong decorative rhythm to the miniatures. This restricted palette works, as in so many other miniatures of this period, against the tendency of the now strongly three-dimensional image to move forward and backwards away from the flimsy page so that it takes on an independent existence.

Like the Luçon workshop, the Cité des Dames artists produced some very elegant books. Artists from this workshop worked alongside the Luçon Workshop in Philippe Le Hardi's "Terence" and imitated the Luçon workshop's very restricted colours (42). However, other manuscripts from this workshop have one of the more varied palettes (sl. 196) found in the period. Almost as prolific as the Boucicaut workshop (see below), their style is not as naturalistic. They continue experiments with bright palettes and decorated costumes first seen in paintings by the Master of Berry's "Clères Femmes" and Coronation Master (43). The Cité des Dames artists never seriously attempted landscapes or natural skies. Rather, they contented themselves with symbolic trees and brightly diapered backgrounds.

More important, the Cité des Dames style, like that of the Coronation Master and the Master of Berry's "Clères Femmes," is
highly decorative, not at all naturalistic. The style is perhaps the most decorative of all the early-15th-century Parisian workshop styles. Several miniatures in Boccaccio's *Cas des Nobles Hommes et Femmes* (Bibliothèque de l'Arsenal 5193 [sl. 198-205]) have layers of conflicting and contrasting colour. In a magnificent miniature, many-armed Fortune on f.229 wears a dress of blue, red, black, gold, mauve, silver, green, pink and white stripes, while her sleeves are mosaic gold, red, green, pink silver and pale blue; she has bright green wings lined with yellow. Behind her is a dark red background decorated with gold swirls.

As well as varied and bright colour, the artists fill their miniatures with real precious metals and mosaic gold. A scene of "Zedekiah blinded at the command of Nebuchadnezzar" (f.70) has four areas of conflicting pattern. The floor is green marked out in black, with yellow and white squares. Zedekiah wears a silver robe decorated with gold, white and dark red stems. There is heavy burnished gold at the cuff and neck. On the floor lie two figures. One wears a blue robe with yellow, red and mosaic gold patterns and a gold border. His companion is in a yellow robe with a green and white pattern and a red shadow. These brilliant colours and complicated designs are offset by the relatively simple red and blue of Nebuchadnezzar's robe and the pink, brown and red of the torturers. The very simplicity of their clothes draws attention to their action. Nevertheless, adding to the general complication are the twisted hairbands of the left hand.
torturer and of Zedekiah who, furthermore, wears his twisted headband under a gold crown.

The bright colours of Pseudo-Jacquemart and the Parement Master are exploited to their full potential in the intensely ornamental images by the Cité des Dames workshop and the rhythmic scenes by the Luçon shop. Strong, vivid colours vibrate in a brilliantly coloured ensemble, but they are used in an almost abstract way. There is a love of colour for itself. Carefully modelled figures act within miniatures which are primarily decorative; naturalism is kept at bay. Miniatures by both the Luçon workshop and the Cité des Dames workshops are quite unlike the elegant scenes by the Boucicaut workshop and do not have the restraint of the Boucicaut artists which makes their paintings so pleasing. Nevertheless, there is no doubt that as far as the use of colours is concerned, all early-XVth-century Parisian workshops used a palette which fell roughly within the same framework and there is no doubt that all these groups of artists were mutually influential. The Boucicaut workshop was certainly not unaware of the experiments in colour made by the Luçon and Cité des Dames workshops, even if its manipulation of the palette was somewhat different.
The Boucicaut workshop is named after a Book of Hours painted for Jean le Meingre Boucicaut II, Marshal of France, between 1405-1408 by the finest illuminator in the group, the so-called Boucicaut Master. The most harmonious productions of the Boucicaut shop are distinguished by simplicity of design, the use of red/blue contrast, a particular rather mauveish blue, gold, rose pink, some bright green, a deep, dark green, black and pale, earth-type colours for landscape. Noticeable too is the fact that figures are now often dressed in single colours, in particular black. This technique introduces large areas of a single colour and is the antithesis of the frenetic patterns of the Cité des Dames workshop (see above).

Arrangement of Colour: Rigorous page arrangement and unity of colour is seen throughout paintings by the Boucicaut workshop. The Boucicaut workshop illuminated many fine Books of Hours, but a typical and indeed beautiful example is B.N. Ms. latin 1161 (c.1409), an excellent workshop production, certainly directed by the Master. Particularly elegant Evangelist miniatures are good examples of the classic Boucicaut colours (ff.20, 22, 23bis & 25). In a rather stark St. John miniature (f.20 [sl. 229]), the Evangelist sits in front of a half-timbered building. The foreground of the miniature is dominated by the framing arch, painted mainly in white, but shaded with blue lake to give a mauveish tinge. Contrasted against this light area, the figure of John is remarkably bright with a blue robe and a vermilion red...
cloak while the strong green floor is decorated in yellow. However, much of the miniature is given over to the background. Entirely filling the cloister behind the Saint is a silvered pond which contrasts with the brilliantly coloured foreground; the background buildings are grey with some silver on the roofs. These dark tones seem even more sober placed against the abstract red and gold backdrop. There is a rhythmic counterpoint of dark and light tones distributed throughout the miniature.

There are similar contrasts in the Luke miniature (f. 22 [sl. 230]), but it is painted by a less competent hand who highlighted blue instead of leaving the colour unmodelled; this treatment makes the colour lighter. The artist has also added gold highlights on red and green face modelling. Furthermore, the figure is placed against a more complex setting of colourful architecture and a flower garden. The pattern of colours is more complex than in the other Evangelist portraits so that the ensemble is less successful in terms of the design of the whole miniature. Simplicity and internal harmony is lost in favour of greater ornament.

In the "Adoration", the artist has unified the miniature by juxtaposing the blue of the sky and the blue of the Virgin's blue robe with the vermilion red hood of the middle-aged king (f. 79 [sl. 231]). This strong blue/red contrast would be rather uninteresting and even muted on its own, but a certain diversity is introduced by the dark green robe of the middle aged king and the old king's gold robe. These strong, bright colours are laid
beside the neutral colours of the hut, wicker fence and miniature frame.

Another manuscript at least in part by the Master, *Hours of Etienne Chevalier* (London, B.L. Ms. Additional 16997, c.1418), has the same reduced range of colours. There are the same typical Boucicaut workshop blue/red exchanges. For example, in the "Annunciation" (f.21), the Virgin's blue robe is reflected in a small arched space over the central door at the back. The blue is contrasted against orange in the cushions and on the outside of the angel's wings. These two strong colours are opposed by the beigeish brown architecture which has probably mosaic gold vaults. In this case the very restrained palette of the miniature is acted against by a much more colourful border, probably by quite another hand. The yellow robe of the angel at the centre bottom represents an entirely different tonality from that of the main miniature. Yellow is not used by the main hands of the shop except for trees and highlights, but it is found fairly generally in miniatures by other members of the workshop. However, not every page has such a strong contrast between main miniature and border. For example, in the "Adoration" (f.68 [sl. 233]) main miniature and border colours are linked together by the predominant colours: blue, pink and mosaic gold.

This exquisite control of the palette is not seen in the scene of "All Saints" (f.129), certainly by an assistant. To the left and in front of the central Virgin are figures in assorted colours:
blue, dark pink, vermilion red, bright blue, yellow, green and gold. While colours are mostly reflected from side to side, the introduction of a bright yellow sleeve in the foreground unbalances the design. The border colours are dominated by green, blue, mauve and orange, but there is none of the yellow or the blueish green found in the miniature.

**Interiors**

It is above all in interiors that the Boucicaut workshop demonstrates such originality. Not only is this the first group of Parisian artists to attempt such complex interior settings but, more important, miniatures are balanced in terms of composition and colour to give a sense of profound space and convey the quality of light in that space(49).

A scene in B.N. Ms. latin 1161 (f.192) shows a family at prayer in a church. In classic Boucicaut style, colours are picked up round the miniature. The vault is a mixture of vermilion red and red lake while the same red recurs at the neck of the left hand boy in the central group, on the group's book and on a gentleman's book. At the bottom left a partly-cut-off choir boy has a white surplus with an orange border and neck. A kneeling lady to the right wears the same orange shaded with red; orange appears again in the standing gentleman's lowered hood. Blue is used in the statue of the Virgin on the altar at the left, in the lady's book on the right and behind the lady, on her handmaiden's
robe. The pale green of the floor is reflected only in a standing attendant's clothes. As in many miniatures by the Boucicaut workshop, part of the architectural setting itself acts as the frame for the miniature (50). These framing arches are generally pale, guiding the eye into the scene. In the chapel of Latin 1161, the architecture is very pale blue at the front, slightly darker further back. Decoration has been added in the form of mosaic or real gold, laid flat onto the front of the architecture in triangles. There are also silvered windows.

There is a contrast between the realism of the three dimensional setting and the entirely abstract background (dark red, with a gold decoration) glimpsed through the door (51). Furthermore, the background pattern is reflected in the altar frontal. The altar frontal forms part of the "real" interior, but the background is quite abstract. A "real" altar frontal is directly linked with an abstract and thus "unreal" background. By linking the tangible with the abstract, the artist introduces spatial ambiguity (52).

Ornament

Precious and imitation metals were extensively used by the Boucicaut workshop to show both the metal itself and other things, for instance glass or light reflected off distant buildings (53). Silvered windows are typical of the problem posed by precious metals in the work of early-XVth-century artists. In
light-filled interiors they give the impression of daylight filtering through windows, often of stained glass. Miniatures in Bibliothèque de l'Arsenal Ms. 5077 (Trésor des Histoires, c. 1410) have some windows painted flat gold with no decoration, but firmly set into their cross bars. On f. 50 these cross bars bite into the gold as the bole laid under the gold is so thick that the window panes are physically higher than the cross bars. They are thus truly three-dimensional. Their three-dimensional quality enhances their "real" or "naturalistic" appearance, but at the same time the artists have negated any "reality" the windows might have had by painting, or rather constructing them in flat gold.

Gold and silver are by their nature flat and very difficult to paint in such a way that they appear modelled. Their flatness inevitably introduces an unnaturalistic element into a miniature and should normally reduce naturalism. However, as was seen in the Brussels Hours (see above), in some cases precious metals, and most particularly silver, were used to give a naturalistic effect. In an astonishing miniature in the Châteauroux Breviary (f. 350 [sl. 254]) showing the Sainte Chapelle, the silvered windows are decorated with the familiar red and blue roundels and are strikingly naturalistic.
Mosaic gold was a cheap substitute for gold and was often mixed with other colours to represent wood or fur making these rather dull-coloured materials sparkle. Furthermore, there were technical reasons why mosaic gold was useful; it needs no underlay. It can easily be laid on in suspension and was frequently used to paint distances where its fine gritty quality would articulate areas of reflected light. Mosaic gold was also often painted lightly over another colour. In miniatures from both the Bedford and Boucicaut shops, ochre is often enlivened with mosaic gold. Yellow under or mixed with mosaic gold is used in Châteauroux Ms. 2 (for example, f. 270v [sl. 249]). In this scene, both the roofs and the king's hat and robe appear to have been painted in mosaic gold mixed with yellow and the king's sleeves are green mixed with mosaic gold.

Typical of the Boucicaut workshop is a reduced range of colours, carefully thought out to give maximum effect. Bright hues stand out against neutral and dark tones, but each colour is chosen to play a role in the internal structure of the miniature. There is no "riot of colour" such as is found in the Cité des Dames workshop; there is an overall restrained ornament in miniatures that are now increasingly naturalistic. The artists have used the strict colour arrangements to produce internal harmony, reduce three-dimensionality and retain the now increasingly tenuous links between the miniatures and the rest of the flat page.
BEDFORD WORKSHOP

Working at more or less the same time as the Boucicaut Workshop, and up until the 1430s, was the Bedford workshop. The atelier is named after two major manuscripts, the Bedford Hours and the Salisbury Breviary produced in the 1420s and 1430s. These books are highly coloured and very ornamental, filled with incidental detail. Although the Bedford style has its roots in the Boucicaut shop, artists of the Bedford group had a much less rigorous system of arranging colours. The image is no longer encapsulated into the frame by the organization of colours within the miniature; the style lacks the rhythm of the Boucicaut workshop and is considerably more ornamental. As the XVth century advanced, Bedford workshop miniatures became even more elaborate, but early tendencies can be seen in the Missal of Magloire (Bibliothèque de l'Arsenal Ms. 623, ff.213A & 213B, c.1412) and the Châteauroux Breviary (1415). Typical of the ornamental approach of these artists is the figure of St. John on f.213A of the Missal of Magloire; he wears a red cloak, lined with silver over a green robe. Already in the Châteauroux Breviary the marked contrasts between the style and techniques of the Boucicaut and Bedford Masters are visible. In this manuscript, where the two groups of artists worked side by side, the Boucicaut miniatures are revealed as paler with a rigorously restricted range of colour. Not only is the Boucicaut palette very simple, but faces are smoother and paler than in the work of the Bedford group and have no green
underpainting, a distinctive mark of Bedford paintings. Bedford artists, on the other hand, show an immediate tendency to arrange the page so that in any given group, almost every figure wears a different colour.

The Bedford miniatures in the Châteauroux Breviary have astonishingly beautiful colours, unlike any seen before. In some miniatures, the illuminator moved away from the brilliant Boucicaut colour conventions not only towards colours that are sometimes dark and vibrant, but also, and apparently only in this manuscript, to remarkable, subtle "pastel" shades. These brilliant but pale colours appear in the historiated initials. For example, in some cases dark blue is so highlighted that it is nearly overtaken by pale blue; on f.40 "David in the Water" [sl. 239] the light, shimmering border colours harmonize with the pale tones in a scene dominated by blue water.

However, several of the miniatures are painted in the darker tones that become typical of the Bedford workshop. An overall sobriety contrasted with some areas of bright colour was used in the scene on f.282v [sl. 251] "Death of the Virgin". Here among the many varied hues is a greenish grey/blue with purple shadows and a green cloak lined with yellow and shaded with red. In the "St. Jerome" miniature (f.357v [sl. 254]) walls of his room are dark red, but a bright area is made by the cardinal's orange hat lying on the floor and a mosaic gold lion.
Especially in the ornamental initials, the artists used deep glowing colours, in complete contrast to the historiated initials like "David in the Water" (f. 40 [sl. 236])⁶⁴ Against a dense, dark red background on f. 110v the artist has painted orange rinceaux with dark red shadows and a mauveish flower with pale highlights; the bottom initial on f. 208 is brightly coloured in blue, orange, mosaic gold and green rinceaux against another dark red background. It is not so much the colours themselves that are striking, but their combination against a dark red background. They seem to glow and become luminous against the sober red.

Bedford miniatures show a distinct taste for ornament, and throughout the Châteauroux Breviary there are experiments with the ornamental possibilities of gold, silver and mosaic gold. Several of the border elements are decorated or simply dusted with gold while wild men and putti, hidden in foliage, have silver highlights⁶⁵ On f. 119v [sl. 244] there is a face picked out in gold against a deep red background and there are several examples of the unusual combinations with mosaic gold and silver. For example, at the left and the right sides of the border on f. 98 [sl. 242] the artist has painted entwined spirals of mosaic gold and silver leaves.

Complex and interlocking architecture is typical of Bedford miniatures (for example, Bedford Hours "Annunciation" f. 32 and "the Duchess of Bedford and St. Anne" f. 257 [sl. 267]). There are, however, signs of an increasingly complicated page layout
already in books from the Boucicaut workshop. A remarkable scene in a Book of Hours (B.N. Ms. latin 10538, c.1416) "Scenes from the early life of the Virgin" (f.31) has an original page arrangement. The whole folio shows one story while a few lines of text are placed like a "billboard" before it. Several scenes take place in a single building. At the top is the "Annunciation" while at the bottom, the "Virgin Weaves". Although in this miniature there is no true unity of time, place and action, a single building unifies the story and gives it coherence. The whole is a continuous narrative and represents, albeit in a rather elaborate way, one scene.

The approach of the Bedford workshop seems somewhat different. The scene of "the Duchess of Bedford and St. Anne" in the Bedford Hours takes place in a room set back a little from its frame and surrounded by small rooms, or rather architectural settings, filled with scenes unrelated to the main miniature. Such architectural elaboration is brought to a high degree of sophistication in the Salisbury Breviary. Although many miniatures have apparently deep space, it is always denied. Either the elaborate settings deny any sense of real architectural space, or the colour is arranged in splashes around the image so as constantly to draw the eye out of the depth and keep it moving over the surface of the miniature.

Space is often negated by a mass of detail crammed onto the page, while very often more than one scene takes place at the same time. In the Salisbury Breviary, in scenes like "Advent" or
"Entry Into Jerusalem" (ff.8 & 212v), figures have their names and sayings written above or below them on banderoles; characters are shown both acting and speaking. Whether or not these banderoles reflect the influence of contemporary drama, they are undoubtedly a space-denying technique and provide a direct link between the story-telling miniature and the written page.

In the background of the "Adoration" (f.106 [sl. 269]) the kings arrive speaking to each other. The deep distance behind the figures is obscured by the banderoles floating into the background air. At the same time, the artist includes several scenes here; the kings meet, journey and arrive, so that any unity of time, place and action is quite lost. Unconcerned with melting the figures into their background, the artist uses contrasting strong, bright colours throughout. The middle-aged king wears a green cloak with gold decoration over a mauve and blue robe; the old king has a blue robe and orange cloak dusted with gold, but so as not to be dull, the artist has given the kings different clothes in the "Meeting" scene in the background.

The multi-scene image is a particularity of the Bedford style. In a "Creation and Fall" (Bedford Hours, f.14), God appears in six places. Although the miniature is divided into areas, there is much spatial ambiguity. At the very top, a gilded fence separates Adam from "Creation". A scene of the "Sacrifice of Cain and Abel" also at the top takes place under a dome that starts where a tower on the right stops, making uncertain the relationship between the tower and the golden fence.
The *Salisbury Breviary* has several of these multi-image miniatures. In the story of St. James (f.515v), the saint himself appears four times, always dressed in the same mauve robe, a little paler in the background scenes. The two perspectival settings, the garden and the courtroom imply a depth that is denied by the sinuous line of the continuous narrative which gives a dominant surface decoration to the whole. Nevertheless, while the image is less unified, more purely decorative and much less logical than in paintings by the Boucicaut workshop, the six figures of God, who always wears a dark blue robe and dark pink cloak, provide internal rhythm.

Bedford artists continually juxtapose bright colours, ornament and strong perspective. The "Annunciation" (f.32) of the *Bedford Hours* has twelve marginal or rather additional scenes and a landscape at the top. At the very top inside the building are God and His angels. While the main scene is set in very deep architecture, its strong perspective is undermined by the landscape which floats at the top. All the marginal scenes interlock and the accumulation of incident prevents historical or spatial logic. In the "Birth of the Virgin" of the *Salisbury Breviary* (f.566v), not only is the architectural setting very complicated, but there are two black and yellow floors, each with a different pattern.

The Bedford workshop brings ornamental manuscript illumination to its culmination. These illuminators take the taste for ornament
found in paintings by the Coronation Master and the Cité des Dames workshops to its furthest extent. There is clearly no serious search for emotional content or for a three-dimensional image. This group of artists is possessed of a wide range of colours, which they exploited not to give internal harmony to the image, but to make it rich.

The manuscripts are of extremely high quality and the artists understood the technique of manuscript illumination well. Colours are modelled in light and shade and miniatures include all the new colours as well as the old. There is a considerable amount of yellow, mosaic gold and some patches of vermilion red. There are bright greens and blacks as well as the usual blues, pinks and oranges. Except in the Châteauroux Breviary, the artists make few experiments with colour combinations. The palette is conventional, rich and unambitious.

Although the image is large and in some respects increasingly three dimensional, any hint that a manuscript illumination might be painted in imitation of panel painting is lost. The space-denying design and heavy ornament around the miniatures are essentially devices to unite the painted image to the flat page. The whole page is perceived as a single decorative surface. Spatial perception is reduced in favour of decorative variety.
In many ways the beautiful and elaborate books produced by the Bedford workshop are the culmination of Parisian medieval book painting. But before concluding this final section on Parisian colour, there will be a brief discussion of some of works from the Rohan workshop. This workshop is named after the Rohan Hours (B.N. Ms. latin 9471) painted for an unknown patron and which passed into the Rohan family before 1516. Books from this workshop also show a reduced palette and rhythmic distribution of colours, but the artists did not have the Boucicaut workshop's grasp of decorative harmony and their palette was neither imaginative nor experimental. Many manuscripts are monotonous workshop productions, with repetitive patterns and poor quality colour. In most, the colours have chipped and peeled. Nevertheless, among the many books produced by the workshop are some of outstanding beauty.

Several uses of colour are taken from the Boucicaut shop. There is a rather mauveish blue not unlike the distinctive "Boucicaut blue" (Arsenal Ms. 647, ff.51v & 56). On f.77 of the same manuscript a yellow cushion is decorated with red, a convention also typical of the Boucicaut shop. The Hours of Isabella Stuart (Cambridge, Fitzwilliam Museum Library Ms. 62, c.1417-1418) has a red/blue combination in the "St. Matthew" (f.16v) scene where Matthew has an orange robe with a blue cloak. Even more closely related to the Boucicaut style is the use of gold in landscapes, for example in the Hours of René d'Anjou (B.N.)
Ms. latin 1156A, after 1409, f.29v) and in the Hours of Isabella Stuart ("Visitation", f.53) (75) However, for these artists, the Boucicaut Master's distant gilded buildings, used to give an impression of suffused light, clearly have another significance. The gold is heavily applied and is obviously intended to be purely ornamental. No attempt has been made to use gold to articulate the distance so that, instead of giving an impression of distance, the gold pulls the eye forward, out of the back of the image towards the front. Furthermore, there has been no real attempt to give a feeling of light except by painting a huge sun with rays. The artist borrows the "naturalism" of the Boucicaut Master and either fails to understand it or, more likely, turns those very elements which create the "naturalistic" effect into pure decoration.

Just as in the Boucicaut and Bedford workshops, the artists use combinations of real or mosaic gold and ochre to enhance an otherwise dull fabric or stuff. For example, in the Hours of René d'Anjou (f.48) gold is touched onto a wicker fence. At the same time there is a new use of very flat gold. Elizabeth and the Virgin in the "Visitation" (f.39) both have flat gold underrobes and in the "Nativity" (f.48) Joseph's robe and the baby's bath are also flat gold. However, the artists also used burnished, shiny gold, for example, the middle-aged king's gift on f.55. In a scene of "the Birth of the Virgin" (f.18v) gold is laid very flat and unburnished in such a way that one can even see the leaves. Such a use of gold is quite unlike that usually found in manuscript illumination. It might possibly be that a
panel painting technique was unsuccessfully adapted to miniature painting. On the other hand, it may merely be a display of opulence.

The Rohan shop's range of colours is for the most part based on combinations of green, blue, pink and red and is not in itself very interesting. It is rather in the expressive style of the miniatures themselves that the visual interest lies. There are, however, some unusual combinations, for example, grey under a pink robe on f.55 ("The Woman Clothed in the Sun") of the Hours of René d'Anjou. Combinations of red and orange are also distinctive. It seems possible to speculate that the workshop retained a distinct group of colours regardless of the budget of the book. So, in a Book of Hours for the Use of Troyes (Bibliothèque de l'Arsenal Ms. 647) the dark red appears not to be opaque red lead or vermilion, but a transparent red lake indicating a less expensive palette. Colours in the magnificent Hours of René d'Anjou seem, on the contrary, to accord with the high quality of the book. The deep reds appear opaque and its colours seems to point to its being vermilion, although it could be red lead mixed with vermilion or red lake.

Like the artists of the Bedford shop, the Rohan artists used green and grey face modelling. In the "Crucifixion" of Arsenal Ms. 647 (f.82) green is used for Christ's body and can be clearly seen at His hands. Green or grey shading is stronger on older figures. However, the artists seem to have been strangely
unprofessional or unconcerned with techniques of illumination(80)

For example, in Arsenal Ms. 647 the face shading on f.55 has chipped, showing green underpainting. The green was apparently used to model the shape of the angel's face and then covered with a thick impasto. The angel of the "St. Matthew" in the Hours of Isabella Stuart (f.16v) is badly chipped and shows grey drawing lines on the face. A painting associated with the Rohan workshop has been identified in the Museum at Laon; it is thus possible that some or all of the artists working in the group were primarily panel painters, which might account for the unsuitable technique used by these artists(81)

The final section of this thesis has attempted, by considering the approach to colour in the most important early-XVth-century workshops, to draw an overall picture of the early-XVth-century attitude to colour in Parisian manuscript illumination. The various techniques studied here all play a rôle in creating an ornamental whole: grisaille, bright colours and limited palette. Despite an interest in naturalism in early XVth-century miniatures, artists are almost as much preoccupied as their early- and mid-XIVth-century predecessors in keeping a balance between the illustrative image and the flat page. More and more gold and silver come into the miniatures to keep the image ornamental, but at the same time silver, in particular, has a different and more naturalistic rôle. It is used to show light-suffused windows. Gold too is used to enhance the vast landscape distances of Boucicaut Workshop miniatures so that the golden
evening sun reflects off distant lakes and buildings. Thus both precious metals are here used to enhance naturalism. Nevertheless, later artists of the early-XVth-century, in particular the Rohan shop, took these light-filled landscapes and filled them instead with huge, domineering suns that completely submerge the gentle light of the Boucicaut miniatures.

By continuing to use grisaille, the early XVth-century workshops acknowledge an artistic and stylistic heritage, but they adopt the technique to make new experiments with the balance of tones within the image. The virtuoso performance by the Limbourgs in \textit{français 166} demonstrates how artists of genius could take a now exhausted technique and turn it into a display of harmonious balance between simplicity and decoration. In the \textit{Salisbury Breviary}, on the other hand, the artists seem to have used the grisaille technique to relieve the very bright overall colours of the hundreds of tiny miniatures that adorn the text. The semi-grisaille techniques of the \textit{Livre des Merveilles} may have been chosen to reduce the cost of such a large undertaking. However, the balance between areas of strong and cool colours, not the sombre tones of the semi-grisaille in this instance, also give unity to the manuscript which is the work of several artists.

Miniatures by the Coronation, Berry's \textit{Cleres Femmes}, \textit{Cité des Dames} and Luçon Masters are all examples of paintings by illuminators who were working within the opulent early-XVth-century Parisian environment. Their miniatures are elegant and often restrained, while especially the Coronation and \textit{Cité des
Dames Masters had styles which used conflicting and contrasting areas of colour and texture to create an exotic and luxurious image.

In the work of the Boucicaut Master and workshop, there is a return to the sort of calm found in the miniatures of Jacquemart. Each area of colour, which is now very strong and bright, is chosen for its rôle in the miniature. At the same time, in Boucicaut miniatures at least, there are finely painted deep distances which are astonishing in their understanding of the fall of light and recession of planes. Nevertheless, artists are constantly striving to keep the eye moving and prevent it from wandering too far into the background of the miniature. To this end the Boucicaut Master places areas of strong colour to the front of scenes to deflect attention from the back. The Bedford workshop certainly imitated the Boucicaut backgrounds and in all probability understood their aim well, but these artists worked even harder to prevent any sense of real space coming within a scene. Colours are widely distributed around the image and, unlike miniatures of the Boucicaut master, there is no limitation of colours; rather the contrary is the rule. There is a constantly shifting decorative line moving through the miniatures which prevents attention from resting too long in one place.

All these workshops use the range of colours established by the Pseudo-Jacquemart and the Parement Master. Despite both the brightness and variety of the colours used by the later workshops and experiments with new combinations, the basic palette is the
same as that established by the "modern" artists working at the end of the XIVth century.
1. Meiss I p. 198-203 gives a lengthy discussion of the authorship of the Brussels Hours and on pp. 223-4 he discusses the contribution of assistants; there is a full bibliography on p. 322. See also: Thomas, The Golden Age, pp. 65-67; Panofsky dates the book c. 1390-5 (Panofsky, Early Netherlandish Painting, p. 46; Pächt places the Brussels Hours after the Grandes Heures (Pächt, "A Forgotten Manuscript", p. 194; Pächt, "Un tableau de Jacquemart de Hesdin?", pp. 156-160).


3. The arguments against the Brussels Hours being by Jacquemart or at least all by Jacquemart are not only colouristic. There is clearly more than one style; the artist of some of the miniatures uses green underpainting, another does not. The manuscript also seems either to have been painted in a hurry or never really finished. Areas like the angel background on p. 14 were evidently handed over to most incompetent assistants. Often drawing lines show through the colours giving an unfinished and untidy appearance. Both Delaissé and Calkins consider that the miniatures are not by one hand. Calkins argues that the manuscript may have been started by an artist with Italian inclinations, but finished by a French-trained artist. He thinks that the manuscript can be dated after the Grandes Heures (B. N. Ms. latin 919) of 1409 and he does not consider it to have been painted by Jacquemart (Delaissé, "Remaniements dans quelques manuscrits", pp. 123-146; Calkins, "The Brussels Hours Reevaluated", pp. 4-19).

4. A similar technique was used on a large leaf in the Louvre which shows a "Way to the Cross". This leaf is considered to have come from the Grandes Heures and to have been painted by Jacquemart (Avril, "Manuscrits", pp. 346-347).

5. For example, pp. 18 & 186 (Thomas, pl. 14).

6. For example, the "Second Dedication" miniature p. 14 and in the "Annunciation" p. 18.

7. Above and to the left of the throne an angel has a mauve tunic, orange sleeves and yellow wings edged with blue. The angel centrally above the throne is in blue with orange wings, on his right, a second angel wears mauve with yellowish green wings and to the far right a third angel has a yellow green robe with blue wings.

8. For example, p. 18, p. 90 & 130. The robe of Christ in the "Betrayal" and background figures in "Way of the Cross" (p. 186) are painted mauve, apparently pink with blue painted on top. A related colour, although much more purple, was extremely popular with the Boucicaut workshop. Simon of Cirene in the "Way of the
Cross" (p.168) and the robe of a woman in the "Entombment" are powder blue with red shading. Neither of these shading techniques was used by Jacquemart.

9. For example, "Adoration" p.90 and "Presentation" p.98.

10. For example, p. 18.

11. Yellow is shaded with green in, for example, "Adoration" (p.90), with grey on pp.192 & 198 and with red on p.18.


13. For example, pp 98, 186 [Thomas, pl.14] & 198.

14. On pp.18 & 98 ceiling vaults have gold edges.

15. It continued to be used in some retardatory manuscripts for example, Le Pèlerinage de Vie Humaine (françois 823, see CHAPTER SIX above) and manuscripts probably from Northern France like Oxford Bodleian Library Ms. e. Mus 65.


17. Meiss II, especially p.38 on colour, and pp.116-122.


19. Assuming that the miniature at the top left is L.1, I have numbered the miniatures from top to bottom left 1, 2 & 3, right 1, 2 & 3.

20. They appear throughout the Bible Moralisée (f.12v (L.4 & R.3) & 24v [sl. 173]), but are typical of the Limbourg, for example, Belles Heures, New York, The Cloisters (ff.136, 157 & 156v) and Très Riches Heures, Chantilly Musée Condé Ms. 65 (ff.1v [sl.204] & 51v [sl. 205]). This taste for exotic hats may have been Burgundian. They appear in the Louvre Entombment for the figure at the head of Christ (Joseph of Arimathea?), in the Louvre small Pietà [sl. 4] for the figure holding Christ's feet (also Joseph?) and in the hats of the figures behind St. Denis' executioner in the St. Denis Retable [sl.270]. Other early examples of this taste for exotic clothes and decoration are also evident in français 12420, Philippe Le Hardi's Cleres Femmes.

21. For example, thick, white faces on ff.5 & 9 and less densely painted faces on ff.19 & f.23 [sl. 172].

22. For example, f.23 [sl. 172].

23. For example, ff.19 (L.2 & R.2) & 23 (L.2) [sl. 172].

24. For example, f.24 (L.4 & R.3 & 4).
25. There are similar devices throughout. On f.1v (R.4) a monk's robe falls over the border edge which does, however, have a bottom edge.

26. For example on f.20v (L.1,3 & R.1,3) [sl. 168]. These trees are quite different from Boucicaut trees with their sharply defined highlights, and are somewhat closer to trees in the Cité des Dames workshop (Paris, Bibliothèque de l'Arsenal Ms. 664 f.220 [sl. 197]).

27. For example, f.165 [sl. 182].

28. For example, f.42 at the bottom right.


31. Meiss considered this cycle more "delicate in form and colour", recalling "continental" book painting. The illuminations in français 598 he thought more "purely Netherlandish" (Meiss II p.63).

32. For example, français 159, f.259v [sl 193].

33. Paris, Bibliothèque de l'Arsenal Ms. 5057- 5058 Bible (ff.6v, 7 & 300) and B.N. Ms. français 159 Bible (ff.29v & 202v).

34. In français 598 it is pale green with darker green strokes representing grass.

35. Meiss considers the figure of St. Luke in Bodleian Ms. Douce 144 to have stylistic associations with the Coronation and Cleres Femmes Masters (Meiss II p.34).

36. I am not going to attempt any analysis of the Très Riches Heures. The style and approach to painting of the Limbourgs in this manuscript is so particular that it does not really fall into the main stream of early-XVth-century Parisian painting. The subject of the Limbourgs has been extensively dealt with by Meiss in the third part of his enormous work, French Painting in the Time of Jean de Berry, pp.143-224 & 308-324. There is an excellent colour facsimile: Les Très Riches Heures du Duc de Berry, Faksimile Verlag, Luzern, 1984.

37. For the Luçon workshop see: Meiss IIII, pp.351-352, 393-398; for the Cité des Dames workshop see Meiss: III, pp.290, 377-382.

38. See also the Pontifical of the Bishop of Luçon (B.N. Ms. latin 8886 f.50v).

39. For example, the Pontifical of the Bishop of Luçon (ff.49, 101 & 130v) and Terence des Ducs (Bibliothèque de l'Arsenal Ms. 664 f.118v).
40. There is quite a wide use of the dotted technique in early-XVth-century Parisian manuscripts. It is seen in the landscape and sky of *Cas des Nobles Hommes et Femmes* (Bibliothèque de l'Arsenal Ms. 5193, ff. 19 & 149) by the *Cité des Dames* workshop and on f. 205 of the same manuscript in a background landscape and castle. The Orosius Master in the Châteauroux Breviary (Châteauroux, Bibliothèque Municipale Ms. 2; see: Meiss II, pp. 81-85) also used it extensively and built up the entire miniature with small dots (for example, ff. 243v [sl. 113] & 337v [sl. 114]). B.N. Ms. français 247 (Josephus: *Antiquités judaïques*) is particularly interesting from this point of view. These artists bring the pointillistic technique to its highest pitch of technical excellence. On f. 25 the hats of the two central figures are stippled grey and pink over a very pale colour, probably white. Pale yellow is stippled with red on f. 49.

41. Meiss believed that this artist was in charge of the équipe and the distinctive features of the Luçon style are certainly evident (Meiss III, pp. 337-9).

42. Meiss thought that the Cité de Dames workshop, who painted ff. 90-125, copied the style of the Luçon shop (Meiss III, p. 337).

43. Some particular uses of colour continued. For example, in an early *Cité des Dames* workshop manuscripts of Augustine: *Cité de Dieu* (B.N. Ms. français 174, c. 1403-5; see Meiss III, p. 381) there are strange unnaturalistic tones (Meiss III, p. 381). On f. 57v God's blue and orange clothes and the dusty pink wall are treated naturally, but the landscape is predominantly yellow. This type of yellow landscape is found in a *Bible Historiale* (Arsenal Ms. 5057-5058, ff. 6v, 7 & 300, c. 1405; see Meiss III, p. 339-342, 380) mostly by the Master of Berry's *Clères Femmes* assisted by the *Cité des Dames* workshop and in a *Bible Historiale* (B.N. Ms. français 159, in Berry's 1402 inventory; see Meiss III, p. 383) by the Coronation Master.

44. A rather less complex silver robe can be seen and a mosaic gold robe on f. 94v. A mosaic gold robe is decorated with red flowers, blue stems and yellow decorations on f. 159.

45. Meiss II, *passim* and especially pp. 7-22.

46. The bright but restricted colour is often based on red/blue combinations as in the Boucicaut Hours (Paris, Musée Jacquemart André Ms. 2, f. 26v & 53v), the *Grandes Chroniques de France* (B.L. Ms. Cotton Nero E II, c. 1415, for example, vol. I, f. 103 [sl. 208]; see: Meiss II, pp. 92-92), the Châteauroux Breviary, (ff. 237 & 265) and a *Trésor des Histoires* (Bibliothèque de l'Arsenal Ms. 5077, c. 1410, for example, f. 324 [sl. 218]; see: Meiss II, pp. 54, 108-113). The colour I have called "Boucicaut Blue" is particular to the workshop and is found throughout that workshop's oeuvre, for example, Cotton Nero B II, (vol. I, f. 18), Arsenal Ms. 5077 (f. 286), B.N. Ms latin 1161 (f. 25), the Châteauroux Breviary, (f. 345v). It was apparently made by painting blue lake over a pink under colour. The effect is not
mauve, but dark blue. The pink underpainting can be clearly seen in Mazarine Ms. 469 (for example, f.13 [sl. 223]) in the figure of God. Rose pink is found in the Boucicaut Hours (for example, ff.15v, 53v & 118v) and Mazarine Ms. 469 (for example, ff.83 [sl. 228] & 110). Bright green is found in the Boucicaut Hours (for example, ff.26v, 53v) and Bibliothèque de l'Arsenal Ms. 5077 (for example, f.29). Examples of deep, dark green are found in the Boucicaut Hours (for example, f.38v), Arsenal Ms. 5077 (for example ff.1 & 286) and the Hours of Étienne Chevalier (for example, f.111; see: Meiss II, pp.92-94). Black has now become a fashion colour. Often important characters wear black ornamented with gold. There is black for an altar cloth in the Boucicaut Hours (f.38v) and the young king's robe in the "Adoration" (f.83v); in Cotton Nero E. II, (vol. II, f.8) Richard II wears black; in the introductory miniature to Geneva, Bibliothèque Publique et Universitaire Ms. français 165 (Dialogues de Pierre Salmon, f.4) Salmon is in black [sl. 260] as he is in B.N. Ms. français 23279 [sl. 259]; in B.N. Ms. latin 10538 (f.22v), even an angel wears black. In Paris, Bibliothèque de la Mazarine Ms. 469 (Hours) "Adoration" (f.61v [sl. 226]) the old king has a black cloak thrown back across his shoulder and he wears the same colour in three of the border miniatures. In the "Presentation" (f.66 [sl. 227]) Simeon wears a black robe. Pale, earth-type colours are generally used for landscape, for example, Boucicaut Hours (for example, ff.65v & 90v) and Arsenal Ms. 5077 (for example, f.20v).

47. Meiss II, p. 92.

48. For example, Bibliothèque de l'Arsenal Ms. 5077 (Trésor des Histoires, f.18v [sl. 211], 29 & 76v [sl. 214]); Arsenal Ms. 650 (Hours, ff.52 & 164) and B.N. Ms. français 259 (Livy, ff.126, 150 & 335v). Meiss notes that all the borders harmonize except the one on f.21 (Meiss II, p.92). In fact the "Trinity" (f.111 [sl. 234]) is not closely linked either.

49. Deep space had of course been seen in Italian, especially Sienese, panel painting by the mid-XIVth century, most particularly in the work of the Lorenzetti (for example, Ambrogio Lorenzetti's St. Peter Offers a Dowry to three Poor Girls (1319-1348) Paris, Louvre [sl.261]). Artists could also have seen deep painted space at Avignon in Matteo Giovannetti's frescoes and in paintings like the Annunciation at Aix-en-Provence (c.1340) [sl. 27] by a follower of Simone Martini. On this last painting see: Michel Laclotte and Dominique Thiébaut, L'Ecole d'Avignon, Paris, 1983. p.52; Dominique Thièbaut, 1981, no.320, pp.367-8.

50. For example, Boucicaut Hours (ff.38v & 142v) and Arsenal Ms. 5077 (f.347bis). In Mazarine Ms. 469 (ff.5 [sl.219], 7 [sl. 220], 9 [sl. 221] & 11 [sl. 222]), the eye is led into the elegantly arranged interiors of the Evangelists' studies by pale arches.

51. A similar arrangement can be seen in Lucca Bibli. Govenativa Ms. 3122 (a Missal for the Use of Rome, c.1415). An abstract
decorative background is seen through one window while the other is evidently silvered. On this manuscript see: Meiss II, p. 100 and vol. II, b/w plate 358.

52. The Châteauroux Breviary (c. 1415) has two different and equally remarkable representations of the Sainte Chapelle (ff. 274 [sl. 250], 350 [sl. 254]). On f. 274 there is an impression of deep space as the viewer looks into the chapel, but the strength of the recession is unbalanced by the blue spandrels with gold decorations on the outside of the building. These are surely introduced to deflect the eye from the strong architectural perspective. There is greater realism and depth on f. 350 [sl. 85] where the side of the building is cut away to reveal silvered windows with red and blue roundels.

53. Boucicaut Hours (for example, ff. 11v, 65v & 79v); the Hours of Etienne Chevalier (for example, f. 68 [sl. 233]); Mazarine Ms. 469 (for example, f. 9 [sl. 221]).


55. For example, St. Matthew's reading desk in Mazarine Ms. 469 (f. 9 [sl. 221]), the lion's fur in a St. Jerome scene in the Châteauroux Breviary (f. 357v [sl. 255]) and for an ornamental tomb in Arsenal Ms. 5077 (f. 49 [sl. 213]).

56. This technique is clearly seen in the Châteauroux Breviary (f. 387v [sl. 237]) where a mosaic gold boat has been painted onto a silver sea. The silver water, seen from the back, has a space where the boat is painted; while the silver water has a bole laid, the mosaic gold boat needed no bole.

57. For instance in landscapes of Mazarine Ms. 469 (f. 38 [sl. 224]) and the Châteauroux Breviary (ff. 345v [sl. 253] & 367v [sl. 257]).

58. Jenny Stratford explains that although there is no doubt that the Bedford Hours were owned by the Duke of Bedford and his wife Anne of Burgundy after 1423 (the date of their marriage) the book may not have been begun for them. It can in any case be dated to the early 1420s. She believes that the Salisbury Breviary was probably begun c. 1424. In the case of this manuscript, on which there were three campaigns of illumination, those parts which have the root devise, arms and supporters of Bedford as an integral part of the decoration may be dated before 1435 and belong to the first campaign. The arms below the "Adoration" (f. 106) (Luxembourg empaled with Bedford's arms) are those of Bedford's second wife Jacquetta of Luxembourg whom he married in 1433. Jenny Stratford point out that this does not necessarily date the painting to 1422 (Stratford, "The Manuscripts of John, Duke of Bedford", pp. 342-346). The style of the Bedford workshop can also be seen in the Grandes Heures (1409). Meiss points out that earlier and later miniatures combine "stocky, bulbous-nosed figures" which derive from Netherlandish painting with the "elegant, sinuously draped
figures of the Simonesque tradition. He defines their difference from the Boucicaut Master by saying that the Bedford illuminators "abhor the poise, moderation and propriety which are the norms of the Boucicaut Master; they prefer an intense though generalized vitality and expressiveness" (Meiss III, pp.363-368). See also: Spencer, "The Master of the Duke of Bedford: The Bedford Hours", pp.495-502; Spencer, "The Master of the Duke of Bedford: The Salisbury Breviary", pp.607-612.

59. Eleanor Spencer believes that the Bedford Master was not formed by the Boucicaut Master, but took possession of some of the designs of the workshop. From a stylistic point of view this may be true. However, many of the colours used by the Bedford shop, in particular the bright green (Salisbury Breviary, ff.106, 515v & 518), mauveish blue (Salisbury Breviary f.515v) and deep rose, (Salisbury Breviary, f.278v), seem particularly derived from Boucicaut colours rather than from those of any other workshop of the period (Spencer, "The Master of the Duke of Bedford: The Salisbury Breviary", p.608).

60. The figure piercing Christ's side has a mosaic gold robe, a blue cloak, a bright malachite green hat and yellow cloak.

61. For example, ff.237 & 238.

62. Meiss III, p.365. In some miniatures from the Egerton workshop and a few from the Boucicaut workshop, artists use green face shading. Such is never the case with the finest miniatures of the Boucicaut Master and that artist's most immediate associates, but it is found for instance in a Livy (B.N. Ms. français 259, ff.126 & 15), the Livre des Merveilles (français 2810, f.1 [sl. 174]) and an Hours (Bibliothèque de l'Arsenal Ms. 650 (f.37v & 47v) by the Boucicaut and Egerton Masters (Meiss II, p. 86). The Egerton shop uses it far more often, for example a Bible Historiale (B.L. Ms. Royal 19 D III, f.422v [sl. 262]) and a Book of Hours, (B.L. Ms. Egerton 1070, f. 92 [sl. 263]). The Bedford workshop used a great deal of green underpainting; for example, in the Missal of Magloire (ff.213A [sl. 264] & 213B [sl. 265]) it is used under skin and beards. Green face painting is used in the Châteauroux Breviary (for example, ff. 33 [sl. 238] & 40 [sl. 239]). On f.181 of that manuscript it is specifically used to show old age. In the Bedford Hours (on ff.65 [sl. 266] & 70v) shepherds have quite heavily painted faces with green shading; in the Salisbury Breviary green and grey is used on the faces of Joseph and the shepherds of the "Nativity" (f.56). The Virgin's and Child's faces in the "Nativity" and "Adoration" (ff.56 & 106 [sl. 269]) remain white and bland.

63. Spencer writes that the palette of the Bedford Master in the Bedford Hours is light and bright (Spencer, "The Master of the Duke of Bedford: The Bedford Hours", p.501). It is true that colours are brilliant, but those of the large miniatures in the Châteauroux Breviary, seen in comparison with the Boucicaut work, seems rather sombre in the Châteauroux Breviary.
64. For example, ff.261v [sl. 247] & 265v [sl. 248].

65. For example, ff.19 [sl. 237], 26v & 33.

66. There is a similar page arrangement on f.116 which shows "Scenes from the life of David". Meiss has a brief discussion of these miniatures (Meiss II, pp.29 & 128).

67. Mazarine Ms. 469 has even more complicated iconography. Scenes which expand the main miniature are arranged not as an integral part of it, but around the outside. Stories from the life of the Virgin surround the miniature on f.50 and at the the bottom, like in latin 10538, there is a continuous narrative linking each scene to the next. The dominant tones of the main miniature, orange and blue, are repeated throughout the marginal illustrations.

68. These speaking figures are a speciality of the Bedford workshop. In a two-volume Bible Historiale (B.N. Ms. français 9-10, c.1412), in the "Beatus" (f.283) a sinner in the background has "chaire de pestilèce" written on his seat while David holds an inscribed scroll (See: Meiss III, p.365). Émile Mâle speculated about the influence of theatre on manuscript painting (Mâle, L'Art Religieux à la fin du moyen âge). There is no proof one way or another, but what is certainly true is that particularly in the miniature of the "Adoration" in the Salisbury Breviary (f.108), the artist introduced words or speeches said by the main actors. In a St. Jerome scene (f.212v), the saint's room is set in a rock to one side of the main scene. This places the saint in the position of an observer, or commentator. Spencer notes that parallels have been drawn between the miniature for "Advent" and the "Prophets who attend the Messiah" and that they are both related to the theme of the Procès du Paradis and to the Christmas Mystery. Furthermore she links the "Story of Clovis" Bedford Hours (f.288v [sl. 268]) to the "Mumming "at Windsor in 1429 (Spencer, "The Master of the Duke of Bedford: The Bedford Hours", p.467; Spencer, "The Master of the Duke of Bedford: The Salisbury Breviary", p.608).

69. One of the kings says "alons en Jherusalem l roy z le roy" in French. However, other sayings, for instance that held by Isaiah on the far left, are in Latin, which seems generally to be the case throughout the manuscript.

70. In front of the wall of Paradise is the "Fall" and to the right "Adam and Eve Delving and Spinning". To the centre right a white tower divides good from ill. Cain kills Abel on the right and the Creation scenes are to the left.

71. Eleanor Spencer says that the Bedford Master distributes the colour around the page to enhance the decorative qualities of the miniature and retain the flatness of the page (Spencer, "Bedford Hours", pp. 468-501).
72. For the Rohan Master and workshop see: Meiss III, pp.256-277, 346-347, 352-353, 401-404; Meiss and Thomas, The Rohan Master; Panofsky, Early Netherlandish Painting, p.74.

73. For example, in a Cas des Nobles Hommes et Femmes (B.N. Ms français 226, c.1415; see: Meiss III, p.403) on f.17 the colours are restricted to blue and orange. The main figure wears blue, while on the right are two figures: one in blue with a red hat and one in orange with a blue hat. These figures worship a golden idol, behind which hangs an orange cloth. The floors and backgrounds were probably painted by artists specially employed for that purpose. Throughout there are repetitive green and black floors (ff.17, 19, 29v & 112). At first sight the backgrounds seem very rich and ornamental, but they are in fact mostly repetitive combinations of gold and yellow laid over a thick bole so that the gold stands up and catches the light. There is a tendency to create the maximum effect with minimum effort. Often gold and dark blue are used to offset otherwise rather dull colours; there is no vermilion red or yellow in the figures (f.19). The same black and green floors were used in Arsenal Ms. 647 (for example, f.18v, 19 & 67v) which is a monotonous and apparently inexpensively produced manuscript. There are traced borders. On this manuscript see: Meiss III, p.402.

74. The blue is rather like the blue used by the Boucicaut Master and shop, but without the pink underlayer. Instead there appears to be a blue lake underlayer with a darker blue dotted on top. On this manuscript see: Meiss III, p.307.

75. Meiss III, pp.346-7. I would like to thank Dr. Michael Camille for his helpful comments on the use of gold in Fitzwilliam Ms. 62.

76. For example, the Hours of René d'Anjou f.68.

77. For example, f.41, 47, 56 & 61. A very bright orange tending to red can be seen at the top of the main miniature behind God on f.41. It is probably good quality red lead mixed with red lakes, but the colour is close to vermilion. There seems to be very little vermilion red in the Hours of Isabella Stuart, but on f.136 ("The Woman Clothed in the Sun") the Virgin's robe is apparently lined with vermilion. This is a logical assumption because the miniature is probably, in the opinion of Michael Camille, by the hand of the Master. Otherwise the reds seem to be red lead shaded with dark red lake.

78. For example, f.14v, 23 & 68 where this colour is used together with orange.

79. On f.18v ("Annunciation"), the Virgin has a pale face, while God, an old man, has greenish face shading. The same can be seen on f.136 "The Woman Clothed in the Sun" of the Hours of Isabella Stuart where there is green face modelling for the two old men
who flank the Virgin, but the Virgin and the Child do not have green faces.

80. Nevertheless some elements of some miniatures in the *Hours of René d'Anjou* are of astonishingly high quality, in particular the soft and subtle modelling of the Virgin's robe on f.48 and God's robe on f.68.

A study of the history of pigments and their availability reveals that many of the colours made and used by Cennini in the late-XIVth century were also used by Theophilus in the XIIth century. Changes in palette at the beginning of the XIVth century away from the rather dark tones of the late-XIIIth century were probably the result of attempts to introduce light into miniatures. Artists created an effect of light by making colours paler than they had been at the end of the XIIIth century. The range of colours itself had actually, I would suggest, changed very little. However, technical developments made during the XIVth century by craftsmen working on pigment manufacture had a considerable effect on the palette of late-XIVth-century illumination. Developments in the pigment industry may be one of the main reasons why the most radical stylistic changes in late-XIVth century Parisian manuscript painting coincide with changes in the range of colours used. Nevertheless, the "new" palette of the late-XIVth century was certainly also due to the changes in the tastes of artists and patrons; changes which could be now indulged with new, transparent coloured lakes, mosaic gold and most important of all, bright yellow.

Patronage must have played an important rôle in the types of pigments used by XIVth and early-XVth-century Parisian illuminators. Although identification by eye alone is difficult, it is possible to see that cheap pigments, white lead, red lead
and the lake colours were used throughout the XIV$^\text{th}$ century. Some manuscripts use additional pigments that would have added to the cost of the book. In the *Hours of Jeanne de Navarre* (ff.29v, 106v, 111 & 113), the artists, especially Le Noir's chief assistant in the "Hours of St. Louis", used a bright green which may be malachite and a strong vermilion red, almost certainly vermilion. A wider range of colours and easy availability of pigments freed XIV$^\text{th}$-century artists from the necessity of making their own colours; they no longer had to be expert chemists as well as painters. The manuscripts discussed in this thesis are of the highest quality and clearly only the very best pigments were used.

Colour in XIV$^\text{th}$-century Paris is sombre, offset by some bright hues, most notably blue, orange and sometimes a bright green which may be malachite. Nevertheless, the general feeling is sober and the extensive use by the Boqueteaux workshop of greyish and dark blueish greens especially emphasizes this sobriety. Even when the Boqueteaux workshop used a saturated, fully-coloured style, the dominance of orange, pale blue and landscape browns and greens lends a subdued note to their works. If Le Noir's palette is somewhat brighter, it too concentrates on orange, yellow ochre and pale blue.

Throughout the century, up to 1380, blue and pink are nearly always painted with a great deal of white highlight which makes them pale. It is for this reason that when, at the end of the XIV$^\text{th}$ century, artists start to use much darker blue, less stark,
more brilliant reds, bright yellow and bright green, these colours appear so strikingly different. As a general rule, the transparent lake colours used by early- and mid-XIVth-century Parisian illuminators are only red and sometimes blue; they did not use pale mauves or yellowish greens.

Along with the strong and vibrant primary colours, there are some new, pale, lake-like colours found in the Psalter of Jean de Berry and the Petites Heures. These pinks, mauves, pale yellows and pale greens seem to arrive with the "new" or "modern" artists and give a softer feeling to the miniature. Furthermore, the end of the XIVth century also sees the introduction of a much softer painting technique, the stippling of one colour over another or onto the blank parchment. This soft approach was introduced by the Boqueteaux group, but is used extensively by Jacquemart and Beauneveu.

Even if Pucelle, when he designed the grisaille miniatures in the Hours of Jeanne d'Evreux, had some sort of illusionism in mind, perhaps the imitation of ivories or sculpture, his followers ignored any "function" that Pucelle might have perceived for his grisaille. His technique was the inspiration for a range of colours based mainly on pale hues and areas of uncoloured parchment and certainly struck a chord in a period when the particular taste prevalent was for areas of light colour. Despite areas of strong colour, grisaille is very restrained and was the obvious solution to the mid-century taste for sobriety. However, very few grisaille manuscripts were completely austere;
most had gold, red and blue page and border ornament as well as many areas of colour in the miniature itself. Furthermore, grisaille or semi-grisaille was clearly considered to be an entirely ornamental technique.

At its very best, for example in the *Bible Historiale de Charles V*, grisaille is a style of great delicacy. In a manuscript like *Le Pèlerinage de Vie Humaine*, on the other hand, it is almost harsh. In this last manuscript dark figures are foiled against dark backgrounds. There is no balance of tone and the whole is dark; outlines are harsh and the style is arid and only copies what has been done before. The artists have made almost no attempt to express some new idea or feeling. Except for Beauneveu's miniatures in the *Psalter*, where he probably uses the technique with the specific purpose of showing large and "sculptural" figures, grisaille almost disappears from court painting with the last works of the Boqueteaux shop. By the early-XVth century, when the Limbourgs painted the *Bible Moralisée* in grisaille, they were using an archaic or archaizing technique; they were looking back, in fact, to the previous century. But they completely changed the nature of grisaille, making it much more colourful and even more ornamental. Large areas of white are used as a foil for bright colours and gold.

The abandonment of grisaille and what has here been called the "grisaille aesthetic" at the end of the century seems a natural result of the developments in the palette which took place in the 1380s. Before that date artists had gradually been introducing
landscape, architecture, animals and strongly characterized faces into their miniatures, but a real sense of space was absent (except in the *Hours of Jeanne d'Evreux*). Consequently grisaille provided a happy solution. It was both unnaturalistic and decorative and could be used for any subject in any setting. If the setting was naturalistic, the unnaturalistic figure would help to connect the miniature with the decorative border ornament and link the image to the page.

Not all artists sought to pierce a hole in the page and fill their paintings with suffused light and ever expanding distance. Even Pucelle, who seems to have been interested in creating monumental and voluminous figures, in some cases offset his three-dimensional designs (*Belleville Breviary* vol.I, f.24v [sl. 60]) by allowing the border decoration to overstep the edge of the miniature and negate the apparent space within. Book illumination in the period under discussion in this thesis is still essentially about flat surfaces.

The XIVth-century artists were struggling to find a balance between creating depth within the image and retaining the ornamental page. While reducing the colour within the miniature, artists often elaborated the border ornament. To some extent this technique separates the picture, within its border, from the page. But an association is also established between the lightness of the colours, especially when the miniature is in grisaille, and the uncoloured parchment of the page. Many Boquesteaux miniatures place their narratives "outside" in
landscape settings. However, these landscapes are piled up in such a way that they too have no depth, and artists are able to negate or reduce perspective. The Le Noir workshop was even less concerned with space and was much more preoccupied by the dramatic story-telling elements of book illumination. Often miniatures are frieze-like with almost no depth while the borders seem to be placed on top of the image which carries on behind the frame.

Both the Le Noir workshop and the Boqueteaux workshop maintained a balance between the individual miniature as an image and the overall decorative plan. By using a rather subdued choice of colours, the Boqueteaux workshop set the scene apart from the brighter page ornamentation, but by the use of a decorative tricolour border, linked the miniature to that very ornament. The Le Noir workshop, on the other hand, used a brighter range of pigments, mirroring more closely the colours used in the page decoration. The frieze-like approach to the image with its rhythmic colour arrangements is even closer to the abstract page ornament and creates close links between the image and the page.

In his later work in the Petites Heures, Le Noir simplifies his borders, abandoning elaborate tricolours for an uncomplicated gold surround. Although they are flat, gold borders seem to focus more attention on the miniature than ornamental, coloured surrounds. The possibility that Le Noir had come under the influence of "modern" painters seems borne out by his use of simplified figures, simpler borders and less obtrusive
backgrounds in addition to a greater sense of space within his miniatures.

It is not surprising that after about fifty years of grisaille, there was a reaction. The nature of the influences upon Jacquemart and the Parement Master is not proven, but their colours become stronger, more saturated and much brighter. Jacquemart's assistant "Pseudo-Jacquemart" used bright, light colours, many of which were probably made from coloured lakes. Furthermore, new, strong yellow brightened the palette considerably. To counteract a growing sense of depth in the miniatures Jacquemart, and later the Boucicaut Master, restricted his range of colours so that, while the perspective of the miniatures is deep, the internal rhythm of the colours provides a type of abstract pattern. By maintaining an internal colour harmony, the artist corrects any imbalance that might exist between the apparent depth of the picture and the flat page.

Jacquemart's miniatures in the Petites Heures and the Psalter of Jean de Berry and the Parement Master's miniatures in the Très Belles Heures seem to be a reaction against the overly ornamental styles of the mid-XIVth century. The near obsession with alternation in the Grandes Chroniques de France, which was certainly a search for greater decorative effect, disappears completely. Instead, artists use simple borders in order to concentrate greater attention on the scene enacted, not on the overall effect of the miniature, including border and background. Nevertheless, throughout the whole period under discussion,
skilled illuminators seek to balance the increasingly deep image with the page ornament as a whole.

If a disproportionate part of the last section deals with the Très Belles Heures and the Petites Heures, it is because there is such a radical difference between these miniatures and paintings of the earlier XIVth century. In fact their bright colours were far more influential than their style. Leaving aside the disputed Brussels Hours, the next major group of painters, the so-called "Netherlandish" artists, were unaffected by the style of Jacquemart and the Parement Master, but the saturation of their colours was certainly related to, if not inspired by, the miniatures of the Très Belles Heures and the Petites Heures.

Some early-XIVth-century illuminators expanded their range of colours so that it becomes even more decorative. Artists of the Cité des Dames and Bedford workshops evidently thought that the great quality of the illuminated page is its potential for ornament. Their miniatures are filled with gold and silver and are marked by their dispersed colours which move the eye around the miniature, never letting it rest and become fixed on one point. This primarily decorative use of colour links the rinceaux and now increasingly complex page decorations to the very ornamental main miniature.

Other illuminators took the new bright palette and reduced it to make a strong pattern. The Boucicaut and Luçon Masters restricted colour to encourage the eye to move backwards,
forwards, round, up and down the page. Most particularly in the Terence des Ducs, the Luçon shop also limited the number of figures, thus further simplifying the image. There is a wonderful quality of starkness about these paintings. The Boucicaut Master's miniatures have a more varied range of colours, but here too there are relatively few figures. In the great miniatures from the Rohan shop the restrained palette allows the artist to draw attention away from the beauty of individual elements on the page to the spiritual subject matter. Whether by increasing the decorative qualities of the miniature or reducing the colours within that miniature, artists reject the sense of space and incipient naturalism of the Boucicaut shop to return to ornamental images. I would suggest that all the artists confronted to a greater or lesser extent the problem of the relation between image and page.

In their use of rather vivid colours, the early-XVth-century illuminators, and in particular the Boucicaut shop, reflect something of the brilliance of Lorenzo Monaco with his taste for bright green and yellow. As a general rule, however, the palette of these Parisian artists is considerably different from that of their Italian contemporaries. In Paris there are often very dark tones with an emphasis on green and red, with some areas of dark blue and dark mauve. However, like some Italian panel painters of this period working in the International Gothic style, in particular Michelino da Besozzo or Lorenzo Monaco, who also emphasize the ornamental possibilities of colour, early-XVth-century Parisian illuminators are increasingly using colour to
enhance the decorative possibilities of their luxurious and opulent illuminations.