The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.
THE UNIVERSITY OF CAPE TOWN

THE TRATTATO DELLA PITTURA
(TREATISE OF PAINTING)
BY LEONARDO DA VINCI

A study of the English editions explaining their origins and development and comparing their structure and differences, with particular reference to the first English edition (1721), analysing its relationship to the other English editions, and defining the philosophy and significance of this treatise.

A thesis submitted in candidacy for the degree of Master of Philosophy

by

RICHARD SHAW POOLER

Cape Town
2003
ABSTRACT

A study of the English editions, explaining their origins and development, and comparing their structure and differences. The research refers particularly to the 1721 English edition, analyzing its relationship to the other English editions, and defines the philosophy and significance of this treatise.

Three aspects are covered:

- The origins of the Treatise, how it evolved from Leonardo’s Notes, leading up to the various printed editions with all their variations.
- The early English editions of the Treatise, with a comparison of their differences, and their development from the first edition. How were the early editions abridged, and for what purpose?
- The structure of Leonardo’s thought, and what he actually said in the Treatise of Painting. How did his thinking fit into the development of Art Theory from the Middle Ages, through the Renaissance, and up to the time of the first printed editions? Who knew about it and commented on it, and what was its influence on subsequent art theory?

The dissertation begins by discussing Leonardo’s genius, and shows how the legacy that he left inadequately reflected his talents. It then questions why a treatise on art by Leonardo was never published. After this death, Leonardo’s manuscripts became dispersed. What happened to them and where the surviving manuscripts are now is explained, and a stemma at the end of that section shows the relationships.

Cassiano dal Pozzo became interested in Vincian manuscripts, and decided to produce a printed edition of Leonardo’s Notes on art. He needed an illustrator for the work that was to become the Trattato della Pittura, and approached Nicolas Poussin. Several illustrated copies of the Trattato were produced by Poussin, and there is a discussion as to which was the original one. More than one copy was sent to France to be used in the production of the first printed edition. Which one did the printer use? This is debated in the text, although the outcome is inconclusive.

After several abridged editions had appeared, the first complete edition of the Codex Urbinas was published, - the Manzi edition in Italian. The development of the complete printed editions is followed by a listing of all the printed editions, with a stemma illustrating their early lines of development, including a discussion about reprints.

An examination of the individual English editions, including a structural analysis of the different editions, through the development of a Concordance is then used to determine the differences and similarities between the 1721 edition and those that followed. In order better to understand the reasons for the differences, the theories that Leonardo inherited from the Middle Ages, and the new unified Renaissance art theory are discussed. Leonardo’s personal art theory, within the parameters of the 1721 and Rigaud editions, covering five main areas, - those of Painting as a Science, Observation, Vision, Colour and Light, and the Theory of Forms, is also examined. This section then identifies how his major lines of thought were adopted by different Academies, showing the influence of the Treatise of Painting.
Declaration and Warranty.

The author warrants that this thesis is his own work, both in conception and execution, and that extracts from the work of others and references to their work have been duly acknowledged in the text, Notes to the text, or Bibliography, and that this thesis will not infringe the copyright or any other rights of any other party. The author further confirms that this text has not been previously submitted to another University, published or otherwise exploited.

R. Sham
3 Nov 2003

Underwood (supervisor)
3 November 2003

Feathers shall raise men even as they do birds, towards heaven; that is by letters written with their quills.
Codex Atlanticus - 'prophecies'

"He was like a man who awoke too early in the darkness, while the others were all still asleep".
Sigmund Freud
FOREWORD

A copy of the first English edition (1721) of Leonardo’s *Treatise of painting* came into my hands, and I could find almost no reference to it in the material available on Leonardo’s Notes. A further search showed this first edition to be rare, but later editions to be more readily available.

It seemed strange that the first English edition of a *Treatise of painting* by an author as eminent as Leonardo da Vinci should be difficult to find, and even more curious that it should appear passed over almost without comment. Curiosity encouraged me to explore this further.

In the text, the names of pictures are in bold type, the titles of books, Codices and Manuscripts are in Italics, double inverted commas have been used for quotations, and single for other references.
# CONTENTS

1. INTRODUCTION

2. THE ENIGMA OF LEONARDO DA VINCI

3. LEONARDO - HIS WORK
   - What remains of Leonardo's work?
   - Paintings.
   - Sculpture.
   - Architecture.
   - Notebooks and Drawings.

4. DEVELOPMENT OF THE TRATTATO DELLA PITTURA
   - Leonardo's literary legacy.
   - Codex Urbina 1270.
   - Was there an earlier Treatise on Painting?
   - What happened to the original manuscripts?
   - Where are the manuscripts now?
   - Manuscript copies of the Codex Urbinas.
   - Stemma of the dispersal of the manuscripts.

5. PRINTED EDITIONS OF THE TRATTATO
   - The printed editions and their development.
   - The first printed edition - du Fresne.
   - Complete printed editions of the Codex Urbina 1270.
   - Printed editions of the Treatise of Painting.
   - Stemma of the development of the printed editions.
   - Reprints of the English editions.

6. ENGLISH EDITIONS OF THE TRATTATO
   - 1721 and Rigaud editions and their Prefaces.
   - The "Life" in the 1721 and Rigaud editions.
   - Structure of the 1721 and Rigaud editions.
   - The nature of the abridgements.
   - Comparison of the illustrations.
   - Detailed analysis of the illustrations.
   - Examples of the illustrations.

7. THEMATIC ANALYSIS OF LEONARDO'S THOUGHT IN THE TRATTATO
   - The central themes in the Treatise of painting.

8. REFERENCES TO AND THE TREATISE OF PAINTING

9. CONCLUSION

APPENDIXES

- Appendix 1 - 1721 edition sections and headings.
- Appendix 2 - Rigaud edition sections and headings.
- Appendix 3 - McMahon edition sections and headings.
- Appendix 4 - The Concordance.
- Appendix 5 - Key Dates.

BIBLIOGRAPHY
1. INTRODUCTION

Some years ago, a copy of the first English edition (1721) of Leonardo's *Treatise of Painting* came into my hands, and I could find almost no references to it in the material available on Leonardo's Notes. Furthermore, I could locate very few copies of the 1721 edition, although later editions are easily found.

In my search for material, I came across two interesting statements by Kenneth Clark. The first was his remarkable comment, "It would not be extravagant to claim that Leonardo da Vinci's *Treatise of Painting* is the most precious document in the whole history of Art". The second comment was his judgement of the 1877 edition as being 'the only good English edition available'. The 1877 edition is a revised version of the first Rigaud edition of 1835.

Within the context of these two comments, my 1721 edition is clearly a document of some value and interest, but is in some way deficient with regard to the Rigaud editions. Kenneth Clark's two comments became an invitation to find out a lot more about the *Treatise of Painting*.

THE PROBLEM

The immediate presentation of the problem is that here is arguably "the most precious document in the whole history of Art", and even if Kenneth Clark was indulging in a bit of hyperbole, one would expect the first English edition to have been generally recognised as important. One expects the great name of Leonardo coupled with the appearance of the first English edition to have been something of an event. This doesn't seem to have been so. The publisher was obscure, and the editor of the edition unknown. The first editions of this Treatise, the Du Frèsne editions in Italian and French, were rather grand, yet this first English edition is a modest octavo edition and is a bit plain. It is now a rarity in comparison with other editions. Why? This first English edition seems to be

---

little recognised, being hardly mentioned in the available literature. The modest profile of this first English edition gives rise to further questions.

What is the relationship between this printed edition, and Leonardo’s famous original manuscripts? How was the text transmitted and by whom? This is an abridged edition – why should this be so, what material was retained for this edition, and for what purpose? There is the suggestion that the first edition was in some way deficient in comparison with later editions. In what ways, and was this criticism fair?

What information is Leonardo da Vinci giving us in this document that makes it important enough to earn such high praise from Kenneth Clark? In what ways did this treatise fit the development of Art theory when it first appeared, what influence did it have, and who knew about it? Did its publication affect Leonardo’s reputation in general, and in what ways?

This modest volume is surrounded by a plethora of such questions, which form a core set of problems regarding its origins, its identity and its influence, against a background of scarce information.

The starting point is the physical fact of a copy of the 1721 edition. It is not unique, or singular, so an analysis of the idiosyncrasies, peculiarities or production history of this particular copy will not shed much light on the core problem. It is rare, but it is possible to find other copies of the same edition with which to compare it, and its collation conforms to other copies in the edition. This approach would throw up interesting differences in binding, ownership, and printing techniques such as work and turn, but would not explain the core questions at issue.

AIMS OF THIS THESIS

What is required is to look at the origins and history of the edition, and to follow the transmission of the text from earliest sources to printed copies. Primary sources need to be identified, with any loss or corruption of material, and the contribution of individuals at different stages of transmission should be understood. As this process continues, it will move from primary sources into secondary
sources, particularly those associated with the printed editions. These need to be carefully assessed to see what light contemporary comments shed on the development and influence of the different editions.

With this in mind, this thesis proceeds along two main avenues of enquiry, which lead into a third.

- The first avenue attempts to explain the origins of the Treatise, and how it evolved from Leonardo's Notes, to eventually take the form of the various printed editions with all their variations.

- The second looks at the early English editions of the Treatise, and compares them with each other to understand their differences and their development from the first edition. The focus therefore is on the first English edition of 1721, relating it to the other English editions. The early editions were abridged, and complete editions were to appear sometime later. How were they abridged, and for what purpose? This will be determined by comparing the sections and chapters in each edition in the form of a Concordance, which will explain the nature of the abridgements, and hence their purpose.

- The third part of the core question looks at the structure of Leonardo's thought, and what he actually said in the Treatise of Painting. How did his thinking fit into the development of Art Theory from the Middle Ages, through the Renaissance, and up to the time of the first printed editions? What was its influence, who knew about it and commented on it, and can we trace any of its thinking in subsequent art theory?

METHODOLOGY

CHAPTER TWO

The point of departure, a look at the origins of the Treatise of Painting, to see how it developed from Leonardo's Notes, turned out to be a more complex issue than expected. Leonardo did not
compile the Treatise himself, nor did he compile the antecedent manuscript, the Codex Urbinas, from which the Treatise was derived.

In a folio at Windsor, and in two places in the Codex Atlanticus, Leonardo stated his intention to complete a 'libro di pittura', but never achieved it. Why was a treatise by Leonardo not published in his lifetime? The reason lies within the personality of Leonardo, and is connected with that side of his genius that would rather pursue more questions than bring to completion work which was already undertaken - much of it pioneering work, that was to remain hidden in his Notes until they were published in the late 1800s. That is why chapter two begins by briefly explaining the enigma of Leonardo's personality and genius.

CHAPTER THREE
He was famous in his own lifetime, yet he left relatively little to sustain his great reputation. Chapter three shows how little remains of Leonardo's work, as so much that he did was either uncompleted, destroyed or lost. There is no sculpture, and no architecture, and only about seventeen paintings remain. Apart from these, his great monument is his Notes, many of which are now lost. It is from these Notes that the Treatise of Painting was to evolve.

CHAPTER FOUR
As Leonardo compiled his Notes, so they formed a number of different manuscripts which circulated amongst other students and artists of the day. In turn, Leonardo would have read other treatises, and been aware of earlier ones. Chapter four begins by detailing which were they, and which contemporary treatises were published. Why was none of Leonardo's work published, particularly as it was known to be outstanding and influential? There are references to an early 'treatise on painting' that Leonardo is believed to have completed, and the likelihood of this is assessed.

---

2 Windsor 19,076, CodexAtlanticus 181 r-a, and 79 r-c.
After Leonardo’s death, his friend Francesco Melzi\(^3\) inherited his manuscripts, and spent years transcribing a ‘treatise on painting’ from his Notes, selecting material from a number of different manuscripts. This selection and the manner in which it was conducted raises several problems, which are defined and discussed.

The single copy that Melzi transcribed is known as the *Codex Urbinas Latinus 1270*, and is the original source from which many other manuscript copies were made, and from which the *Treatise of Painting* was ultimately derived. This is the original manuscript that lies behind the printed editions, and it is only relatively recently that the hitherto unidentified hand in the *Codex Urbinas* has been identified as that of Francesco Melzi. This chapter traces the story of the *Codex Urbinas*, listing the manuscripts that were used, and those that survive, and the collections they are in. This is where the tracing of the transmission of the text begins.

After Melzi’s death, Leonardo’s manuscripts began to disperse, and many were lost. The *Codex Urbinas* itself was lost for many years, and was eventually discovered in the library of the Duke of Urbino before being transferred to the Vatican library. The chapter ends with a stemma of the dispersal of Leonardo’s manuscripts.

CHAPTER FIVE

Chapter five begins with the intervention of a fascinating figure, Cassiano dal Pozzo\(^4\). He became determined to prepare a text for a printed edition of the *Treatise of Painting* with illustrations, and he worked for years on various manuscripts to prepare a definitive copy which could be used in producing a printed edition. The story of how he prepared a printer’s copy is detailed, with the sources he used, and the difficulties he faced. He transcribed his own manuscript copy, and

---

\(^3\) Francesco Melzi (1491-1568) became Leonardo’s apprentice in early adolescence, and then his constant companion. After Leonardo’s death, he brought all his manuscripts back to his villa in Vaprio d’Adda. Melzi lived a further 49 years, dying at the age of 77. In that time he compiled the *Codex Urbinas* from material scattered throughout Leonardo’s notes.

\(^4\) Cassiano dal Pozzo (1588-1657).
commissioned Nicolas Poussin\(^5\) to illustrate it, which gave rise to further difficulties. It appears that several copies were transcribed, and illustrated by Poussin, and they all have claims to be the original source used for the first printed edition. Which copies were used in the production of the first printed edition? They were abridged. Who made the abridgements, and why? How did they relate to the full *Codex Urbinas*?

In due course, the complete *Codex Urbinas* was published by Guglielmo Manzi in 1817, followed by subsequent complete editions. Following this part of the story is a list of the printed editions, first in date order, then in language groupings with individual detail. This section ends with a stemma of the early development of the printed editions, and a discussion of later reprints of the English editions.

CHAPTER SIX

At this point, it can be said that the first part of the core question relating to the importance of the *Treatise of Painting*, has been addressed. Its origins have been traced with all the secondary questions arising from its development explored. Why then did Kenneth Clark suggest that there was difficulty finding a good edition of the *Treatise of Painting*? This second part of the core question is best attempted by looking at the Treatise itself, as there is little other source material to consider, and this is the subject of chapter six.

In looking at the *Treatise of Painting*, there is a curious sense of disappointment for the modern reader. It is a compilation of notes on a variety of artistic subjects, written at different times, often repetitively returning to an earlier topic, finally assembled to form a treatise. The first English edition of 1721 reflected this acutely, after which John Francis Rigaud\(^6\) re-arranged the text.

---

\(^5\) Nicolas Poussin (1594-1665).

\(^6\) John Francis Rigaud (1742-1810) was born in Turin, and died at Packington Hall in England. He first studied painting with Chevalier Beaumont of Turin, historical painter to the King of Sardinia. He later studied at various centres in Italy, finally living in Rome from 1768 to 1770. He moved to London in 1771, becoming an associate RA in 1772, and a full Academician in 1784. He also became an Academician of the Academia Clementina at Bologna, and the Royal Academy at Stockholm. He received important commissions, and was a major painter of fashionable interiors of the late 18th century, and was well known as a portrait painter.
and imposed a greater order and fluency on it to create the second English edition of 1802. In doing this, he strongly criticised the earlier 1721 edition in his Preface. This provides us with a good starting point for the comparison of the English editions. Central to the comparison are the Prefaces in each edition. Here the editors have revealed their expectations of their own editions, and Rigaud in particular has a lot to say about the previous 1721 edition. Was he justified? The issues raised are discussed and tested against the texts, to understand in what sense the 1721 edition is inferior to later editions.

The comparison then moves on to the *Life* in each Preface, concentrating on comments relating to the development of the *Treatise of Painting*.

An important question underlying the comparison of the various editions is that of the abridgements. What form have they taken, and why? To establish this, extensive work has been done in compiling a Concordance, a tool that enables us to compare the abridged editions with each other and with the complete *Codex Urbinas*. This provides an insight into the structure and nature of the abridgements, which is an essential step in identifying the audience for whom the treatise was intended. This provokes further questions regarding the form of the first two abridged printed editions, the Du Frésne editions, with their grand format and 365 sections. Why were they so grand in comparison with the later octavo editions?

After this, the illustrations are compared, concentrating on the abridged editions. (The first complete edition in English which appeared in 1956, the McMahon edition, did not contain illustrations.) Small discrepancies appear, but nothing of substantial interest. A sample of various illustrations is then included in the text.

This ends the second part of the core question, and establishes the extent to which the 1721 edition compares favourably with the Rigaud edition, in addition to a number of subsidiary questions.
CHAPTER SEVEN

Following this in chapter seven is the final part of the core question - what, in fact, does the *Treatise of Painting* have to say, and how does its 'voice' relate to the development of Art theory from the Middle Ages, to the time in which it was written, and then to the time at which it was published. Can its place be established within this great line of development, and can any subsequent influence be ascribed to it?

First, some introductory remarks show the thinking that preceded Leonardo - his inheritance from the Middle Ages. The text explains the fragmentation within the guild system, which worked against a unified art theory, the iconoclastic problem, and the problem of artist as 'creator' or 'maker'. There was the growing focus on the imitation of nature, with its attendant problems of interpretation, as well as the development of perspective.1 These different strands of the old adapting to the new, and the new seeking development, became the building blocks of a unified Renaissance theory of art on both practical and theoretical levels. The development of this new approach to art could be found in Leonardo's Notes, and later in the *Codex Urbinas*, the forerunner of the *Treatise of Painting*.

Following this is an attempt to extract from the detailed text an over-arching set of concepts or art theory from which all else hangs as explanatory detail. These concepts cover five main subject areas, those of Painting as a Science, Observation, Vision, Colour and Light, and the Concept of Forms. This is what Leonardo had to say about art in a unified theory within the confines and parameters of the *Treatise of Painting*, available to readers of the text at that time. The parameters would, of course, be much wider if we were to look back from our standpoint today.

What follows that section is a brief glance at how many of Leonardo's ideas were congruent with the major themes of Renaissance art theory. Some of these survived to influence our thinking

---

1 For many of these views, see M.Barasch, 1985, *Theories of art from Plato to Winkelmann*, New York: N.Y. University Press.

interiors of the late 18th century, and was well known as a portrait painter.
even today. Some were discarded, but many changed and were adapted to the requirements of the art world in the seventeenth century, during the rise of the Academies.

CHAPTER EIGHT

The thesis then details various comments made by prominent people, and their responses to the Treatise of Painting in printed form, as well as earlier comments on the antecedent manuscripts. These show how the study of the Treatise of Painting and Leonardo's Notes, and hence his reputation, spread and grew from the 16th to the 20th century.

APPENDICES

The first three Appendices at the end list the section headings in each of the English editions. These are followed by the Concordance which relates common sections in each of the Du Fréne, 1721, Rigaud, Ludwig and McMahon editions to each other. There is also a list of Key Dates, showing major events in Leonardo's life, but concentrating on dates relating to manuscripts and paintings.

ORIGINAL MATERIAL

Having explained in outline the purpose and form of this thesis, perhaps a final note is necessary to show what is new or noteworthy in this treatment. A point to stress is that a great deal has been written about Leonardo, his paintings and his manuscripts, but relatively little has been written about the Treatise of Painting. Chapter 8 deals with references to Leonardo's Notes and manuscripts, and very few comments can be found that relate directly to the English editions, and almost nothing to the first English edition in particular. Any discussion of the 1721 edition in particular is therefore original. With the exception of Kate Steinitz' excellent treatment, Leonardo da Vinci's Trattato della Pittura, there are very few books of note that deal with the Treatise of Painting as a single topic, and she has little to say of the 1721 edition. Carlo Pedretti's remarkable work, "Leonardo da Vinci on painting": a lost book is a mine of information, but its focus is on the Codex Urbinas rather than the abridged editions of the Treatise of Painting. In general source

material is scattered, and appears in publications devoted primarily to other aspects of Leonardo's work. A considerable effort has gone into assembling the story and detailed analysis of the Treatise of Painting in one place.

Parts of Chapter 4 are original, particularly the stemma, and the discussion of the reprints. Chapter 5 includes original work on the analysis of the Prefaces and the Life in each of the early English editions. The question of how the Treatise of Painting was abridged is also original, with its detailed analysis of the chapters and final summary. This is based on the Concordance, the compilation of which was an enormous task, and a key piece of original work in respect of the entries referring to the 1721 and Rigaud editions. Concordances depend on references to particular sections, and these do not exist in the 1721 edition. It has therefore been necessary to list the section headings with numbers in the first three appendices, thus creating a new reference list for the 1721 edition, which has enabled a comparison with the other editions. The analysis of the illustrations is also original work, with its accompanying summary. This develops into the Structure of Leonardo's thought and the central concepts, which is also new material.

*C. Pedretti, 1965.*
2. THE ENIGMA OF LEONARDO DA VINCI

Leonardo da Vinci - a name to conjure with, was arguably the most famous figure of the Renaissance, one of the greatest ages of man. In his own lifetime he was popular, famous and respected. One remarkable pictorial record of this is Raphael’s\textsuperscript{10} painting, The School of Athens. Although depicting ancient Greece, the figures are portraits of some of Leonardo’s distinguished contemporaries of the late fifteenth century, and the central figure, that of Plato, is considered to be a portrait of Leonardo da Vinci himself. Here we see Leonardo with his reputation at its peak, a tremendous influence on the artists, thinkers and leaders of his day, and fabled, a few years later, to die in the arms of the King of France.

Yet he was an enigma. Although he was famous and deeply influenced the artists who knew him, the legacy he left was scattered, unfinished, damaged or destroyed, and much of it was inaccessible at the time of his death. Despite his many talents that illuminated the artistic and intellectual milieu of his day, it is surprising to realize that he could have sunk into obscurity.

He did not leave a large collection of paintings to sustain his reputation, and some of his greatest work suffered drastic damage after he experimented not altogether successfully with underpainting surfaces and with oil-based paints. His reputation has been further obscured by problems of attribution, and it is only in the twentieth century that there is reasonable certainty about the few remaining examples of his work.

It can be argued that Leonardo’s patrons saw his genius as a painter as secondary to his other talents. Lorenzo de’ Medici\textsuperscript{11} enjoyed his musical gifts, and recommended him to Ludovico Sforza\textsuperscript{12} as a violin maker. Ludovico asked him to organize festivities, and used him as an engineer. Pope Leo X\textsuperscript{13} commissioned him to work on the draining of the Pontine Marshes, and not on any of the artistic and

\textsuperscript{10} Raphael (1483-1520).
\textsuperscript{11} Lorenzo de’ Medici (1449-1492).
\textsuperscript{12} Ludovico Sforza (1451-1508). He became the Duke of Milan in 1494.
\textsuperscript{13} Pope from 1513 to 1521, he was the second son, Giovanni, of Lorenzo de’ Medici.
architectural projects that had drawn many other outstanding artists, architects and sculptors to Rome.

Leonardo claimed he was as skilled a sculptor as painter. Yet his largest commission, the great equestrian statue of Francesco Sforza,\(^{14}\) was never cast, and was eventually destroyed. Little is known of any other sculptures.

None of his notes and drawings was published in his lifetime, and after his death they became scattered, some stolen, some separated and sold, and at least half irrevocably lost. The remaining notes and drawings were dispersed, and most remained more or less unknown until the late nineteenth century. Even the *Trattato della pittura* remained unpublished until 1652, circulating in the meantime in the form of manuscript copies.

He was a great inventor, as his copious ‘notes’ show, but many of his ideas were to be appreciated fully only centuries later. Most of his inventions remained unknown to his contemporaries, and undiscovered in his ‘notes’ until relatively recently. It is now realised that many of his constructions could not have been built with the materials of his day, and require modern technology and the stronger materials of today for them to work.

His reputation was kept alive by the artists he had influenced, the circulation of manuscript copies, the later publication of the *Trattato della pittura* and various prints, but particularly by Giorgio Vasari’s\(^{15}\) book *Lives of the most excellent painters, sculptors and architects*.\(^{16}\) Vasari’s work was first

---

\(^{14}\) Francesco Sforza (1401-1466). He fought for and captured Milan in 1450, ruling it as duke for the next 16 years.

\(^{15}\) Giorgio Vasari (1511-1574).

\(^{16}\) It is interesting to note that even early treatises showed a tendency to include material on ‘Lives of the Artists’, in addition to theory, and this was to continue usually as part of larger works, all the way up to Vasari and beyond. In Roman times, Cornelius Nepos wrote 16 books consisting of the biographies of famous men, which contained a section on ‘Lives of the Artists’. Many more treatises of this kind were to follow, amongst which were the following: (for the following references see J. Turner (ed.) 1996, *The dictionary of art [DOA]*, 34 vols. London: Macmillan.) In 1381-1382, Filippo Villani wrote his *Liber de origine Civitatis Florentiae et eiusdem famosis Civibus* in which were included the lives of artists [DOA] vol.32, p.561. There were also numerous other writers who included notes on local artists when writing about their own cities. Several fifteenth century writers incorporated the lives of artists into other works, such as Cristoforo Landino who included a history of Florentine Art in his commentary on Dante of 1481 [DOA] vol.18, p.699. In 1512, Ugolino Verino wrote his *De illustratione Urbis Florentiae*, which contained a section on artists [DOA] vol.32, pp.255-256. Similarly Bartolommeo Facio’s *De viris illustribus* (1456) was noteworthy because it contained material on Flemish and North Italian painters, including the *Life of Jan van Eyck [DOA]* vol.10, p.747. Raphael’s father, Giovanni Santi, wrote a rhymed Chronicle which included the lives of artists up to the 1490’s. Even Giovanni Boccaccio included an artist in his *Decameron*, this being Giotto.
published in 1550, and then revised and enlarged in 1568. This was one of the earliest and most important sources of information about Leonardo, and it is significant that he occupies a key position in this book, being the first entry in the third and most important section, and for generations Vasari’s view remained the accepted one. There was little else on which to base an assessment.

Despite Vasari’s strong influence, it should be remembered that his famous Lives is not always reliable. He was often wrong on details, such as dates of births and deaths, attribution, and other facts about particular pictures. Vasari wrote his Lives in about a year, so could not have visited much of the material he was writing about. He simply wrote about everything he knew, had heard about, or remembered, and based many of his comments about northern artists on hearsay. He went on a trip to Northern Italy in 1566, after the first edition of his work had been printed the previous year, so it is not surprising that the best range and detail in Vasari’s work covers Florentine Art. Vasari begins his Life of Leonardo as follows:

In the normal course of events many men and women are born with various remarkable qualities and talents; but occasionally, in a way that transcends nature, a single person is marvellously endowed by heaven with beauty, grace, and talent in such abundance that he leaves other men far behind, all his actions seem inspired, and indeed everything he does clearly comes from God rather than from human art.

Everyone acknowledged that this was true of Leonardo da Vinci, an artist of outstanding

There were three Lives of note before Vasari’s: The Il libro di Antonio Billi, which may have been compiled by several writers, and included Lives from Cimabue to Michelangelo [DOAJ] vol.4, pp.63-64. It was used by Vasari in his own book. The Anonimo Fiorentino (also known as Gaddiano or Magliabechiano) wrote a manuscript of Lives, but it remained unfinished perhaps because Vasari had just published his at the time [DOAJ] vol.20, pp 93-94. There was also a manuscript of about twenty Lives by Giovanni Battista Gelli, but this remained unpublished until 1896 [DOAJ] vol.12, p.244. There were several others after Vasari, such as Carlo Ridolfi (1594-1658), whose Le maraviglie dell’arte (Wonders of art) appeared in 1648 [DOAJ] vol.26, pp.361-362, and Marcantonio Michel (1484-1552) whose notes on artists Lives were published in 1800 in Abate Morelli’s Notizie d’opera di disegno [DOAJ] vol.21, p.474.

Vasari claims that after the Pazzi conspiracy, Andrea del Castagno was commissioned to paint the conspirators on the walls of the Bargello. It was actually Botticelli who was commissioned to do the painting, as Andrea del Castagno had died in 1530. Vasari also claims that Andrea, in a fit of envy, murdered Domenico Veneziano, who is credited with the development of oil painting (along with Jan van Eyck and others). The fact is that Domenico outlived Andrea by four years.
physical beauty who displayed infinite grace in everything he did and who cultivated his genius so brilliantly that all problems he studied he solved with ease. He possessed great strength and dexterity; he was a man of regal spirit and tremendous breadth of mind; "

Leonardo da Vinci was a phenomenon, although he was also an enigmatic figure whose personality is easy to admire but difficult to understand. He was a very complex person, whose talents were astounding. He had great charm, and made a deep and lasting impression on his contemporaries, but he was also a very private person, for nowhere in all the thousands of pages that he wrote does one get a glimpse of the emotional and subjective side of his nature. His writings are devoid of emotion, and reveal nothing of his feelings, loves, likes or dislikes. Even the death of his father evoked no warmer entry in his diary than the following:

"On Wednesday, the ninth of July 1504, my father, Ser Piero da Vinci, notary at the Palazzo de Podesta, died at 7o'clock; he was eighty years old; left ten sons and two daughters." 19

Leonardo was mistaken regarding his father's age - he died at the age of seventy-seven.

His objectivity towards the world around him was a reflection of his personality, and yet this inner detachment did not in any way stifle an enormously creative vision and imagination. Leonardo was certainly one of the most creatively intelligent major figures of the time, or of any time, but he fits the mould of the Renaissance very awkwardly. He was in some respects very representative of his time, developing ideas whose lineage went back to the Middle Ages, but he was also two or three centuries ahead of his time. He cannot be pigeon-holed, and made to fit the popular concept of the Renaissance.

His thinking in some respects was Aristotelian, and this was congruent with the rise of

Humanism\textsuperscript{20}. Leonardo refers several times to Aristotle\textsuperscript{21} in his ‘notes’\textsuperscript{22}, and to the two Arabic exponents of Aristotelianism, Averroës and Avicenna.\textsuperscript{23} He also refers to Albertus Magnus who played an important part in introducing their thought to the West.\textsuperscript{24} Both Albertus Magnus, and his pupil St. Thomas Aquinas,\textsuperscript{25} are mentioned in Leonardo’s Manuscript I. It is interesting to assess Leonardo’s familiarity with the great thinkers and writers of the past by looking through the list of 116 books that he owned.\textsuperscript{26}

He was also forward-looking, with an experimental approach to the world which first appeared at the end of the twelfth century, in opposition to the earlier Scholasticism, and can be found in the thinking of Roger Bacon\textsuperscript{27} who first introduced the phrase ‘scientia experimentalis’ in the thirteenth century.

Leonardo’s forward looking rationalism with its focus on science and mechanics anticipates the thinking of a later age. An example of this can be found on a page of notes in the Windsor collection, where Leonardo wrote in the margin, “il sole no si mueve (The sun does not move)”, a departure from the Ptolemaic view of the universe in which the earth was the unchanging centre.\textsuperscript{28}

And in other manuscripts, he wrote the following:

\textsuperscript{20} This rise of Humanism, a driving force behind the Renaissance, was one of several developments in a time of change that was deeply threatening to the scholastic establishment, and Cardinal Domenici of the University of Padua was to say of the Florentine Humanists, "They were the instrument used to corrupt politics, religion, family, education" (cited in R.M. Leets, 1992, \textit{Cambridge history of the Renaissance}, Cambridge University Press, p.9). This is not to suggest that Humanism replaced Scholasticism, but it offered an influential alternative. There were aspects of Scholasticism that were deeply entrenched, and their influence can still be felt today.

\textsuperscript{21} Aristotle (384-322 BCE).

\textsuperscript{22} Leonardo read Aristotle’s \textit{Physics} in 1508, and he referred to it in his notes at the time. See \textit{Manuscript F} fol 84v, and \textit{Manuscript D} fol 10v.

\textsuperscript{23} Quaderni iii 3v. Averroës (Ibn Rushd) (1126-1198) was the most famous thinker of Moslim Spain and Avicenna (980-1037), a philosopher and physician who wrote the influential \textit{Canon of Medicine}.

\textsuperscript{24} Albertus Magnus (c.1200-1280), Saint, scholastic philosopher, natural scientist and theologian, who wrote the \textit{De coelo et mundo}, and the \textit{Opus Philosophie Naturalis} (1490) also called the \textit{Philosophia paupersum}, Brescia, in addition to several other works, and effectively promoted Aristotelianism amongst his contemporary theologians. (see Geyer, B. 1964. \textit{Encyclopaedia Brittanica}, p.528.)

\textsuperscript{25} St. Thomas Aquinas (1225-1274).

\textsuperscript{26} \textit{Codex Madrid II} fol 2v and 3r.

\textsuperscript{27} Scientist, philosopher and educational reformer (c.1220-c.1292) who lectured at the Universities of Paris and Oxford, and who tried to compile an encyclopedia of all the known sciences. He was particularly interested in languages, mathematics, optics, alchemy, astronomy and experimental science, and was strongly influenced by the works of Aristotle.
"...the earth is a star..."29 "...much like the moon..."30 it "...is not in the centre of the circle of the sun, nor in the centre of the universe...And if one were to be upon the moon... this earth of ours with the element of the water would appear to him in the same relationship as the moon has to us..."31 This was written in about 1500, in advance of Copernicus32 and Galileo Galilei.33 However there is no evidence in his surviving 'notes' that Leonardo was able to develop this thinking into a full blown cosmology.

Another example is Leonardo's dissection of the heart, and mapping of the arteries. He injected parts of the heart and brain with wax, and then made plaster casts of them, so he could study how they worked. He blew molten glass into his cast of the heart, so he could closely study the Aorta and Aortic valve to see "the true form of this gate..." and described the heart as "...a vessel formed of thick muscle, vivified and nourished by the artery and vein, as are the other muscles..."34 He wrote, "...the root of all the veins is in the gibbous part of the heart..."35 all the veins and arteries proceed from the heart...36 and described the beat of the heart as producing "...a wave of blood in all the veins..."37 Yet he never discussed the actual circulation of the blood, a discovery in 161638 for which William Harvey39 was to achieve fame, nearly a hundred years after Leonardo's death.

Leonardo has been described as the forerunner of Francis Bacon,40 James Watt,41 and Sir Isaac Newton.42 He pursued speculations that may have led to their conclusions, but time and again was side-tracked into other studies before reaching the discoveries that were to make others famous.

28 Quaderni v 25 r.
29 Codex Atlanticus fol.112v.
30 Manuscript F fol.56r.
31 Manuscript F fol.41v.
32 Copernicus (1473-1543).
33 Galileo Galilei (1564-1642).
35 Fogli B, 34 v.
36 Fogli B, 11 r.
38 In the Exercitatio anatomica de motu cordis et sanguinis in animalibus, 1628, Frankfurt.
39 William Harvey (1578-1657).
40 Francis Bacon (1561-1626).
41 James Watt (1736-1819).
42 Sir Isaac Newton (1642-1727)
Dr William Hunter,⁴³ the famous anatomist, was to describe Leonardo as the best anatomist at that time in the world. His studies of anatomy were in advance of all contemporary work of the same kind, and were equal to any such work well into the seventeenth century. Yet his work in anatomy remained hidden in his unpublished Notebooks until the late 1800's. Instead it was Andreas Vesalius⁴⁴ who was to become regarded as the founder of modern Anatomy.

According to Benvenuto Cellini,⁴⁵ King Francis I of France said of Leonardo that “He (the King) did not believe that any other man had come into the world who had attained so great knowledge as Leonardo, and that not only as sculptor, painter, and architect, for beyond that he was a profound philosopher”.⁴⁶

---

⁴³ A Scottish physician, obstetrician and anatomist (1718-1783).
⁴⁴ Regarded as the founder of modern anatomy, Vesalius (1514-1564) established modern anatomical nomenclature and scientific method in the seven books of the De humani corporis fabrica of 1543, although his physiology was still largely that of Galen.
⁴⁵ Florentine Mannerist sculptor, goldsmith and metal-worker (1500-1571) who wrote a famous Autobiography. The first part of his life he spent in Rome, after which he worked for King Francis I of France, thereafter returning to Florence to work for Cosimo I.
3. WHAT REMAINS OF LEONARDO'S WORK?

It is surprising that Leonardo's great reputation seems to be based on such a small surviving body of work - a handful of paintings, claims to architecture and sculpture without surviving evidence, and 'notes' that until relatively recently, were largely unknown. It is therefore necessary to look briefly at his extant work (paintings, sculpture, architecture, then 'notes'), to establish what has survived, key parts of which helped form the ideas that eventually became the basis for the Trattato della pittura.

PAINTINGS

One of the problems besetting the assessment of Leonardo's influence and stature amongst fifteenth and sixteenth century painters has been that of attribution. Several paintings previously thought to be by him have been re-attributed to other painters, and some paintings, partially painted by Leonardo, are now known to have been completed by students and other artists.

There are written references to paintings that are lost or destroyed which were based on extant drawings. In addition, many paintings were left unfinished - The Adoration of the Magi, St. Jerome, The Musician, the Virgin and Child with St. Anne and John the Baptist. Listed below are the few paintings that are extant, in chronological order. 47

Madonna Benois (c.1472-1476, Hermitage Museum) (AODC9). 48

The Annunciation (c.1472-1477, Louvre) (AODC11). 49

The Annunciation (c.1473, Uffizi, Florence) (AODC2). 50

47 Numbers are from the catalogue by A.Ottino della Chiesa published as The complete paintings of Leonardo da Vinci, 1985, Harmondsworth: Penguin, and are expressed as (AODC1,2,3...). These references are sources for critical comment on the paintings, and see also K.Clark, 1958.

48 Probably painted in Leonardo's last four years in Verrocchio's studio. This painting was based on a sketch which is in Paris, and was first attributed to Leonardo early in the twentieth century.

49 Once attributed to Leonardo, but now thought to be by Lorenzo di Credi (1458-1537), a painter of the Florentine School, and a fellow pupil with Leonardo in the workshop of Verrocchio. He became Verrocchio's assistant, and then managed the studio. His early work can easily be confused with Leonardo's early work, so similar were their styles (a point made by Vasari).
Madonna and Child with a vase of flowers (or carnation) (c.1474, Alte Pinakotheck, Munich) (AOCC12).

Head of a woman (c.1474, National Gallery of Art, Washington) (AOCC7).\(^{51}\)

Baptism of Christ (c.1476, Uffizi, Florence) (AOCC1).\(^{52}\)

Madonna Litta (c.1480-1481, Hermitage Museum) (AOCC18).\(^{53}\)

Adoration of the Magi (c.1481, Uffizi) (AOCC14).\(^{54}\)

St. Jerome (c.1481-1483, Vatican Museum, Rome) (AOCC13).\(^{55}\)

Portrait of a musician (c.1482-1490, Pinacoteca Ambrosiana, Milan) (AOCC25).\(^{56}\)

Virgin of the Rocks (c.1483-1490 - Louvre) (AOCC15) and Virgin of the Rocks (c.1494-1508, National Gallery London) (AOCC16).\(^{57}\)

\(^{50}\) This picture hung in the Monastery of San Bartolomeo at Monteoliveto near Florence, and was thought to be by Ghirlandaio (1448-1494) until 1869, when it was attributed to Leonardo. Ghirlandaio was a Florentine painter in fresco, who ran a flourishing studio with his two brothers, and one of his apprentices was Michelangelo.

\(^{51}\) Thought to be of Ginevra de’ Benci, a relation and perhaps sister of Leonardo’s young friend Giovanni di Amerigo Benci, who shared his interest in cosmographical studies. It is probable that this painting was originally longer. This portrait was copied by another pupil of Verrocchio showing crossed hands, and the back of the painting shows a truncated wreath. Both pieces of evidence indicate that this painting was cut down by about eight inches.

\(^{52}\) This is a portrait by Verrocchio, and partly by Leonardo who appears to have painted the angel on the left, and parts of the drapery and the mountains behind. It has been attributed partly to Leonardo since 1510.

\(^{53}\) This appears to be a copy of Leonardo’s original which no longer exists, and has been repainted twice; once by a Milanese artist in 1495, and again when it was transferred from panel to canvas in the nineteenth century. Another copy, probably by Boltraffio, is in the Poldi-Pezzoli Museum in Milan.

\(^{54}\) In March 1481 the Monastery of San Donato at Scopeto near Florence commissioned Leonardo to paint an Adoration of the Magi, to be delivered within 24 months. Leonardo left Florence sometime in 1482, without finishing it. The Monastery later commissioned Filippino Lippi to paint a replacement which was completed and delivered in 1496.

\(^{55}\) This painting was reportedly discovered by Cardinal Fesch, the uncle of Napoleon, who found it in two pieces, one half being used as a table top.

\(^{56}\) This unfinished portrait is the only one Leonardo ever painted from life of a man, and may be of Franchino Gaffurio, the court musician and choirmaster of Milan Cathedral.

\(^{57}\) The origins of these two paintings is not entirely clear, and experts disagree on details. On 25 April 1483, Leonardo and the two brothers Evangelista and Giovanni Ambrogio da Predis were commissioned by the Confraternity of the Immaculate Conception in Milan to paint an altarpiece for their chapel, in the church of S. Francesco Grande. Leonardo was to paint the central panel, the Madonna of the Rocks, and seems to have finished it in 1490. This is the painting in the Louvre. The brothers finished painting the framework, and ran out of money.
Lady with an Ermine (c.1485-1490, Museum Narodowe, Cracow, Poland) (AODC27).  

La Belle Ferronnière (c.1495, Louvre) (AODC28).  

The Last Supper (1495-1497, Monastery of Santa Maria delle Grazie in Milan) (AODC19).  

Madonna with the yarn winder or distaff (c.1501) (AODC32).  

The Mona Lisa (1501-1503, Louvre) (AODC31).  

Madonna and Child with St. Anne (c.1508-1510, Louvre) (AODC35).  

before painting the side pieces. The Confraternity offered an extra 25 ducats for the completion of the full altarpiece, but Leonardo appears to have sold the completed central panel for 100 ducats instead. There is a view that it came into the hands of Ludovico Sforza and may have been given away by him either to the French King or the German Emperor as a diplomatic gift. Leonardo then started a replacement. On 27th April 1506, the Confraternity obtained a Court Order which declared the replacement Virgin of the Rocks unfinished, and Leonardo was given 2 years to complete it. This was completed by 18th August 1508. This painting remained in the Chapel of S.Francesco until 1781, then passed through several hands until it reached the National Gallery in London in 1880.  

This is possibly a portrait of Cecilia Gallerani, Il Moro's mistress from 1481 until her marriage in 1491.  

Arguably the most famous painting of the High Renaissance, it had begun to deteriorate as early as 1517. Vasari saw it in 1556, and described it as a “muddle of blots” (C.Clark, 1958, p.146). There have been several unsuccessful attempts to restore it, culminating in a recent restoration attempt using modern technology. Nevertheless it has influenced countless painters, and been greatly admired by artists of the calibre of Rubens and Rembrandt (1606-1669). It has become widely familiar through many reproductions and prints, notably those produced by Raffaello Morgen (1758-1833) in 1800.  

Painted for Florimond Robertet, secretary of state to the King of France, Louis XII. There are a number of copies, and Leonardo may well have painted parts of the best surviving copy, which is in the collection of the Duke of Buccleuch and Queensberry.  

This painting is now referred to as Lady on a Balcony. It is now known to be a portrait of Isabella of Aragon, but was claimed by Vasari to be Madonna Lisa, and so the name persisted. Vasari had never seen the painting - he described it from hearsay as this picture was already in France when Vasari was a child, and he later seems to have been misled by quoting the Anonimo Fiorentino (Anonimo, Fiorentino, 1969). The Anonimo wrote the Codice Magliabechiano, or manuscript of Lives, but it remained unfinished perhaps because Vasari had just published his own Lives of the Artists in 1550, with a revised and enlarged edition in 1568.  

This was originally commissioned as an altar-piece for the Church of the Annunziata which Filippo Lippi declined in favour of Leonardo. By 1501, Leonardo had completed only the cartoon, so the monks gave the commission back to Filippino Lippi, and on his death to Perugino. The final form of the Madonna and Child with St. Anne is the painting in the Louvre. However its development resulted in two cartoons along the way, neither of which were finally painted. There is a cartoon (c.1499) in the National Gallery, London, which Leonardo completed in Milan, and a sketch for this cartoon is in the British Museum. The other cartoon, which Leonardo completed when he was in Florence, is lost, but a copy is in the Esterhazy collection in Vienna. Leonardo was clearly exploring two variations, probably starting with the cartoon now in the National Gallery. There is a reference to this in a letter to Isabella d'Este from her agent in Florence, Fra Pietro da Nuvolaria. He wrote letters to her on the 3rd and 4th April 1501 in which he described the paintings Leonardo was working on. He detailed what sounds like the cartoon for the Madonna with St. Anne now in the Louvre, as it included a description of the lamb which does not appear in the
The St. John (1509, Louvre) (AODC37).  

St. John-Bacchus (c.1513, Louvre) (AODC36).  

The decoration of the Sala delle Asse (Room of the Boards) in the Castello Sforzesco, Milan (AODC24).  

Lost paintings.

From references in Leonardo's 'notes', in correspondence, and from later painted copies, it is clear that other paintings were completed by Leonardo that are irretrievably lost. Some of the major ones are as follows: Leda (c.1503-1506), Salvator Mundi (c.1510-1515), The Battle of Anghiari (1503-1506), Angel of Annunciation, and the Portrait of Isabella d'Este (1499-1500, Louvre). In
addition there are some interesting references in correspondence with Charles d'Amboise. In a letter to Charles d'Amboise, Lord Chaumont in 1508, Leonardo says, "I...hope to be in Milan by Easter and bring with me two pictures in which are two madonnas of different sizes which I have begun for the most Christian King, or for whoever shall please you".72 There are other references which support this, so it is likely that these pictures were completed, and no longer exist. One of them may have been a Madonna of the Cherries, and there is a surviving painting of this which could be a copy of an original Leonardo painting.

There is also a record of two small paintings done for a member of the Papal Court during Leonardo's final stay in Rome between 1513 and 1516, one of a child, the other of a madonna, both of which are now lost.

There are references to two other paintings which Leonardo was commissioned to paint; a Nativity for the Emperor Maximilian, but nothing more is known of this, and a Madonna which was presented to King Matthias Corvinus of Hungary73 by Ludovico Sforza.

Another enigmatic reference occurs in the records of Antonio de' Beatis, the secretary to Cardinal Louis of Aragon, who visited Leonardo in France in 1517. He noted that the Cardinal was shown "three pictures; one of a certain Florentine lady, done from the life, at the instance of the late Magnificent, Giuliano de' Medici;..."74 This is considered to have been the Mona Lisa, but she was not commissioned by Giuliano de' Medici, and Antonio de' Beatis appears to have been mistaken. If Antonio de' Beatis was correct, and was referring to another painting, there are no copies extant to show what the original could have been like.

drawing dated to about 1505, which must have culminated in a finished painting, because several copies exist. In addition, Vasari describes this painting, and confirms that it was owned by the Grand Duke Cosimo.

71 A black chalk drawing survives which is pricked for transfer.
72 See K. Clark, 1958, p.205.
73 King Matthias Corvinus (1440-1490).
Then there are the drawings, which many artists copied and developed into paintings. Leonardo brought several of these drawings to a finished state, but never turned them into actual paintings. A case in point is the Neptune, which was copied by other artists to the extent that it influenced a particular style of art and sculpture. Examples can be found in certain of the fountains in Rome and elsewhere, and this style was to influence artists as great as Raphael and Bernini.75

SCULPTURE

No single surviving piece of sculpture can be proved to be by Leonardo alone. There is a terracotta Virgin and Child in the Victoria and Albert Museum in London, claimed to be by Leonardo, but more probably by Antonio Rosselino.76

There is a stucco relief from Verrocchio’s77 workshop dated to about 1476 in the Jones Collection in London, as well as the Head of an Old Man in the Silberman Collection in Vienna, which is one of several attributed to Leonardo.78

There is a bronze horse with rider in the Szépmûvészeti Mûzeum in Budapest, and similar works in a number of other collections. They are probably later castings from other copies based on drawings of the Battle of Anghiari.

There are the three figures of John the Baptist Teaching with the Levite and the Pharisee above the North door of the Baptistery in Florence. Leonardo may have worked on the figure of the Pharisee, but the group was actually done by Giovanni Francesco Rustici79 and was placed in position in 1511. Leonardo went to Florence for six months in the winter of 1507-8, and it was then that he helped Giovanni Francesco Rustici with these bronzes.

---

77 Verrocchio (1435-1488)
79 Giovanni Francesco Rustici (1474-1554).
An interesting event occurred in 1501 when the Gonfaloniere Piero Soderini\(^{10}\) offered Leonardo a large damaged block of marble which he declined. It was then offered to Michelangelo who carved the David from it three years later.

Leonardo's largest sculptural achievement, the Sforza horse, was started in 1483, but never cast in bronze, and was finally destroyed when used for target practice by French archers in 1500. Luca Pacioli\(^{11}\) said that when cast, the bronze horse and rider would have been about 12 bracci tall (approx. 56 feet/17 metres), and would have weighed 70 tons.\(^{12}\) Ludovico Sforza simply could not afford this amount of bronze at a time of war, especially when he was fighting for his survival.\(^{13}\)

Lomazzo\(^{14}\) claims to have owned a terracotta head of the Child Christ, by the hand of Leonardo, but this is now lost.\(^{15}\)

**ARCHITECTURE**

There is no building that can credibly be claimed to be by Leonardo, and none of his designs appears to have been built. Several designs for churches are in *Manuscript B*,\(^{16}\) which he compiled in 1487-88. They are planned on a centralised design for a church developed by Alberti\(^{17}\) who had based his architectural forms on the circle, considering it to be a perfect form, symbolic of the unity of God and the Universe. Leonardo adopted these ideas, and designed a series of elevations and plans for churches, none of which was ever built. It was Bramante\(^{18}\) who took the idea of the centralised church and applied it in the new St. Peter's in Rome, which was begun in 1506.

---

\(^{10}\) Piero Soderini (1452-1522).
\(^{11}\) Luca Pacioli (1445-1514). Author of a best selling book on counting and arithmetic, and a good friend of Leonardo who illustrated his treatise the *De Divina proportione*.
\(^{12}\) In the Preface to his *De Divina proportione*.
\(^{13}\) An American art patron, Charles Dent, has made Leonardo's horse a reality, some 500 years later. It was crafted by the Tallix foundry in Beacon, New York, and is now in its permanent position in Milan.
\(^{14}\) Giovanni Paolo Lomazzo, 1538-1600. A mannerist painter in Milan, who went blind at the age of thirty-three, and then wrote two famous treatises on art.
\(^{15}\) In his *Trattato dell'arte de la pitura*, (1st ed.), book II, cap. viii p.127. See also K.Clark, 1958, p.207.
\(^{16}\) Manuscript B contains drawings of engines of war and architectural studies, domed churches, and engineering ideas. On folio 42r there is the date 2nd April 1489, and the manuscript runs to 84 sheets. He may have begun this manuscript as early as 1482.
\(^{17}\) Leon Battista Alberti (1404-1472).
\(^{18}\) Bramante (1444-1514).
Not content with the general thinking of his own day, Leonardo also developed far reaching ideas about city planning, which included multi-tiered traffic, and public sanitation.

There is an unusual feature in a building that may be by him, and this is the double spiral staircase at the Palace of Romarantin, near Amboise. Leonardo may have inspired its construction during his final years in France, and what makes this probable is that there is a sketch for such a staircase in his notebooks. 89

Nevertheless, despite his many Architectural sketches and designs, no building stands as a memorial to his creativity; there is no piece of Sculpture that can be claimed indisputably to be by him; the paintings that remain, although of the highest order, are few - some damaged, others unfinished, and some retouched by other hands.

NOTEBOOKS AND DRAWINGS

It is his notebooks and drawings that underpin Leonardo's reputation as being such a remarkable creative genius, and they are astonishing both in range and quality.

The manuscripts that have survived have come down to us in the form of notebooks and single sheets with text and drawings covering both sides. The peculiarity common to them all is the mirror script in which Leonardo wrote from right to left, in both his quick notes and his final or good copies. There are a few instances of his writing left to right, but they are rare. There is a view that Leonardo wrote like this to conceal his work, and that his calligraphic style was a sort of code. This is fanciful as his writing is frequently accompanied by illustrations that present his thoughts quite clearly. He was left-handed, and seems to have developed the dexterity to write from right to left with ease, and for him it must have been a matter of convenience and habit, not concealment.

With a few unimportant exceptions, all Leonardo's 'notes' were written in the last thirty years of his life. He planned a number of treatises and started ordering his 'notes' accordingly, but like many of his

89 Manuscript B, fol.69r. See also C. Pedretti, 1972, *Leonardo da Vinci, the Royal Palace at Romarantin*, Massachusetts, Harvard University Press.
enterprises, this was never completed. After his death, his ‘notes’ became scattered, and less than half have survived. The next chapter turns to the question of what happened to them, to understand how some of them evolved into the *Treatise of painting*. 
4. DEVELOPMENT OF THE TRATTATO DELLA PITTURA

LEONARDO'S LITERARY LEGACY

It is on the importance of Leonardo’s notebooks that a great part of his reputation rests. It is from these ‘notes’ that a treatise on painting was compiled, now called the *Codex Urbinas Latinus 1270*. This chapter considers how this came about, which manuscripts were used, and indicates their present locations. The *Codex Urbinas* was copied many times; what was the role of these copies, and how does the famous *Codex Huygens* relate to them? There are references to an earlier treatise than the *Codex Urbinas*. What is their significance?

Leonardo da Vinci died leaving thousands of pages of ‘notes’, some of them bound into notebooks, and others as single sheet studies on a wide variety of topics. There is no record of the number of pages that Leonardo left, and, of course, there is no knowing how many have been lost, but the pages that have survived amount to more than 5200, written between 1488 and 1519, and it is surmised that there were originally more than double that number. It is these surviving ‘notes’ that constitute a monument to Leonardo as remarkable as the few great paintings that have survived. Yet none of his work was published in his own lifetime, and it was not until 1651 that any of it appeared in print. Leonardo’s *Treatise of painting* first appeared in Italian and French in the Du Frésne editions of 1651, more than 130 years after his death. Before that, his ideas circulated in manuscript form and in copies amongst his students and other artists and strongly influenced them. His influence began to spread through their treatises, notably those of Pacioli, Serlio⁹⁰ and Lomazzo.

Leonardo seems to have been familiar with the four most important art treatises of his day, all of which influenced him. The first one was the *Il libro dell’arte* by Cennino Cennini,⁹¹ which appeared in manuscript in 1400. Leone Battista Alberti’s *Della pittura* appeared in manuscript in 1436. Then came

---

⁹⁰ Sebastiano Serlio (1475-1564) completed seven books on Architecture and Perspective.
⁹¹ Cennino Cennini (c.1370-c.1440).
Filarete's 92 De architettura written between 1451 and 1464. There are differing views on whether this treatise influenced Leonardo, but there is evidence to suggest it was likely, and there was a manuscript copy in the Sforza Library. This was followed by Piero della Francesca's 93 De prospectiva pinghiendi in 1485.

A surprising aspect of the Renaissance is the number of artists who compiled workbooks and wrote treatises. They read each other's manuscripts, and borrowed each other's ideas which later appeared in their own work. Leonardo developed the ideas of his predecessors, and his students and successors borrowed from him, especially as his manuscripts in circulation were regarded as important and outstanding even at that time. The more important of the works which appeared before and during Leonardo's time, and shortly thereafter are as follows: 94

1400 Il libro dell'arte by Cennino Cennini. 95
1436 Leone Battista Alberti's Della pittura.
C.1447 Lorenzo Ghiberti's 96 Commentarii, books I to III.
1452 Alberti's De re aedificatoria which he wrote between 1443 and 1452. 97 Pedretti 98 suggests that Leonardo knew of Alberti's De re aedificatoria through the treatises of Antonio Filarete and Francesco di Giorgio, 99 and he acquired his own copy.
1464 Alberti's De statua.
1451-64 Antonio Averlino, called Filarete, is thought to have written a Treatise on architecture (De architettura), for Francesco Sforza. The treatise was an imaginary dialogue with Francesco Sforza and Averlino Filarete, the architect, who had been commissioned to design a city called 'Sforzinda'.

92 Filarete (1400-1469).
93 Piero della Francesca (c.1415-1492).
94 Except where specified, the following references can be found in J. Turner (ed.) 1996, The dictionary of art [DOAJ], and in H. Osborne, 1970.
95 Mrs. Merrifield's translation is reviewed, and his techniques are compared with Leonardo's, in [review of] "Cennino Cennini on painting", Blackwood's Edinburgh magazine, 1845, vol.57 (356), June, pp.717-730.
96 Lorenzo Ghiberti (1378-1455).
97 The De re aedificatoria was influenced by and based on the De architectura of Vitruvius. See also R. Wittkower, 1973, Architectural principles in the age of Humanism, London: Academy Editions, p.3.
98 In C. Pedretti, 1972.
99 Francesco di Giorgio (1439-c.1501).
Piero della Francesca's treatise on Perspective, *De prospectiva pingendi*, and then his treatise on Geometry called *The five regular bodies (De quinque corporibus regularibus)*, which was written after 1482 and published at the end of the fifteenth century. This latter treatise strongly influenced Luca Pacioli, and many of its ideas appear in the *De divina proportione* of Pacioli, which Leonardo illustrated.

Vitruvius\textsuperscript{100} works on Architecture.

Francesco di Giorgio wrote his *Treatise of architecture, engineering and the military arts* (*Trattato di architettura civile e militare di Giorgio Martini*). Leonardo met Francesco di Giorgio in 1490 and they rode together from Milan to Pavia to advise on the building of the new cathedral. Leonardo had his own copy of di Giorgio's unfinished treatise and annotated it, and it is now in the Laurentian Library known as the *Codex Ashburnham 361*.\textsuperscript{101} It contains plans of churches and drawings of machinery and weapons, and may well have been the inspiration for Leonardo's own volume, *Manuscript B*.

c.1500 Bramante completed his *Pratica*, which has not survived but was referred to by Antonio Doni in his *Disegno, la seconda libreria*\textsuperscript{102} and was also referred to by Vasari in his *Lives*\textsuperscript{103}.

Pomponius Gauricus\textsuperscript{104} wrote his treatise *De sculptura* which was published in Florence in 1504, in which he mentions that Leonardo was taught by Verrocchio.

Pelerin's\textsuperscript{105} *De artificiali perspectiva*.

Luca Pacioli\textsuperscript{106} completed his treatise, *De Divina proportione*, which was illustrated by Leonardo. In the foreword to this treatise dated 9th Feb 1498, Luca Pacioli mentions a debate or "duel of words" which occurred in the Castello Sforzesco. This could well have been the basis for the *Paragone* in Leonardo's *Trattato della pittura*\textsuperscript{107}.

The year in which Leonardo died.

Albrecht Dürer\textsuperscript{108} completed his *Underwyssung der messung*,\textsuperscript{109} his *Vier bucher von menschlicher proportion* was published after his death in 1528. Dürer wrote a letter on the

\textsuperscript{100} Vitruvius (later 1\textsuperscript{st} century BCE).
\textsuperscript{102} Venice 1551, p.44.
\textsuperscript{104} Gauricus (c.1482-c.1528).
\textsuperscript{105} Pelerin (c.1435-1524).
\textsuperscript{106} Luca Pacioli may have been at one time a pupil of Piero della Francesca (J.J. O'Connor and E.F. Robertson, *Luca Pacioli* [Online], available: http://www-history.mcs.st-andrews.ac.uk/history/Mathematicians/Pacioli.html).
\textsuperscript{107} K.T.Steinitz, 1958, p.43.
\textsuperscript{108} Albrecht Dürer (1471-1528).
proposed dedication in this book in which he said, "...I give praise to the Italians for their pictures of nudes, and most of all for their perspective...".\textsuperscript{110}

Sebastiano Serlio started publishing his volumes on Architecture and Perspective and incorporated many of Leonardo’s theories of perspective in them, which he had read in manuscript copies, one of which was owned by Benvenuto Cellini.\textsuperscript{111} Serlio’s second volume, \textit{On perspective}, appeared in 1551.

Varchi’s\textsuperscript{112} \textit{Disputa della maggioranza della arti.}

The \textit{Dialogo della pittura} of Paolo Pino.\textsuperscript{113}

Antonio Francesco Doni’s\textsuperscript{114} \textit{Disegno partito in più ragionamenti ne’ quali si tratta della pittura.}

Michelangelo Biondo’s \textit{Della nobilissima pittura.}

Only in this year did Vasari complete his \textit{Lives}, which did so much to re-establish and perpetuate Leonardo’s reputation.

The \textit{Dialogo della pittura intitolato l’Aretino} of Lodovico Dolce.\textsuperscript{115}

Vincenzo Danti’s\textsuperscript{116} treatise on proportions, the \textit{Trattato delle perfette proporzioni.}

Benvenuto Cellini, who owned one of Leonardo’s manuscript copies, published his \textit{Trattati del l’oreficeria e della scultura.}

Daniele Barbaro\textsuperscript{117} wrote a treatise on perspective, amongst several other titles, including his famous commentaries on Vitruvius.\textsuperscript{118}

Palladio’s\textsuperscript{119} \textit{Quattro libri dell’architettura.}

Cristoforo Sorte\textsuperscript{120} wrote his \textit{Osservazioni della pittura.}

Paolo Lomazzo’s first treatise, that borrowed a great deal from Leonardo’s manuscripts. This was the \textit{Trattato dell’ arte de la pittura},\textsuperscript{121} which spread Leonardo’s ideas almost seventy years before the first printed edition of the \textit{Trattato della pittura.}

\textsuperscript{109} Dürer explained the new theory of perspective that he had learnt in Italy in Book IV of his treatise on Geometry, published in 1525.


\textsuperscript{111} Benvenuto Cellini (1500-1571).

\textsuperscript{112} Varchi (1503-1565).

\textsuperscript{113} Paolo Pino (fl.1534-1565). The first treatise on painting to be written in Venice. See M.Barasch, 1985, p.241.

\textsuperscript{114} Antonio Francesco Doni (1513-1574).

\textsuperscript{115} Lodovico Dolce (1508-1568).

\textsuperscript{116} Vincenzo Danti (1530-1576).

\textsuperscript{117} Daniele Barbaro (1514-1570).

\textsuperscript{118} R.Wittkower, 1973, p.66.

\textsuperscript{119} Palladio (1508-1580).

\textsuperscript{120} Cristoforo Sorte (c.1506-after 1594).
The *Il Riposo* of Raffaello Borghini\textsuperscript{122} - the third and fourth books contain Lives.

Armenini,\textsuperscript{123} *De veri precetti della pittura*\textsuperscript{124}

Paolo Lomazzo then wrote the *Idea del tempio della pittura*\textsuperscript{125}

In this list there are those who preceded Leonardo and influenced him, there are his contemporaries and friends, his students, those that borrowed from him, and those who were later influenced by his work. The greatest omission is Leonardo himself.

There is no clear explanation why none of his 'notes' was published in his lifetime, but one hypothesis concerns Vasari and the first edition of his *Life of Leonardo* published in 1550. In it Vasari said, "Leonardo was of so heretical a cast of mind that he conformed with no religion whatever, accounting it, perchance, much better to be a philosopher than a Christian."\textsuperscript{126} This sentence does not appear in the second edition of 1568. This appears to me to be an unlikely explanation for Leonardo’s (and later Melzi’s) failure to see his work published.

A more probable reason was the sheer practical difficulty of compiling and ordering Leonardo’s 'notes'. As his studies expanded, and his subjects widened, he began talking of them as different treatises, but he was faced with an ever expanding 'encyclopaedia' of knowledge. At times, he would return to his earlier studies and add more. He later added different material wherever there was space. The result was that material became repetitive and was scattered throughout his ‘notes’. Although he referred to particular sections as treatises, they were only partially consistent and none of them was complete.

During his second Milanese period, Leonardo wrote:

---

\textsuperscript{122} Lomazzo’s *Trattato dell’arte della pittura* (published in 1585) was a large work of 700 pages. It was translated by Richard Haydocked and published in Oxford in 1598. Haydocked approached Nicholas Hilliard to write on illuminating, or limning, and part of the resultant treatise appears to be a summary of Lomazzo’s *Trattato*. See M. Barasch, 1985, p.272).

\textsuperscript{123} Raffaello Borghini (c.1537-1588).

\textsuperscript{124} Armenini (c.1525-1609).

\textsuperscript{124} On page 132 he refers to Leonardo’s small drawings as superior to anything else in science and wisdom. Also see M. Barasch, 1985, p.240.

\textsuperscript{125} The *Idea dell’tempio della pittura* is really a short version of his ideas in the *Trattato*.
"This is to be a collection without order, made up of many notes which I have copied for the purpose, in the hope of arranging them in their proper place, according to subject. But I think that before I achieve this I shall be liable to repeat the same thing more than once, and for this the reader should not blame me, as the topics are numerous and one’s memory is not able to recall them so precisely as to say ‘I will not treat of this since I have done so before’. 127 This repetition is evident in the Treatise of painting, where sometimes points are repeated in a slightly different way creating confusion between them.

Leonardo’s thinking and working methods were based on what he called “the observation of nature”. This was not a new idea, but Leonardo gave it particular emphasis as he saw observation, and hence Art, as a way of attaining knowledge of the world. He wrote, “it is my intention first to cite experience, then to demonstrate through reasoning why experience must operate in a given way”. 128 He did so to an astonishing extent, recording his observations in drawings with notes written in mirror script. 129 He studied anatomy so that he could better depict the human body; his early drawings of plants and landscapes led on to studies of botany and geology; he studied birds in flight, which led to studies of the movement of water and hydraulics, and then mechanics and optics, compiling thousands of pages of ‘notes’ as he did so. Each new area of study widened into adjacent fields, or led backwards into more primary fields of study. This in turn provided him with forward insights into the implications and possible development of his ideas, in which he anticipated the future in some instances by as much as three hundred years.

127 From Codex Arundel fol.263v.
128 Manuscript E fol.55r.
129 This view is contested by LynnThorndike, who points out that Leonardo was himself not always rigorous regarding knowledge from experiment and the observation of nature. Several of his ‘observations’ repeated mistakes found in earlier medieval texts. This suggests that Leonardo clung to his inheritance from the Middle Ages more strongly than is generally acknowledged; see L.Torndike, 1941, A history of magic and experimental science, New York: Columbia Univ. Press.
This spirit of enquiry through art led into wider and wider fields of scientific discovery. As the volume of Leonardo's 'notes' increased, so his focus on painting diminished, and his interest in science and mechanics intensified. In his later years, Leonardo's studies became increasingly wide-ranging and scientific, and he used his artistic genius to illustrate them.

As McCurdy says, "This habit of scientific investigation in inception subsidiary to the practice of his art, so grew to dominate it as to alienate him gradually from its practice to the study of its laws, and then of those which govern all created Nature. The fruits of these studies lay hidden in manuscripts of which the contents have only become fully known within the last half century"\(^\text{120}\)

And so Leonardo died, in 1519, with his thousands of pages of 'notes' disordered, incomplete and unpublished.

**THE CODEX URBINAS**

After Leonardo's death, a treatise was at last compiled from his 'notes', and we need to go back to the final years of his life to trace its development.

Francesco Melzi became Leonardo's apprentice in early adolescence, and then his constant companion. He accompanied him on his disastrous trip to Rome in 1513, and then finally left Italy with him and went to France in 1516. King Francis I of France\(^\text{131}\) had given Leonardo life tenure of the Chateau Cloux near Amboise and there he stayed till his death in 1519.

Francesco Melzi, now about 28 years old, returned to Italy. He had inherited all Leonardo's manuscripts, and brought them back to his villa in Vaprio d'Adda (with the exception of some anatomical studies that Leonardo had left in the hospital of Santa Maria Nuova in Florence when he went to France in 1516). Melzi lived a further 49 years, dying at the age of 77 in 1568. In that time Melzi compiled a treatise on painting from material scattered throughout Leonardo's 'notes', with the

---

help of at least one assistant for the actual transcribing of the material. He picked out all the passages he thought related to painting, and marked them with an ‘o’, then had them copied into a book, which he had divided into eight parts. There are blank pages at the end of each section that suggest he did not complete his selection, and intended adding more.

It is this ‘Melzi’ compilation, known as the Codex Urbinas Latinus 1270, now in the Vatican Library, that is considered the earliest source of all other manuscript copies of Leonardo’s ‘notes’ on painting. It is a selection of 944 paragraphs or sections from Leonardo’s original notebooks. Today three-quarters of this material cannot be traced in extant manuscripts, so the original sources have to be assumed lost.

The Codex Urbinas ends on Folio 231r and 231v with a list compiled by Francesco Melzi of the original manuscripts he had used in his compilation, with his own code marks on them. The list refers to eighteen manuscripts, and when Melzi’s marks are related to extant manuscripts, it is clear that only the following sources have survived:

1. Windsor 12,604
2. Codex Trivulzianus (c.1487-1490)
3. Manuscript A (c.1492)
4. Manuscript Ashburnham 2038 (c.1492)
5. Manuscript L (c.1502)
6. Manuscript F (c.1508)
7. Libro A (c.1508-1515)

---

131 King Francis I of France (1517-1547).
132 This is only one page of a lost manuscript from Leonardo’s early period, about 1487-1490.
133 From July 1502 to March 1503, Leonardo travelled over much of central Italy, through Emilia and the Marches in his capacity as Chief Inspector of Military Buildings for Cesare Borgia. This entailed extensive travel through Umbria, Romagna and Tuscany, and formed the basis for many of his notes on architecture, fortifications and cartography. This was when he drew the beautiful maps that are now at Windsor, such as the map of Imola. Leonardo recorded this expedition in a diary, which is now known as Manuscript L.
134 This manuscript has a note claiming it was begun in Milan on Sept. 12th 1508, and deals largely with the study of water.
Manuscript G (c.1510-1515)

Manuscript E (Libro B) (c.1513-1514)\textsuperscript{136}

Codex Madrid II (1503-1505)\textsuperscript{137}

There is a problem relating to the small circles which Melzi used to mark the passages he intended to include in his compilation. It seems he slashed them as a check when they had been transcribed. Some of Melzi's circles are not slashed yet the notes appear in the Codex Urbinas. Some, however, are slashed and do not appear in the Codex Urbinas. How does one account for this? Can it be that a signature or section is missing from the Codex Urbinas? Pedretti suggests that this may be the explanation, in which case the missing signature could be from the beginning of Book Three, where the title page is missing.\textsuperscript{138}

Other surviving manuscripts contain notes on painting, which Melzi did not use in the compilation of the Codex Urbinas, although it is probable he intended doing so. These are as follows:

Manuscript C (c.1490)\textsuperscript{139}

Manuscripts H1, H2, and H3 (c.1493-1495)

Codices Forster I, II and III (c.1493-1497)\textsuperscript{140}

Manuscript I (c.1497-1518)

Codex Arundel (1508)\textsuperscript{141}

Codex Atlanticus (c.1478-1518)

\textsuperscript{135} Both Libro A and B were used by Melzi in compiling the Codex Urbinas. Libro B has survived as Manuscript E, but Libro A was assumed lost until C.Pedretti realised that most of it had been copied into the Codex Urbinas, and the rest into the Codex Leicester, now named the Codex Hammer. He was able to reconstruct it.

\textsuperscript{136} This manuscript deals with plants and trees.


\textsuperscript{138} C.Pedretti, 1965.

\textsuperscript{139} This manuscript on light and shade contains a note that says, "on the 23rd day of April 1490, I commenced this book...".

\textsuperscript{140} Codices Forster I, II and III were begun in 1505, although there is a view that they date from 1493-1497.

\textsuperscript{141} The Codex Arundel Manuscript 263 in the British Museum has at the beginning "begun at Florence in the house of Piero di Braccio Martelli, on the 22nd day of March, 1508". However there is a view that this could have been started as early as 1495. This Codex was acquired in Italy by Thomas Howard, Earl of Arundel, and was presented to the Royal Society by his grandson, Henry Howard in 1681. It was transferred to the British Museum in 1831.
After Leonardo's death, the major difficulty inhibiting publication was the disordered state of his manuscripts, and the consequent difficulty of compiling the material. A more disastrous problem occurred after Melzi's death, which was the dispersal of the manuscripts before copies were made. Early eye-witness accounts and cross-checking with extant material indicate a great deal has been irretrievably lost.

The Life in the 1721 edition of the Treatise of painting is based on Mazenta's\textsuperscript{143} Memorie and outlines what happened. Francesco Melzi died in 1568, and all Leonardo's manuscripts then passed into the hands of his son and heir, Orazio Melzi, who had absolutely no idea of their value. Some time later, Lelio Gavardi d'Asola, a tutor to the Melzi family, noticed that these manuscripts were neglected and left in the attic. He stole thirteen of them intending to sell them to the Grand Duke of Tuscany in Florence, but was frustrated in his plan because of the Grand Duke's death in 1587. Gavardi then went to Pisa to meet a fellow student called Giovane Ambrogio Mazenta. Mazenta pricked his conscience about taking the manuscripts, took them from him and returned them to Orazio Melzi. Orazio then confirmed his lack of interest by letting Mazenta keep them, claiming he had many more. Word of this soon got round, and the manuscripts began to disperse.

One person to hear of them was Pompeo Leoni,\textsuperscript{144} a sculptor working for the King of Spain, who approached Orazio Melzi for whatever Leonardo manuscripts he still had. Part of his offer included the claim that he could arrange a seat for him in the Senate of Milan in exchange for manuscripts. This

\textsuperscript{142} This was subsequently renamed the Codex Hammer after Armand Hammer bought it.
\textsuperscript{143} Mazenta (1565-1635).
was heady stuff in exchange for material that Orazio had clearly considered worthless. It must be assumed that few of the manuscripts were still in Orazio’s possession at this stage, because he approached Mazenta, who still had the thirteen manuscripts stolen by Gavardi, asking for their return. Mazenta returned only seven, which Orazio Melzi handed over to Pompeo Leoni. The other six stayed with Mazenta, who in 1600 gave what is now known as Manuscript C to Cardinal Federico Borromeo. This is a manuscript on light and shade. Mazenta also gave a manuscript to the Duke of Savoy, and another manuscript to the painter Ambrogio Fugino.\textsuperscript{145} Both are now lost.

The remaining three eventually ended up in Pompeo Leoni’s hands.\textsuperscript{146} He divided his loose ‘notes’ into two halves, one roughly on technology, the other on anatomy and artistic studies. The former became the Codex Atlanticus in Milan, so called because of its size; the latter finally ended up in the Royal Library at Windsor. There are doubts as to which parts of his collection he split up and re-mounted. It was thought that he had destroyed some of Leonardo’s actual notebooks to compile the Codex Atlanticus, but now it seems that he mounted only loose sheets in his possession, and deserves praise for effectively preserving them. Further detail about the dispersal of Leonardo’s manuscripts at this stage is hazy, but it is clear that an enormous amount of material was split up and lost.

It will never be known how many manuscripts have been lost, but there are some clues. Pompeo Leoni marked his collection with numbers, and the highest number on an extant manuscript from his collection is 46. There may well have been higher numbers, now lost, and it is possible that there were more, but there can be no certainty about this. Only nineteen of these manuscripts have survived.

Another list of interest is in the Codex Madrid II. On folios 2v and 3r appear the titles of 116 books that Leonardo left in Florence when he went to Piombino in 1504, and two of them appear to be

\textsuperscript{144}Pompeo Leoni (1533-1608).
\textsuperscript{145}Ambrogio Fugino (1548-1608).
\textsuperscript{146}Pompeo Leoni returned to Italy from Spain in 1582, and must have acquired the manuscripts sometime between then and 1590 when Lomazzo mentioned the sale in his Idea del tempo della pittura p.17.
original manuscripts of his own. But on the next folio, 3v, is a list of books itemized by size, and not by title. They add up to fifty volumes, and could well refer to original manuscripts.

The dispersal of the original manuscripts after Francesco Melzi’s death did not of course leave the *Codex Urbinas* untouched. It too disappeared. Nothing is known of its whereabouts for the next seventy years. Then Francesco Maria della Rovere II,\(^{147}\) the last Duke of Urbino, died in 1631. Five years before his death, in 1626, he had ceded his lands to Pope Urban VIII. This meant that Urbino, with its three hundred odd vassal towns and villages, became part of the Papal States. At the same time, the Duke’s magnificent library was left to the Roman Curia on condition that it remained with him until his death. The library was then transferred to Urbino from the small town of Castel Durante, and was left in a store-room in twelve crates. Nine years later, in 1640, the manuscript that would become known as the *Codex Urbinas Latinus 1270* was discovered in one of the crates. The rest of the Duke’s library was transferred to the Vatican library in 1657. How the *Codex Urbinas* came into the Duke’s hands remains a mystery.

**WAS THERE AN EARLIER TREATISE ON PAINTING BY LEONARDO?**

An intriguing problem is that there are several references to a treatise on painting completed by Leonardo, which of course would pre-date the *Codex Urbinas*.

The first reference was by the mathematician Luca Pacioli, who wrote in the *De Divina proportione*, “Leonardo with painstaking care has finished his praiseworthy book on painting and human motion.”\(^{148}\) Leonardo was a good friend of Luca Pacioli and drew the diagrams for him in the *De Divina proportione*.

Another reference was by Giorgio Vasari, who wrote, “So also there are in the hands of..., a painter of Milan, some writings of Leonardo, in characters written with the left hand backwards, which

\(^{147}\) Francesco Maria della Rovere II (1549-1531).

38
deal with painting and the methods of drawing and colouring. Not long ago, he came to Florence to see me, wishing to print this work, and took it to Rome to achieve this". Vasari did not mention the name of this artist, but it is thought that he was either Aurelio Luini, the son of Bernardino Luini (who may have worked with Leonardo during his second stay in Milan from 1506 to 1513), or Paolo Lomazzo.

Vasari, in speaking of the equestrian statue of Francesco Sforza, said, "Also lost is a little wax model which was held to be perfect, together with a reference book which Leonardo composed on the anatomy of horses". And he later said, "Because of Leonardo we have a deeper knowledge of human anatomy and the anatomy of the horse. And because of his many wonderful gifts ... his name and fame will never be extinguished."

Another mention is by Benvenuto Cellini who referred to a manuscript he had bought in 1542, and described it as a book, "of great excellence and beautifully done after the admirable genius Leonardo...I found in it among other amazing subjects a discourse on perspective...The aforesaid Leonardo had found the rules and explained them with such a facility and order that they were comprehensible to everyone who saw them". This manuscript copy owned by Benvenuto Cellini may have included a Treatise on perspective by Leonardo that is now lost. Cellini then described how Bastiano Serlio wished to read the same material, and use it in his second book about Architecture, On perspective, which appeared in 1551.

Another reference concerns Giovanni Paolo Lomazzo who wrote "...Leonardo da Vinci in his book which I read some years ago which he wrote with his left hand on request of Lodovico Sforza,

---

149 In the introductory letter (addressed to Ludovico Sforza) in his book De Divina proportione, dated February 9, 1498. 
151 Lomazzo claims that Aurelio Luini had a book of about 50 caricatures drawn by Leonardo in red chalk, as well as owning the cartoon of the Virgin and Child with St. Anne and the Infant St. John, which he may have bought from Francesco Melzi's estate. See [DOAJ] vol.19, p.784. 
152 Bernardino Luini (1480-1532). 
Duke of Milan,..." There is doubt that Lomazzo could have seen such a book. He was born in 1538, and Lodovico Sforza was overthrown in 1499. Leonardo left Milan in the same year, at the end of his first stay there, and surely would have taken the treatise with him. His second period in Milan was from 1506 to 1513. There was no mention of such a treatise in the manuscripts inherited by Francesco Melzi after 1519. Lomazzo also referred to Leonardo and his "various drawings of whom are in the hands of several owners, and especially in the house of Francesco Melzi, a gentleman of Milan, his disciple, in addition to the anatomy of the horse that he made." Later he wrote, "But above all writers Leonardo da Vinci is worthy of note; he taught the anatomy of human bodies and of the horse which I have seen in the home of Francesco Melzi, drawn divinely by his hand".

Antonio Franchi recalled reading a manuscript by Leonardo when he was a young painter in Florence. He said, "for in this form it circulated in the hands of the studious painters before it was printed".

The above comments could have been made after seeing fragments of Leonardo's notes or Melzi's transcription and confusing them when remembered many years later. Some of the comments could have been made after seeing fragments of Leonardo's own notes when Melzi had transcribed them, and after they had been split up and passed into subsequent hands. There can be no certainty about this, but the balance of probability is that faulty recollection and circulated fragments are the source of

---

156 G.P. Lomazzo, 1585, Trattato dell'arte della pittura . . . , Milan.
157 G.P. Lomazzo, 1585. In a later reference, G. Uzielli commented in 1869 on Rubens' work, Osservazioni di fisionomia, which had been burnt in a fire in 1720. He claimed that Rubens discussed Leonardo's studies of human and equine anatomy, having seen the original drawings and manuscripts in the house of Pompeo Leoni. Whether this referred to existing notebooks, or a separate treatise, remains unanswered. Rubens visited Pompeo Leoni sometime between 1600 and 1606, and this visit was recorded in R.de Piles, 1699, Abrégé de la vie des peintres, avec des réflexions sur leurs ouvrages, et un traité du peintre parfaut, de la connaissance des dessin, de utilité des estampes. Paris, p.168. See also L. Leinat1, 1956, Leonardo da Vinci, New York: Reynal, p.390.
158 In the Idea del tempio della pittura of 1590. See L. Leinat1, 1957, Comparative anatomy, Leonardo da Vinci, New York: Reynal & Co., p.390. E. McCurdy states that according to both Vasari and Lomazzo, Leonardo had finished two early treatises; the Il libro de pittura et movimenti humani, and one on the anatomy of the horse which he had written as part of his planning and design for the Sforza horse. See Preface to E. McCurdy, 1906, p.54.
159 Antonio Franchi (1634-1709).
160 In his Teorica della pittura, 1739.
recorded comments at the time. As far as is known Leonardo never managed to compile any of his work into a complete treatise, although he referred to particular sections as treatises. It seems likely that they were only partially consistent and never complete. If it is true that he did complete a treatise, which was seen by other artists of the day, it is now sadly lost.

Although there does not seem to have been a complete compilation of a Treatise of painting by Leonardo, what he envisaged can be fairly closely surmised by virtue of the following.

Firstly Melzi was a constant companion to Leonardo and would have known very well what he intended. In addition the surviving notes by Leonardo in the various manuscripts are obviously meant to be brought together in a logical order. We also know that Leonardo intended such a treatise because Luca Pacioli, Paolo Lomazzo and Vasari referred to it as noted above. In addition, Leonardo expressed his intention to produce a 'libro di pittura' in three places in his later 'notes'.

Luca Pacioli's comment that "Leonardo with painstaking care has finished his praiseworthy book on painting and human motion" suggests that there was a treatise completed by 1498. However we know that a large part of the 'notes' for the Treatise of painting were written after that date. Pacioli must have seen another codex, earlier and less ambitious. Ludwig Heydenreich comments that Luca Pacioli could have seen the Manuscript Ashburnham 2038 which is now in the Bibliothèque Nationale in Paris. This contains material on painting and human motion, and dates from 1490-1495. Heydenreich also suggests that this early manuscript could be the same one that both Lomazzo and Vasari saw.

---

161 Windsor 19,076, Codex Atlanticus 181 r-a, and 79 r-c.
162 In the De Divina proportione.
WHAT HAPPENED TO THE ORIGINAL MANUSCRIPTS?

In 1603, the famous Cardinal Federico Borromeo\textsuperscript{165} founded the Ambrosian Library\textsuperscript{166} in Milan, and this was to become the home of an astonishing collection of Vinciana. In 1609 he deposited \textit{Manuscript C} there, the so called \textit{Treatise of light and shade}, which he had received from Mazenta. The Ambrosian then acquired a copy of an abridged version of the \textit{Codex Urbinas} from the library of G.V.Pinelli, known as the \textit{Codex Pinellianus}.

Pompeo Leoni died in 1610, leaving his collection to Polidoro Calchi. Sometime between 1615 and 1632, Calchi sold this collection to Count Galeazzo Arconati,\textsuperscript{167} who gave it to the Ambrosian Library in 1637, and it is now known as the Arconati Donation.\textsuperscript{168} This consisted of eleven manuscripts written by Leonardo, and one by Luca Pacioli. Count Galeazzo Arconati's donation was to include the \textit{Codex Atlanticus}, \textit{Codex Trivulzianus} and the \textit{Manuscripts A,B,E,F,G,H,I,L and M}. The arrangement was that these would remain with Arconati until his death. When the donation was eventually given effect, it was found that the \textit{Codex Trivulzianus} had been replaced with \textit{Manuscript D}. In 1674 the Ambrosian enlarged its collection further with \textit{Manuscript K}, a gift from Count Orazio Archinti.

It is astonishing that so many of the extant manuscripts that Melzi used in compiling the \textit{Codex Urbinas} ended up in the Ambrosian through the Arconati donation. This remarkable collection was to experience a sudden change of circumstance. In 1796 Napoleon entered Milan, and on the pretext that

\textsuperscript{164}See introduction to Leonardo da Vinci, 1956, \textit{Treatise on painting, <Codex Urbinas Latinus 1270>} p.xxiii.

\textsuperscript{165}Cardinal Federico Borromeo (1564-1631).

\textsuperscript{166}The building of the Ambrosian started in 1603, and it was to become the first public library in Italy. However it only opened its doors to the public for the first time on 10th December 1609. See M.Burton, 1937, \textit{Famous libraries of the world: their history, collections and administration}, London, Grafton, p.254. See also J.Dalton, \textit{Notes and queries}, 1869, vol. 4, 4\textsuperscript{th} S. (101), 4 Dec, p.472, "Cardinal Federigo Borromeo founded the Ambrosian College, and appointed sixteen doctors to teach all the fine arts and sciences gratuitously: to this noble establishment he joined the Ambrosian Library, and opened it to the public under the title of 'Bibliotheca Ambrosiana'. It is said to contain more than 40,000 volumes and 15,000 Mss".

\textsuperscript{167}Count Galeazzo Arconati (1592-1648).

\textsuperscript{168}See J.Dalton, 1869, p.472, "...mentions that the most valuable treasure in the library was a manuscript collection, in 12 vols. Folio, of various works of Leonardo da Vinci, consisting of drawings, designs, etc. These had been presented to the library by a citizen of the name of Galeas Arconati, who generously refused vast sums for this precious deposit. To secure its possession to his country, he consigned it to the Ambrosian Library, as to an inviolable sanctuary. The reverend gentleman states that this collection was torn from the Milanese by the French, and 'sent off, lost and jumbled in the common mass of plunder, to Paris'."
"all men of genius are French", he transferred the Ambrosian collection of Vinciana to France. The Codex Atlanticus went to the Bibliothèque Nationale in Paris, and the other Leonardo manuscripts went to the Institut de France. In 1815 the Codex Atlanticus was returned to the Ambrosian,\textsuperscript{169} but the other twelve manuscripts remained in Paris.

WHERE ARE THE MANUSCRIPTS NOW?

The important manuscripts are in England, France, Spain, Italy, and America, with scattered folios in private collections across Europe.\textsuperscript{170}

In ENGLAND, there are:

The Drawings at Windsor which number approximately 600 on 234 folios. These are the Dell' Anatomia Fogli A & B, and the Quaderni d'Anatomia I-VI, and separate sheets that passed from Lord Arundel into the Royal Library.

These manuscripts, as their names suggest, are mainly notes and illustrations of the human figure. Anatomical Manuscript B is dated April 2nd, 1489, on folio 42r.

Their provenance is not clear, but it is thought that they were largely the part of Pompeo Leoni's collection that ended up in Spain. It is known that some had come from Pompeo Leoni's collection, because one of them has a note on it which reads 'Disegni di Leonardo da Vinci Restaurati da Pompeo Leoni'. After his death, they passed into the hands of Don Juan de Espina. An agent later bought them for the collector Thomas Howard, Earl of Arundel,\textsuperscript{171} and brought them to England between 1625 and 1630. They are known to have been part of Lord Arundel's collection, as three were copied and

\textsuperscript{169} A typical reference to the Codex Atlanticus being in the Ambrosian appeared in Blackwood's Edinburgh Magazine in 1861: "Folio volumes contain the drawings of Leonardo in Milan; and no forms of human face, whether in beauty or caricature, seem to have escaped the keenness of his observation ..." [review of] "The Art-student in Rome", 1861, Blackwood's Edinburgh Magazine, 90 (551), Sept. p.386.

\textsuperscript{170} Sources for the following references come from Leonardo da Vinci, Reynal & Co., New York, published in 1956, especially the section by E.Carusi, "Leonardo's manuscripts", pp.157-162.

\textsuperscript{171} Thomas Howard, Earl of Arundel (1585-1646).
engraved by Wenceslaus Hollar\textsuperscript{172} sometime between 1645 and 1651 when they were still in the Arundel collection, and they bear the inscription ‘Ex collectione Arundeliana’.\textsuperscript{173} (Hollar worked for Lord Arundel from 1636 to 1641). They subsequently entered the Royal Collection, though not all at the same time. It seems that most were part of the Royal Collection at Windsor by 1690.

Constantine Huygens\textsuperscript{174} noted in his diary on the 1st September 1690 that he was shown a book of Leonardo’s drawings by Queen Mary II.\textsuperscript{175} It seems that Charles I had placed that book in a chest at Kensington, and it was found there by Richard Dalton,\textsuperscript{176} the King’s librarian. It is not known how Charles I acquired Leonardo manuscripts, but there is a reference to it that goes back to about 1639.\textsuperscript{177} This earliest reference is intriguing in that it appears in three sources; in the Ms. Granay (fol.115v), in Manuscript H 227 Inf., and in Manuscript H229 Inf (fol.18). This reference came about when Cassiano dal Pozzo sent 32 chapters to Galeazzo Arconati for checking against his manuscripts in about 1639, and Arconati was able to compare 17 of them. He noted in these sources that he couldn’t compare the other 15 chapters, as they formed part of treatises which had passed into the possession of the King of England.

Another reference was an inventory of Leonardo’s drawings in the Royal Collection which was compiled after 1737. This established that by 1760, when George III\textsuperscript{178} became King of England, almost all the present collection was in the possession of the English Crown.

A further reference is a note that Richter found in the British Museum which states that some drawings of Leonardo da Vinci were delivered for Her Majesty’s use in the year 1728, without any other

\textsuperscript{172} Wenceslaus Hollar, born in Prague in 1607 and died in London in 1677. He was the author of over 2400 engravings.


\textsuperscript{174} Constantine Huygens (1596-1687).

\textsuperscript{175} O.Kurz, 1936, Shorter Notice in the Burlington magazine, Sept. vol.68, p.135.

\textsuperscript{176} Richard Dalton (c.1715-1791).


\textsuperscript{178} King George III (1738-1820).
details. He also found a note at Windsor from the early 1800's claiming that one of the Leonardo
drawings had been bought in Venice from the Buonfigluolo collection.

The Codex Arundel.

283 sheets 150X220 mm.

Lord Arundel was a keen collector, and bought this manuscript in Italy after the death of Pompeo Leoni
in 1610. It was written in Florence and completed in 1508. The British Museum acquired it in 1831.

The Codices Forster.

Vol.I. 55 sheets 105X138mm.

Vol.II has two parts:
  part one 63 sheets, 70X90mm; part two 96 sheets 65X93mm.

Vol.III. 88 sheets 73X94mm.

The Codices Forster I, II, and III were bought by Lord Lytton in Vienna and he gave them to John
Forster, who in turn gave them to the Victoria and Albert Museum in London in 1876.

Vol. I contains a note, "begun by me Leonardo da Vinci on July 12, 1505". This is a treatise on the
transformation of plane rectilinear figures and geometric and curvilinear solids into equivalents, which
was what Leonardo called 'The Science of Equiparation'. A great deal of his thinking on this is in
Codex Madrid II.

In FRANCE there are:
The twelve Manuscripts that were looted from the Ambrosian Library by Napoleon, and these are

Manuscript A\textsuperscript{179}

43 numbered sheets 146X212mm.

Manuscript B\textsuperscript{180}

\textsuperscript{179} In about 1840, Count Libri stole folios 54 and 65-80 which are now lost. He also took folios 81-114 which were
recovered and became Manuscript Ashburnham 2038 - see below.
84 sheets 176X235mm.

*Manuscript B* is a miscellany of notes containing a series of drawings of Churches and their structural problems, dated about 1488.\(^\text{181}\)

*Manuscript C*

30 sheets 210X220mm.

This is the *Treatise on light and shade* that was given to Cardinal Federico Borromeo in 1600 by Mazenta, and was placed in the Ambrosiana in 1609. It was marked ‘*Manuscript C*’ by G.B. Venturi in about 1796. Originally covered in red velvet, it is now bound in brown leather with gold tooing.

*Manuscript D*

10 sheets (with four blank sheets) 160X222mm.

This is a slim but very carefully written volume, dealing with optics and the eye.

*Manuscript E*\(^\text{182}\)

80 sheets 99X150mm.

*Manuscript F*

96 sheets 100X145mm.

*Manuscript G*

93 sheets 95X140mm.

*Manuscript H*

142 sheets (divided into three parts separately numbered 1-48, 1-46, 1-47) 74X104mm.

*Manuscript I*

140 sheets (divided into two parts separately numbered 1-48, 2-91) 74X102mm.

*Manuscript K*

\(^{180}\) In about 1840, Count Libri stole folios 91-100, which were later recovered and became *Manuscript Ashburnham 2037*. He also stole folios 3 and 84-87 which are lost, as well as the *Codex on The flight of birds*, which is now in the Turin Royal Library - see below.

\(^{181}\) What may have inspired *Manuscript B* is a manuscript by Francesco di Giorgio in the Laurentian Library containing plans of churches and drawings of machinery and weapons that was owned and annotated by Leonardo.
128 sheets (divided into three parts separately numbered, 49 sheets, 32 sheets, 48 sheets) 65x98mm.

*Manuscript L*

90 sheets 75x101mm.

*Manuscript M*

94 sheets 70x98mm.

**The two Ashburnham Codices**

*Ashburnham Manuscript I and II* are now:

*Codex Ashburnham (Manuscript 2037)*, now part of *Manuscript B* at the Institut de France.

10 Sheets plus six additional sheets 210x140mm.

*Codex Ashburnham (Manuscript 2038)* which is now in the Bibliothèque Nationale, Paris.183

34 sheets 210x140mm.

These were originally torn out of *Manuscripts A* and *B* in about 1840 by Count Guglielmo Libri who stole folios 65 to 114. He sold folios 81 to 114 to Lord Ashburnham which became known as the *Codex Ashburnham*. Folios 65-80 and folio 54 remain lost.

**In SPAIN there are:**

*Codex Madrid I and II.*

These are in the Biblioteca Nacional in Madrid. They were known to have been in the library of King Philip V of Spain184 until about 1830. Then they were transferred to the Biblioteca Nacional, where a cataloguing mistake occurred. As a result, they could not be found, and were considered lost. Scholars realized the two Madrid codices should be somewhere in the Biblioteca Nacional of Madrid, and they were registered there in an inventory prepared by the chief librarian, Antonio Gonzalez, in 1830. Later, in 1863, they were again mentioned by Bartolome Gallardo when quoting the catalogue entry:

---

182 It had 96 sheets and the last 16 are now lost, having been stolen by Count Libri in about 1840.

183 These were the folios 81-114 that Count Libri stole from *Manuscript A*.

In 1898 Professor E. de Marinis of Florence checked these references, and found two different volumes in their places, being the *De remedis utriusque fortunae* of Petrarch, and glosses on the *Digest* of Justinian. It was assumed that these had been exchanged for the Leonardo volumes that were now lost. Subsequent searches revealed nothing.

In 1965, Dr Jules Piccus, an expert in early Spanish literature, was looking for mediaeval ballads, and accidentally 're-discovered' the two Madrid Codices on the shelf where they had been for 135 years. These two volumes originally went to Spain with Pompeo Leoni who offered them to the King, Philip II. Philip did not buy them and they were inherited by Polidoro Calchi, Pompeo Leoni's heir, with the rest of his collection. Part of the collection was then sold to Count Galeazzo Arconati, and other volumes passed through unknown hands, finally ending up in the Royal Collection in England. These two volumes remained in Spain. An interesting reference concerns Vicente Carducho,^{186} Court Painter to Philip III of Spain, who wrote, "I saw there, in Juan de Espina's home, two books drawn and written by the hand of the great Leonardo da Vinci, of great learning and curiosity, which he would at no price sell to the Prince of Wales, who was at the court".^{187} These may have been the Madrid Codices. De Espina, the famous collector, refused to sell them to the Prince of Wales, later King Charles I,^{188} and left them to King Philip IV^{189} of Spain on his death in 1642.

*Codex Madrid I* - 1497-1499 dealing with theoretical and applied Mechanics.

*Codex Madrid II* - 1491, 1493, and 1503-1505.

Together these codices are about 700 pages long.

---

^{184} King Philip V (1683-1746).
^{186} Vicente Carducho (1578-1638).
^{187} Quoted from his 1633 treatise on art called *Dialogos de la pintura*, Madrid.
^{188} King Charles I (1600-1649).
^{189} King Philip IV (1621-1665).
In ITALY there are:

The **Codex Atlanticus**.

Approximately 4000 sheets (only 393 with numbers).

Large sheets 450X670mm - many of different sizes, now bound into twelve separate volumes.

This large album is in the Biblioteca Ambrosiana in Milan. It returned to Italy from Spain about 1604, after the death of Pompeo Leoni. Count Arconati bought it for 300 scudi, and gave it to the Ambrosiana. Napoleon looted it for France in 1796, and it was returned to the Ambrosiana in 1815.

The **Codex Trivulzianus (Libro F)**.

51 sheets of 198X137mm. Six sheets are missing.

This is Leonardo's earliest manuscript, along with *Manuscript B* and part of *Anatomy B*. They were written in the last years of the 1480's when Leonardo was about 35.

It was owned by Gaetano Caccia from Novara, and was then bought by Carlo Trivulzio in 1750. It became part of the municipal collections of Milan in 1935 and is now in the Museums of Castello Sforzesco, Milan.

The **Codex on The flight of birds (Manuscript 'Sul volo degli uccelli')**.

Four surviving sheets from a manuscript of 18 folios.

213 X154mm.

Leonardo began his studies on flight in 1486, the last being dated 1515.

This Codex is in the Biblioteca Reale in Turin, and was written in Florence between 14th March and 15th April 1505. It was bound together with *Manuscript B*, and was stolen by Guglielmo Libri just before 1848. Count Giacomo Manzoni found it amongst Libri's papers in 1867, and bought it in December 1868, although it had five folios missing. In 1892, Theodore Sabachnikoff bought it from the heirs of Manzoni, and published it. He later gave it to Queen Margherita of Italy. The five missing folios were dispersed, and later bought in sales, one by Sabachnikoff, and the other four by the collector Enrico Fatio in Geneva.
In SWITZERLAND there is:

A manuscript *On flight - Manuscript ‘Sul volo’*.

This is in the Enrico Fatio Collection, Geneva (see above).

In AMERICA there is:

The *Codex Leicester*, later named the *Codex Hammer*.

36 sheets 295X218mm.

Thomas Coke,\(^{190}\) who was to become Lord Leicester, bought this Codex in Rome from Giuseppe Ghezzi sometime between 1713 and 1717. It deals mainly with the movement of water and with Leonardo’s researches into the natural history of the earth.

It was in the library of Lord Leicester at Holkham Hall,\(^{191}\) Norfolk, until it was bought by Armand Hammer, and was, until recently, housed in the Los Angeles County Museum under the title *Codex Hammer*. In November 1994 it came up for sale, and was bought by Bill Gates, the President of Microsoft Corporation.

MANUSCRIPT COPIES OF THE *CODEX URBINAS*

Francesco Melzi made the *Codex Urbinas* freely available to serious artists of his day, and copies were made for personal use, or for inclusion in other subsequently published works on art. Many of these personal copies are in collections, and follow the pattern of the *Codex Urbinas* to a greater or lesser extent. There are variations in chapter headings, numbers, wording and illustration, and some are shorter than others having omitted certain chapters. Nevertheless they are textually consistent, and all are abbreviated versions of the *Codex Urbinas*.

---

\(^{190}\) Thomas Coke, Lord Leicester (1697-1759).

\(^{191}\) See E. Edwards, 1865, *Notes and queries*, 3rd S vol.8, (187), 29 Jul. p.89, which included the following notices of the famed Holkham library: “Early in the last century, an accomplished member of a famous family, Thomas Coke, Lord Lovel, and... Earl of Leicester, collected, during his lengthened travels on the Continent, and more particularly in Italy, a choice collection of MSS... there, the elaborate treatise of Leonardo da Vinci on the movement of water, illustrated with drawings by his own hand.”
With the dispersal of Leonardo's manuscripts, the *Codex Urbinas* also disappeared, and thirty seven years were to pass before it was rediscovered in the library of the Duke of Urbino, in 1640. It is not known how it got there. In the meantime, manuscript copies were made from existing copies, which raises the question of how many handwritten copies there are? Ludwig Heydenreich claimed to know of fifty, and suggested there may be twice that many.\(^{192}\) They all follow the pattern of the *Codex Urbinas* and none of them are longer, supporting the view that the *Codex Urbinas* is the archetype.

An important source for several copies was the *Codex Barberinus*. This was owned by Cardinal Francesco Barberini, and he allowed copies to be made from it in his famous library in Rome. He had established this library at about the same time Cardinal Federico Borromeo had founded the great Ambrosian Library in Milan in 1603.

Surviving manuscripts which are known to be in important collections can be considered to fall into different groups, and are listed below.

The most important group consists of those that were transcribed directly from the *Codex Urbinas*, including the copies of those transcriptions. The next group contains the few that were copied selectively with additions from Leonardo's other extant manuscripts, in an attempt to widen their scope to include art and science, which embraced optics, hydraulics, physics and mechanics.

Another group includes later manuscript copies handwritten from the printed editions, and there is a unique manuscript, the *Codex Huygens*, with a significance all of its own, discussed below.

**Manuscripts copied from the *Codex Urbinas* (and their copies)**

(Some manuscripts in this group are abridged and include Poussin's illustrations, or their copies, so they can be considered fore-runners of the abridged first printed editions. These are marked with an asterisk.)

Rome:  
*Codex Barberinus* in the Vatican Library (16th Cent).  
*Codex Ottobonianus* in the Vatican Library (17th Cent).  
*Codex Casanatense 968* in the Biblioteca Casanatense (17th Cent).

---


51
Codex Casanatense 5018 in the Biblioteca Casanatense (17th Cent).
Codex Corsini in the Biblioteca dell’ Accademia dei Lincei (17th Cent).

Milan:  
Codex Pinellianus in the Ambrosiana (16th Cent).
Manuscript C.III 43. in the Raccolta Vinciana.
* Manuscript 228 inf. in the Ambrosiana (17th Cent).

Florence:  
Codex Riccardianus in the Biblioteca Riccardiana (17th Cent).
Codex Laurenzianus in the Bibl. Medicea Laurenziana (16-17th Cent).
7 more in the Biblioteca Nazionale Centrale.

Venice:  
Manuscript Ital. Lainino in the Biblioteca Marciana (16th Cent).
Manuscript Ital. Nani in the Biblioteca Marciana (16-17th Cent).

Bologna:  
Manuscript B.271 in the Biblioteca dell’ Archiginnasio (17th Cent).

Cortona:  
Manuscript 297 in the Biblioteca Etrusca (17th Cent).

Modena:  
Manuscript Furini in the Biblioteca Estense (17th Cent).

Paris:  
Codex 967 in the Bibliothèque Nationale (17th Cent).
* Manuscript Ganay in the Marquis de Ganay collection (17th Cent).

Los Angeles:  
Manuscript Belt 35 in the Elmer Belt Library (16th Cent).
* Manuscript Belt 36 in the Elmer Belt Library (17th Cent).

St. Petersburg:  
* Manuscript Hermitage in the Hermitage Museum (17th Cent).

England:  
16 Drawings at Windsor Castle possibly from Poussin’s studio, now separated from a lost manuscript (17th Cent).

Unknown:  
* Manuscript de Noailles now lost but copied from an original in the Barberini library in the 17th Century.
* Manuscript Sandrart now lost but given to Joachim Sandrart by Nicolas Poussin early in the 17th Century.

Manuscripts on Art and Science

Milan:  
Manuscript H 227 inf. in the Ambrosiana, compiled between 1634 and 1640.
Manuscript H 229 inf. in the Ambrosiana, compiled between 1634 and 1640.

Montpellier:  
Manuscript H 267 in the Bibliothèque de la Faculté de Médecine (early 17th Cent.).

Naples:  
Manuscript XII D. 79 in the Biblioteca Nazionale, copied from Manuscript H 229 inf. in about 1637. Giuseppe Bossi made a copy of this in 1810, but it is now lost.
However G.B. Venturi made a copy of Bossi’s manuscript sometime between 1810 and 1815, and this is now in the Biblioteca Civica of Reggio Emilia.

Manuscripts from the printed editions

There are a number of manuscripts that were transcribed by artists and teachers from the first printed editions, because of the scarcity of the early manuscript editions. These were copied in the late 17th and 18th centuries.

The Codex Huygens

The Codex Huygens was bought by the collector Constantine Huygens in 1690 from the widow of the painter Remigius van Leemput.\(^{193}\) Gaspare dall’Olio, a dealer in prints, may have owned it before him. The Pierpont Morgan Library in New York acquired it in 1938.\(^{194}\)

The Codex Huygens is important because it is a copy of material which shows that whoever transcribed it must have had access to Vincian manuscripts that are now lost. It was written in about 1570 in Milan, and contains five books dealing with the form and structure of the human body. It contains material on the theory of human movement, transformation, the theory of proportion, and perspective. In this manuscript there are copies of some of Leonardo’s original drawings that have not survived in any other source. So although this is not an original manuscript by Leonardo, it assumes the importance of one because it is the only extant source for material from the original manuscripts that are now lost. Although most of the Codex Huygens is clearly copied from notes of Leonardo’s that are now lost, Book V seems to be based on other sources, that are difficult to identify.

Of particular interest is the section on perspective, because it develops a theory that is a departure from that derived from Alberti. It explores the idea that objects diminish in all directions from the standpoint of the observer, and that these visual distortions should be represented on the flat pictorial surface. This means that objects lying parallel with the plane of the observer should be represented

\(^{193}\) Remigius van Leemput (1607-1675).
subject to perspective, and not only foreshortened. Alberti did not apply perspective to objects lying parallel to the surface of the picture. This was a very important development in Leonardo’s theory of Linear Perspective.

Who transcribed the *Codex Huygens*? Over the years various names have been proposed, including Aurelio Luini, Ambrogio Figino, Bernardino Campi, Paolo Lomazzo, Gerolamo Figino, and Carlo Urbino. Documentary proof has now established that it was compiled by Carlo Urbino. It seems that the *Codex Huygens* was Urbino’s own artist’s notebook or handbook.

---

196 Bernardino Campi (1522-1591).
197 Carlo Urbino (c.1510-after 1585).
5. THE PRINTED EDITIONS AND THEIR DEVELOPMENT

This chapter looks at the development of the printed editions, how they evolved from earlier manuscripts, and which manuscripts were used. It also looks at the problems surrounding the illustrations and the role Nicolas Poussin played in their development. This culminated in the first Du Frésne editions, followed by the early English editions of the Treatise of painting, and by the complete editions of the Codex Urbinas. All the editions in their various languages are listed.

The development of the printed editions goes back to the early seventeenth century, and starts with Cardinal Francesco Barberini,¹⁹⁹ who founded the Biblioteca Barberiniana in Rome. He was a bibliophile and keen collector, and was able to acquire the Codex Barberinus 832 (later known as the Codex Barberinus Latinus 4304 when it entered the Vatican Library in Rome). This was an early copy of the Trattato della pittura, and although the Cardinal understood its importance and value, he allowed it to be copied several times. His new library became a centre of interest in Vincian studies, and the key figure behind this was his brilliant and scholarly secretary Cassiano dal Pozzo. Cassiano had studied the Codex Barberinus and became an enthusiastic scholar of the writings of Leonardo. He decided to widen and build the collection of material for the Library, commissioning copies from other manuscripts elsewhere, and even transcribed a copy of the Trattato for himself. He withdrew from the life of the Papal Court, and dedicated himself to the development of the Biblioteca Barberiniana and its collections, especially those devoted to the work of Leonardo.

As Cassiano's collection developed and his vision expanded, he decided to produce a printed edition of Leonardo's 'notes' on painting. Some time between 1630 and 1640, he began this project by transcribing a manuscript copy from the Codex Barberinus, and included his own careful copies of the diagrams. His copy is now Manuscript H 228 inf. in the Ambrosiana which was to become the basis for

¹⁹⁹ Cardinal Francesco Barberini (1597-1679).
the first printed and abridged edition known as the *Trattato della pittura*.\(^{200}\) His next step was to check his copy against other existing sources. He had heard of an older copy in the Ambrosian Library, the Codex Pinellianus (*Ms D 467*) dated about 1585, which had been donated by Cardinal Borromeo. Also in the Ambrosiana was the Arconati Donation, consisting of the 13 Leonardo notebooks, the *Codex Atlanticus* and several drawings which Galeazzo Arconati had purchased from the grandson of Pompeo Leoni in Milan in 1622. These had entered the Ambrosiana in 1636, and several of them were the original notebooks on which the *Codex Urbinas*, and therefore subsequent copies, were based. (At this stage the *Codex Urbinas* was lost and was only re-discovered in 1640). Cassiano was now able to send his transcription of the Barberini text to Galeazzo Arconati to be checked against the *Codex Pinellianus*, and against the original notebooks. Arconati, assisted by other Milanese scholars, was working from the notebooks in the Ambrosiana, and was able to send corrections and chapter headings back to Cassiano. The notebooks, especially *Manuscript A*, contained material on painting that had not appeared in either of the two manuscript copies, and Arconati made a copy of this material as well. All this additional transcribed material contained notes dealing with optics, perspective, mechanics, hydraulics, physics, and the natural sciences, and Cassiano bound it up into volumes which became known as the *Manuscripts H 227 inf.*, *H 229 inf.* with its copies, and the *Manuscript Montpelier H 267*. Cassiano dal Pozzo also had assistants working for him on manuscripts, and in 1973, Carlo Pedretti found examples of these, known as the *Zaccolini Manuscripts*, in the Laurentian Library in Florence. The *Zaccolini Manuscripts* were copies made by the painter Matteo Zaccolini in the 1630's. Cassiano dal Pozzo edited them at about the same time he was preparing a copy of the *Trattato della pittura*. They consist of four parts called: 1) *De colore*  2) *Prospettiva del colore*  3) *Prospettiva lineale*  4) *Della descrizione dell'ombre prodotte da corpi opachi rettilinei*.

The correspondence between Cassiano and Arconati ceased in 1642-44. Pope Urban VIII died in 1644, which ended the patronage of Cardinal Barberini, and Cassiano had to turn elsewhere for support,

---

\(^{200}\) K.T.Steinitz, 1958, p.45.
especially to his friends in Paris. All this took time, and Cassiano’s transcription of the Barberini text had been checked more than four years earlier.

Cassiano dal Pozzo still had ambitions for a printed edition of the Trattato della pittura, but it was clear that illustrations from extant manuscripts and copies would be totally inadequate,\(^1\) so he turned to his artist friend, Nicolas Poussin. Poussin had been born in Normandy, and moved to Paris when he was seventeen. When he was nearly thirty, he went to Rome and met the Italian poet Giambattista Marino.\(^2\) Through Marino and his connections, he was able to meet Cardinal Barberini. This led to a meeting and subsequent friendship with Cassiano dal Pozzo, who made the Barberini library freely available to him, and commissioned him to do his most important pictures of this period, The Seven Sacraments.

Cassiano dal Pozzo then asked Poussin to illustrate his copy of the Trattato, and so inspired him with his studies of Leonardo, that Poussin made a copy for himself, and appears to have made other copies as well. Poussin finished the illustrations by the beginning of 1639. The original, now known as the Manuscript H 228 inf., was returned to Cassiano dal Pozzo.

Nicolas Poussin\(^3\) had lived and worked in Rome since 1624, and now, fifteen years later, he was suddenly pressured to return to France. On 15 January, 1639, King Louis XIII\(^4\) wrote to him from Fontainebleau as follows: "...you stand among the most renowned and most excellent Painters in all Italy...We have chosen and retained you as one of our Painters in ordinary, and that it is our pleasure henceforth to employ you in that quality."\(^5\)

Nicolas Poussin returned to live in Paris for two years, from 1640 to September 1642. He remained in touch with Cassiano dal Pozzo, and sent him a letter from Paris on 6 January 1641, part of which read as follows: "Trustling in the customary benevolence that Your Honour has always been wont to show towards me, I felt it my duty to tell you of the good outcome of my journey and of the state and

---

\(^1\)K.T. Steinitz, 1958, p.40.
\(^2\) Giambattista Marino (1569-1625).
\(^3\) Poussin arrived in Rome in 1624.
\(^4\) King Louis XIII (1610-1643).
place in which I find myself, so that my patron, which you are, shall know whither to send me his orders.” 206

In another letter dated 20 September in the same year, he wrote, “...the yoke that I have laid on my shoulders prevents me from my duty and affection towards you, but I trust soon to throw it off and be again at liberty...”207 He returned to Rome twelve months later. Poussin’s collaboration with Cassiano has left us a puzzle. Several illustrated copies of the Trattato in manuscript have survived, but there is debate as to which of these contain the original Poussin illustrations, and which contain copies. It is not clear whether the Manuscript Garay, which Poussin made for himself, contains the original drawings, or whether Cassiano dal Pozzo’s copy does. On a piece of paper next to the fly-leaf in the Manuscript Garay is written “Manuscript d M Poussin”, and various other folios show two different handwritings, presumably that of Nicolas Poussin and his brother-in-law Jean Duguet, who is known to have helped him transcribe it. But Poussin’s and Duguet’s handwriting appear on another Codex in the Bibliothèque Nationale as well, and these two examples do not match, so some doubt remains.208

Manuscript H 228 inf. is the manuscript copy that Cassiano dal Pozzo transcribed for himself, written in his easily identifiable handwriting which can be compared with several extant examples, such as Manuscript H 229 inf., parts of Manuscript H 227 inf., and Montpellier Manuscript H 267, together with others from dal Pozzo’s studio such as the Zaccolini Manuscripts. The illustrations in Manuscript H 228 inf. are tipped in on separate pages, and appear to be the originals. It can also be presumed that Cassiano dal Pozzo would have wished the Poussin originals to be part of his own copy. Three pieces of paper are tipped in on the inside of the front cover, containing various notes amongst which is the claim that these illustrations are the Poussin originals.

Then there is the *Manuscript Hermitage* in St. Petersburg. This is another copy by an unknown hand, but Cassiano dal Pozzo’s handwriting is recognisable in places where he has added his own remarks. This seems to be an additional copy made under the supervision of Cassiano dal Pozzo, and it also contains illustrations tipped in on separate pages. The title page is in Russian, part of which translates as, “Manuscript copy 17th century with 27 illustrations by Poussin from 16th century manuscript kept at Rome in the Barberini library”. This is a very good copy of the important *Manuscript H 228 inf.*, and one wonders why Cassiano dal Pozzo commissioned it. Is it possible that Poussin drew these illustrations as well? They certainly came from his studio, as this is confirmed by a note on the fly-leaf written by M. de Chantelou. However Anthony Blunt questioned the illustrations for five of the chapters, and suggested they may be later copies.\(^{209}\)

M. de Chantelou’s name appears again in a de Noailles sale catalogue dated 1795.\(^{210}\) A missing manuscript is described in the sale catalogue claiming that it was copied from an original in the Barberini library. It also claimed that Poussin made the figures in 1640 at the age of 46, and that amongst others, previous owners had been M. de Chantelou and the Cavalier dal Pozzo. This manuscript is now missing.

Another important copy is the *Manuscript Belt 36* in Los Angeles. This is an accurate copy of the *Manuscript Ganay*, but with peculiarities of its own, especially with regard to the illustrations.\(^{211}\) Nevertheless they seem to be careful copies of Poussin’s originals.

A mention of yet another copy occurs in a sentence written by Joachim Sandrart\(^{212}\) in the 1683 Latin edition of the *Life of Leonardo*, which translates as follows: “I have received a book on the same subject from my friend and relative Nicolao Pascia in Rome, written by him, rather profound and great

\(^{209}\) K.T. Steinitz, 1958, p.83.

\(^{210}\) Catalogue No.390 p.37. See also K.T. Steinitz, 1958, p.90.


\(^{212}\) Joachim Sandrart (1606-1688).
in my judgement”. What copy was this? It is no longer extant, but this proliferation of copies suggests that Poussin produced several in his studio.

Which of the surviving manuscript copies can be considered to be the first copy of the Codex Urbinas? This is strongly debated, but Steinitz lists the Codex Barberinus as first. Pedretti disagrees, claiming that the Codex Ottobianus 2984 or the Codex Casanatense 968 have a stronger claim. That has not been established, and the ‘editio princeps’ or first copy may even be one which is now lost. Nevertheless it is Manuscript H 228 inf., Cassiano dal Pozzo’s own copy, that is of particular interest, because it is one of the key copies that led to the production of the first printed Du Frêne edition.

THE FIRST PRINTED EDITION - DU FRÊSNE 1651

As stated above, Cassiano dal Pozzo had copied the Codex Barberinus, which was itself a copy of the Codex Urbinas, and had asked his friend Nicolas Poussin to illustrate it. It was now 1640, and Cassiano dal Pozzo heard that Paul Fréart, Sieur de Chantelou, Major Domo of the court of Louis XIV, was travelling in Italy with his brother Roland Fréart, Sieur de Chambray. He met them in Rome, and handed them a complete manuscript with illustrations. They took it back to France, accompanied by Nicolas Poussin, with the intention of producing a printed edition. This took ten years to achieve. They placed it in the hands of Raphaël du Frêne who was to be the editor of the 1651 printed edition. Roland Fréart, Sieur de Chambray translated it into French, and the Du Frêne edition was published in 1651, separately in Italian and French.

The timing was good. Richelieu had proposed a system of Academies under Royal patronage, and this policy was carried forward by his successor Jules Mazarin. In 1648 the ‘Académie Royale de Peinture et Sculpture’ was established, to train students in the principles of the fine arts. The first book

---

215 Richelieu (1585-1642).
216 Jules Mazarin (1602-1661).
to be considered by the Academicians, according to the Secretary, Henri Testelin, was the Du Frêne edition of the *Trattato della pittura*. Leonardo’s thinking now became an important part of the foundation of the French School of Painting.

This is where questions arise. Which manuscript or manuscripts reached the printer? Was it Cassiano dal Pozzo’s copy, or the copy that Nicolas Poussin transcribed for himself? Or was it one of the several other copies that seem to have been made by Poussin and Cassiano dal Pozzo? Most likely, it was more than one copy, as Raphael du Frêne mentions the courtesy of Signor Thevenot who provided him with a more correct copy. But the Thevenot copy has since disappeared.\(^{217}\) Which was the other copy that the printer used? The contenders for this are led by the *Manuscript Ganay*, followed by the *Manuscript Hermitage, Manuscript de Nocailles* and *Manuscript H. 228 inf.*, as they all contain comments that they went to France with M. de Chantelou.\(^{218}\) A point of interest is that the *Manuscript Ganay* is shorter than the printed edition, lacking about sixty lines, so it cannot have been the only copy that the printer used, although it has a strong claim to have been one of them.

Whichever manuscript copies were received by the publisher in France, they were the basis for the first two Du Frêne editions. These editions raise further questions. They were not full editions of the earlier manuscript copies, nor of the *Codex Urbinas*, but were in the abridged form of most of the subsequent editions. Why was this abridgement made? If it was for the practical purpose of providing a handbook for artists, then the grand format of the first Du Frêne editions was inappropriate. The smaller octavo format was used for the succeeding French edition of 1716, the first English edition in 1721, and subsequent editions. And who was the original editor who made the first abridged selection? This is simply not known.

The Du Frêne editions were designed to be large and imposing, and the printer, Jacques Langlois, clearly considered Nicolas Poussin’s illustrations too severe for the overall design of his new editions.

---

\(^{217}\) K.T.Steinitz suggests this could be *Codex 967* in the Bibliothèque Nationale, Paris.

\(^{218}\) K.T.Steinitz, 1958, pp.77 and 147.
He therefore employed Charles Errard, who had worked in Poussin’s studio in Rome, to elaborate them. Poussin knew nothing of this, and when he saw the printed edition, with his ‘doctored’ illustrations and their heavy shading, he was enraged. He sent an angry letter to his friend, Abraham Bosse,\(^{219}\) saying, “As to what concerns the book of Leonardo da Vinci, it is true that I have drawn the human figures ... but all the geometrical and other designs are by a certain Gli Alberti\(^{220}\) ... The awkward landscapes behind the human figures in the book which Mr. de Chambray had caused to be printed have been added by one Errard\(^{221}\) without my knowing anything about it”.

Despite being a great admirer of Leonardo’s work, to the extent of personally copying the original manuscript for himself, Poussin then petulantly added, “All that is good in that book one could write in large characters on one single sheet of paper, and those who believe that I approve of all that is in it do not know me...”\(^{222}\)

The 365 chapters of the Du Frêne French edition were a direct translation of the Italian edition, and both were published in the same format and by the same printer in the same year. They both contained a Life of Leonardo by Raphael du Frêne. It is not known which of these two editions appeared first, but the Italian edition is traditionally accepted as the first one.\(^{223}\) All subsequent editions were based on this edition until the translation of the full Codex Urbinas by Manzi in 1817, with one

\(^{219}\) Abraham Bosse (1602-1676).

\(^{220}\) Gli Alberti who drew the diagrams for the Treatise of painting was Pierfrancesco Alberti, a painter and engraver from Borgo S. Sepolcro who died in Rome in 1638. (referred to by Nicolas Poussin in Correspondance de Nicolas Poussin, 1911, Paris, p.420, letter 185, and in K.T.Steinitz, 1958, p.148. Why he is called ‘Gli’ is unclear, but he was part of a large artistic family, and this may have been a reference to the family studio or workshop. See also J.Turner (ed.) 1996, The Dictionary of Art, vol.1, pp.550-551.

\(^{221}\) Errard (1606-1689) was Charles Errard, painter, engraver and architect, who was born at Nantes. When he returned from Rome to France, Louis XIV gave him the title ‘Peintre du Roy’. He was one of the twelve founders of the Académie de Peinture et Sculpture, and returned to Rome in 1666 as Director of the Académie de France à Rome. Errard helped Roland Fréart, Sieur de Chambray, with the French translation of the Du Frêne edition. See J.Turner (ed.) 1996, The Dictionary of Art, vol.10, pp.488-489.


\(^{223}\) The Italian title page contains more information than the French title page, including the works of Alberti, and the supposition is that this information was added later. If so, this supports the view that the French edition was the first one.
exception. This was the edition by Fontani in Florence in 1792 based on the *Codex Riccardianus*, dating from about 1650, with drawings by Stefano della Bella.

**COMPLETE EDITIONS OF THE CODEX URBINAS 1270**

Over the years new editions and translations of the abridged edition were published, but there was always the desire to publish the full text of the *Codex Urbinas* as Melzi had transcribed it. It is necessary briefly to trace this line of development, as the complete editions are the forerunners of the first complete English edition of McMahon in 1956.

The first attempt was by Giuseppe Bossi,\(^\text{224}\) in 1809. He approached Abate Gaetano Luigi Marini, who was the first custodian of the Vatican Library, to have the complete *Codex Urbinas* transcribed, and offered to pay for it. Marini supervised this project, and a complete copy was made of about 600 pages. But Giuseppe Bossi died in 1815 before this edition was published.

Two years later, in 1817, the full *Codex Urbinas* was published in Rome by Guglielmo Manzi. This first Italian edition of the complete Codex was important because certain sections were now in print that had never previously appeared, such as the *Paragone*, and some on light and shade, clouds and the horizon, trees and perspective. This new edition included material prior to that in the abridged editions, from a source close to Leonardo himself.

The next complete edition was that of Heinrich Ludwig in 1882. This was an important German translation with accompanying text in Italian consisting of 944 chapters. It appeared in four volumes, the first two being the actual text in both languages, each on alternate pages. The third was a critical volume containing notes on the first two. Although the title page referred to "DREI BANDEN", there was a fourth which contained a German translation with a new arrangement of subject matter, and cross references to the earlier arrangement. Ludwig followed this in 1885 with a supplement to his previous edition.

---

\(^{224}\) Giuseppe Bossi (1777–1815). A neo-classic painter from Milan, who wrote several works on art, including a *Discourse on the political utility of the Arts of design* in 1805, *Four books on Leonardo's 'Last Supper'* in 1810, and *Researches on natural and artificial chromatic harmony* in 1821.
edition, and in 1888 with a reprint of the fourth volume of 1882. In 1909, Marie Herzfeld selected Ludwig’s new arrangement from the fourth volume of the 1882 edition, and added a new Preface.

Ludwig’s dissatisfaction with the arrangement of the complete Codex Urbina was echoed by Sar Péladan225 in France. In 1910, a French edition appeared, in which Péladan had rearranged the Manzi edition of 1817. He issued a supplementary volume in the same year, and both volumes went through several reprints. This was followed by a Russian translation in 1934, containing the full 944 chapters of the Ludwig edition.

The complete Codex Urbina in Spanish appeared in 1943. This should not be confused with the abridged version of the previous year containing Rejon da Silva’s translation of the Du Frênsne text. The full 1943 edition was based on the Angelo Borzelli version of 1914, containing 935 chapters in the original order of the Codex Urbina. The editor had also used the Preface by Marco Tabarrini and the notes by Gaetano Milanesi from the 1890 Italian edition. This ‘traditional’ version was followed in 1944 by a Spanish version of the Péladan text, with its arrangement into 1100 chapters. Again, this should not be confused with another Spanish edition in 1944, also based on Péladan’s, but abridged into 777 chapters.

This historical trail now brings us to the 1956 edition of the complete Codex Urbina in English by Philip McMahon. It was published in two volumes with an introduction by Ludwig Heydenreich. One volume is a facsimile edition of the Codex Urbina, and the other is an English translation of the full text. This is divided into 1008 chapters, as against the 944 of Ludwig’s translation. The chapters in the Manzi edition have headings, but are unnumbered following the style of the Codex Urbina.

PRINTED EDITIONS OF THE TREATISE OF PAINTING.

The first two printed Du Frênsne editions appeared in 1651, and the Italian edition is traditionally considered to be the first, although there is good reason to believe that the French edition actually may have been the first to appear. These were the first of the abridged printed editions, so did not include the

225 Sar Péladan (1858-1918).
Paragone. Apart from interim excerpts which followed, the next published text was a French edition in 1716. The first English edition then appeared in 1721, called The Treatise of Painting. The next English edition appeared in 1802, and the next in 1956, with reprints and excerpts interspersed. Of course, in the meantime, many other language editions appeared. All the early printed editions were abridged. Listed below are printed editions that have appeared since 1651 in date order, and then in language groupings with brief descriptions of each edition.

A LIST OF THE PRINTED EDITIONS OF THE TREATISE OF PAINTING

KEY: * Excerpt only, (s) Summary only, (p) Paragone only, # An illegal and fragmentary edition, (Pe) Péladan’s selections, (c) Complete editions.

<table>
<thead>
<tr>
<th>Year</th>
<th>Language</th>
<th>Year</th>
<th>Language</th>
<th>Year</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>1651</td>
<td>Italian</td>
<td>1716</td>
<td>French</td>
<td>1802</td>
<td>English</td>
</tr>
<tr>
<td>1651</td>
<td>French</td>
<td>1721</td>
<td>English</td>
<td>1803</td>
<td>French</td>
</tr>
<tr>
<td>1657</td>
<td>Italian*</td>
<td>1723</td>
<td>Italian</td>
<td>1804</td>
<td>Italian</td>
</tr>
<tr>
<td>1674</td>
<td>Italian*</td>
<td>1724</td>
<td>German</td>
<td>1805</td>
<td>Italian</td>
</tr>
<tr>
<td>1682</td>
<td>Dutch*</td>
<td>1733</td>
<td>Italian</td>
<td>1817</td>
<td>Italian (c)</td>
</tr>
<tr>
<td>1747</td>
<td>German</td>
<td>1773</td>
<td>French*</td>
<td>1820</td>
<td>French</td>
</tr>
<tr>
<td>1784</td>
<td>Spanish</td>
<td>1786</td>
<td>Italian</td>
<td>1827</td>
<td>Spanish</td>
</tr>
<tr>
<td>1786</td>
<td>German</td>
<td>1792</td>
<td>Italian</td>
<td>1835</td>
<td>English</td>
</tr>
<tr>
<td>1792</td>
<td>Italian</td>
<td>1796</td>
<td>English</td>
<td>1839</td>
<td>Italian*</td>
</tr>
<tr>
<td>1796</td>
<td>French</td>
<td>1796</td>
<td>French</td>
<td>1859</td>
<td>Italian</td>
</tr>
<tr>
<td>1877</td>
<td>English</td>
<td>1882</td>
<td>German(c)</td>
<td>1934</td>
<td>Russian (c)</td>
</tr>
<tr>
<td>1882</td>
<td>German(c)</td>
<td>1885</td>
<td>German</td>
<td>1939</td>
<td>English (p)</td>
</tr>
<tr>
<td>1885</td>
<td>German</td>
<td>1888</td>
<td>German</td>
<td>1942</td>
<td>Spanish</td>
</tr>
<tr>
<td>1890</td>
<td>Italian (c)</td>
<td>1890</td>
<td>Italian (c)</td>
<td>1943</td>
<td>Spanish (c)</td>
</tr>
<tr>
<td>1892</td>
<td>English</td>
<td>1892</td>
<td>English</td>
<td>1944</td>
<td>Spanish (c)</td>
</tr>
<tr>
<td>1944</td>
<td>Spanish</td>
<td>1948</td>
<td>German (p)</td>
<td>1950</td>
<td>Spanish</td>
</tr>
<tr>
<td>1949</td>
<td>English (p)</td>
<td>1950</td>
<td>Spanish</td>
<td>1953</td>
<td>Polish (p)</td>
</tr>
<tr>
<td>1956</td>
<td>English (c)</td>
<td>1956</td>
<td>English (c)</td>
<td>1977</td>
<td>French</td>
</tr>
<tr>
<td>1980</td>
<td>Spanish</td>
<td>1989</td>
<td>Italian (c)</td>
<td>1989</td>
<td>German</td>
</tr>
<tr>
<td>2002</td>
<td>English</td>
<td>2002</td>
<td>German</td>
<td>2002</td>
<td>English</td>
</tr>
</tbody>
</table>

The above list of printed editions is repeated below in language groupings with individual detail (reprints and selections/excerpts are indented).
## ENGLISH EDITIONS

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1721</td>
<td>The first English edition. 226</td>
</tr>
<tr>
<td>1796</td>
<td>Resetting of 1721 227</td>
</tr>
<tr>
<td>1802</td>
<td>A new edition by Rigaud. 228</td>
</tr>
<tr>
<td>1835</td>
<td>Resetting of 1802 with changed introductory matter. 229</td>
</tr>
<tr>
<td>1877</td>
<td>Resetting of 1835 with additional supplementary matter. 230</td>
</tr>
<tr>
<td>1892</td>
<td>Reprint of 1877. 231</td>
</tr>
<tr>
<td>1906</td>
<td>Reprint of 1892. 232</td>
</tr>
<tr>
<td>1939</td>
<td>Paragone only - Richter’s translation. 233</td>
</tr>
<tr>
<td>1949</td>
<td>Paragone only - Richter’s new and more comprehensive translation. 234</td>
</tr>
<tr>
<td>1956</td>
<td>The first English translation of the complete Codex Urbicus by Philip McMahon. 235</td>
</tr>
<tr>
<td>2002</td>
<td>Reprint of 1892 236</td>
</tr>
</tbody>
</table>

## ITALIAN EDITIONS

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1657</td>
<td>Excerpt.</td>
</tr>
<tr>
<td>1674</td>
<td>Excerpt.</td>
</tr>
<tr>
<td>1723</td>
<td>First Italian printing of the Du Frésne edition.</td>
</tr>
<tr>
<td>1733</td>
<td>Reprint of 1723 with additional supplementary matter.</td>
</tr>
<tr>
<td>1786</td>
<td>Resetting of 1651 with changes to supplementary matter, and illustrations from the 1733 edition.</td>
</tr>
<tr>
<td>1792</td>
<td>From the manuscript of Stefano della Bella for M. Riccardi (Codex Riccardianus + Codex Pinellianus).</td>
</tr>
<tr>
<td>1804</td>
<td>Conforms to the 1651 edition (Amoretti).</td>
</tr>
<tr>
<td>1805</td>
<td>1651 text with Orsini additions. 237</td>
</tr>
</tbody>
</table>

---


228 Printed for J. Taylor at the Architectural Library, High Holborn, London.

229 Printed for J.B. Nichols & Son, 25 Parliament Street, London. Also sold by J. Wesley, High Holborn; J. Williams, Charles Street, Soho; W. Pickering, Chancery Lane who had to sell his personal library and his stock to pay his debts. He died in 1854 during the course of the sales, which were successful (The Book Collector, Spring 1972, Vol.21, No.1, pp.33-34 - A.N.L. Munby, The Sales of William Pickering’s Publications).

230 Published by George Bell & Sons, York Street, Covent Garden.

231 Published by George Bell & Sons, York Street, Covent Garden.

232 Published by George Bell & Sons, York Street, Covent Garden.

233 Oxford University Press, London.

234 Oxford University Press, London.

235 Princeton University Press, New Jersey, USA.

236 Prometheus Books, New York.
1817 The Manzi edition - The first printed edition of the full text of *Codex Urbinas* 1270, which included the *Paragone* for the first time. It was Manzi who named the first section the *Paragone*.

1826 Excerpt - *Treatise on Water*.

1839 Excerpt.

1859 Edited combination of Amoretti (1804) and Manzi (1817).

1890 Milanesi version based mainly on Manzi.

1914 An edition edited by Angelo Borzelli based on the *Codex Urbinas*.

1923 Based on Arconati’s compilation of writings on water.

1924 Reprint of Angelo Borzelli edition (1914).

1939 Resetting of Du Frêne (1651) with changes in supplementary matter and illustrations.

1989 Reprint of 1890

1990 Reprint by Brancato.


**FRENCH EDITIONS**

1651 The first Du Frêne edition (the same format and same printer as the first Italian edition) translated by Roland Frêart, Sieur de Chambray.

1716 Resetting of French edition of 1651 in octavo (Giffart edition) with changes in the illustrations.

1773 Excerpt.

1796 Resetting of 1716 edition (Giffart) with illustrations based on the 1716 edition.

1803 Gault de St. Germain edition based on 1716 (Giffart) and *Manuscript H* 228 inf., with his own annotations.

1803 Resetting of 1716 (Giffart).


1901 Fragmentary - considered unscientific and illegal. Theodore Sabachnikoff had photographed important drawings in the Windsor Collection, and left the negatives with his publisher in Paris, M. Rouvèyre, who published them without any text and without permission. This devastated Sabachnikoff who now considered his life’s work destroyed and died shortly thereafter.\(^{238}\)

1910 Translation and rearrangement by Péladan of Manzi edition (1817).

---

237 Orsini was director of the Academy of Design in Perugia, and used the *Trattato della Pittura* as a textbook for his students. He added two supplements; the bending and turning of the human body, and the motion of the horse, using blocked and cubic figures to show volume.

1910 Supplement to Péladan translation (1910).

GERMAN EDITIONS
1724 Translation by Johan Boehm of the 1651 French and Italian editions (new grouping of chapters).
1747 Resetting of 1724.
1786 Revised and modernised edition of 1724.
1882 Full text of Codex Urbinas translated by H. Ludwig in four volumes.
1885 Supplement to 1882.
1888 Reprint of 4th Volume of 1882.
1909 A condensation of the Codex Urbinas by W. Von Seidlitz.
1909 M. Herzfeld’s edition of Ludwig text of 1882.
1919 Summary by W. Von Seidlitz.
1921 Selection of artistic chapters from H. Ludwig edition (1882).
1948 Paragone re-edited from Ludwig (1882).
1989 Reprint of 1909 edition

SPANISH EDITIONS
1784 Based on Du Frèsne (1651) and translated by Rejon da Silva.
1827 Reprint of 1784.
1942 Resetting of 1784 with changed supplementary matter.
1943 Chapters translated from the Italian Milanesi edition (1890) and Borzelli edition (1914).
1944 Translation from the French text of 1910 using Péléadan arrangement, edited by J. Gil.
1950 Reprint of 1944.
1980 Reprint.

DUTCH EDITIONS
1682 Excerpt.
1827 Translation by J. Vos from the French Giffart edition (1716).

SWEDISH EDITION
1911 Excerpt.

RUSSIAN EDITION
1934 Translated from Codex Urbinas by A. Guber and V. Silejko.

POLISH EDITION
1953 Translation of the Paragone with a commentary by J. Bialostocki.
STEMMA SHOWING THE DEVELOPMENT OF THE PRINTED EDITIONS FROM MANUSCRIPTS

WINDSOR 12,604
CODEX TRIVULZIANUS
MS.A
MS.ASHBURNHAM 2038
MS.L
MS.F
LIBRO A
MS.E
MS.G
CODEX MADRID II

CODEX URBINAS

CODEX CASANATENSE 968
CODEX BARBERINUS
CODEX OTTOBIANUS 2984
CODEX PINELLIANUS

OTHERS

MS.H227 INF.
MS.H229 INF.
MONTPELIER H267
OTHERS

OTHERS

NOW LOST

MS.GANAY
MS.H228 INF.
MSS.ZACCOLINI
MS.NOAILLES

(MORI LOST)

OTHERS

NOW LOST

MS.BELT 36

?MS.THEVENOT

DU FRÈSNE EDITIONS
(FRENCH & ITALIAN)

1ST ENGLISH EDITION
1721

RIGAUD EDITION
1802

ETC.

MANZI EDITION
1ST PRINTED ED.
OF COMPLETE
CODEX URBINAS
ITALIAN 1817

LUDWIG EDITION
COMPLETE ED. OF
CODEX URBINAS
GERMAN 1882

McMAHON EDITION
1ST COMPLETE ED.
ENGLISH
REPRINTS OF THE ENGLISH EDITIONS

An interesting aspect of the English editions is that there were quite a number of them, and it is frustrating that very little information is available regarding them, the re-set editions, and their reprints. Records of print runs, sales, stocks etc cannot be sourced despite a far ranging search.\(^{238}\) Nevertheless, it is necessary to look at them in more detail.

ENGLISH EDITIONS

1721  The first English edition. Printed for J.SENEX at the Globe in Salisbury Court, and W.TAYLOR at the Ship in Paternoster Row.


1835  Resetting of 1802 with changed intro. matter. LONDON, J.B.NICHOLS & SON, 25 Parliament Street. Sold also by W.PICKERING, Chancery Lane; J.WEALE, High Holborn; and J.WILLIAMS, Charles Street, Soho.

1877  Resetting of 1835 with additional supplementary matter. GEORGE BELL & SONS, York Street, Covent Garden.

1892  Reprint of 1877. GEORGE BELL & SONS, York Street, Covent Garden and NewYork.

1906  Reprint of 1892. GEORGE BELL & SONS.

1939  Paragone only - Richter's translation. OXFORD UNIVERSITY PRESS, London.


The first English translation of the complete Codex Urbinas Latinus by Philip McMahon.

PRINCETON UNIVERSITY PRESS, New Jersey.

There are very few facts on which to base an assessment of the reprints, so much of the following depends on reasonable surmise and probability.

1721 - The first English edition was printed for J. Senex (bookseller1719-1741) in Salisbury Court, London. The next was in 1796, 75 years later. But Senex died on the 1st January, 1740, and had not required a reprint in 20 years.\(^\text{239}\) The sales could not have been strong, and this is not surprising as the text is difficult to read and not very accessible. Another point supporting this is that the edition is very rare, which indicates that the print run was modest. A reviewer\(^\text{240}\) of the following 1796 edition referred to the 1721 edition as "long been so very scarce and dear". This latter point is made in the 'Advertisement' at the beginning of the 1796 edition, which says, "...nor is it needful to make an apology for reprinting a Work, which could not be procured but at an extravagant price, nearly treble the cost of the present edition". This point is made again in the 'Translator's preface' to the 1835 edition, with the words "... and had risen to a price so extravagant,...". This appears to have seriously undermined sales.

Further recent comment comes from a leading antiquarian bookseller in London who said that he hadn't seen a copy in fifteen years, which he regarded as rare in his business. Other editions appeared more often according to both him and another antiquarian bookseller in Brussels.\(^\text{241}\) Apart from the 1721 edition on account of its rarity, neither of these experienced booksellers regarded any other edition as particularly collectable or special in any way.

\(^\text{239}\) After the death of John Senex, his wife, Mary, kept the business going, but eventually sold the copyrights and stock in a joint sale with the late Thomas Cox on 16th December, 1755. Longman's Sale Catalogue number 69 records the sale, and shows that only one copy of the \textit{Treatise of painting} remained, and this was sold with other stock to J.Rivington, who was very strong in the remainder business. The fact that only one copy of the \textit{Treatise of painting} remained suggests that the original print run was small, although it is not conclusive evidence.


\(^\text{241}\) These comments arose in conversation with the writer. A search of Internet bookshops located a copy of the 1721 edition where the price reflected its rarity at 6000 dollars, whereas later editions were offered at 1500 dollars or less.
1796 A re-setting of the 1721 edition by I. and J. Taylor. Only 6 years later the same J. Taylor published the 1802 Rigaud edition. The 1796 edition must have sold quite well for him to have undertaken this, especially as it was priced at one third the cost of the 1721 edition.\textsuperscript{242} \textit{The Gentleman's Magazine} published a review\textsuperscript{243} of this edition in 1796, referring to the 1721 edition as being 'a good English translation ... published about fifty years ago'. It was actually published seventy-five years previously, and the better Rigaud edition was still to appear in six years time. The French edition referred to in the review is the 1651 Du Frêne edition translated by Roland Frêart, Sieur de Chambray.

1802 This new edition had a readable and accessible text, due to Rigaud's editing skills, and followed fairly hard on the heels of the 1796 edition which seemed to have sold well. So it is very surprising that no reprints were undertaken for 33 years, until J.B. Nichols published the 1835 edition. In the Preface\textsuperscript{244} of the next edition of 1835, the 1802 edition is referred to as "...the work having been long out of print". The known facts are consistent, and suggest a successful edition - that the previous edition appears to have been a success and this one was a

\textsuperscript{242} 'Good sales' is a relative concept. At the time, a print run for a non-fiction book was between 500 and 1000 copies, with 2000 being the maximum. Popular novels seldom exceeded 4000 copies. Books were expensive, octavos 6/-, and folios being 12/-, about the cost of a pair of breeches, and the weekly wage of a craft worker. The English reading public was estimated to be about 80,000 people, and possibly a great deal less. See P. Gaskell, \textit{A New Introduction to Bibliography}, Clarendon Press, Oxford, 1972, also D.F. McKenzie and J.C. Ross, \textit{A Ledger of Charles Ackers}, Oxford, 1968, and R.D. Altick, \textit{The English Common Reader: a Social History of the Mass Reading Public, 1800-1900}, Phoenix, Chicago, 1957.

\textsuperscript{243} \textit{The Gentleman's Magazine}, vol. 66, 1796, p. 1101 published this review: \textit{A Treatise on Painting, by Leonardo da Vinci. Translated from the original Italian. Illustrated with a great Number of Cuts. To which is added, the Life of the Author; and his Portrait, from the Gallery at Florence.}

THE great character of Leonardo da Vinci is well and universally known, and his instructive treatise on painting is deservedly admired by the best judges of the art. He flourished in the early part of the 16th century, and was a favourite, particularly, with Francis I. king of France, in whose arms he died at the age of 75.

Many editions of the treatise on painting have appeared, both in the original, and in the very respectable French translation by M. Chambré, which was accompanied by a biographical account of the author.

Leonardo da Vinci was also author of other valuable compositions, mathematical, philosophical, anatomical, mechanical etc, for, this highly accomplished man was well skilled in many sciences and arts; but the work which has had the greatest circulation among the lovers of science and of the polite arts is the above mentioned admirable treatise on painting, of which a good English translation was published about fifty years ago. That translation, however, has long been so very scarce and dear, that we think the revivers of the work, in the present impression, deserve well of the publick for bringing it again to the literary market.

To this edition is prefixed a print of Leonardo, well engraved, from a picture in the Tuscan gallery. It has received, also, an additional engraving, which the reader will find among the out-line drawings of human figures, the plate is marked No.26.

\textsuperscript{244} page v.
great improvement on it. In addition, the comment that it remained out of print for so long suggests that it sold out quite quickly. Why it was not reprinted for so long remains a mystery.

1835 This edition soldiered on for 42 years without a reprint. Less than 20 years later, a bookseller who stocked it, W. Pickering, died in 1854, and there is no record of this title in the sale of the stock. We can reasonably assume it was out of print at this stage, and this is supported by a comment in the Preface of the 1877 edition which said, “The 1835 edition of the ‘Treatise of Painting’ has long been scarce.”

1877 This edition was published by George Bell and Sons. After 15 years, they reprinted it in 1892, and a sales catalogue entry indicates it was still in stock at the end of 1904. Another reprint was undertaken in 1906. It was therefore just a steady seller in good enough volume to justify a reprint.

It appears from the above sparse facts and speculation that the 1721 edition was rare and sold slowly. This was hardly surprising as it was regarded as expensive, being three times the price of the next edition. Perhaps the publisher was trying to capitalise in his pricing on Leonardo’s great name, or perhaps his print run was so modest that a high price was necessary. The 1721 edition was also more difficult to read than the later Rigaud editions, but this does not seem to have militated against sales, as its reprint in 1796 seems to have sold satisfactorily.

What is puzzling, and remains unanswered, is why the first Rigaud edition with its improved structure and lower price took 33 years to reprint. The common pattern across most editions is that they sold well enough and steadily enough to justify further reprints, but only after

---


extended periods. None of the editions and reprints became 'best sellers', and only the 1721 edition became noticeably more collectable than any other because of its greater rarity.

A point worth considering is why John Senex published the 1721 edition at all. He was primarily a map engraver and globe maker as well as bookseller, with an interest in the new philosophy. His father was described as a 'gentleman', so he came from a good background, and in 1728 he was elected a Fellow of the Royal Society, being proposed by Dr. Halley.\textsuperscript{250} Of course, at this time, membership was open to anyone with an interest in the new philosophy, which Senex clearly was, and he once read a paper at the Royal Society.\textsuperscript{251}

It is therefore unsurprising that he published a number of titles on mathematics, astronomy and physics. Apart from these, his publishing activity appears to have been unfocused and varied -- there are titles on anatomy, religion, architecture, discovery, freemasonry, and even the building of chimneys. One wonders why Senex branched out from his main concerns into these other subjects. A possible explanation is that he was living in that part of London that contained a concentration of trade publishers, clustered near the Stationers Hall. Being an obviously intelligent and curious individual, he may have been beguiled by the activity around him to branch out, and become more than a map-engraver and maker of globes. Even so, it is strange that he chose to publish Leonardo's \textit{Treatise of painting}, which stands out from the varied Senex publication list as being a subject apart. Perhaps John Senex was fascinated by Leonardo's attempt to explain the rules of painting as a science, and saw this possibly as part of the new philosophy.

Even so, the publication of the \textit{Treatise of painting} is unusual in relation to publishing activity of the time. For the whole of the eighteenth century, the subject area of 'Art' was covered

\textsuperscript{250}In addition to Edmund Halley as his proposer, he was also recommended by Sir Hans Sloane, the President of the Royal Society at the time, as well as Dr. Desagulier. This was heavyweight support for the candidature of a map maker and bookseller, so John Senex may have been well connected through his family. Another possible reason for this support is the fact that John Senex had published a work of Edmund Halley's, \textit{A description of the passage of the shadow of the moon over England, in the total eclipse of the sun on 22\textsuperscript{nd} day of April, 1715}.

\textsuperscript{251}on the 4\textsuperscript{th} May, 1738. His paper was on a contrivance for locating the position of stars in any age using a celestial globe.
by the publication of about seven thousand titles (in a total of over two hundred thousand titles all together), of which about seventy per cent dealt with music and drama. Within these seven thousand titles, only three were devoted to painting before the appearance of the *Treatise of painting* in 1721.

It can be seen from this that the *Treatise of painting* appeared before a somewhat 'philistinistic' reading public, before there was interest in the Grand Tour of Italy, and the interest in art theory and practice that it generated. Add to this the fact that most books were published in small quantities at this time, and created little stir, and it becomes more understandable that Leonardo's *Treatise of painting* should have been a modest selling title. Perhaps this goes some way to explain that other surprising question - why the first Rigaud edition with its improved structure and lower price took as many as 33 years to reprint.

---


253 See J. Elsum, 1703, *The art of painting after the Italian manner: with practical observations on the principal colours, and directions how to know a good picture*, London. - R. Graham, 1716, *A short account of the most eminent painters, both ancient and modern*. - T. Page, 1720, *The art of painting in its rudiment, progress and perfection: delivered exactly as it is put in practice, so that the ingenious may easily understand its nature, to perform it. being illustrated, in all the parts of drawing, viz. with charcoal. to which is necessarily subjoined, the most approved methods of copying, mending, cleaning, and varnishing of pictures, etc.* Norwich.

254 There were successes, one of which was Daniel Defoe's *Robinson Crusoe*, which made a fortune for its publisher, William Taylor, who was also John Senex's associate.
6. THE ENGLISH EDITIONS OF THE TRATTATO DELLA PITTURA

The historical background, development of the *Codex Urbinas* and its subsequent copies, and the development of the printed editions have been discussed. The English editions in particular now need to be analysed. The 1721 and Rigaud editions invite comparison because they are the first two, and are clearly congruent in several respects. The McMahon edition of 1956 is quite different in that it is the full translation of the original *Codex Urbinas* without any original Prefaces or other introductions, but has a modern critical introduction by Ludwig Heydenreich.

Both the 1721 edition and the later Rigaud editions contain Prefaces which are valuable in that they reveal the intentions and difficulties of each editor. This applies to the Rigaud edition in particular as it contains critical comment on the 1721 edition.

THE 1721 EDITION AND RIGAUD EDITIONS AND THEIR PREFACES

It is simply not known who translated the 1721 edition, and neither a name, initial nor reference appears anywhere. Of course, John Francis Rigaud translated the 1802 edition, and there are selective quotes from both Prefaces below, exposing the main concerns of each translator, with comments upon them.

The Preface to the 1721 edition starts expectedly with the laudatory point that Leonardo was unique in the span of his thought...

"The province of a painter...the management of the pencil, and the mixture of colours, with the knowledge of perspective, and the habit of designing, wherewith most painters seem to content themselves, make but a part of the art, as understood by Leonardo. To these he calls in the assistance of other arts; Anatomy, Opticks (sic), Meteorology, Mechanics, etc...and from the depths of Philosophy, drawing means for the improvement of painting".

However the editor then appears to do his edition an injustice when he says the following:

255 K.T. Steinitz suggests that it may have been W. Goerce, who translated the Dutch edition of 1682, but there is no firm evidence for this.
"The reader is not to expect to find, a just, a methodical institution of the art of painting: what he has to look for is a noble collection of useful precepts, and curious observations on the several parts of that art. Instead of treating us with a dry, an insipid system, dully drawn out into its divisions and subdivisions, our author...sets before us...the most valuable parts of his knowledge. If any objections lie against Leonardo's performance, they must be drawn, either from the looseness, and inaccuracy of his style, or the want of order, and connecting in his periods:...for the treatise...never had the finishing hand of its author; and though he might intend it for the press, 'tis evident, that it was never prepared for it. So that we have here, the elements of a work, not the work itself, mature and finished; ...As to the want of method,...we lose somewhat by having things of like kind disjoined, and promiscuously intermingled with others, to which they bear no relation...”

He is in fact referring to the original Du Frésne edition, and identifies the shortcomings he has had to live with as a translator. He saw his role as faithfully translating, and editing where necessary, but keeping changes to a minimum, and he noted that the

“brevity, and abruptness of the original made a strict translation unadvisable...without the help of a little periphrasis...on the most urgent occasions...with as much moderation as might be...”

Rigaud, in his Preface, described the Du Frésne edition less kindly, as follows:

“for the original work consisting in fact of a number of entries made at different times, without any regard to their subjects, or attention to method, might rather in that state be considered a chaos of intelligence, than a well-digested treatise”.

There was one particular respect in which the 1721 edition was edited, which was very noticeable: this concerned the headings, which were dealt with as follows:

“Instead of dividing the book into chapters, and prefixing titles to each, as they stood in the former editions, it has been thought proper, barely to throw the work into distinct paragraphs, and to affix the subject matter on the margin: for, in the former case, besides that the course of
the reading was too much interrupted; the shortness of the chapters, and the length of the titles, would have proved matter of raillery to some readers; who might have been scandalized to see the head, sometimes, as big as the body”.

There are a few cases where the headings compete in length with the text, but not so many as to be a problem. This looks like an excuse to revert to a method of presentation that was traditional and usual at the time. The editor was faced with the 1651 edition which has been described by Steinitz as follows:

“The first edition of the Trattato della pittura was designed to represent Leonardo monumentalmente. The format of the book is large, the typography elaborate”.

To create this effect, headings had to be enlarged and generously displayed in the text, which provoked the not unreasonable response above from the editor of the 1721 edition. After all he was producing an octavo work without embellishments, and a reversion to the usual typographical style of the day was sensible. But this point was strongly exploited by Rigaud in the Preface to the next edition, notwithstanding the fact that eighty-one years had passed, and typographical styles had changed greatly. He was promoting his own new edition. Now that changed styles were in vogue, it is undeniable that the new presentation of headings was a considerable improvement.

But a greater contribution was Rigaud’s editing and re-arrangement of the text. A glance at the Concordance (a comparison of the different editions in Appendix 4) shows that the 1721 edition follows the order of the Du Frêne edition very closely, whereas Rigaud has extensively re-arranged the order. As he said,

“It has now... been attempted to place each chapter under the proper head or branch of the art to which it belongs; and by so doing, to bring together those which...stood...at such a distance from each other as to make it troublesome to find them...The consequence ...has been, that in a few instances the same precept has been found in substance repeated;...it clearly shews the work to be a much more complete system than those best acquainted with it, had before any idea of, and
that many of the references in it apparently to other writings of the same author, relate in fact only to the present, the chapters referred to having been found in it”.

Except for the comments on the re-arrangement, this assessment can be applied to both the 1721 and the Du Frène editions, as they contain substantially the same material.

Of the 1721 edition, Rigaud then said,

“though it professes to have been done from the original Italian, it is evident, upon a comparison, that more use was made of the revised edition of the French translation…”

The title page of the 1721 edition announces that it is a translation of the original Italian edition of Du Frène. But Rigaud reminds us in his Preface that:

“In the same year, and size, and printed at the same place, a translation of the original work into French was given to the world by Monsieur de Chambray. The style of this translation, being thought, some years after, too antiquated, some one was employed to revise and modernise it; and in 1716 a new edition of it, thus polished, came out”.

Rigaud claims that the 1721 editor used the 1716 French edition, known as the Giffart edition. What does the editor of the 1721 edition have to say in his own defence?

“My predecessor, Mons. Chambr’e [sic], the applauded author of the French translation has taken the same measures;...and yet, ...it has its failings too...I found myself, pretty frequently under the necessity of dissenting from him, and of putting constructions on my author, very different from what I found in his version”.

This clearly establishes that the editor of the 1721 edition used both the Italian and French first editions for his translation. But he infers that he used the French as a guide to the approach he should take, and he used the Italian for the textual substance. This point is further supported by a comment in

the 'Translators preface'\footnote{page x} of the 1835 edition, which reads "It does not declare by whom it was made; but though it professes to have been done from the original Italian, it is evident, upon a comparison, that more use was made of the revised edition of the French translation".

In the Preface to the 1721 edition, there is reference to the illustrations as follows:

"As to the figures, a bare out-line, we thought sufficient for the purpose: To have given finished designs would have... (been) in no wise necessary, excepting where the relievo of a body, the diminution of a colour, or the quality of stuffs in a drapery, are concerned: and on those occasions we have never failed to make use of them".

Rigaud then comments on the illustrations in his edition, first referring to the Du Frésne Italian edition...

"Of the original work...it was published at Paris, accompanied with a set of cuts from the drawings of Nicolo Poussin, and Alberti; the former having designed the human figures, the latter the geometrical and other representations. Poussin's drawings were mere outlines, and the shadows and back-grounds behind the figures were added by Errard,...as Poussin himself says, without his knowledge".

So far, Rigaud's comments do not contradict those of the translator of the 1721 edition. Rigaud then continued:

"The cuts have been re-engraven with more attention to correctness in the drawing, than those which accompanied the two editions of the former English translation possessed (even though they had been fresh engravened for the impression of 1796); and the diagrams are now inserted in their proper places in the text, instead of being...collected all together in two plates at the end."

Here Rigaud is overstating his case again. Later in this text, the illustrations have been analysed with some thoroughness, and there is scant evidence to support the view that there is more correctness in the drawing in the Rigaud text, and in fact there are fewer illustrations. Those new illustrations that replace
earlier ones do not evince any improvement. Rigaud is correct to claim that the changed positions of diagrams are an improvement, but even here there are fewer.

As far as content is concerned, the Rigaud edition runs to 365 sections, reflecting the extent of the earlier Du Frêne editions, but they are in a different order. The 1721 edition is slightly shorter, following the order of the Du Frêne edition more closely, but omitting seven sections. This is analysed in detail later.

There is another respect in which the Rigaud edition is a great improvement on the 1721 edition, and that is in the style of language. The style of the Rigaud edition is much more straightforward, and therefore accessible to readers today, whereas the 1721 edition requires concentrated effort to read, with its more convoluted style of language. A sample of text from each of the two editions follows below; note the didactic use of capitals in the 1721 edition. This is not just a typographical shortage of certain fonts at the printer, but a deliberate style affecting key words which runs throughout the complete text.

From the 1721 edition:

"'Tis a very gross tho' a very common Fault, to repeat the same Attitudes, and the same

Folds of the drapery, in the same Painting; and to draw all the Faces so like one another, that

they all appear design'd after the same Model."

The same section from the Rigaud edition:

"It is a very great fault in a painter to repeat the same motions in figures, and the same folds

in draperies in the same composition, as also to make all the faces alike."

In summary, Rigaud's criticisms of the 1721 edition seem exaggerated in an effort to establish his own new edition. The shortcomings he mentions are more properly directed towards the earlier Du Frêne edition, which were of necessity inherited by the 1721 editor. The question of which edition he used for his translation is adequately answered by his own careful assessment of the first two editions. And Rigaud's laudatory comments on the completeness of the text can be applied to the Du Frêne, 1721 and
Rigaud editions. The seven sections omitted from the 1721 edition contain material that is adequately dealt with elsewhere, so this should not be considered a significant omission.

The major difference between the 1721 and Rigaud editions is the drastic re-arrangement by Rigaud, which is a considerable improvement. So much so that Kenneth Clark judged the later 1877 edition of Rigaud to be "the only good English edition available." \(^{258}\) This is an enlarged, revised version based on the 1835 edition.\(^{259}\) Linked to this is the question of language, as the more direct style of the Rigaud edition makes it a lot more readable and accessible, and demonstrates the great effort that Rigaud invested in improving his edition.

**THE LIFE IN EACH EDITION**

The introductory section in each of the abridged English editions contains a Life of Leonardo, with information on the development of the *Treatise of painting* and biographical material. This has been considered on a selective basis from the original editions, leaving out biographical information, and concentrating on comments dealing with the history, form and development of the *Treatise of painting*.

Three different 'Lives' have been used. The Life in the 1721 edition has no obvious authorship, except for a reference on the title page where it says, "The Author's Life, Done from The Last Edition of the French". This refers to the 1716 edition, in which Giffart used Mazenta's *Memorie*. The 1796 edition was a reprint of this.

The first Rigaud edition of 1802 included a new Life by John Sidney Hawkins.\(^ {260}\) The next edition of 1835, replaced that Life with one by John William Brown,\(^ {261}\) which persisted throughout the subsequent

---


\(^{260}\) John Sidney Hawkins (1758-1842) was a fellow of the Society of Antiquaries, living in London, and a number of his works were published. However, he was so easily drawn into argument, that the *Gentleman's magazine* described him as "a learned antiquary whose talents were overshadowed by a sour and jealous temper".

\(^{261}\) J.W. Brown wrote this short biography of Leonardo which was published as a separate volume in 1828. He lived for many years in Italy, and knew the language and literature well.

1721 edition - Life based on Mazenta's Memorie (approx. 6000 words).

This Life contains more historical points of interest than critical comment, and includes an account of what happened to Leonardo's manuscripts as they began to disperse. It also contains the following comments:

"Paul Lomazzo in his treatise of painting, assures us, that Aurelo Lovino had a book of draughts, wholly performed by Leonardo, in this kind."\textsuperscript{262}

This copy of Leonardo's work is thought to be the copy mentioned by Giorgio Vasari in his \textit{Vita d. Leonardo da Vinci}, Venice 1568, where he wrote, "So also there are in the hands of..., a painter of Milan, some writings of Leonardo", without including the name of the artist. Here the archaic spelling of 'draughts' should obviously be read as 'drafts'. It continues:

As to the discourses Leonardo had composed, and the draughts he had made,...After Leonardo's death they were digested into thirteen volumes, all written backwards, after the Hebrew manner, and in so very small a character, that the naked eye was at a loss to distinguish one letter from another...

The story that follows describing what happened to Leonardo's manuscripts is essentially the same as that in the earlier chapter dealing with the \textit{Codex Urbinas}, but here it is suggested that Gavardi returned the manuscripts to Orazio Melzi, whereas it seems much more likely that they were returned by Mazenta.

The text then cites various treatises supposedly written by Leonardo, mentioning the following:

A treatise of the Nature Equilibrium and Motion of Water...

A treatise of Anatomy...

\textsuperscript{262} Aurelo Lovino was mentioned in G.P.Lomazzo, 1584, \textit{Trattato dell' arte de la pittura}, Milan. He was Aurelio Luini, the son of Bernardino Luini who had been influenced by Leonardo, although there is no proof that he was ever
The anatomy of a horse...

A treatise of perspective...

A treatise of light and shadows...

In his Treatise of Painting, Leonardo promises two other works. The one on the Motion, and the other on the Equilibrium of bodies.

The last of Leonardo's treatises... upon Painting...

The comments above on the various treatises are vague and clearly depended on reported comment at the time they were written. They do not add any new insight.


This Life contains more critical comment than the earlier one, and begins with a reference to Venturi, with some of his comments, as follows:

"Of the Treatise on Painting, Venturi gives the following particulars:" 263

'The Treatise on Painting which we have of Vinci is only a compilation of different fragments extracted from his manuscripts. It was in the Barberini Library at Rome, in 1630: the Cav. del Pozzo obtained a copy from it, and Poussin designed the figures of it in 1640. This copy, and another derived from the same source, in the possession of Thevenot, served as the basis for the edition published in 1651, by Raphael du Frêne. The manuscript of Pozzo, with the figures of Poussin, is actually at Paris... Du Frêne confesses that this compilation is imperfect in many respects, and ill arranged. It is so, because the compiler has not seized the methodical spirit of Vinci, and that there are mixed with it some pieces which belong to other tracts; besides, one has not seen where many other chapters have been neglected which ought to make part of it.'

---

263 See G.B. Venturi, 1797, Essai sur les ouvrages physico-mathematiques de Leonardo de Vinci, avec des fragments tirés de ses manuscrits, apportés de l'Italie; tu à la première classe de l'Institut, etc. (Essay on the physical-mathematical works of Leonardo da Vinci, with extracts from the manuscripts brought from Italy), Paris, p.42.
In the present publication that objection is removed, and the attempt has been favourable to the work itself, as it has shewn it, by bringing together the several chapters that related to each other, to be a much more complete and connected treatise than was before supposed”.

The Rigaud edition is more connected, as claimed above, and only more complete in respect of the seven sections mentioned earlier. The Rigaud edition is less complete than the 1721 edition with regard to illustrations. These points will be dealt with more fully later. The comment that the Du Frèresne edition contains “pieces which belong to other tracts” cannot be supported, and a glance at the concordance in Appendix 4 shows this. Hawkins is correct when he criticises the selection of material in the Du Frèresne edition, as more could have been included from the Codex Urbinas. But we do not know who made the selection, or on what basis. The nature of the abridgements is analysed in a later section.


This Life deals mainly with Leonardo’s life, times and achievements with almost no comment on his Treatise or on other editions, and is the longest of the Lives. It does however say:

“But his best known work is the Trattato della pittura, of which there are several editions; an old one with etchings by Stephano della Bella, and a more recent one printed at Paris by Du Frèresne in 1651, with figures by Nicolas Poussin”.

This is incorrect. The della Bella edition was published in 1792, and not earlier than the 1651 Du Frèresne as Brown claims.264

THE STRUCTURE OF THE 1721 AND RIGAUD EDITIONS

The structural differences between the various English editions can now be analysed using the Concordance in Appendix 4. This Concordance has been compiled using the Du Frèresne, 1721, Rigaud, Ludwig and McMahon editions. The 1721 edition does not have numbered headings to each section, but has notes in the margin. These notes have now been numbered and listed scrinatim as section headings for

264 See the list of printed editions in Chapter 4.
the purpose of comparison, and listed in Appendix 1, with the Rigaud and McMahon section headings in Appendices 2 and 3. Each section in the 1721 edition has been compared with each in the Rigaud edition, and the section numbers compiled in the correct sequence to form the concordance.

With the aid of the Concordance, a comparison can now be attempted with reference to the Du Frêne edition as a base, as this was the first printed edition. The Du Frêne edition has chapters that run from 1 to 365. The 1721 edition runs from 1 to 354, in much the same order as the Du Frêne edition. And the Rigaud runs from 1 to 365, corresponding with the Du Frêne in extent, but not order. The Concordance establishes the actual extent to which the Rigaud edition differs from the 1721 edition, and it appears that seven sections have been included in the Rigaud edition from the original Du Frêne, which never appeared in the 1721 edition. The sections are as follows, giving the Du Frêne reference first, followed by the corresponding reference in the Rigaud edition:


These seven sections are the only ones omitted from the 1721 edition when compared with the 365 sections in the Du Frêne edition. It is curious that they should have been omitted and there is nothing in their subject matter that gives us a clue as to why they were rejected. Their subject matter is similar to that in other sections in the Treatise. Perhaps the editor felt they were repetitive, and should be excluded for that reason. This is not convincing as other sections are repetitive and should have been similarly excluded. In the absence of any clear and convincing reason, perhaps we should speculate that the editor of the 1721 edition was not greatly skilled, and achieved only a partial edit. This would be congruent with other editorial shortcomings, such as the repetition, and the muddled order of many sections without logical headings, all of which Rigaud corrected. If this is the most likely explanation, why did the editor not stick slavishly to the original Du Frêne order and completeness, without leaving out any sections at all? Perhaps it was at the printer’s request to accommodate the space requirements of a surprisingly full
index? This is unlikely as there are blank folios at the front and back of the bound book. No final answer can be given, only speculation.

Comparing the Du Frèresne with the 1721, there is little difference in the Concordance, apart from the omissions mentioned above. Section numbers run in order with few exceptions. Part of Du Frèresne 36 has been moved to 106 in the 1721 edition, and 278 has moved to 296, and 305 has become 267, both dealing with light and shade. Du Frèresne sections 8, 9 and 10 are consolidated into section 6 in the 1721 edition, and there is a little minor re-ordering elsewhere. Apart from that, the 1721 edition is directly based on the Du Frèresne edition.

It was Rigaud who re-arranged the order, whilst maintaining the completeness of the Du Frèresne selection, and a glance at the concordance shows this. Rigaud's headings are listed below with their chapter groupings, and the corresponding sections from the 1721 edition are then listed under the same keys, as follows:

**KEY (from Rigaud)**

- **P** = Proportion (Ch 1-25)
- **A** = Anatomy (Ch 26-59)
- **ME** = Motion and Equipoise (Ch 60-111)
- **LP** = Linear Perspective (Ch 112-127)
- **IC** = Invention and Composition (128-164)
- **EC** = Expression and Character (165-174)
- **LS** = Light and Shadow (175-210)
- **R** = Reflexes (211-221)
- **C** = Colours (222-248)
- **CLS** = Colours: light and shadow (249-262)
- **CB** = Colours and their backgrounds (263-269)
- **CHR** = Colours: contrast, harmony and reflexes (270-282)

88
CP = Perspective of colours (283-303)
AP = Aerial perspective (304-322)
L = Landscape (323-343)
M = Miscellaneous (344-365)

If the corresponding chapters from the 1721 edition are ordered under the above keys, a pattern emerges that shows how Rigaud re-arranged the text:

P = 1, 3, 4, 9, 14, 16, 22, 27, 28, 35, 39, 44, 45, 46, 122, 160, 161, 163, 167, 169, 180, 181, 240.
IC = 7, 10, 13, 18, 34, 41, 42, 55, 62, 63, 64, 85, 88, 89, 90, 91, 92, 93, 175, 176, 184, 203, 207, 208, 209, 210, 233, 241, 242, 243, 244, 347, 348, 349, 350, 351, 353.
EC = 47, 58, 59, 60, 61, 179, 234, 245, 246, 247.
CB = 48, 67, 107, 131, 295, 324, 328.
CHR = 69, 73, 77, 80, 81, 82, 94, 117, 119, 138, 140, 151.
\[ L = 30, 124, 127, 139, 158, 275, 298, 301, 304, 305, 320, 321, 322, 334, 335, 336, 337, 338, 354. \]
\[ M = 6, 8, 11, 12, 17, 21, 36, 262, 263, 264, 265, 266, 270, 276, 287, 291, 292, 323, 325, 331, 341. \]

In looking at the Rigaud edition, there is not much change in the chapters dealing with *anatomy* and *motion and equipoise*, from the equivalent sections in the 1721 edition. Rigaud has also kept the form of the main sections in chapters on reflexes, *colours: contrast, harmony and reflexes*, and *aerial perspective*, but added scattered sections from elsewhere in each case. He has brought together two main sections plus scattered pieces in each of the chapters dealing with *linear perspective, expression and character, colours, the perspective of colours*, and *miscellaneous*. In each of the chapters on *proportion, light and shadow*, and *landscape*, he has brought together three main sections plus other scattered pieces. Sections on *colours: light and shadow*, and *colours and their backgrounds* were scattered throughout the 1721 edition, and have been consolidated into these two new chapters. In addition, a chapter on *invention and composition* has been formed from seven disparate sections, plus extra scattered pieces.

Rigaud did an excellent job of re-organising these sections and consolidating them - particularly in respect of the large number of scattered pieces. This re-organisation, and the placement of material under appropriate headings resulted in the first easily readable English edition of this abridged Treatise.\(^{265}\)

**THE NATURE OF THE ABRIDGEMENTS**

The early printed editions were all abridged, and it was the famous Manzi edition of 1817 in Italian that presented the *Codex Urbinas* in full for the first time. This makes the nature of the

\(^{265}\) Hence one reads in Blackwood's Edinburgh Magazine, 'Leonardo da Vinci, the obscurity and want of arrangement of whose treatises are so much to be regretted,...' *Eastlake's Literature of the Fine Arts*, vol. 64 (398), Dec. 1848, p. 760.
abridgements of particular interest, as so many editions followed the pattern of the shorter version. The concordance establishes a close correlation between the Du Frêne and the 1721 edition, showing the selection of sections in the Du Frêne to be the influential one. An analysis of the Rigaud edition shows it to be substantially the same as the 1721, with the sections in a different order, and 7 sections included from the Du Frêne edition which had been omitted in the 1721 edition.

The McMahon is the first English edition of the full Codex Urbinas, so a comparison of structure will show which sections were omitted from the 1721 and Rigaud editions. This in effect becomes an analysis of the abridgements.

Looking at the summary below, the totals show that Rigaud used 379 sections out of a possible 1008 later translated by McMahon, excluding 629 sections. Most of the sections he left out come from the Paragone, and chapters five and six, dealing with shadow and light, and trees and verdure. Apart from one section, he also omitted the two short last chapters, dealing with clouds and the horizon. On a sectional basis, most come from chapters two and three, being Rules for the Painter, and The Various States and Movements of the Human Body, and of these two chapters, Rigaud has included nearly 74%.

The nature of the abridgements is demonstrated below by listing sections included in the Rigaud edition with those omitted from the full McMahon edition of 1956 (numbers refer to sections in the McMahon edition).

<table>
<thead>
<tr>
<th>sections included in Rigaud</th>
<th>sections excluded from Rigaud</th>
</tr>
</thead>
</table>

PART ONE......PARAGONE; OF POETRY AND PAINTING

1-19
20
21-58
PART TWO......OF RULES FOR THE PAINTER

59-65  66
67-70  71
72  73-75
76-78  79-81
82-88  89-90
91  92
93-94  95
96-97  98-100
101  102-103
104-106  107-108
109-110  111-112
113-114  115
116-118  119
120-121  122-123
124-125  126
127-130  131
132-133  134
135-140  141
142-176  177
178-179  180-182
183-185  186
187-193  194
195-207  208
209-210  211
212-217  218
219-220  221
222-223  224
225-242  243
244-266  267
268-269  270
271-273  274-280
281-282  283
284

PART THREE.....OF THE VARIOUS STATES AND MOVEMENTS OF THE HUMAN BODY

285-287  288
289-306  307
308  309-311
312-313  314
314-319  320
321-322  323-324
325-326  327
328  329
330-331  332
333-337  338

92
PART FOUR.....OF DRAPERIES
PART FIVE......OF SHADOW AND LIGHT

575-635
636
637-740
741
742-872

PART SIX......OF TREES AND VERDURE

873-986

PART SEVEN.....OF CLOUDS

987-997

PART EIGHT....OF THE HORIZON

1007
998-1006
1008

SUMMARY

<table>
<thead>
<tr>
<th>Part</th>
<th>Included Sections</th>
<th>Excluded Sections</th>
<th>Total Sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>2%</td>
<td>58</td>
</tr>
<tr>
<td>2</td>
<td>174</td>
<td>77%</td>
<td>226</td>
</tr>
<tr>
<td>3</td>
<td>193</td>
<td>70%</td>
<td>274</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>50%</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>1%</td>
<td>298</td>
</tr>
<tr>
<td>6</td>
<td>-</td>
<td>-114</td>
<td>114</td>
</tr>
<tr>
<td>7</td>
<td>-</td>
<td>-11</td>
<td>11</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>9%</td>
<td>11</td>
</tr>
</tbody>
</table>

379 37.6% 629 62.4% 1008 100%

The 379 sections from the McMahon edition are in excess of the 365 sections in the Du Frézne edition. This is accounted for by the fact that several single sections in the Du Frézne edition are matched by two, three, and in one case, four sections in the McMahon edition.

The overall figure of interest is that all the sections in the abridged edition comprise about 37.6% of the complete Codex Urbinae. The most important point to note here is that 367 out of 379 sections come from Parts 2 and 3. These Parts are 'Of rules for the painter and Of various states and

94
Movements of the Human Body', and effectively comprise the abridged Treatise of Painting (96.8%), with a few extra sections from elsewhere.

Apart from the different order of sections between the 1721 and subsequent editions, the selection is essentially the same. That selection comprises the hard-core basics forming an introduction, the heart of information for the student painter, without the detail required by a more advanced artist. Of Rules for the Painter contains a range of information, especially on light and colour, that appears in more detail in other sections, and is clearly intended as an introduction for the student. Of Various States and Movements of the Human Body is a guide to simple anatomy and movement, including Contrapossto. There is also a small representative selection from the chapter on draperies. More advanced information, such as that on light and colour, most of the sections on draperies, and Of Trees and Verdure are left out. It is clear that the abridged English editions are all directed at the same audience, that of the student.266

The McMahon edition is different. It is a translation of the full Codex Urbinas which Melzi compiled in an orderly manner, trying to include whatever he could on painting from the material scattered throughout Leonardo's notes. He wasn't extracting specific material for a particular readership, apart from artists in general. He was simply compiling everything he could on painting. Although it includes the material in the abridged editions, it is not itself complete. There is evidence mentioned earlier that Melzi planned to include further material from other manuscripts, some of which are are now lost. The McMahon edition is the first English translation of the complete Codex Urbinas, without illustrations, plus a facsimile of the Melzi compilation, with an introduction by Ludwig Heydenreich. It was published by Princeton University Press in 1956, and is clearly intended for a serious or academic readership, which hailed its appearance at last with great interest and enthusiasm.

266 See K.T. Steinitz, Leonardo da Vinci's Trattato della Pittura, University Library, Copenhagen, 1958, p.158, where she says "this edition... was designed for those art students... who wanted Leonardo's Treatise on Painting in small size as a constant companion.
To revert to the Du Frèsne edition, a point worth noting is the curious number of sections, being 365. They represent 379 sections in the McMahon edition, and appear to have been selected and in some cases amalgamated to correspond with the days in the year. It is as if the student is advised to study one new section each day, so that the Treatise can be read as a one-year course. A strange aspect of this is that this point is not mentioned in the Preface. Nevertheless, given the introductory nature of the material, the neat number of 365 is too coincidental to have been unintended by the editor who made the selection.

Another curiosity is the grand format and treatment of headings in the Du Frèsne edition. The later compact octavo English editions are appropriate to the requirements of a students edition. The Du Frèsne is not. One can only guess at the reasons for this, but I believe that the elevated name and stature of Leonardo must account for part of it. Included must be the fact that this was the first printed edition 232 years after Leonardo's death. An octavo edition with simple typography designed for students would have been insufficient to mark such an occasion. Additional expectation was present in the form of the figure of Cassiano dal Pozzo in the background, with the Du Frèsne edition being the fulfilment of his wishes and dreams from so many years before. He was still alive when the Du Frèsne edition appeared in 1651, and died in 1657. So, there appeared the magnificent Du Frèsne edition to honour these accumulated expectations. This was followed by the more appropriate quarto and octavo formats with their simpler headings in later abridged editions and their reprints.

Finally, it is interesting to see what these additional sections are that have been included apart from parts 2 and 3, and whether they are significant. They come from Parts 1, 4, 5 and 8, and are as follows:

367 All the abridged English editions are octavo. The imposing first Italian edition was followed by two quarto excerpts, then three folio editions; subsequent Italian editions were either quarto or octavo. The imposing first French edition was followed by octavo editions, except for the 1773 excerpt, and the 1901 fragmentary edition, both of which were folios. The first two German editions were quarto, all subsequent editions being octavo. The Spanish and Swedish editions were quarto; the Dutch, Russian and Polish were all octavo.

368 38 X 26.5cms with elaborate typography.
PART ONE

20 Of painting and poetry.

This section comes from the Paragone, and attempts to establish that Painting is superior to Poetry. It does not appear to sit happily within the abridged edition. If the Paragone was considered by the editor to be a necessary 'Introduction' to this practical handbook, then a wider and more representative selection should have been included. As it stands, this lone section contributes little, and would have been better omitted.

This section appears in the Codex Urbinas on 28v, and a note has been written at the end of it, "This chapter on painting and poetry was found after having written this whole book. It seems to me that it would be well if it followed the chapter, Which science is mechanical and which is not, on folio 19r." With darker ink another hand has added:

"Rather, after the chapter, Argument of the poet against the painter on folio 14v, or after the following."  

The following sections come from PART FOUR, OF DRAPERIES.

560 Of folds of draperies in foreshortening.
563 Of the nature of the folds in draperies.
564 Of the draperies that clothe figures, and their folds.
565 Of the eye which sees the folds of drapery that surround a man.
566 Opinion regarding draperies and their folds, which are of three sorts.
567 Of the folds of draperies.
571 Of folds.
572 How folds should be made in draperies.

269 After the first two Du Fresne editions, came excerpts which were the Italian editions of 1657 and 1674[ and the Dutch edition of 1682. Then came the first abridged octavo edition, the Giffart, in 1716.
270 The scribe wrote "Questo capitolo de Pittura et poesia e ritrovato dopo l'auer scritto tutto'l libro, pero mi pare starebbe bene s'ei seguissi dietro il cap. quale scientia e' meccanica et quale no e' meccanica, a car. 19. f. 1."
271 "piu tosto dietro al cap. arguizione del poeta contra'l pittores a car. 14. f.2. ouero dietro al seguente."
This is a good representative selection on this subject, and it is entirely reasonable that such practical sections should have been included.

PART FIVE, OF SHADOW AND LIGHT

636 The more a cast shadow is mixed with light, the farther away it is from the shadowed body.

741 But simple colour is never seen, and this is proved by the ninth proposition which says:...

At first glance it appears strange that so little comment from the Part on *Shadow and light* has been included. The explanation is that a lot has been included from the Part on *Rules for the painter*, which covers similar ground but on a less theoretical level, mainly in sections dealing with *Reflections* and *Colour*. These two sections are a useful addition, and not merely repetitive.

PART EIGHT ..OF THE HORIZON

1007 Where the horizon is mirrored on the wave.

In the Rigaud edition, this falls into a section called *Landscape*, which contains a loose collection of items on this subject, ranging from The Wind, Smoke, Sun-beams, Rain, to the handling of Colour. This is the only entry on the Horizon, although there are 9 sections dealing with the Horizon in the *Codex Urbinas*. This particular entry is not exceptional, and its lone status is strange. One expects more of the others to have been included in the *Treatise of painting*, and their omission is a loss in a practical handbook.

The two Parts from which no sections are included are:

PART SIX ..OF TREES AND VERDURE and

PART SEVEN ..OF CLOUDS

Finally there are the discrepancies between the 1721 edition and the Rigaud edition. The few sections that Rigaud had included from the Du Frêne edition that the 1721 edition omitted, are numbered below, using references from the Rigaud edition, with their headings.
13 Of the proportion of the members.
23 The method of retaining in the memory the likeness of a man, so as to draw his profile, after having seen him only once.
27 Mode of studying.
39 Of the joints.
273 Of the colour of reflexes.
286 Of the diminution of colours and objects.
309 Of precise and confused objects.

As said before, these sections add little that was not included elsewhere.

COMPARISON OF THE ILLUSTRATIONS
IN THE 1721, RIGAUD AND McM A HON EDITIONS

In the history of the development of the *Treatise of painting*, the controversy over the illustrations, their commissioning, and the subsequent debate over which extant copies were part of the ‘editio princeps’, has given them a high profile in relation to the text. It has been necessary therefore to check for consistency in the illustrations in the English editions, to see whether further analysis might throw up discrepancies of any importance. This is further necessitated by the re-setting of the text in succeeding Rigaud editions with their changed pagination.

Detailed analysis of the illustrations

The arrangement of the illustrations in the 1721 edition placed the diagrams on two pages, and not opposite the appropriate text. The cuts are in the correct places but lack any section or chapter references. For purposes of comparison the illustrations or cuts have been listed below with page numbers and descriptions.
Illustrations in the 1721 edition

The cuts are numbered in sequence, but have no reference numbers to the text. The text is not numbered, but has summarized headings in the margin. The following list records and describes each cut with a page and section reference as a basis for further analysis.

**PAGE** | **CUT**
---|---
66-67 | The first cut is of a man standing, and refers to page 67. It illustrates the section “Of the position of figures”.
94-95 | Table I contains a number of diagrams from fig. 1 to fig. 15 (excluding fig. 13) on one side of a fold-out page. They refer to sections that are listed below and appear from pages 42 to 94.
98-99 | The second cut is of a number of buildings behind a wall, and refers to page 99. It illustrates the section “Of the aerial perspective”, and has heavy shading and cross-hatching.
102-103 | The third cut is of the bones of the arm and leg, and refers to page 103. It illustrates the section “The arm longer when bent, than when stretched out”, and also the section “Of the jointure of the foot” on page 104.
104-105 | The fourth cut is of a man holding a club, and refers to page 104. It illustrates the section “Whence an arm moves with the greatest violence”.
104-105 | The fifth cut is of a man holding a dart, and refers to page 105. It illustrates the section “Of the motion of man”.
104-105 | The sixth cut is of a man throwing a stone, and refers to page 105. It illustrates the section “Of the motion of man”.
110-111 | The seventh cut is of a man standing, and refers to page 111. It illustrates the section “Objection”.
110-111 | The eighth cut is of a man standing, with his weight to one side, and refers to page 111. It illustrates the section “Objection”.
112-113 | The ninth cut is of a man standing with a stone on his shoulder, and refers to page 112. It illustrates the section “Of a man bearing a burthen on his shoulders”.
112-113 | The tenth cut is of a man standing, but bent to one side, and refers to page 113. It illustrates the section “Of the bends and turnings in the body of man”.
112-113 | The eleventh cut is of a man walking, with a stone on his shoulder, and refers to page 113. It illustrates the section “Of the equilibrium, or counterpoise of the body”.
112-113 | The twelfth cut is of a man standing, and refers to page 113. It illustrates the section “Of a man walking”, and this illustration is almost a copy of the first cut without the alphabetical notation.
114-115 | The thirteenth cut is of a man standing with his weight on one foot, and refers to page 114. It illustrates the section “Of the equilibrium of a figure”.
122-123 | The fifteenth cut is of a man standing, back facing, with his arms folded behind his back, and refers to page 122. It illustrates the section “How near the elbows may be drawn together, behind the back”.
122-123 | The sixteenth cut is of a man standing with his left hand resting on his right shoulder, and refers to page 122. It illustrates the last part of the section “How near the elbows may be drawn together, behind the back”.
122-123 | The fourteenth cut is of a man looking down behind him, and refers to page 122. It illustrates the section “The greatest contortion of a man, in looking at his hind parts”.
122-123 | The seventeenth cut is of a man preparing to strike with a club, and refers to page 123. It illustrates the section “Of the disposition of the members, when a man is preparing to strike with violence”, which starts on page 122.
122-123 | The eighteenth cut is of two men pushing and pulling an object embedded in the ground, and refers to page 123. It is on one side of a fold-out page, and illustrates the section “Of the force of the arms”.

100
134-135 The nineteenth cut is of a man preparing to throw a dart, and refers to page 134. It illustrates the section “Of a man throwing anything from him with violence”.

134-135 The twentieth cut is of Hercules stifling Antaeus, and refers to page 135. It illustrates the section “Of the equilibrium of a body at rest and out of motion”, which begins on page 134.

136-137 The twenty-first cut is of a horse, and refers to page 136. It is on one side of a fold-out page and illustrates the section “Of quadrupeds and their motion”.

146-147 The twenty-second cut is of a bust, reminiscent of the Mona Lisa, placed on a light ground, which in turn is on a dark ground, and refers to page 146. It illustrates the section “How to raise and loosen a figure from its ground”.

148-149 The twenty-third cut is of a building with a square end section joined to a convex section in a landscape, and refers to page 148. It illustrates the section “The effect of one body bounding on another”.

148-149 The twenty-fourth cut is of a man walking with a garment blown behind him, and refers to page 148. It illustrates the section “Of a man walking against the wind”.

152-153 The twenty-fifth cut is of a man standing before lines of measurement radiating upwards from a smaller source before him, and refers to page 152. It illustrates the section “How a painter may design a figure that may appear twenty-four fathoms high, on a wall only twelve fathoms high”.

156-157 The twenty-sixth cut is of a tower and buildings in a landscape, and refers to page 157. It illustrates the section “Of cities and other objects seen in a gross air”.

158-159 This cut is also marked 26, and should be the twenty-seventh cut. It is of a tower and wall in a landscape with sea, and refers to page 158. It illustrates the section “Of buildings seen through a gross air”.

164-165 The twenty-eighth cut is of three towers and the fortifications of a city, and refers to page 164. It illustrates the section “The highest objects seen at a distance, and in a fog, appear more obscure than those which are lower”.

166-167 The twenty-ninth cut is of a tower casting a shadow on a building at sunset, and refers to page 166. It illustrates the section “Why the shadows projected on a white wall, towards the close of the day, appear azure”.

168-169 The thirtieth cut is of a landscape with buildings, showing strong lights and shadows at sunset, and refers to page 168. It illustrates the section “Miscellaneous rules and precepts, for painting”.

178-179 Table II contains a number of diagrams from fig.1 to fig.11 on one side of a fold-out page. They refer to sections that are listed below and appear from pages 137 to 178. This page of diagrams is headed Tab.II.

186-187 The thirty-first cut is of a man standing, wearing a garment, and refers to page 187. It illustrates the section “How to conduct the folds of a drapery”, which begins on page 186.

188-189 The thirty-second cut is of a person standing and one sitting, both wearing garments, and refers to page 188. It illustrates the section “Of the folds seen in the draperies of members that are shortened”.

188-189 The thirty-third cut is of a landscape with water, and a distant horizon, and refers to page 189. It illustrates the section “Of the horizon appearing in the water”.

The following list relates the 1721 cuts detailed above to the plates in the 1802 Rigaud edition, followed by the figures in Tables I and II.

This will show discrepancies and changes, and any points of importance.

272 On page 146, there is an incorrect reference in the text to Tab.2, fig.2 – this should be to Tab.II, fig.3.
273 On page 178, there is an incorrect reference in the text to Tab.2, fig.2 – this should be to Tab.II, fig.11.
<table>
<thead>
<tr>
<th>Cut no.</th>
<th>Rigaud plate no.</th>
<th>p.1721</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13</td>
<td>66-67</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>98-99</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>102-103</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td>104-105</td>
</tr>
<tr>
<td>5</td>
<td>20</td>
<td>104-105</td>
</tr>
<tr>
<td>6</td>
<td>21</td>
<td>104-105</td>
</tr>
<tr>
<td>7</td>
<td>11</td>
<td>110-111</td>
</tr>
<tr>
<td>8</td>
<td>12</td>
<td>110-111</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
<td>112-113</td>
</tr>
<tr>
<td>10</td>
<td>6</td>
<td>112-113</td>
</tr>
<tr>
<td>11</td>
<td>7</td>
<td>112-113</td>
</tr>
<tr>
<td>12</td>
<td>omitted</td>
<td>112-113</td>
</tr>
<tr>
<td>13</td>
<td>9</td>
<td>114-115</td>
</tr>
<tr>
<td>14</td>
<td>3</td>
<td>122-123</td>
</tr>
<tr>
<td>15</td>
<td>4</td>
<td>122-123</td>
</tr>
<tr>
<td>16</td>
<td>17</td>
<td>122-123</td>
</tr>
<tr>
<td>17</td>
<td>14</td>
<td>122-123</td>
</tr>
<tr>
<td>18</td>
<td>2</td>
<td>122-123</td>
</tr>
<tr>
<td>19</td>
<td>15</td>
<td>134-135</td>
</tr>
</tbody>
</table>

Cut number 1 is missing the letter 'A' below the left elbow, and it is referred to in the text. This is corrected in plate 13. A piece of prudery common to several of the Rigaud plates appears here for the first time. The male genitals are covered with a fig leaf. However cut number 1 is also malformed in this respect presumably in an effort to conceal, which is strange because other cuts are normal and natural.

Plate 1 is reversed and redrawn with better detail and shading.
Plate 16 now has a more detailed foreground, and the addition of a genital fig leaf. The letter A has been placed lower in an odd but not quite nonsensical position.
Plate 20 is a reversed version of cut 5, and is an enlarged version of plate 15. The foreground is more detailed than Plate 20, and the genital fig leaf has appeared again.
Plate 21 is essentially the same with extra detail in the foreground.
Plate 11 is essentially the same as cut 7 with minor foreground details, and the addition of a fig leaf, although cut 7 is malformed in the same way as cut 1.
Plate 12 is the same as cut 8 except for a more detailed foreground, and a fig leaf covering the genital malformation of cut 8. Both this illustration and the previous one are referred to together in the text.
Typically plate 10 has a more detailed foreground than cut 9, and the usual fig leaf has appeared, concealing normality, but there is less shading on the stone the figure is carrying.
Plate six has the usual more detailed foreground, and fig leaf.
Plate 7 has some foreground detail, otherwise the same.
Plate nine has a fig leaf, and minor foreground detail, otherwise the same.
Plate 3 has foreground detail, otherwise the same.
The same apart from foreground detail and a fig leaf.
The same apart from minor foreground detail and a fig leaf.
The same apart from minor foreground detail and a fig leaf.
The garments are unnecessary and peculiar.
Plate 2 now includes the letters CN and ABN which relate to the text. Cut 18 omitted them although the text quoted them.
The same apart from a fig leaf in plate 15.
These are the same, and the pose is strongly reminiscent of “Hercules and Antaeus” by Pollaiuolo.274

Plate 8 has minor foreground detail, otherwise the same.

The same apart from a fig leaf in plate 22.

The illustration on page 171 is redrawn and much simpler, without the landscape background, and heavy details ascribed to Errard.

The comment immediately above can be applied to this illustration as well. Also note that the number of cut 26 has been repeated, and this should be cut 27.

This is another redrawn and simpler illustration without an elaborate background and Errard’s shading. Cut 28 lacks the letter A above the first tower, and this is corrected in the Rigaud edition.

This is another example of a simpler redrawn illustration without a background and heavy shading.

These are the same, except that plate 18 omits the heavy shading of Errard, and has duplicated the letter C, widening the application of the text.

Plate 19 is the same as cut 32, without the background and heavy shading.

Table I. pp.94-95

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>fig.1 (ref.p.42)</td>
<td>p.93 Redrawn and enlarged.</td>
</tr>
<tr>
<td>fig.2 (ref.p.48)</td>
<td>p.55 Redrawn and enlarged with less shading.</td>
</tr>
<tr>
<td>fig.3 (ref.p.48)</td>
<td>p.55 The same as fig.2</td>
</tr>
<tr>
<td>fig.4 (ref.p.59)</td>
<td>p.57 Redrawn and enlarged. The letters B and C have been added, and are referred to in the text.</td>
</tr>
<tr>
<td>fig.5 (ref.p.63)</td>
<td>p.113 Redrawn and enlarged. The letters D and C have been omitted as they are not referred to in the Rigaud text, as they were in the 1721 text.</td>
</tr>
<tr>
<td>fig.6 (ref.p.64)</td>
<td>p.114 Redrawn and enlarged with less shading. The letter R has been moved to the right.</td>
</tr>
<tr>
<td>fig.7 (ref.p.65)</td>
<td>p.146 Redrawn and enlarged.</td>
</tr>
<tr>
<td>fig.8 (ref.p.65)</td>
<td>p.148 Redrawn and enlarged. Rigaud has omitted the letter H in error, and compounded the error in his text by quoting CB instead of H.</td>
</tr>
<tr>
<td>fig.9 (ref.p.74)</td>
<td>p.159 Redrawn and enlarged. Rigaud corrected the position of the letter L by raising it one degree, level with the letter A. But he then misplaced the letter O which should be dropped level with the letter P.</td>
</tr>
<tr>
<td>fig.10 (ref.p.76)</td>
<td>p.157 Redrawn and enlarged.</td>
</tr>
<tr>
<td>fig.11 (ref.p.80)</td>
<td>p.124 Redrawn and enlarged with better proportions.</td>
</tr>
<tr>
<td>fig.12 (ref.p.86)</td>
<td>p.152 Redrawn and enlarged with more shading.</td>
</tr>
<tr>
<td>fig.14 (ref.p.88)</td>
<td>p.102 Redrawn and enlarged with better shading and proportion.</td>
</tr>
<tr>
<td>fig.15 (ref.p.94)</td>
<td>omitted</td>
</tr>
</tbody>
</table>

Antonio Pollaiuolo (c.1432-1498).
In the above comparison, the 1802 edition of Rigaud has been used for reference purposes, simply because it appeared before the others under consideration here. It is necessary to check the first Rigaud edition with subsequent editions to confirm their consistency. The next edition, 1835, is textually the same, but is not a reprint. The type has been re-set, which has led to different pagination and the consequent repositioning of illustrations. The 1877 edition was also reset when published by George Bell, with consequent re-pagination.

An analysis of the differences (below) show them to be minor and not of substance or importance.

The 1802 text runs from pages 1-208. The 1835 text runs from pages 1-225, and the 1877 from pages 1-156.

The illustrations appear as follows:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30&amp;37</td>
<td>14-15</td>
<td>Verso</td>
<td>16-17</td>
<td>Verso</td>
<td>10-11</td>
<td>Verso</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>48&amp;49</td>
<td>22-23</td>
<td>Centre-fold-out</td>
<td>22-23</td>
<td>Recto</td>
<td>16-17</td>
<td>Verso</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>54*</td>
<td>24-25</td>
<td>Recto</td>
<td>24-25</td>
<td>Verso</td>
<td>18-19</td>
<td>Recto</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>53</td>
<td>24-25</td>
<td>Recto</td>
<td>24-25</td>
<td>Verso</td>
<td>18-19</td>
<td>Recto</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>62</td>
<td>26-27</td>
<td>Verso</td>
<td>26-27</td>
<td>Verso</td>
<td>20-21</td>
<td>Recto</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>66</td>
<td>28-29</td>
<td>Recto</td>
<td>28-29</td>
<td>Verso</td>
<td>20-21</td>
<td>Recto</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>67</td>
<td>28-29</td>
<td>Recto</td>
<td>28-29</td>
<td>Verso</td>
<td>22-23</td>
<td>Recto</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>74</td>
<td>30-31</td>
<td>Verso</td>
<td>30-31</td>
<td>Verso</td>
<td>22-23</td>
<td>Verso</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>78</td>
<td>32-33</td>
<td>Recto</td>
<td>32-33</td>
<td>Verso</td>
<td>26-27</td>
<td>Verso</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>80</td>
<td>32-33</td>
<td>Verso</td>
<td>34-35</td>
<td>Recto</td>
<td>26-27</td>
<td>Verso</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>84</td>
<td>34-35</td>
<td>Verso</td>
<td>36-37</td>
<td>Recto</td>
<td>26-27</td>
<td>Recto</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>84</td>
<td>34-35</td>
<td>Verso</td>
<td>36-37</td>
<td>Recto</td>
<td>26-27</td>
<td>Recto</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>85</td>
<td>34-35</td>
<td>Verso</td>
<td>36-37</td>
<td>Recto</td>
<td>26-27</td>
<td>Verso</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>89</td>
<td>36-37</td>
<td>Verso</td>
<td>38-39</td>
<td>Verso</td>
<td>28-29</td>
<td>Recto</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>90</td>
<td>38-39</td>
<td>Recto</td>
<td>38-39</td>
<td>Verso</td>
<td>28-29</td>
<td>Verso</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>92</td>
<td>38-39</td>
<td>Verso</td>
<td>40-41</td>
<td>Recto</td>
<td>28-29</td>
<td>Verso</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>96</td>
<td>40-41</td>
<td>Verso</td>
<td>42-43</td>
<td>Recto</td>
<td>30-31</td>
<td>Verso</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>145</td>
<td>68-69</td>
<td>Recto</td>
<td>70-71</td>
<td>Verso</td>
<td>50-51</td>
<td>Verso</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>147</td>
<td>68-69</td>
<td>Verso</td>
<td>72-73</td>
<td>Recto</td>
<td>50-51</td>
<td>Verso</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>153</td>
<td>72-73</td>
<td>Recto</td>
<td>76-77</td>
<td>Recto</td>
<td>54-55</td>
<td>Recto</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>153</td>
<td>72-73</td>
<td>Recto</td>
<td>76-77</td>
<td>Recto</td>
<td>54-55</td>
<td>Recto</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The plates in the 1802 edition show the plate number, chapter number, and page number to which they refer. Beneath these appears:

London Published by J. Taylor High Holborn.

The plates in the 1835 edition show the plate number and chapter number. Beneath these appears:

Published by Nichols & Son, Parliament Street, 1835.

Printed from Stone by Standidge & Co. London.

The plates in the 1877 edition show the plate number and chapter number.

The Diagrams drawn by Gli Alberti appear in the 1721 edition on two pages, being Table I between pages 94-95, and Table II between pages 178-179. They are redrawn for the 1802 edition, enlarged, and separately placed in the text where referred to. Several have been redrawn again and slightly enlarged for the 1835 edition. These have been repeated in the 1877 edition with the exception of that on page 148 (1835 ed.) which has been redrawn again. It is not known who redrew these diagrams. Due to re-setting, the diagrams appear on different pages in the 1835 and 1877 editions to those in the 1802 edition.

<table>
<thead>
<tr>
<th>1721 edition</th>
<th>1802</th>
<th>1835</th>
<th>1877</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Table I</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Figure 1</td>
<td>93</td>
<td>100</td>
<td>69</td>
</tr>
<tr>
<td>Figure 2</td>
<td>55</td>
<td>58</td>
<td>42</td>
</tr>
<tr>
<td>Figure 3</td>
<td>55</td>
<td>58</td>
<td>42</td>
</tr>
<tr>
<td>Figure 4</td>
<td>57</td>
<td>60</td>
<td>43</td>
</tr>
<tr>
<td>Figure 5</td>
<td>113</td>
<td>121</td>
<td>84</td>
</tr>
<tr>
<td>Figure 6</td>
<td>114</td>
<td>122</td>
<td>85</td>
</tr>
<tr>
<td>Figure 7</td>
<td>146</td>
<td>159</td>
<td>110</td>
</tr>
<tr>
<td>Figure 8</td>
<td>148</td>
<td>160</td>
<td>111</td>
</tr>
<tr>
<td>Figure 9</td>
<td>159</td>
<td>173</td>
<td>120</td>
</tr>
<tr>
<td>Figure 10</td>
<td>157</td>
<td>170</td>
<td>118</td>
</tr>
<tr>
<td>Figure 11</td>
<td>124</td>
<td>133</td>
<td>93</td>
</tr>
<tr>
<td>Figure 12</td>
<td>152</td>
<td>165</td>
<td>115</td>
</tr>
<tr>
<td>Figure 13</td>
<td>102</td>
<td>109</td>
<td>76</td>
</tr>
<tr>
<td>Figure 14</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Figure 15</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Table II</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Figure 1</td>
<td>44</td>
<td>46</td>
<td>33</td>
</tr>
<tr>
<td>Figure 2</td>
<td>205</td>
<td>222</td>
<td>153</td>
</tr>
<tr>
<td>Figure 3</td>
<td>100</td>
<td>107</td>
<td>75</td>
</tr>
<tr>
<td>Figure 4</td>
<td>197</td>
<td>213</td>
<td>147</td>
</tr>
<tr>
<td>Figure 5</td>
<td>130</td>
<td>140</td>
<td>98</td>
</tr>
<tr>
<td>Figure 6</td>
<td>195</td>
<td>211</td>
<td>146</td>
</tr>
<tr>
<td>Figure 7</td>
<td>103</td>
<td>110</td>
<td>77</td>
</tr>
<tr>
<td>Figure 8</td>
<td>104</td>
<td>111</td>
<td>78</td>
</tr>
<tr>
<td>Figure 9</td>
<td>193</td>
<td>209</td>
<td>144</td>
</tr>
<tr>
<td>Figure 10</td>
<td>194</td>
<td>210</td>
<td>145</td>
</tr>
<tr>
<td>Figure 11</td>
<td>198</td>
<td>214</td>
<td>148</td>
</tr>
</tbody>
</table>
Following the above scheme, the four new pictures that Rigaud introduced to replace existing cuts can be found as follows:

<table>
<thead>
<tr>
<th>Cut No.</th>
<th>136</th>
<th>148</th>
<th>103</th>
</tr>
</thead>
<tbody>
<tr>
<td>(29)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(26)</td>
<td>170</td>
<td>185</td>
<td>128</td>
</tr>
<tr>
<td>(26-should be 27)</td>
<td>171</td>
<td>186</td>
<td>129</td>
</tr>
<tr>
<td>(28)</td>
<td>176</td>
<td>191</td>
<td>133</td>
</tr>
</tbody>
</table>

The above analyses have covered the following. The illustrations or cuts have been listed with page numbers and descriptions. These have been compared with the illustrations in the first Rigaud edition, being 1802, with comments, references and page numbers. The cuts and plates have been analysed seriatim, and the figures in Tables I and II in the 1721 edition have been compared with their Rigaud counterparts. As an additional check, the sequence and pagination of the plates in the Rigaud editions of 1802, 1835 and 1877 have been compared. The sequence and pagination of the figures in the 1721 edition have been listed with those in the 1802, 1835 and 1887 Rigaud editions to throw up any further discrepancies.

What can be said of the above analyses? Figures 2 and 3 in Table I in the 1721 edition appear in subsequent editions as one illustration. Figures 6 and 9 in Table II in the 1721 edition are reversed in subsequent editions. Of the 33 cuts in the 1721 edition, Rigaud uses only 22. However he has replaced four of the unused pictures with new engravings of similar scenes, leaving a shortfall of seven cuts, being 2, 12, 21, 22, 23, 30 and 33. He has used 13 out of the 14 figures in Table I, omitting figure 15, and used all 11 on Table II. There are four new illustrations, and various other discrepancies such as omitted or replaced letters, and reversed plates. The Rigaud editions are consistent with each other, and have left out the excessive shading by Errard, and the repositioning of the illustrations is consistent with the repositioning of some of the sections. There is also the error in Rigaud’s text dealing with Table I, figure 8, appearing on page 148 in the 1802 edition.
In summary then, Rigaud has used fewer illustrations, and a few of them are redrawn. Positioning throughout the text is better, and the removal of Errard’s work is a relief whilst the addition of the fig leaf is annoying. Nothing more significant than this has been thrown up by the analysis.

The McMahon edition has no illustrations as part of the new translation, but the second volume is a facsimile of the Codex Urbinas, and therefore includes copies of the original sketches. It is not known who drew these original sketches, but it is presumed they were done by Francesco Melzi. What follows are selected illustrations from the Codex Urbinas, which show clearly why Cassiano dal Pozzo commissioned Nicolas Poussin to provide illustrations worthy of the text. These are followed by illustrations from the 1721 and Rigaud editions, including the Tables, and the additions by Errard that annoyed Poussin so much.

SELECTED ILLUSTRATIONS

Included in this selection are some of Poussin’s illustrations from the 1721 and Rigaud editions, including the diagrams, and the additions by Errard that annoyed Poussin.

The selection of illustrations is as follows:

1. An illustration by Poussin from the 1721 edition.
2. The same illustration from the Rigaud edition.
3. Another illustration by Poussin from the 1721 edition.
5. An illustration by Poussin from the 1721 edition heavily shaded by Errard.
6. Another illustration by Poussin from the 1721 edition heavily shaded by Errard.
7. An example of the rudimentary figure drawings from the Codex Urbinas.
8. Another example of the rudimentary figure drawings from the Codex Urbinas.
9. Gli Alberti’s diagrams (Table I) from the 1721 edition.
10. Gli Alberti’s diagrams (Table II) from the 1721 edition.
11. An example of the diagrams from the Codex Urbinas.
An illustration by Poussin from the 1721 edition.
The same illustration from the Rigaud edition.

Published by Nichols & Son, Parliament Street, 1836.

Another illustration by Poussin from the 1721 edition.
The same illustration from the Rigaud edition.
An illustration by Poussin from the 1721 edition heavily shaded by Errard.
Another illustration by Poussin from the 1721 edition heavily shaded by Errard.
An example of the rudimentary figure drawings from the Codex Urbinas.
Another example of the rudimentary figure drawings from the Codex Urbinas.

**TERZA.**

alle gomita delle spinte mani, cioè che l’ultima mietion
che hanno
gomitate
ten scato
giusto che
muto allo
maggior
piato, queste braccia fanno un quadrato perfetto.
Quante si possono traversare le braccia sopra il petto
e che le gomitate peggino nel mezzo del petto,
quando gomite colo spalle e braccia fanno un stringaro
e le equivalenti
Dell’aparrehio della forza nel uomo
che nel generare gran percuazione
Quando l’homo si dispone alla creazione del moto
colla forza
et si stacca
te si mora
di esso
gienerare
si (quini
alla forza di alzi e possibile la quale puoi imaginarti
e lascia sepra dela cosa da lui percossa, cò morto deciperse
Della forza composta dal homo e
prima si diva della sua
bracciare,

Vedono che moversi il maggiorfico del braio nell’
ascenzione, c’astensione del braio nascono circhi al mezo
Gli Alberti's diagrams (Table I) from the 1721 edition.
Gli Alberti's diagrams (Table II) from the 1721 edition.
An example of the diagrams from the Codex Urbinas.

...
7. THEMATIC ANALYSIS OF LEONARDO'S THOUGHT

THE CENTRAL THEMES IN THE TREATISE OF PAINTING.

An analysis of the Treatise of painting should try to get behind the precepts that comprise this work, and identify Leonardo's vision, or personal art theory. It is tempting to broaden the scope of this attempt to a fuller analysis of Leonardo's art theory, and see how it was placed in the context of the art world at that time, and how it influenced subsequent art theory. However that would be a large and different undertaking, and does not fall within the bounds of this thesis. Nevertheless some introductory remarks may be helpful in establishing the inheritance that Leonardo received, the roots of which went back into Medieval art theory and practice, and beyond. One needs to look at the legacy of the Middle Ages to understand the changes and challenges faced by leading thinkers of the Renaissance such as Alberti and Leonardo.

Renaissance artists inherited a disparate and sometimes conflicting set of ideas from the Middle Ages, some of which went back a long way, and which were to persist through a time of gradual cohesion as they developed into a unified Renaissance art theory. A number of different strands contributed towards this, one of which was the role of the guilds in the development of art theory.

Within the guild system, there was the practical need to repeat, develop and pass on skills, which led to the development of workshop manuals, and model or copy books. Works of this kind were usually written by practising artists for other artists or artisans, and focused on the processes involved in the production of an artist's work, not really on the theory behind it. There were many of these practical guides, but one of the most important workshop manuals from the Middle Ages was The various arts by Theophilus Presbyter, known as Theophilus or Rugerus. This was typical of all medieval workshop manuals, consisting of practical precepts, in a disordered arrangement. There were others such as the

275 De diversis artibus written in about 1150. See Theophilus, 1847, The various arts (De diversis artibus), Translated ... with introduction and notes by C. R. Dodwell. London, Thomas Nelson. See also M. Rasselas, 1985, p. 78.
276 Theophilus Presbyter (12th century).
Sketchbook of Villard de Honnecourt compiled in about 1230, and The Painter’s Guide by Denis of Fourni. This common practice of presenting practical knowledge in the form of precepts can be seen in Cennino Cennini’s Libro dell’arte and also in Leonardo’s ‘notes’. These early treatises had no overall structure or form, as there was not yet a complete system or unifying theory of art.

It is tempting to draw a strong parallel with this and the disordered way in which Leonardo wrote his material, precept after precept, but he did have a cohesive view, an underlying unity and theory of art. Earlier treatises were disordered because they lacked a unifying theory. Leonardo’s were disordered for other reasons, such as his personality, and the way in which he worked, with his intention to one day compile his notes into separate treatises.

Then there was the Medieval custom of separating the arts from each other in guilds. The guilds focused on many different practical crafts, and their diversified structure separated different art and craft skills. This fragmentation on a practical level had consequences on the theoretical level. It worked against the opportunity to develop a unified art theory. This changed with the Renaissance, where many artists came together, such as the painters, sculptors and architects, to discuss and explore common problems. This practical development had a unifying effect, making the development of a cohesive art theory possible. But this was a partial and gradual process, and some guilds actually strengthened in the face of this change. Different artists still felt a strong primary allegiance to their own workshop, type of skill or practise of the arts. Hence the debate in the Courts of the day that we read in the Paragone. It was later, in 1550, that Vasari reiterated the development by bringing together architects, painters and sculptors in his famous Lives.

In addition, other divisive forces were at work, notable amongst which was the iconoclastic problem. Quite simply, religious and monastic thought was suspicious of sculpture

---

and painting in that they might produce 'graven images'. Pope Gregory defended images up to a point on practical grounds because they performed a useful function in instructing the illiterate. This aspect of instruction and learning through pictures persisted and grew throughout the Middle Ages, and is congruent with Leonardo's later view of art being the means of acquiring knowledge of both this world, and a transcendental world.

Another problem of the time revolved around the nature of artistic creativity. In what sense did the act of creation by an artist mirror God's Act of Creation? Both St Thomas Aquinas and St Augustine maintained that only God can create. This posed a problem and resulted in the distinction that God creates, but artists make. This 'artistic making' followed rational rules, and was regarded as superior to the mere 'crafting' of a craftsman.

The scholastics did not write about the visual arts, as such, and neither St Thomas nor St Augustine contributed much to the development of art theory. St Thomas Aquinas did write about beauty. He thought of beauty as an objective quality, depending on 3 conditions - integrity or perfection (the opposite is defective which is ugly), - proper proportion or harmony, - and clarity. It is interesting that he never referred to any particular work of art. He does point out in a marginal note that an object rendered in outline without colour will be legible, but will be diffused when rendered in colour without outline. He clearly considered line to be superior to colour, and this question of colour versus line was to become a central point in the development of Renaissance art theory.

Part of St Augustine's view was the idea that number was the basis of beauty, which of course had come down from Plato. St Augustine wrote "in beauty, the shapes; and in the shapes,
the proportions; and in the proportions, the numbers". Here again we see an idea, the relationship between proportion and number, or mathematics, that was to become a central part of Leonardo's thinking.

Another important strand in this cohering process was the idea that the visual arts should imitate nature, and this was common to all Renaissance Treatises on art. One of the early treatises was Cennino Cennini's *Libro dell'arte*, and his understanding of this concept was very simple and direct. The imitation of nature meant copying a figure or object to produce a replica, an accurate representation of nature and man as they are, as we actually see them. Here one thinks of Leonardo's many sketches throughout his notes, painstakingly recording how things really are, as a basis for his scientific enquiries, and his paintings.

Then came Alberti. His background was not that of the workshop, yet he wrote for artists. He did not write in the traditional workshop manner, where practical information on processes was given as precepts or observations in discrete pieces. He had a more rational, logical and systematic approach containing the elements and rules of painting, all of which were directed towards the imitation of nature. The earlier 'direct imitation' of Cennini had evolved into the idea that imitation of nature had to be 'correct', and to be beautiful. In the *De re aedificatoria*, Alberti states that "beauty is the harmony of all parts in relation to one another", and he says, "Beauty is a kind of concord and mutual interplay of the parts of a thing... which is realised in a particular number, proportion, and arrangement demanded by harmony...". Compare this with the words of St Thomas Aquinas and St Augustine noted above. Alberti saw no contradiction in pursuing this idea of beauty, and imitating nature. Clearly, the artist should select the beautiful in nature. This is an important move forward from the medieval custom of copying from workshop manuals and model books, without discretion. The inherent problem of pursuing an idea of beauty, whilst at the same time faithfully imitating nature which might be far less than beautiful was to persist. It did not disappear, and was to demand proper resolution for a long time to come.

---

285 *De Ordine* II 15. 42.
286 II, 13.
This elaborated form of correct imitation contained another inherent problem, that being the risk that representation could easily become contrived and mannered. The need to resolve these difficulties spurred on the development of several technical devices, the most important of which was the development of perspective. It changed the status of a picture from that of a flat surface, to one of a transparent surface through which one could see a scene with apparent depth, based on lines of vision which obeyed the rules of geometry. It was Alberti who made the science of perspective comprehensible and accessible to artists in his Della Pittura. He took Brunelleschi’s early work on perspective, and explained it more fully, presenting it clearly and more simply with the great advantage that it was now in Italian, not Latin.

Leonardo, too, considered perspective to be of the utmost importance, and added further important developments, such as aerial perspective and the perspective of colour with their various implications. One of his discoveries affected the understanding of the concept of ‘correct imitation’. A frustration he encountered was that paintings did not show the relief that a scene has when seen in a mirror. He realised that scientific perspective used in painting depended on a single point of vision - the equivalent of looking through one eye. A greater sense of ‘relievo’ is achieved by looking through two eyes. He realised that scientific perspective was geometrically and mathematically correct on a flat surface, but we need more than a single point of vision to explain the ‘relievo’ in the real world.

From about 1500 onwards, the problem of artistic creativity took on an additional dimension, that of the creative nature of the artist. It was noted by Leonardo that painting cannot be taught to someone who is not naturally fitted for it. And this natural aptitude arose from the personality of the artist, the psychological source of creativity. The importance of the personal vision of the artist within the creative process was to become very important at the beginning of the seventeenth century, and was to remain a central feature of art theory up to today.

Vasari reflected this process of a gradually developing unified art theory in his Lives, where he said, "Design, however, is the foundation of both these arts (sculpture and painting), or

\[^{288}\text{In the Preface.}\]
rather the animating principle of all creative processes." He then said, "Since Design, the father of our three arts, Architecture, Sculpture, and Painting...". This recognition of commonality within the arts finally cemented the coming together of the visual arts after the fragmentation of the Middle Ages, and added a new unity and dimension to the Renaissance theory of art.

With these background comments in mind, what follows is an attempt to define Leonardo's thinking on art in terms of the contents of the early abridged editions. Even though Rigaud re-ordered the material in the 1721 edition for his 1802 edition, the approach is still didactic, and follows from one detailed point or precept to the next. What follows is an attempt to get behind that material, and identify the structure of Leonardo's thought, as it appears in these early editions, and as it would have appeared to a reader of, say, the 1802 edition. It is therefore limited by the presentation of that material, and by the scope of the sources on which it was based.

In his mechanical and scientific enquiries, Leonardo had developed an empirical approach and a scientific method, and he believed he could do the same for art, defining its rules, and bringing it within a system. This would reinforce its status as a branch of knowledge, with The Treatise of Painting being in a sense 'the science of art'. Many of his notes provide little more than explanatory comment on a visual detail, but there are those that are more general and provide us with an insight into Leonardo's systematic thinking on art, which constitutes an aesthetic concept or philosophy.

Leonardo's ideas can be grouped into five main areas, or theories. Because of the haphazard order of Leonardo's original notes, these theories do not neatly follow each other in manuscript copies and printed texts, and are not easy to find under the actual section headings in the Codex Urbinas or Treatise of Painting.

---

289 In the Introduction the enlarged section on Painting in the second edition of 1568.
The first is his **Theory of Painting as a Science**, and occurs in the *Paragone* in which Leonardo argues about the definition of painting, and attempts to establish it as a system of rules, giving us access to knowledge of the world, and enabling us to express that knowledge.\textsuperscript{290} The *Paragone* does not occur in the abridged editions, and only in the complete editions, so should not strictly be included here. However, any discussion of Leonardo’s art theory should include it, as it precedes his thinking on more detailed points. It establishes Leonardo’s vision of Art as a superior vehicle for both gaining and imparting knowledge of the world, and the responsibilities that go with that.

The second can be called Leonardo’s **Theory of Observation**, in which he stresses the importance of observing nature, thereby gaining knowledge of the structure of reality, without which no worthwhile art is possible.

Thirdly, Leonardo examines the practical aspects of painting as a science, which relate to geometry, perspective, and optics.\textsuperscript{291} This constitutes his **Theory of Vision**.

The fourth is an extensive **Theory of Colour and Light**, and the fifth is his **Theory of Forms**,\textsuperscript{292} most of which concerns human proportion and mechanics.

**Painting as a Science**: Part one of the *Codex Urbinas*, called the *Paragone: of Poetry and Painting*,\textsuperscript{293} attempts to establish painting as a science, and elevate it above Poetry and Music. Leonardo argued that painting was superior to poetry and the other arts, and that the sense of sight was superior to the other senses. This was a topic of common concern at the time, and was debated in both the courts of the Sforza and the Medici. Lomazzo\textsuperscript{294} suggests that Leonardo wrote the notes that were later named the *Paragone* at the request of Ludovico Sforza himself.

Leonardo begins by saying:

> "Science is that mental analysis which has its origin in ultimate principles, beyond which nothing in nature can be found which is part of that science. No human


\textsuperscript{291} L.H. Heydenreich, 1954, p.98.


\textsuperscript{293} The *Paragone* did not appear in the abridged editions, but only in the *Codex Urbinas* and later complete editions, as well as particular excerpts.

\textsuperscript{294} In his *Trattato dell’Arte de la Pittura*, 1584 p.158.
This link between art and mathematics was familiar to the artists of the day. It was the underpinning of perspective, and hence the science of vision. He then tries to determine the principles of Painting:

"The first principle of the science of painting is the point, then comes the line, then the surface, and then the body bounded by a given surface."

The second principle of painting is the shadow of the body which it represents.

The science of painting includes all the colours of surfaces, and the forms of the bodies bounded by them, as well as their nearness and distance, including the proper degrees of diminution, according to degrees of distance. This science is the mother of perspective, or visual lines.

This is further discussed in the section on the Theory of Colour.

"Painting is proved to be philosophy because it treats of the motion of bodies and the rapidity of their actions, and philosophy also includes motion."

Leonardo then discusses Painting in relation to the senses, preparatory to establishing it as a superior activity to Poetry and Music. He establishes that sight is more exact and 'less deceived' than hearing or smell because it depends on the science of perspective. And Painting reveals nature to the senses with more truth and certainty than do words or letters. He expands his defence of painting by claiming it is more all embracing than music, arithmetic and geometry. He then goes on to say:

"To represent words, poetry surpasses painting; and to represent facts, painting surpasses poetry. There is the same relation between facts and words that there is between painting and poetry...painting is superior to poetry.\(^\text{301}\) That is more worthy which satisfies the better sense. Therefore, painting which satisfies the sense of sight is more noble than music, which satisfies only hearing.\(^\text{302}\) After painting comes sculpture, a very valuable art, but it is not produced by minds of such excellence as is painting."\(^\text{303}\)

This last is an interesting comment on sculpture in view of his disappointment over the 'Sforza Horse', and his competitive relationship with Michelangelo. There is a feeling of artificiality in this section, a sense of point scoring and sophistry, but that is understandable when considering it as a record of the type of debate that went on at the time - perhaps it is a record of an actual debate in which Leonardo took part. A unique aspect of it is that we see a side of Leonardo that we do not see anywhere else in his notes - a more personal, less didactic, and more impassioned side to his personality. For Leonardo, this personal defence of painting was not just a point scoring exercise. It was part of his view that painting occupied a special place, and had an elevated role in the science of knowledge.

The Theory of Observation

An important aspect of this Theory that Leonardo stresses again and again, is the importance of 'observing nature'. He means this in a very particular sense, and has a complex interpretation of 'observation', regarding it as the means by which we can train the eye to see how things really are, and so discover the true structure of reality. Underpinning his Theory at a primary level is the action of 'simple observation', with which the painter becomes aware of the basic elements he is looking at. He frequently exhorts the painter to observe nature, as follows:

"The mind of the painter ought to be as continually concerned with as many orderly analyses as there are forms of notable objects appearing before him".304

"The painter should be solitary and consider what he sees, discussing it with himself, selecting the most excellent parts of the appearance of what he sees, acting as the mirror which transmutes itself into as many colours as exist in the things placed before it. And if he does this he will be like a second nature".305

Leonardo then extends this Theory of Observation to a more complex level, developing it into an enquiry into the working principles of the object observed, and its relationship with its environment. In this way he gains empirical and experimental knowledge. An example of this would be the simple observation of a human limb, which he would develop into an enquiry into anatomy, mechanics and movement.

This level of experimental knowledge can be extended further still by introducing a 'creative' dimension. Leonardo insisted that sensory information should be creatively interpreted, and criticised the use of creative imagination that was not based on observation and information received through the senses. Both creative imagination and sensory information should combine to enable an artist to portray an intense re-creation of nature. Leonardo does this by carefully observing nature, and re-creating it in a painting with a transcendent quality, incorporating his knowledge of geometry, perspective, proportion, and mechanics. Leonardo, with his keen sense of observation, elevated by creative imagination, painted pictures that are realistic in a very intense way, almost as if we are shown insights that are not available through the normal act of perception. Walter Pater, memorably summed up this special quality when he said,

"His art, if it was to be something in the world, must be weighted with more of the meaning of nature and purpose of humanity...He plunged, then, into the study of nature...and for years he seemed to those about him as one listening to a voice, silent

for other men. He learned here the art of going deep, of tracking the sources of
expression to their subtlety retreats, the power of an intimate presence in the things he
handled... His type of beauty is so exotic that it fascinates a larger number than it
delights, and seems more than that of any other artist to reflect ideas and views and
some scheme of the world within; so that he seemed to his contemporaries to be the
possessor of some unsanctified and secret wisdom." 

For Leonardo there was no point seeking metaphysical truths in some idealistic notion of the soul.
Truth lay in an elevated interpretation of the natural world, whose access was through the senses,
but primarily through the eye. He saw painting as a way of gaining and imparting knowledge. In
the Treatise of Painting, he talks of the function of the eye and relates it to painting.
He says,

"Light, darkness, colour, body, form, location, remoteness, nearness, motion and
rest. Of these ten parts of the function of the eye, painting has seven: light, darkness,
colour, form, location, remoteness, and nearness. I exclude those which remain, body,
motion, and rest. Light and darkness mean shadow and light, or brightness and
obscurity, and colour. I do not include body, for painting is on a surface, and a surface
does not have body as this is defined in geometry."

He then explains that painting is the knowledge of the form of things, which we gain through the
detailed observation of Nature:

"We know clearly that vision is one of the swiftest actions there is, and in a instant
sees infinite forms; nevertheless, it understands only one thing at a time. So I say to
you, whom nature turns to this art, if you wish to acquire knowledge of the forms of

---

things, you will begin with their details, and not go on to the second phase until you have the first well fixed in memory and know it through practice."^308

His observation of nature, and his method of enquiry from the particular to the general, from mechanical functions to the whole organism, from organism to the environment, and then to the cosmos, led him to question the traditional world view of the time. He realised that a neat and tidy world obeying rules of natural order could no longer explain the enormous energy of natural forces and the structure of the universe. This preoccupation appeared in his later sketches which showed elemental scenes of storms and rushing water, and scenes of the deluge. He had rejected the Ptolemaic conception of the universe, when he realised that "the sun does not move".

These fundamental developments in his thinking can be seen in his late work, where truths are no longer measurable, but are part of a greater scheme of things, and become mysterious. The strong symbolism and deep inner mystery of the St. John is so intense that it becomes disturbing. His Theory of Observation, with its heightened creative demands, required matching technical developments, and naturally led to the evolution of Perspective in his Theory of Vision.

The Theory of Vision

One of the most important aspects of Leonardo's view of painting is his Theory of Vision, incorporating geometry, optics and perspective. He had been introduced to a theory of Perspective by Alberti, but elaborated it and extended it beyond recognition.

The move away from merely depicting a God-revealed universe, usually in a stylized and symbolic manner, to exploring man's standpoint in the world in a naturalistic manner had changed the role of painting dramatically. New techniques were required which would allow an artist to depict three dimensional space on a flat panel.

^308 Treatise on Painting, 1835, Rigaud edition, Ch.II. p.2.
This of course heralded the development of perspective, one of the most important developments of the Renaissance.

Brunelleschi,\(^{309}\) in 1415, explored for the first time a single point or centralized perspective, that he developed into a system of focused mathematical diminution to a fixed vanishing point, arranging lines diagonal to the plane of the picture so that the eye would be led into the background.\(^{310}\)

This systematic and 'scientific' approach to perspective was developed further by Alberti\(^{311}\) in his treatise *On Painting*, the *Della Pittura*, which appeared in 1436. Both Alberti and Leonardo tried to raise the status of painting by basing it on the 'Science' of perspective, which obeyed mathematical rules.

Then in 1485, Piero della Francesca\(^{312}\) explored the rules of linear and geometrical perspective, and set them down in his famous treatise *De Prospectiva Pingendi*.

Leonardo took these rules and developed them further. This can be seen in the section on perspective in the *Codex Huygens*, as mentioned earlier, where Leonardo developed a theory that is a departure from that derived from Alberti.

In summary, he explored the idea that objects diminish in all directions from the standpoint of the observer, and that this creates visual distortions which should be represented on the flat pictorial surface. This means that objects lying parallel with the plane of the observer should be represented subject to perspective, and not only foreshortening.\(^{313}\) This was a very important

---

\(^{309}\) 1377-1446. He was first a goldsmith, but later trained as an architect in Rome after competing with Ghiberti for the baptistery doors in Florence. He studied the mathematics underlying appearance, and has therefore been credited with the early development of perspective. His greatest achievement was the dome of the Cathedral in Florence.

\(^{310}\) H.Osborne, 1970 p.842.

\(^{311}\) He published his first treatise, the *Della Pittura*, in 1436. He practised Architecture from about 1440 onwards, and began the *De re Aedificatoria* in 1450, and the *De Statua* in 1464.

\(^{312}\) c.1415-1492. He worked for the most part outside Florence as an independent artist, but kept in touch with the Florentine School, and lived in Florence during the 1430s, working with Veneziano. His interest in Mathematics, stressed by Vasari, was the basis for his research into perspective, following the lead of Brunelleschi and Uccello. He completed his final painting, the Nativity sometime after 1475, and spent his final years pursuing his interest in Mathematics. This may support the idea that he was blind at the end of his life. His reputation fell into decline, but modern historians regard him highly, as one of the leading artists of the 15th century.

development of Leonardo's theory of linear perspective, going well beyond Alberti's theory of perspective.

Although it has been suggested that Leonardo was very strongly influenced by him, the extent of Alberti's influence is the subject of considerable disagreement, and there is little reference in Leonardo's notes to demonstrate Alberti's influence. It is curious that Leonardo scarcely acknowledged him, and in one note he actually criticised Alberti and referred to a work of his that is very obscure.\textsuperscript{314} Despite this, the underlying influence of Alberti's \textit{della Pittura} was very strong - this can be seen in Libro A particularly, where many instances can be related to Alberti's own work. On the question of perspective in particular, Leonardo followed the thinking of the Polish mathematician Witello (or Vitelo), whom he referred to as Vitolone.\textsuperscript{315}

Witelo lived and worked in Northern Italy, and in about 1270 he wrote a commentary\textsuperscript{316} on Alhazen,\textsuperscript{317} the great Arab specialist on Optics, and one can see a congruence between some of his ideas and those of Leonardo. Leonardo clearly worked within a tradition that can be traced back through Pecham, Witello and Alhazen to Aristotle. He directly copied a passage from Pecham's \textit{Perspectiva communis} into the \textit{Codex Atlanticus},\textsuperscript{318} and mentioned Witelo's great compendium on optics (which included much of Euclid's \textit{Optics}) at least five times.

Leonardo acknowledged that the laws of linear perspective, through which we recognise forms, are determined by geometry, but added that there are other forms of perspective, namely aerial and colour perspective, which are based on optics.

\textsuperscript{314} The \textit{Ludi rerum mathematicarum} that is now in the Biblioteca Laurenziana, Florence.

\textsuperscript{315} Witello (12\textsuperscript{th} century). \textit{Codex Atlanticus} 247r. Witelo believed that the varied possibilities of images are better understood through experience rather than books, and he encouraged his readers to experiment for themselves. Although Witelo tried to make connections between optics and astrology and thaumaturgy, the main thrust of his approach was based on geometry. In fact the first book, which preceded his material on Alhazen, was a geometry containing 137 propositions, many of which were based on experiments he conducted when he was in Padua.

\textsuperscript{316} Witelo's commentary was called the \textit{Opticae Libri Decem}.

\textsuperscript{317} The great Arabian mathematician who died at Cairo in 1038. His treatise on Optics was translated into Latin by Witelo in 1270, and published in 1572 as the \textit{Opticae Thesaurus Alhazeni libri VII, cum Eiusdem Libro de Crepusculis et Nubium Ascentionibus}.

\textsuperscript{318} \textit{Codex Atlanticus} 203 râ.
This was a novel development and a breakthrough in perspectival theory, and is explained by Leonardo as follows:

"Perspectives are of three kinds. The first has to do with the causes of the diminution or, as it is called, the diminishing perspective of objects as they recede from the eye. The second, the manner in which colours are changed as they recede from the eye. The third and last consists in defining in what way objects ought to be less carefully finished as they are further away". 319

He explained linear perspective with its dependence on geometry in Manuscript A, 320 where he said,

"Every body fills the surrounding air with images of itself, and every image appears in its entirety and in all its parts. The air is full of an infinity of straight lines and rays which cut across each other without displacing each other and which reproduce on whatever they encounter the true form of their cause".

He went on to say,

"Perspective is the rational law by which experience confirms that all objects transmit their image to the eye in a pyramid of lines. Bodies of equal size produce angles that are more or less acute depending on their respective distances. I call 'pyramid of lines' the lines that emanate from the surfaces and outlines of the bodies and, as they converge from a distance, end in a common point". 321

In the Treatise of Painting, Leonardo said of Perspective:

"Practice ought always to be built on sound theory; perspective is the guide and the path to this theory, and without it nothing is done well in painting. There are five parts in

319 Treatise on Painting, 1835, Rignaud edition, Ch.CCIII, p.178.
320 Manuscript A 2v.
painting, which are: surface, form, colour, shadow and light, proximity and distance, or increase and diminution with distance, which are the two perspectives, as in the diminution of quantity and distinctness of objects seen at a great distance; and then the perspective of colour which determines what colour first diminishes, and what remains the same at an equal distance.322

The first task of painting is that the objects it represents should appear in relief, and that through the use of the three perspectives, the backgrounds surrounding them with their several distances should appear to be contained within the wall on which the painting is created. These perspectives are diminution of the forms of objects, diminution of their magnitudes, and diminution of their colours. The first of these three perspectives originates in the eye; the other two derive from the air lying between the eye and the objects seen by the eye”.323

Leonardo repeatedly mentions the medium of air between the eye and the object, showing how it affects our perception, and uses examples to illustrate this, such as ‘buildings in a fog’324 or ‘the sun passing through clouds’.325 He reinforces the idea of difference between an object and how it is perceived, and the subtle factors that create the difference such as light and shadow, and colour. Here again we can see a modern idea at work in his thinking, as he explores the difference between an object, and our perception of it both in terms of form and colour. The most obvious example of this exploration in modern times was of course the French Impressionists.

"The eye, without moving, will never know, by means of linear perspective, how much distance there is between the object that lies between it and another object, except through the perspective of colours.”326

321 Manuscript A. 3r.
324 Treatise on Painting, 1835, Rigaud edition, Ch. CCCXVII, p. 190.
325 Treatise on Painting, 1835, Rigaud edition, Ch. CCCXXXII, p. 199.
This was Leonardo's important contribution to the theory of perspective in his *Theory of Vision*, moving beyond the linear perspective of Alberti, and deeply influencing all those artists and architects that were to follow.

In the *Codex Atlanticus*, Leonardo wrote,

"Perspective, which shows how linear rays differ according to demonstrable conditions, should therefore be placed first among all the sciences and disciplines of man, for it crowns not mathematics so much as the natural sciences..."\(^{327}\)

This is an interesting comment in that it shows Leonardo saw perspective as more than just a mathematical or geometrical framework for painting. He saw it as the key that enabled the painter to not just depict objects, but to re-create the world - this carried a special responsibility in that it was a way in which the painter could represent God in being able to re-create nature.

**The Theory of Colour**

Leonardo's perspective of colour was inseparable from his general *Theory of Colour and Light*, and it was in the *Codex Urbinas* and later in the *Treatise of Painting* that Leonardo proposed an extensive theory of colour. This theoretical basis found practical expression in Leonardo's sfumato technique, and the development of chiaroscuro which influenced Cinquecento painting so strongly. He said:

"The simple colours are six, of which the first is white, although some philosophers do not accept white or black in the number of colours, because one is the origin of all colours and the other is their absence.

But as painters cannot do without them, we include them in the number of the others, and say that in this order white is the first among the simple, and yellow is second,"
green is third, blue is fourth, red is fifth, and black is the sixth."  

In the *Treatise of Painting*, Leonardo made the observation that shadows on a wall are not black and white, but blue plus other colours thrown by nearby objects. This was later regarded as a discovery by the French Impressionists which was in turn to influence twentieth century painting. Leonardo then elaborated on his Theory of Colour by placing it within the context of light and hence shadow.

"Simple colour in the presence of more or less light becomes complex. Every colour is more beautiful in the light than in shadow, because light enlivens and gives a true perception of the quality of colour, while shadow deadens and darkens this same beauty and clouds perception of the colour." Shadow is divided into two parts, of which the first is called primary shadow; the second, derivative shadow. The primary shadow varies in two ways, of which the first is simple, and the second is compound. The simple shadow is that which goes toward a dark place, and for this reason such a shadow is dark. The compound one is that which goes toward an illuminated place with various colours, and then such a shadow will be mixed with the kind of colours of the objects placed opposite it. Derivative shadows are of three kinds, of which one is spreading, the other columnar, and the third converging to the place where there is an intersection of its sides.  

Leonardo keeps bringing in this point that there is colour in shadow, and more colour as there is
more light. This runs counter to the frequent criticism of chiaroscuro, that it dispenses with colour in favour of muddy and murky areas in the shadows. In the next quotation, one sees Leonardo beginning to link his thoughts on colour, with the development of aerial perspective.

"The shadows and lights of the countryside take on the colour of their causes, because the compound obscurities of the densities of clouds added to the absence of solar rays tinge whatever they touch with their colours. But the surrounding air, excepting the clouds and shadows, illuminates that place and causes it to take on the colour blue."\(^{334}\)

There are four fundamentals which must be considered in painting (shadows and lights); these are quality, quantity, location, and figure."\(^{335}\)

He then went on to discuss the effects of different kinds of lights and shadows.

After considering the perspective of colour, Leonardo has analysed 'pure' colour and its fundamentals, and has then analysed its characteristics in an actual environment under the influence of light and shade. This is typical of his general approach to the observation of nature, perceiving the particular, placing it in a wider context, then analysing and understanding the underlying causes, so that he can formulate the basic rules in terms of which the causes function.

This analysis of colour and its effects was important. Up to this point the use of light and shade had been subordinate to outline and colour. Characterization had depended upon composition and design, with a strong linear construction enclosing areas of plain colour. Leonardo changed this. He recognised that light and shade were equally important, and this led to his development of Chiaroscuro.\(^{336}\) One of its strong attractions was that a dramatic use of light and shade introduced a new mysterious dimension, that contributed an emotional and


transcendental quality. This influenced Fra Bartolommeo,\textsuperscript{337} and Raphael,\textsuperscript{338} and later Giorgione\textsuperscript{339} and Correggio.\textsuperscript{340} The introduction of Chiaroscuro was not unreservedly accepted. Fra Bartolommeo and Andrea del Sarto\textsuperscript{341} understood its dramatic benefits, whilst realising that the introduction of so much shadow could overwhelm and destroy the balance of colour, leaving a few highlighted areas in a mass of colourless shadow.

Several critics, such as Berenson, have suspected that its lack of apparent linear definition was an ideal cover for lesser artists who wished to conceal weak draughtsmanship.\textsuperscript{342}

\section*{The Theory of Forms}

Leonardo's Theory of Forms\textsuperscript{343} appears in Part Three, \textit{Of the Various States and Movements of the Human Body}, and is based on proportion, concentrating on human proportion.

Leonardo wrote,

"All parts of any animal exist in relationship to the whole; that is, those short and stocky ought to have each part short and stocky, and those long and thin should have parts that are long and thin, and the medium-sized should also have medium-sized parts".\textsuperscript{344}

He then said,

"that the proportions of the parts of the body should correspond to the proportions of the whole".\textsuperscript{345}

In the \textit{Codex Urbinas} and the \textit{Treatise of Painting} there are chapters comparing the proportion

\textsuperscript{\textcircled{337}c.1472-1517  
\textcircled{338}1483-1520  
\textcircled{339}1475-1510  
\textcircled{339}c.1489-1534  
\textcircled{341}1486-1531  
\textcircled{342}B. Berenson, 1901-1916, \textit{The Study and Criticism of Italian Art}, London, G. Bell and Sons, p.20.  
of men with women and children, and the young with the old. Leonardo wrote,

"that the allocation of the parts of the body should be adjusted to the kind of men
portrayed; that is, delicate limbs for the delicate, thick limbs for the thickset, and
likewise fat for the fat." 346

Here we can see that Leonardo's theory of forms has begun to move beyond a theory of
proportion on a simple level, and incorporates his ideas on the appropriateness of form. This
development brought into question the quality of form, which depended on a wider set of factors.
Proportion became linked to the appropriateness of form, and the quality of action and
movement. He said,

"The proportion of the parts of the body is divided into two parts also which are
quality and movement. By quality is implied that in addition to the measurements
corresponding to the whole, you should not mix the limbs of young people with those of
the aged, nor those of the fat with those of the lean, and beyond this you should not
give men feminine attributes, nor mix graceful limbs with clumsy ones. By movement
is understood that the attitudes or movements of the old should not be made with the
same vivacity which would be suitable to the movement of a young man, nor that of a
small child like that of a young man. Do not represent actions that do not become him
who embodies them," 347

This final phrase is a key point in Leonardo's theory of appropriateness, which is
explained in the Treatise of Painting. 348 All elements should be fitting, the action should
reflect the emotion, and the setting should be realistic to the circumstances, a view
reminiscent of Aristotle's writings.

---

Within the Theory of Forms there are sections dealing with the proportion of faces. Leonardo proposed mathematical relationships between parts of the body and face, and it is easy to see how this study led, on the one hand, to heroic examples and, on the other, to disproportionate examples, resulting in the studies of the grotesques\textsuperscript{349} for which he became famous. Leonardo's distortion of faces had an interesting correlative. He realised that distortion had interesting implications when linked with perspective. Distortion could exploit the fact that objects and their perception are different, and that deliberate distortion could produce an effect or perception quite different from actual reality. For instance Leonardo shows us how to distort measurement to show "a figure twenty-four Braccia high, upon a wall twelve Braccia high".

In the typical Vincian manner, Leonardo's focus on proportion led on to the adjacent study of anatomy, and the functions of organs. Leonardo said,

"On this account I urge you to study the anatomy of the muscles, sinews and bones, without knowledge of which you will do little."\textsuperscript{350}

We read for instance, that when a limb functions, it does so according to the laws of mechanics. We then read chapters on the mechanics of human forms, such as "Of the postures of women and young people" and "Motion produced by the loss of equilibrium".

Leonardo's Theory of Forms then moves into a section on the form in action, which involves the loss of balance and equilibrium. His study of proportion and movement became the technical underpinning for a further development, the depiction of expression and movement. This became central to his thinking, that emotional and mental states must have a physical manifestation. He wrote,

"Make the motions of your figures appropriate to the mental conditions of those figures; that is, if you conceive a man that is enraged, let his face not look the

\textsuperscript{349} The study of grotesques or caricatures in the form of Physiognomics goes back a long way. Aristotle wrote the Physiognomica, and there were other studies up to and during the Renaissance. Notable treatments then appeared in the work of Alberti, Leonardo, Dürer, Pomponius Gauricus and his brother Lucas.
contrary, but depict it so that nothing but rage can be discerned in it; and do the same with regard to joy, melancholy, laughter, tears and the like. The movements of men are as varied as are the emotions which pass through their minds. A good painter has two principal things to paint: that is, man and the intention of his mind.351

Leonardo was interested in the progress other artists were making in the depiction and presentation of movement, and how it could be used to show expression. Andrea del Castagno352 had made studies of anatomy, and Antonio Pollaiuolo353 was working on the movements of the human body in violent action. Andrea Verrocchio354 showed how these developments could be used to capture the intensity of different moods and conditions. A significant portion of the Treatise of Painting355 details Leonardo's interest in these developments, and advocates balanced and counterpoised poses, which gave rise to his theory of Contrapposto. He said that a pose should express the "emotions of the soul",356 reflecting the inner mental state of an individual. This intense individualism of expression became more stylized in the later work of other artists, giving rise to abstract expressions of grace, dignity, or grandeur. This mannerist approach resulted in the pure style of the High Renaissance where the individualism of figures became subordinate to the demands of the general composition and mood of a painting.

The Theory of Forms invested Leonardo's Theory of Proportion with a sense of appropriate form, movement and location, and explored the link between the body and the mind that was to preoccupy so many generations of later philosophers. In other notes, Leonardo recorded that the sense of proportion in the human body and its motion had parallels in other fields, manifesting itself as harmonies in the universe. For instance, in Manuscript K, Leonardo described 'proportion' as being "not only to be found in number and measure, but also in sounds,

352 Andrea del Castagno (c.1423-1457)
353 Antonio (c.1432-1498), was primarily a goldsmith and metal-worker. It is thought that Antonio dissected corpses to study anatomy before Leonardo.
354 Andrea Verrocchio (c.1435-1488)
weights, times and places, and in every power that exists". Leonardo's mind was turning to an analysis of man's environment and the power of universal forces with the same attention to underlying causes and detail as he applied to proportion and human mechanics. We read chapters in the Treatise of Painting called, 'Of the beginning of rain' and 'How to represent the wind' and 'Of dust'. Some of his drawings at this time show a new and additional quality, a sense of power and natural dynamism. They capture a feeling of huge pent up force and released energy in the physical world, exemplified in such pictures as those of the Deluge. It is this spirit of natural dynamism lying behind ordinary appearance that formed the basis of a mysticism which characterised his last few years. His earlier ability to express sublime transcendent expression now showed itself, in the St. John for instance, as a beckoning mystery from some other world.

This was a long way from the world into which Leonardo had been born. Those pictures of Death Triumphant after the Black Death had swept through Italy between 1348 and 1350 had been replaced at the beginning of the fifteenth century by a style that became known as International Gothic, which showed the world as the creation of God. This style was highly artificial, and stylized, with religious symbolism in a formal courtly world, showing the ordered and privileged life of the nobility. Nevertheless this depiction of the world contained the seeds of the naturalism which was to develop into one of the mainsprings of Renaissance art.

Although the style remained stereotyped, it gradually began to change, and scenes of nature appeared in which Man in Nature became more important, and was the centre of his environment. Art began to show Man as an expression of God himself, with his own will, and mastery over nature. Leonardo played a leading role in this fundamental change in attitude which led to great social, cultural, religious and political shifts that were to affect the history of the fourteenth to the sixteenth centuries, and have lasting effects up to today.

In Florence in particular, there were two strong traditions influencing art in the fifteenth century, apart from minor fragmented activity. One tradition was derived from the work of Fra
Filippo Lippi\textsuperscript{357} and Botticelli,\textsuperscript{358} and was typified by an ornamental linear style and evocative, delicate sentiment. The other was more naturalistic, starting with Masaccio.\textsuperscript{359} He had taken Giotto's\textsuperscript{360} monumental patterns and imbued them with new values of light and shade, resulting in a new form of naturalism. This development has been called Scientific Naturalism and was to influence Verrocchio,\textsuperscript{361} and then Leonardo whose work bridged both these traditions and brought them together. Many of the points he makes in the *Treatise of painting* are the developments and discoveries that enabled him to assimilate these traditions, resolve their differences, and move forwards.

Leonardo was also able to assimilate several of the other developments that occurred in the last two decades of the fifteenth century, and combined these disparate elements into an approach that was to pioneer the intellectual and classical style of the High Renaissance, reaching a high point in the *Last Supper*. This was to become known as 'the Grand Manner', which had an enormous effect on the art of Leonardo's own time, and later painting, especially in 17th century France.

Leonardo strongly influenced the Milanese school - Boltraffio,\textsuperscript{362} Cesare da Sesto,\textsuperscript{363} Andrea Solario,\textsuperscript{364} Ambrogio da Predis,\textsuperscript{365} Francesco Melzi, and many lesser artists. At this time the artistic reputation of Milan was growing to the point at which it began to rival that of Florence and Rome. It is a point of note that in 1481, Milan with 200,000 people, was a lot larger than Florence, with just over half that number. Leonardo also influenced Raphael and his followers in Rome, and his Florentine

\textsuperscript{357} Fra Filippo Lippi (c.1406-1504).
\textsuperscript{358} Botticelli (1445-1510).
\textsuperscript{359} Masaccio (1401-1428).
\textsuperscript{360} Giotto (c.1267-1337).
\textsuperscript{361} Italian sculptor and painter of the Florentine school, Verrocchio was a pupil of Donatello. In the second half of the 15th century, his studio was the largest in Florence, and one of his pupils was, of course, Leonardo.
\textsuperscript{362} Boltraffio (1466-1516). His silver-point drawings are mentioned by Leonardo in his notebooks, and it is thought that he may have painted *La Belle Ferronnière* (a portrait of Lucrezia Crivelli) which was supposedly painted by Leonardo in about 1495.
\textsuperscript{363} It is suggested that Cesare da Sesto may have also worked on the *St. John-Bacchus* with Leonardo as it is congruent with his style and it is known that he worked with Leonardo at about that time, being 1513.
\textsuperscript{364} He was active between 1493 and about 1517.
\textsuperscript{365} On 25 April 1483, Giovanni Ambrogio da Predis, his brother Evangelista, and Leonardo were commissioned by the Confraternity of the Immaculate Conception in Milan to paint an altarpiece for their chapel, in the church of S. Francesco Grande. Leonardo painted the central panel, which was the *Madonna of the Rocks*. 

143
contemporaries, such as Michelangelo, especially with his development of contrapposto and his use of Chiaroscuro which captured expression so dramatically. The ‘dark manner’ of Chiaroscuro created a ‘Relievo’ which influenced the Mannerists, especially Pontormo, as it created a common ground and atmosphere for figures that could then seemingly float against their background.

The battle scenes of Anghiari painted by Leonardo, and Cascina by Michelangelo exemplified the two main styles which developed in the sixteenth Century. These were the Baroque and the Classical styles which influenced all subsequent art in that century. The Baroque stemmed originally from Leonardo, and the Classical from Michelangelo and later from Raphael. There were many other important developments later in the century, but the influence of the first two decades was paramount, especially in Florence and Rome.

In the seventeenth century, Italian art theory spread beyond Italy and across Europe. The Italian influence was still enormously important, but new centres were challenging the traditional supremacy of Florence and Rome. It was also a time in which Academies of Art became important. Their establishment provoked the question of what should be taught to art students, what should be the curriculum and the courses. And it is in these courses that we can see their inheritance from the Renaissance. But it is an inheritance that was changed by taking established doctrines and transforming them a little here and a little there to form the new Classical Ideal. It was an inheritance that seemed to follow two lines of thought - naturalism on one hand, and mannerism on the other. Naturalism was too imitative of the flaws in nature, lacking an ideal standard, and mannerism was too divorced from nature, and hence too derivative and artificial, following custom and habit. So the Academies changed the

---

366 Michelangelo (1475-1564). He went to Rome in 1496, but returned to Florence five years later to work on the David. After he completed the David, he was commissioned by the Signoria of Florence to paint the Battle of Cascina on one of the walls of the new Council Chamber in the Palazzo Vecchio. Leonardo had been commissioned to paint the Battle of Anghiari on the opposite wall. Neither commission was completed. Another ‘contest’ against Leonardo was the commission for the Laurentian Library in 1524, which Michelangelo was awarded, but never completed.

367 Pontormo (1494-1557).
emphasis of various doctrines, but the underlying inheritance from the Renaissance was still recognizable.

On 14th November 1593, the Academia del Disegno (Academy of St Luke) was inaugurated in Rome with Federico Zuccari\textsuperscript{368} as its first president. He started his lectures with a definition of ‘disegno’, and these lectures were later published as the \textit{L'idea de' pittori, scultori, et architetti} in 1607. He quoted several earlier theorists, including Alberti and especially Lomazzo. His major break with tradition was his rejection of mathematical rules as a foundation of painting, which Leonardo had worked hard to promote. He said, “... the art of painting does not draw her principles from the mathematical sciences... Painting is the daughter not of Science, but of Nature and Design... Rules serve no purpose, but only do harm... The artist’s mind should be not only clear, but free”\textsuperscript{369} He felt that artists should be free to explore their creativity and imaginations, and rules inhibited this. His focus was on the creative process and the vision of the artist. The individual psychology of the artist was suddenly the central issue, and this swept away the importance of scientific and mathematical rules for painting, and questions such as the correct representation of nature. Zuccari then said, “Of as small fruit and substance is that other treatise, illustrated with drawings and written backwards, left us by that other artist (Leonardo), adept in our profession... but oversophistical, who laid down mathematical precepts for drawing the movements and attitudes of figures by means of perpendicular lines, the square, and the compasses”\textsuperscript{370}

One can hear the echo of Leonardo, and those before him, when Giovanni Bellori\textsuperscript{371} told his students at the Rome Academy that those who copy other artists “create works which are not daughters

\textsuperscript{368} Federico Zuccari (1543-1609). He gave his house to the Academy as its headquarters.
\textsuperscript{371} Giovanni Bellori (1615-1696). Poussin helped him prepare his work \textit{Vite de’ pittori, scultori et architetti moderni} which he published in 1672, and dedicated to Jean-Baptiste Colbert, Protector of the Royal Academy of Painting and Sculpture in France.
but bastards of nature". The earlier reference in the Codex Urbina was "...nobody ought ever to imitate another's manner, because he will be called a grandson and not a son of nature...".

Le Brun, a leading member of the French Academy of Art, followed a different line. He urged his students to learn from the masters how to copy nature, an approach that Leonardo opposed. A bit later, in 1720, Antoine Coyel addressed the Academy, and made a similar point, when he said, "This nobility of drawing, which belongs to the genius of the painter, is not easy to define... to attain it Correggio cannot be too much imitated... Consult Michelangelo, Leonardo da Vinci, Raphael, and the Carracci. They contain the antidote to... mediocrity in general".

However, on another point, Le Brun was insistent that emotions should be shown in the face, not just in the actions and postures, and he included this topic in the curriculum, as well as completing a thesis on it called Traité de la passion. One is reminded of those sections in the Codex Urbina where Leonardo talks of the expressions of the face, but not as extensively as Le Brun. Again one can recognise the source, but with a changed emphasis. Leonardo would have drawn from nature, but Le Brun presented his students with drawings and models to copy.

When Colbert visited the Academy in Paris in 1666, he found it dominated by artists working in the Renaissance tradition of 'history' painting, using the Du Fresne edition of Leonardo's Treatise of painting, which had been published in 1651. The arrangement was that whenever a lecture on a particular subject had not been prepared, then the relevant section from an art treatise could be used instead. It was Le Brun who provided a copy of Leonardo's Treatise of painting for this purpose.

---

374 Antoine Coyel (1661-1722).
377 Colbert (1619-1683).
378 Le Brun (1619-1690).
When the Royal Academy was founded in England, its primary focus was on 'history' painting, a tradition that can be traced back to those sections in the Treatise of painting that explain it in some detail. But this had to be reconciled with the strong tradition of portraiture that existed – so much so that Hogarth said, "Portrait painting ever has, and ever will, succeed better in this country than in any other".  

Another point in common between Renaissance art theory, and that of the seventeenth century, was adherence to precepts or rules. Leonardo, for instance, tried to present art theory as the science of painting, and his precepts appeared in the Codex Urbinas. French classicism also recognised the commonality between the laws of nature, and the rules of art, and these rules were compiled from conferences of the Academy, and became part of the curriculum. As in the Renaissance, following the rules of art was very important, but the focus on geometry, mathematics, perspective and anatomy had changed to a focus on composition, drawing, colour and the expression of emotion.

---

380 C. Goldstein, 1996, p.56.
8. REFERENCES TO LEONARDO AND THE TREATISE OF PAINTING

Earlier comments have been made regarding Leonardo's influence within the development of art theory from the Renaissance to the seventeenth century. Running parallel with these developments, and at times reinforcing them, was the influence of Leonardo’s actual manuscripts, and latterly their increasing availability in facsimile, plus the printed editions of the Trattato della pittura or Treatise of painting, in all their language editions. Over the years a scattered body of reference to Leonardo's Trattato appeared amongst influential artists and writers. Previous comments have made clear how little reference there was to the 1721 edition in particular. Some earlier references referred to manuscript copies, which were fairly widely circulated, and then to the Du Frêne and later editions. From century to century, one can see these references growing, and the influence of the Trattato increasing.

Of the early references, the key document of the sixteenth century that was to establish Leonardo's reputation, although somewhat inaccurately, was of course Vasari's Lives. The idea for a book of Lives was first mooted at the Papal Court in Rome. One evening, in Cardinal Farnese's house in about 1546, it was suggested that there should be an account of the famous artists from Cimabue to the present time. It was agreed that Paolo Giovio should write the book, since he had written a few brief Lives in the 1520's. These included a Life of Leonardo which he wrote on the island of Ischia sometime after 1527. Vasari offered to help. Giovio made a start, but soon gave it up and turned the project over to Vasari.

Another important reference to Leonardo appeared in the Poema by Pablo de Cespedes, a poet and painter who studied in Rome, and returned to Spain in 1577. He wrote various prose pieces on art, but it was his famous poem called the Poema de la pintura which was

381 Cardinal Farnese (1468-1549).
382 Cimabue (1240-1302).
383 Paolo Giovio (1483-1552).
384 Pablo de Cespedes (1538-1608).
to influence Francesco Pacheco, and through him, subsequent Spanish painters. The *Poema de la pintura* draws on many of Leonardo's ideas, and one passage, for example, includes the image that "man was formed by sculpture and enlivened by painting". This is reminiscent of several similar images in Leonardo's *Paragone*, and is repeated in a slightly different form.

Leonardo's reputation spread further in Spain through the influence of Vicente Carducho who wrote a treatise on art called *Dialogos de la pintura*, which was based on Italian art theory. In this treatise he mentioned Leonardo's drawing of Neptune in his chariot, that he saw in Pisa in the house of Giovanni Gaddi.

Another reference, this time to the *Trattato*, was made by Annibale Carracci, the Italian painter who said if he had known of the *Trattato della pittura* earlier it would have saved him twenty years of labour. He was, of course, referring to a manuscript copy.

Leonardo was mentioned in Paolo Lomazzo's treatises which appeared in 1584 and 1590. These were the *Trattato dell' arte de la pittura* that had borrowed a great deal from Leonardo's manuscripts, and the *Idea del tempio della pittura*. Lomazzo's comments are not very revealing and they seem to be a collection of second-hand opinions, rather than fresh insights. He was blind by the age of thirty-three, which probably accounts for this quality of hearsay.

The first time Leonardo's name appeared in a book published in England seems to have been in 1598. It was Richard Haydocke's *Treatise on the art of painting*, and referred to Leonardo as 'Leonard Vincent'. England, of course, had remained untouched by the spreading influence of Italian Art at this stage. At the beginning of the sixteenth century, King Henry VIII encouraged Italian artists to visit England, but most of them were sculptors. One of the Italian sculptors to

---

385 Francesco Pacheco (1564-1654).
386 He completed this in 1633. Vicente and Bartolommeo were two Florentine brothers, the Carducci, who went to Spain and adapted the spelling of their name. Vicente succeeded his brother Bartolommeo as Court Painter to King Philip III in 1609.
387 Annibale Carracci (1560-1609).
388 K. Clark, 1958, p.126.
visit was Pietro Torrigiani,\footnote{Torrigiani (1472-1528). K. Clark, 1958, p.191. Pietro Torrigiani carved the tomb of Henry VII in Westminster Abbey. Other sculptors from Maiano and Rovezzano in the hills round Florence were commissioned to work for Cardinal Wolsey. Of interest is that Shakespeare mentions only one Italian artist, Giulio Romano, who worked in Rome as an assistant to Raphael after 1511. Also surprising is that Reynolds, in his Notes on Du Fresnoy's The art of painting, described Giulio Romano as "possessing the true poetical genius of painting, perhaps, in a higher degree than any other painter whatever". See also R. Goldwater and M. Treves, 1976, p.186.} and he made disparaging remarks about it which Benvenuto Cellini included in his autobiography.\footnote{See Chapter XII of the first book of Benvenuto Cellini's Life.} The break between Henry VIII and the Catholic church occurred in 1534, which curtailed subsequent artistic contact between England and Italy. This meant that the English knew very little of Italian art of the sixteenth Century, which was later corrected when the Grand Tour through France and Italy became part of a gentleman's education.

Awareness of Leonardo's work, and the Treatise of painting in particular, increased from about the middle of the seventeenth century.

Cassiano dal Pozzo's interest in Leonardo's manuscripts, along with support from Count Galeazzo Arconati, came at a time when there was new interest in Leonardo. This was in about 1630. Collectors in Europe were trying to buy Leonardo's notebooks, and the King of England offered Count Arconati 1000 gold doubloons for the Codex Atlanticus, which Arconati refused. Lord Arundel meanwhile was trying to buy notebooks from the collector Don Juan de Espina in Madrid, as well as from Arconati. Yet, a few years earlier, in 1607, Federico Zuccari in his L'Idea de' pittori, scultori, ed architetti, described Leonardo's thoughts on perspective as "of little merit and substance".

Galileo was familiar with Leonardo's treatise in manuscript, and said of it, "...others may enjoy all the precepts of Leonardo da Vinci and yet not know how to paint a stool".\footnote{Torrigiani (1472-1528). K. Clark, 1958, p.191.} He died in 1642, nine years before the Du Frèsne edition was published.

Of course Nicolas Poussin was a strong influence in disseminating Leonardo's views. Poussin had established his own type of Classicism and developed it throughout the 1630's. By about 1640, he had become obsessionall about the rendering of emotions through gestures, expressions and poses. This was one of the important ideas that Leonardo stressed in his treatise,
and this mixture of emotion and classical form can be seen in Poussin's illustrations in the Trattato della pittura. In 1665, the year of Poussin's death, he sent a letter to M. de Chambray dated 1 March that could almost have come straight from Leonardo's Treatise, with its logical and ordered observations:

"It is first needful to know of what nature is this sort of imitation and to define it...

There can be no thing visible without light

There can be no thing visible without a transparent medium

There can be no thing visible without outline

There can be no thing visible without Colour

There can be no thing visible without Distance

There can be no thing visible without Instrument (the eye)...

...One must begin with the Arrangement, then with ornament, Decoration, beauty, grace, vivacity, Costume, Verisimilitude and Judgement throughout." 392

Poussin's views had strongly influenced the Academie Royale in France, and through them many of Leonardo's ideas had been perpetuated, and promoted in subsequent teaching.

The French Royal Academy of Fine Arts (Academie Royale) was founded in 1648 in Paris, to establish standards for Art. It was shortly thereafter, in 1651, that the Du Frésne edition of the Trattato della pittura appeared in Italian, with a French edition in the same year. Leonardo's views, now readily available in published form, became the foundation for the standards laid down by the French Royal Academy of Fine Arts, and hence became National Art policy.

A few years later, a 'Conference upon Expression' took place at the Academie Royale addressed by Charles Le Brun, the Premier Peintre du Roi, the text of which was published in 1667, a few years after the Du Frésne edition. Many of the comments seem to be quoted almost directly from the Treatise of painting.

391 See Foreword to K. Steinitz, 1958, p.12.
Le Brun said,

"Expression...it is by that, the different natures of bodies are distinguished; that the figures seem to have motion, and that everything therein counterfeited appears to be real...the Eyebrow will be still more frowning than in the preceding Action;...the mouth will be open, but closer in the middle than at the corners, which ought to be drawn back..."

The equivalent comments in the 1721 edition are,

"The Motions of the Face, occasioned by sudden Agitations in the Mind, are very numerous;... The Knowledge of these Motions is of the last importance to a Painter, and his Figures without this will be dead in a double capacity;...his Eye-brows drawn down, and gathered close together, the sides of his Mouth bent into an Arch..."

This is just one of several close similarities.

Leonardo's ideas strongly influenced Francesco Pacheco del Rio in Spain, who promoted Italian art theory through his own treatise on art, *El Arte de la pintura* of 1649. He stressed, in common with Leonardo and earlier artists and writers, that art should imitate nature, but added that there should be a spiritual purpose to it. Pacheco made use of many art theories, and the *El arte* is almost an anthology of art theory prior to 1650, in which he quotes several artists, among them Alberti, Leonardo, Michelangelo and Raphael. It is also possible that he owned one of Leonardo's manuscripts.

In the *El arte*, Pacheco said, "Hence, perfection consists in passing from ideas to nature and from nature to ideas, always seeking the best, the surest and the perfect. Raphael's own master, Leonardo da Vinci, did this as well, following the example of the ancients".

---

394 See the *Treatise of painting*, 1721 edition, p.107.
395 It is interesting that one of his pupils was Velazquez, who became his son-in-law when he married Pacheco's daughter Juana in 1618.
Pacheco quoted that part of de Cespedes' poem, the *Poema de la pintura*, which is derived from Leonardo's *Paragone*, as mentioned above. He also referred to other treatises on Art in the *El Arte*, such as those written by Paolo Pino,398 Antonio Doni,399 Lodovico Dolce400 and Raffaele Borghini.401 A member of Pacheco's Academy was Juan de Jauregui.402 He had lived in Rome, as had de Cespedes, and returned to Spain to write an essay on art theory403 in which painting and sculpture debate which is superior, with Nature as the judge. Painting is triumphant, and several of the points in Leonardo's *Paragone* are repeated.

In 1667, André Félibien404 published his *Entretiens* which was a collection of Lives like those of Vasari, including a Life of Nicolas Poussin. His treatment included eleven pages on Leonardo but as many as forty pages on Raphael. His comments on Leonardo are interesting in that he identified expressiveness as his great skill, but he also showed disquiet at the darkness of Leonardo's shadows, one of the enduring criticisms of chiaroscuro.

Through Lomazzo's writings, Leonardo's ideas reached the French painter Charles Alphonse Du Fresnoy,405 and influenced his thinking. One can see clear evidence of this in his famous didactic poem *De arte graphica*, which appeared in 1667 and was translated into English by John Dryden406 in 1695 as the *Art of painting*.407 The *De arte graphica* was originally written in Latin verse, explaining the principles of French Classicism, and remained influential until the end of the

398 P. Pino, 1548, *Dialogo della pittura*.
399 A. Doni, 1549, *Deseago partito in più ragionamenti ne' quali si tratta della scultura et pittura de'colori, de'getti, de modelli con molte cose appertinenti a quest'arti. ... alcune lettere che trattano della medesima materia*.
400 L. Dolce, 1557, *Dialogo della pittura intitolato L'Arteino. Nel quale si ragiona della dignità di essa pittura, e di tutte le parti necessarie, che a perfetto pittore, si accompongono: con essempi di pittori antichi e moderni: e nel fine si fa menzione ... delle opere del Titiano*, Venice, G. Giotto dei Ferrari.
402 Juan de Jauregui (c.1570-c.1640).
403 J. de Jauregui, 1618, *Dialogo entre la naturaleza y los dos artes pintura y escultura*.
404 André Félibien (1619-1695) was a friend of Poussin, and a close associate of his during his years in Rome. See M. Burnsch, 1985, pp.323, 326.
406 John Dryden (1631-1700).
eighteenth century. It included an evaluation of Italian artists, and it is interesting that Leonardo did not appear in the evaluation, except for a short note at the end which said,

"I say nothing of Leonardo, because I have seen little of his; though he restored the arts at Milan and had many disciples there". 408

By the end of the seventeenth Century, reference to Leonardo was increasing. He was mentioned in a number of books, but particularly in William Aglionby's history of Italian painting. 409 Aglionby described Leonardo as follows, "...Leonardo da Vinci whom we must recognise as the father of the third stage of painting, that of the modern method; in him nothing was lacking. Not only were his drawings strong and true, he also gave clearer rules and more exact measurements, and showed more profundity in art than anyone who had preceded him". 410 This quotation reflects the strong influence of Vasari's Lives, and, in fact, Aglionby's book contains translations of eleven from Vasari.

By the end of the century, five printed editions of the Treatise of painting had appeared, three of which were excerpts only.

Interest in Leonardo and his Trattato increased further in the eighteenth century. A rather curious reference occurs early in the century, in the letters of Antoine Watteau 411 in France. In his circle of friends was a M. de Julienne, and Watteau wrote to him as follows:

"Sir! I am returning to you the great first volume of the Writings of Leonardo da Vinci and at the same time offer you my sincere thanks for it..." 412

He made no other comment on it, but he is referring to the 1651 Du Frésne edition. It is strange that Watteau made no comment about it, but the point to note is that a painter of the influence and stature of Watteau knew about the Trattato, and read it.

---

408 Du Fresnoy, C.A., 1750.
409 William Aglionby, 1685, Painting illustrated in three dialogues; containing some choice observations upon the art, together with the lives of the most eminent painters, from Cimabue to the time of Raphael and Michael Angelo, etc., London, printed by John Gain for the Author.
411 Antoine Watteau (1684-1721).
Interest in Leonardo continued to grow. Collectors started buying his work, key paintings entered National Collections, and a number of engravings of his work were commissioned which spread his reputation more widely, although many of them were of grotesques which proved to be popular.

Sometime between 1713 and 1717 Thomas Coke, who became the Earl of Leicester, acquired a manuscript from Giuseppe Ghezzi in Rome, which became known as the Codex Leicester, and later the Codex Hammer. This was not long before the 1721 edition of the Treatise of painting appeared in print, the first English edition.

One year after the first English edition had appeared, Edward Wright went to Milan, and described his visit in his book Some observations made in travelling through France, Italy, etc; and refers to Leonardo and the Arconati collection as follows:

“His paintings are esteemed there at least equal to Raphael’s; and his twelve volumes of mechanical designs, which they preserve in an apartment near the library, almost with veneration, are held inestimable. They were given to the library by Count Galeazz Arconato...”

Further comment on Leonardo appeared in 1730. This was in a twenty-two page foreword on Leonardo and his work, attached to a series of engravings which Mariette commissioned from the Comte de Caylus.

In this year, Joshua Reynolds turned seven years old. He was born in 1723, two years after the first printed edition of the Treatise of painting in English appeared in 1721. Reynolds died in 1792, before publication of the first Rigaud edition in 1802. He not only knew of the 1721 edition, but quotes from it in his Discourses on art, showing reluctance to acknowledge the

412 Part of an undated letter from Antoine Watteau to his friend M. de Julienne. See also R. Friedenthal, 1963, p.207.
413 E. Wright (II.1720-1750).
414 E. Wright, 1764, Some observations made in travelling through France, Italy, etc. in the years MDCCXXI, MDCCXXI and MDCCXXII, 2nd ed., London, A. Millar, p.467.
415 Mariette (1694-1774).
416 Comte de Caylus (1692-1765).
source of his material, except in two places, one being in Discourse Eight where he says the following:

“One of the first rules, for instance, that I believe every master would give to a young pupil, respecting his conduct and management of light and shadow, would be what Lionardo [sic] da Vinci has actually given; that you must oppose a light ground to the shadowed side of your figure, and a dark ground to the light side...\textsuperscript{417}

In the 1721 edition, the actual words are,

“Since we find by Experience, that every Body is encompassed, with lights, and Shadows, let me advise the painter, so to dispose his Figures, as that their illumined parts be found on dark Grounds; as on the contrary, their shadowed parts on Grounds, that are more bright.”\textsuperscript{418}

Reynolds made another reference to the 1721 edition when he said in Discourse Two, “...as Leonardo da Vinci has observed, he improves upon the fanciful images that are sometimes seen in the fire, or are accidentally sketched upon a discoloured wall”.

Another influential figure who was able to spread Leonardo's ideas was George Vertue,\textsuperscript{419} the engraver. He was 37 years old when the \textit{Treatise of painting} was published, and he owned his own copy of the 1721 edition. His notes in that edition show that he gave it serious consideration, and Leonardo's ideas influenced Vertue's own Notebooks.\textsuperscript{420} These became the basis of studies of the art of the early eighteenth century. He died 35 years later in 1756. On Vertue's death, Horace Walpole\textsuperscript{421} bought his notebooks, (about fifty of them) and used them extensively in his \textit{Anecdotes of painting in England (1765-71)}. Horace Walpole was a great letter writer to


\textsuperscript{418} See the \textit{Treatise of painting}, 1721 edition, p.144.

\textsuperscript{419} George Vertue (1684-1756).

\textsuperscript{420} George Vertue's copy of the \textit{Treatise of painting} was bought by Horace Walpole on Vertue's death. Walpole died in 1797, and his house in London, 'Strawberry Hill', with its contents were inherited by Mrs Damer, the daughter of Walpole's friend, General Conway. The contents were then passed on to the Waldgraves in about 1800. George, the 7th Earl Waldgrave, sold the contents in the famous 'Strawberry Hill' sale of 1842. This copy of the 1721 edition was sold at the 'Strawberry Hill' sale to an unknown buyer and it later passed into the hands of a Dr James Forbes Young in Kenmington, Oxford. It is now in a private collection in Cape Town.

\textsuperscript{421} Horace Walpole (1717-1797).

156
numerous people, but one of his ‘inner circle’ of correspondents was William Mason,\textsuperscript{422} the poet. Mason knew of Leonardo’s ideas, and translated into English some of Du Fresnoy’s Latin verse from the \textit{De arte graphica} which detailed Leonardo’s theory of Aerial Perspective.\textsuperscript{423} Sir Joshua Reynolds, who became a great friend of Mason after meeting him in 1755, then annotated the poem for him, and a selection follows that clearly shows Leonardo’s influence:

...Know first that Light displays and shade destroys

Refulgent Nature’s variegated dyes.

Thus bodies near the light distinctly shine

With rays direct, and as it fades decline...\textsuperscript{424}

In silver clouds in aether’s blue domain,

Or the clear mirror of the watry plain

If chance some solid substance claim a place,

Firm and opaque amid the lucid space,

Rough let it swell and boldly meet the sight,

Mark’d with peculiar strength of shade and light;

There blend each earthy tint of heaviest sort,

At once to give consistence and support,

While the bright wave, soft cloud, or azure sky,

Light and pellucid from that substance fly.\textsuperscript{425}

Influential people now knew the \textit{Treatise of painting} through the Du Frèsne and 1721 editions, and later the German and Spanish translations, and Leonardo’s reputation grew on a secondary basis, through their writings.

\textsuperscript{422} William Mason (1725–1797).
\textsuperscript{423} K. Steinitz, 1958, p.11. Charles Alphonse du Fresnoy published his \textit{De arte graphica} in 1667, which was followed by Dryden’s famous English translation in 1750, the \textit{Art of painting by C.A.Du Fresnoy with remarks}, London.
\textsuperscript{424} \textit{De arte graphica}, p.30.
\textsuperscript{425} \textit{De arte graphica}, p.34.
In 1785, Pierre-Paul Prud’hon \(^{426}\) wrote a letter from Rome to Jean-Baptiste Fauconnier in Paris in which he extolled the virtues of Leonardo. He wrote,

“But one who far surpassed him (Raphael) in precision, pithiness, and force of execution, and in harmony of chiaroscuro and perspective etc., is the inimitable Leonardo da Vinci, the father, the prince, and the first of all painters... Yet few people pay any attention... to Leonardo generally: either his merits are too far beyond their intelligence, or he is so perfect that it never occurs to them even to try to follow a style which seems impossible to approach. To a sublime genius this rare man joined a just reason and a profound imagination, qualities rarely found in the same mind, since the first seems to belong to a sanguine, and the second to a cold and reflective nature”. \(^{427}\)

Prud’hon wrote this after seeing the Last Supper, and his strong inference that Leonardo’s true stature had been over-looked is perceptive. Although Prud’hon does not mention the Treatise of painting, his knowledge of Leonardo’s ‘reason, imagination, and cold and reflective nature’ strongly suggest that he was familiar with it. At this time, both the Du Frésne and 1721 editions were available, but not the Rigaud.

On the ninth of February, 1788, Wolfgang von Goethe \(^{428}\) wrote in his diary,

“I read Leonardo da Vinci’s book on painting and now I know why in this art I was never able to achieve a thing”. \(^{429}\) In his well-known essay of 1817, \(^{430}\) Goethe described Leonardo in terms that had clearly been influenced by Vasari’s Lives. He then referred to the Trattato della pittura, when he said,

“To this acute and intelligent intuition of the material world we owe that great precision and detail, with which he is able to set forth, in words, the movements of the most intricate events,

\(^{426}\) Pierre-Paul Prud’hon (1758-1823).
\(^{427}\) R. Goldwater and M. Treves, 1976, p.177.
\(^{428}\) Wolfgang von Goethe (1749-1832).
\(^{429}\) Goethe, 1912, Italianische Reise, Leipzig, Im Inselverlag. See also Foreword to K. Steinitz, 1958, p.12.
just as if they were intended for pictures. Read his description of a battle, a storm and the
like, and you will acknowledge, that you scarcely ever met with more accurate
representations, which, though they may not themselves be fit to be painted, yet are calculated
to insinuate to the painter, what may be required of him.\footnote{The edition of the Treatise of painting which Goethe read is not mentioned, but it was probably the German edition of 1724. This was a translation by Johann Boehm of the 1651 French and Italian editions with a new grouping of chapters. It was reprinted in 1747 and 1786. The descriptions of the Storm and the Battle appear in chapters 157 and 158 in the Rigaud edition, and chapters 281 and 282 respectively in the McMahon edition.}

Later in the essay, he said,

“In conclusion, we will notice a publication that has lately appeared at Rome: Trattato della
It is a large volume, containing a great deal of matter, previously unknown, from which a new
and deep insight into the art and method of Leonardo may probably be derived”.

This was the famous Manzi edition, the first full published text of the Codex Urbinas. Then
appeared the 1796 edition of the Treatise of painting, which was a resetting of the 1721 edition.

In the same year, the Ambrosian Library in Milan, with its remarkable collection of original
manuscripts by Leonardo suffered a stunning reversal. Napoleon removed the Vincian
manuscripts from the Ambrosian library and sent them to Paris, under the following breathtaking
pretext:

“The sciences that honour the human spirit, the arts that embellish life and transmit great acts
to posterity, ought to be especially noted in free governments. All men of genius, all who
have attained a distinguished rank in the republic of letters are French, whatever the country
that gave them birth...”\footnote{Expressed in one of his letters dated 1796.}

G.B. Venturi, the well-known Italian physicist, was in Paris on a diplomatic mission when
Leonardo’s manuscripts arrived with other spoils confiscated by Napoleon. Venturi was able to
gain access to them and transcribed three thick notebooks of material before he returned to Milan.

Sadly, these ended up in the library at Reggio Emilia, neglected for another eighty years. A great
deal of his work remained unprinted, but a selection from these notes at last appeared in 1797 when he published an *Essay on the physical-mathematical Works of Leonardo da Vinci, with extracts from the manuscripts brought from Italy.*

By the end of the eighteenth century, thirteen printed editions of the *Treatise of painting* had been published in different languages, one of which was an excerpt only.

From the above, it can be clearly seen that Leonardo’s reputation was spreading on a selective basis, and his work was becoming better known. But there was little direct study of his work until the beginning of the nineteenth century, when the famous Manzi edition of the *Codex Urbinas* was published.

In 1802, the Rigaud edition of the *Treatise of painting* appeared. This greatly facilitated the study of Leonardo’s ideas on painting, notably in the New World. The *Treatise of painting* was described in America as “the only work necessary to be put into the hands of the student” by Shearjashub Spooner. C.W. Peale owned a copy, as did his son Rembrandt Peale, and his notes can be found in the margin of his copy. The Rigaud edition in the National Academy of Design was used by a number of artists, James Jackson Jarves quoted from it extensively, and the artists Samuel Morse and Jasper Cropsey did so as well. Samuel Morse was referred to by his biographer as the ‘American Leonardo’. It can in fact be argued that Leonardo’s influence in America through the *Treatise of painting* is possibly greater than that of any other Renaissance painter.

---

433 After whom the Venturi Tube was named.  
435 C.W. Peale (1741-1827).  
436 Rembrandt Peale (1774-1825).  
438 George Innes in 1868, R.S. Gifford in 1869, Samuel Colman in 1870, and David Johnson in 1872. See also I.B. Jaffe, 1989, p.57.  
440 Samuel Morse (1791-1872).  
441 Jasper Cropsey (1823-1900).  
442 In Morse’s notebook of 1823, and several pages into Cropsey’s sketchbook. See also I.B. Jaffe, 1989, p.57. Incidentally, Morse’s biographer referred to him as the ‘American Leonardo’.  
Another edition of the *Treatise of painting* was published in Milan in 1804.\textsuperscript{444} Carlo Amoretti,\textsuperscript{445} now the librarian of the Ambrosian, wrote his *Memorie storieche su la vita gli studi et le opere di Leonardo da Vinci* (Historical Memoirs) as a preface to this edition. Amoretti asserted that Leonardo had been born in 1452, not 1445 as had been hitherto believed. He corrected many of Vasari’s misrepresentations, and asserted that the *Treatise of painting* was just part of what was intended to be a much larger work.

Then came the publication of the first full text of the *Codex Urbinas 1270* in Italian in 1817. This was the celebrated Manzi edition. It was followed by further editions of the abridged version in French, Spanish and Dutch, and then in 1835, a reset version of the 1802 Rigaud edition of the *Treatise of painting* appeared. The *Treatise of painting* was becoming increasingly influential as an educational handbook. In 1853, the French Commission, (on which artists such as Ingres,\textsuperscript{446} Meissonier,\textsuperscript{447} Flandrin\textsuperscript{448} and Delacroix\textsuperscript{449} had served) published a report by Felix Ravaisson issued under the auspices of the Ministry of Education. In this report, the *Trattato della pittura* was quoted and confirmed as an aid to teaching Art.

In addition, Ruskin,\textsuperscript{450} a contemporary of Walter Pater,\textsuperscript{451} frequently referred to Leonardo in his lectures at Oxford, and urged his students to follow the teaching of the *Treatise of painting* slavishly,\textsuperscript{452} but described Leonardo as one who “depraved his finer instincts by caricature and remained to the end of his days the slave of an archaic smile.”\textsuperscript{453}

\textsuperscript{444} This was an Italian edition that conformed to the first Du Frêne edition.
\textsuperscript{445} Carlo Amoretti (1741-1816).
\textsuperscript{446} Jean Auguste Dominique Ingres (1780-1867). Eighteen years after the Rigaud edition appeared, Ingres wrote, “The completion of the form is achieved by finish. There are people who, in drawing, are satisfied by feeling; with feeling once expressed, the thing suffices them. Raphael and Leonardo da Vinci are there to prove that feeling and precision can be allied” (*Ecrits sur l’art, <Notes and thoughts on art*>*, 1870).
\textsuperscript{447} Meissonier (1815-1891).
\textsuperscript{448} Flandrin (1809-1864).
\textsuperscript{449} Delacroix (1798-1863) became a great admirer of Leonardo.
\textsuperscript{450} Ruskin (1819-1900).
\textsuperscript{451} Walter Pater (1839-1894).
\textsuperscript{452} See Ruskin, 1887, *Lectures on art*, George Allen, London, where he says at the beginning of a series of lectures he gave in 1870, “We will take Leonardo’s treatise on painting for our first text-book...I ask you to do only what Leonardo bids...” p.34.
\textsuperscript{453} G.C. Williamson, 1899, p.11.
Familiarity with the *Treatise of painting* continued to spread, and references began to appear in magazines. Quotations from the *Treatise of painting* appeared on a number of occasions in *Blackwood’s Edinburgh Magazine*, notably in December 1848. An important reference appeared in the *Fortnightly Review*, which published Walter Pater’s famous essay on Leonardo in 1869. In his memorable prose, Pater referred to the *Trattato* and said,

“...Later writers, thinking only of the well-ordered treatise on painting which a Frenchman, Raffaelle Du Frênes, a hundred years afterwards, compiled from Leonardo’s bewildered manuscripts, written strangely, as his manner was, from right to left, have imagined a rigid order in his inquiries. But this rigid order would have been little in accordance with the restlessness of his character.”

The French poet and critic, Charles Baudelaire, referred to Leonardo in various poems, one of which appeared in *Les fleurs du mal*, and he also dedicated one of his quatrains in *Phares* to Leonardo. He influenced the critical writings of the time, notably in his review of the Salon of 1846, and was strongly supported by Sar (Josephin) Péladan who later produced his own French edition of the *Trattato della pittura* in 1910. This romantic and occultist interest in Leonardo provoked a response from the great scholar Duhem, a scientist and orthodox Catholic, who set out to discover the medieval roots of Leonardo’s thought.

1877 saw the appearance of another resetting of the Rigaud edition of the *Treatise of painting*. This appeared near the beginning of a new increase of interest in Vincian studies. Two works had been published in 1872 which were to spur forward the critical study of Leonardo’s work; these were the important studies by Gaetano Milanesi, and Gustavo Uzielli.

In addition, the 1870’s and 1880’s, saw the development of a project that started a real and wide-spread interest in Leonardo as a scientist. Charles Ravaissin-Mollien embarked on his

---

456 Charles Baudelaire (1821-1867).
457 This was really a re-arrangement of the famous Manzi edition of 1817.

162
important project to produce all of Leonardo’s surviving work in facsimile and transcription. The twelve notebooks in the Institut de France were published in facsimile from 1880-1891 in Paris. They appeared in six volumes with a French translation by Charles Ravaissan-Mollien. These were, of course, facsimiles of the manuscripts which had been taken from the Ambrosian by Napoleon and never returned.

A new momentum in Vincian studies had at last begun. It was amazing that Leonardo’s influence should have been so persistent for so long amongst so many key and influential writers and artists, and yet so little direct research and publication of his actual writing had been undertaken.

In 1883, J.P.Richter produced the first edition of Leonardo’s Notebooks, oddly called the *Literary works of Leonardo da Vinci*. This was published in England and made possible a much wider study of Leonardo’s work. The *Literary works of Leonardo da Vinci* contained excerpts from the *Codex Trivulzianus* (*Libro F*), which Luca Beltrami published as a complete facsimile version in Italy in 1891.

The Windsor manuscripts were published in summary by J.P.Richter also in 1883. They were later published more fully in two volumes with facsimiles, transcripts and translations by Messrs. G.Piumati and Sabachnikoff as *Dell’ anatonia fogli A*460 and *fogli B*.461 Then other pages were published in facsimile by the French publisher Rouveyre. This was an incomplete publication, and he used plates that had been prepared for Sabachnikoff without authority.

In 1892, there was a reprint of the 1877 Rigaud edition of the *Treatise of painting*.

Then in 1893 Sabachnikoff published his small volume of 18 pages containing mathematical figures and drawings on the flight of birds, and gave the original manuscript to the Royal Library in Turin. It had been stolen earlier by Count Guglielmo Libri sometime before 1848. In 1868...

---

460 Published in Paris in 1898.
461 Published in Turin in 1901.
Count Libri sold it to Count Giacomo Manzoni of Lugo, and in 1892 it was acquired from Count Manzoni's heirs by Sabachnikoff.

In 1895 an essay by Paul Valéry⁴⁶² appeared in *La nouvelle revue* entitled *Introduction to the method of Leonardo da Vinci*. He had been commissioned to write this essay by Madame Juliette Adam a year earlier, and he said,

"Knowing very little about Leonardo, ...I accepted...and invented a Leonardo of my own".⁴⁶³

This 'invention' appears at first glance to be irresponsible, in line with his claim that history is a mental state. Yet this essay was based more on fact and actual knowledge of Leonardo than he cared to admit. At one point he quoted from the *Treatise of painting*, probably using one of the Du Fréson edition reprints or the Giffart edition. He also relied heavily on the 1892 volume by Gabriel Séailles, *Leonardo da Vinci, the artist and scholar: Essay in psychological biography*.

Another important achievement was the publication of the *Codex Atlanticus* in facsimile from 1894 to 1904. This was published in Rome under the direction of the Accademia dei Lincei, and transcribed by Giovanni Piumati. This was followed by the publication of the *Anatomical Manuscripts A and B*, by T.Sabachnikoff, mentioned above, starting in 1898 and reaching conclusion in 1901.

By the end of the nineteenth century, nineteen printed editions of the *Treatise of painting* had been published in different languages, two of which were excerpts only.

Three years after the turn of the century, Herbert Horne's English translation of Vasari's *Life of Leonardo* appeared with a commentary. This was followed in 1906 by a reprint of the 1892 Rigaud edition of the *Treatise of painting*, and by an edition of the *Codex Leicester* which was edited and published by Gerolamo Calvi in Milan, in 1909.

The next important event was the appearance of the six volume *Quaderni d'anatomia* which was published in full in Oslo from 1911 to 1916 by the three Norwegian Professors Vangenstan,

---

⁴⁶² Paul Valéry (1871-1945).
Fonahn and Hopstock. This contained the drawings at Windsor that had not been included in the selection by Sabachnikoff.

The *Codex Arundel* in the British Museum and the three volumes of the *Codex Forster* in the Victoria and Albert Museum in London were published by the Reale Commissione Vinciana in Rome from 1923 to 1934, and an anatomical sheet at Weimar Castle was published by E. Möller in 1930.

During the twentieth century, twenty-five printed editions of the *Treatise of painting* were published in different languages, two of which were excerpts only, four were the *Paragone* only, and one was an unauthorised and fragmentary edition published by M. Rouveyre. Amongst these editions was the first complete English edition of the *Codex Urbinas* by Philip McMahon in 1956, and another facsimile in 1995. With the publication of facsimiles of the original manuscripts has come a flood of critical commentaries.

A balanced assessment of Leonardo was difficult before the twentieth century because of a number of factors. There was the uncertainty of attribution for one. Walter Pater's famous *Essay* is an example, in which he wrote about paintings which were subsequently shown to be by other artists. There was the difficulty of access to Leonardo's work, which was gradually resolved as facsimiles became available. There were entrenched attitudes and long accepted views that were difficult to overcome, and the influence of Vasari's *Lives* is a case in point. There was the problem of Leonardo the enigma, with his multi-faceted genius. Many studies have assessed his manuscripts and his paintings, and through them, suggested a profile of the man himself. Most have differed from each other, so we have been left with a collection of 'constructs'. In addition to this was the rigid influence of various Academies, perpetuating views and approaches that no longer matched changing circumstances. Today standards are freer, and Leonardo's work can be appreciated from a much wider perspective. New interdisciplinary approaches have enriched understanding, and the rise and development of Psychology has shed light on obscure matters such as Leonardo's symbolism, and the influence of his childhood.
In all these competing views, one fact is overwhelmingly clear. Leonardo had never been forgotten, but for more than three centuries after his death he had not occupied the place he deserved. If his ‘notes’ had been readily available in the sixteenth century, many branches of science would have been transformed, and catapulted forwards. Leonardo’s work has been rediscovered, and today his remarkable talents are still being re-assessed. However the personality that lies behind these talents remains an enigma, and the unemotional didactic style of his ‘notes’ gives little insight into which of the many ‘constructs’ has really touched on Leonardo the ‘man’.
9. CONCLUSION

This thesis has attempted to explain the origin and development of Leonardo’s *Treatise of painting*, and to show how the first English edition related to the later editions, with an assessment of its reputation and place in the development of Art theory. The story of the origins of the 1721 edition, along with that of the other abridged English editions has been traced. Their slow and complex evolution goes back into the personality of Leonardo himself, who was unable to bring to completion so much that he attempted. Chapters 2 and 3 discuss his genius, and show how the legacy that he left (his paintings, sculpture, architecture and ‘notes’), inadequately reflected his talents and was insufficient to maintain his fame and reputation for a variety of reasons.

Leonardo intended compiling a treatise on painting from his ‘notes’, along with a number of other treatises, but never achieved this. It is surprising how many other artists wrote treatises at the time, and Leonardo’s place within this list remains blank, although his work in manuscript form circulated widely among his friends. Why was a treatise on art by Leonardo never published? Possible reasons have been put forward, but probably the overwhelming reason was the disordered state of his manuscripts, and that quirk in his personality that drove him to seek other interests before completing what was immediately in hand. There are references to a completed treatise, but there is insufficient evidence to establish this, and they may equally well refer to other manuscripts, or be misrecordings of the facts.

The way in which Francesco Melzi compiled a treatise from Leonardo’s ‘notes’, the *Codex Urbinas*, has been explained. It shows that there may be a missing signature from the *Codex Urbinas*, and that it is incomplete as it stands, because Melzi intended adding more material from other manuscripts. These are listed, as are those which have survived from all the sources which he used.
After Melzi's death, Leonardo's manuscripts dispersed, including the *Codex Urbinas*, and there is evidence that there may have been as many as fifty of them. What happened to them and where the surviving manuscripts are now is explained, and a stemma at the end of that section illustrates this. Copies were made of the *Codex Urbinas* before it disappeared, and copies were made of those copies. The major ones are listed, as well as the *Codex Huygens*, which has now been shown to be Carlo Urbino's own notebook. It contains material probably copied from Leonardo's manuscripts that are now lost, so in that sense it assumes the importance of an original Leonardo manuscript.

The next section has shown how Cassiano dal Pozzo became interested in Vincian manuscripts, and decided to produce a printed edition of Leonardo's notes on art. At this stage, the *Codex Urbinas* was still lost, so Cassiano used a copy, the *Codex Barberinus*, along with other manuscripts. He also needed an illustrator for the work that was to be known as the *Trattato della pittura*, and so began his friendship with Nicolas Poussin. It appears that several illustrated copies of the *Trattato* were produced by Poussin, and there is a discussion as to which was the original one. Furthermore, more than one copy was sent to France to be used in the production of the first printed edition. Which one did the printer use? This is debated in the text, although the outcome is inconclusive. It took ten years to produce a printed edition from the time that Cassiano dal Pozzo sent the manuscripts to Paris, but he was still alive when the Du Frêsné edition finally appeared, and died six years later. The appearance of the first printed edition caused uproar with Nicolas Poussin, who saw that several of his illustrations had been embellished by Errard, and this deeply annoyed him.

After several abridged editions had appeared, the time had come for the first complete edition of the *Codex Urbinas*, the Manzi edition in Italian. The development of these complete printed editions has been detailed, followed by a listing of all the printed editions, with a stemma illustrating their early lines of development. A point arising from this is the question of the reprints. There are several of them amongst the English editions, and one wonders whether their
spacing is significant, or whether some were more collectable than others. A wide search has thrown up almost no information on this matter, only speculation. None of the editions seems to have sold particularly well, although well enough to be reprinted after extended periods. Even the 1721 edition was reprinted, although it was much more expensive than other editions, with a text that was more difficult to read. Its rarity alone makes it more collectable than other editions. In the absence of more information, it remains curious that the first Rigaud edition with its clearer text, and lower price should have taken more than 30 years to reprint.

What follows has been a look at the individual English editions, starting from the perspective of their Prefaces. Each Preface reveals the intentions and difficulties of each editor, and the Preface in the Rigaud edition is particularly interesting, as he made assertions about the previous edition that have needed testing. Rigaud criticised the 1721 edition for its lack of order. He certainly improved the order of sections in his own edition to a great extent, which made it much more readable. But the lack of order in the 1721 edition was inherited from the Du Frêne edition, as the editor took it directly from the first Italian edition, using the first French edition for guidance in his translation. He clearly felt he did not have the authority to reconstruct the material he was translating. He did however omit seven sections (none of them important or substantial), which Du Frêne re-incorporated in his own text.

Rigaud appears to overstate his case when he claims that his edition contained improved illustrations. He claims that his were “re-engraven with more attention to correctness in the drawing”, and a close inspection shows this not to be the case. This seems to be a marketing ploy to promote his own new edition by criticising the previous one.

In addition to the improved order of the sections in the text, the other great improvement was the style of language that Rigaud used. It is very much more fluent, direct, and readable. So one should accept his edition to be a great improvement on the previous one, but not for all the reasons he puts forward.
What follows is a structural analysis of the different editions, using the Concordance. Each section in the Du Frêne, 1721 and Rigaud editions have been compared and listed with their equivalents in the Ludwig and McMahon editions. One of the interesting points that arose from this is that the 365 sections in the Du Frêne edition may have been intended to correspond with the days of the year. Another point that is thrown into focus is that most of the Treatise of painting (about 98%) comes from only two sections of the Codex Urbinas. These are parts 2 and 3, and are those most suitable for the student painter. This was clearly intended to be a student’s edition. Within this context, the grand format of the Du Frêne edition is a strange anomaly. Perhaps it was felt that the octavo format of a students edition would be inappropriate for the first printed edition since Leonardo’s death 232 years before. This edition was also the fulfilment of the dreams of Cassiano dal Pozzo, and the culmination of all those years of effort. Whatever the reasons, there can only be guesses and no definite answers.

The question of the illustrations has been extensively analysed, and has thrown up very little of any interest. Apart from minor points, it has been noted that Rigaud used fewer illustrations than are in the 1721 edition, but positioned them better. He also removed the contribution of Errard that annoyed Nicolas Poussin so much.

The following section has looked at the detailed text of the Treatise of painting, and identified Leonardo’s vision or personal art theory, within the parameters of the 1721 and Rigaud editions. It has looked at the theories he inherited from the Middle Ages, and identified the main issues and trends that either adapted to, or contributed to, the new unified Renaissance art theory. Following this is an attempt to extract from the detailed text an art theory that covers five main subject areas, those of Painting as a Science, Observation, Vision, Colour and Light, and the Theory of Forms. This is Leonardo’s unified theory of art as expressed within the confines and parameters of the Treatise of painting, available to readers of the text at that time.

There has been the temptation to look at what Leonardo said, and follow the main lines of argument through the seventeenth century in particular, to identify the influence of his ideas or:
succeeding ages. However this subject would provide matter for another thesis. A few comments have been made to identify how major lines of thought were taken up and adapted differently by both the Rome and French Academies. The French Academy actually adopted the Treatise of painting as a 'prescribed text', and Joshua Reynolds of the British Academy adopted several of its precepts as part of his own lectures. Its influence was therefore major, although the detail and focus changed as the academies developed their own curricula in the development of the new Classical Ideal.

The final section records various references to Leonardo and his written work to show how his reputation, and that of the Treatise of painting, steadily spread and strengthened up to the end of the nineteenth century, when critical study of his work rapidly intensified.

There were very few written references to Leonardo and his 'notes' in the sixteenth century, apart from Vasari. A direct reference to the Trattato della pittura was made by Annibale Carracci, and several treatises by other artists appeared which showed the influence of Leonardo's own work.

More interest was shown in Leonardo during the seventeenth century. Cassiano was at work on Leonardo manuscripts and their copies, collectors were trying to buy Leonardo's work, and various Academies were establishing their curricula, taking some of Leonardo's ideas and adapting them, the French Academy in particular being influenced by Poussin. Several more treatises appeared that had been influenced by Leonardo's thinking, notably the El arte de la pintura of Pacheco. References to Leonardo appeared in an increasing number of books, including the poem De arte graphica of Du Fresnoy. There was also a direct reference to the Trattato by Galileo.

Interest continued to grow throughout the eighteenth century, but not dramatically, much as it had during the previous century. Collectors were continuing to buy Leonardo's paintings

---

Marc Fumaroli in his writings on Poussin argues that the Paragone was used in a number of Art Academies even earlier.
and manuscripts, and the *Codex Leicester* was acquired by Thomas Coke, Earl of Leicester. Leonardo’s name appeared in several more books, and Joshua Reynolds quoted him in his Discourses. Then came the most dramatic event of this century, when Napoleon snatched the outstanding collection of Vincian manuscripts from the Ambrosian Library, and took them to Paris.

The early part of the nineteenth century showed interest still growing, surprisingly in the New World of America, and particularly in the educational world. Goethe referred directly to the *Treatise of painting*, as did Walter Pater. While Ruskin in England was urging his students to read the *Treatise of painting*, the Ministry of Education in France recommended it as an aid to teaching art. Now came developments near the end of the nineteenth century that really accelerated studies of Leonardo’s work. A number of facsimiles appeared, notably of the *Codex Atlanticus*, the other notebooks taken from the Ambrosian, the *Codex Trivulzianus* and the *Drawings at Windsor*. At about the same time appeared the critical studies of Gaetano Milanesi, Gustavo Uzielli and the work by Richter. This set the stage for a new momentum in Vincian studies, and the twentieth century has seen a flood of critical publications.

Since the publication of the Du Fréne editions in 1651, each century up to our own has seen an increasing number of editions of the *Treatise of painting* appearing in more and more languages, as its reputation and influence spread. The 1721 edition played a pivotal historical role in the development of this important text within the English speaking world.

Kenneth Clark’s judgement of the 1877 edition as being “the only good English edition available” is certainly borne out by the rarity of the earlier 1721 edition, and the improvements that John Francis Rigaud made to the later English editions. Looking back over its long history and its influence on the art and science of painting, there can be few who would not agree with Kenneth Clark’s assertion that “Leonardo da Vinci’s *Treatise of painting* is... a precious document in the whole history of Art”, and can see the grounds for arguing that “it is the most precious document”.

172
Appendix 1

SECTION HEADINGS FROM THE TREATISE OF PAINTING - 1721 EDITION

The 1721 edition has no chapter headings or section numbers, just section descriptions as they appear in the margin next to the running text. These are listed below with new numbers placed next to them in the order in which they appear. This numbering is essential as it enables a comparison with the Rigaud and other editions. The headings have been changed from the original only in respect to excessive capital letters, and archaic punctuation and spelling. Otherwise these headings are as they appear in the margins of the 1721 edition.

1  The first thing to be learned by a novice in painting.
2  In what a painter ought principally to exercise himself.
3  The order to be observ'd in teaching a novice to design.
4  An inclination not always attended with genius to painting.
5  A painter to be universal.
6  How a painter may become universal.
7  The course a painter must take in his studies.
8  How a painter may judge of his proficiency.
9  The manner of learning to design.
10  How to sketch out a history-piece.
11  Faults to be corrected as soon as discovered.
12  A painter never to trust his own judgement.
13  A new art of invention.
14  The advantage of recollecting in the night, what has been studied in the day.
15  A man to go through a course of labour and industry, e'er he can attain to do things with ease and expedition.
16  A painter to covet the censures of different persons on his works.
17  A painter to design after nature, rather than his own ideas.
18  Variety of proportions to be affected.
19  No difficult matter to become universal.
20  The absurdity of meddling with the practice, before having master'd the theory.
21  One painter never servilely to imitate another.
22  How to design after the life.
23  A caution about lights and shadows.
24  The light proper to design by.
25  The lights proper for figures designed after the life, or after Relievo's.
26  The lights proper for figures designed from the life.
27  How to design a nudity.
28  How to design from the life.
29  How to design a landscape from the life, or to make an exact plan of a country.
30  The light proper for a landscape.
31  How to design by candle light.
32  How in painting a head to give it all the advantage of light and shadow.
33  The light proper for faces, and all carnations in general to be painted by.
34  The method to be taken in designing the figures in a history-piece.
35  How to design a nudity, or any other object from the life.
36  The measure or division of a statue.
37  How a painter must place himself with regard to the light shining upon the model.
38  The light in which objects appear, with the most advantage.
39  A painter's judgement sometimes imposed upon by the defects of his own person.
40  Anatomy necessary for a painter.
41  Repetition in the same painting, a fault.
42  How a painter may secure himself from being abused in the choice of his model.
43  A fault of some painters, who introduce a figure design'd for one light, into a piece supposed to be enlightened by another.
44  Division of painting.
45  Division of designing.
Proportion of the parts.
The motion and expression of figures.
The contours never to be too harsh and apparent.
A fault not so easily discovered in a small thing, as a large one.
Why the relief's in painting can never be so bold, as those in nature.
Several history-pieces never to be painted one over another on the same front.
The light in which figures appear with the greatest relief.
Greater variety in the lights of shadows of figures, than in their contours.
The muscles used in the several motions of the body, to be remembered by a painter.
A remark upon expression, and attitudes.
Painting only to be viewed from some single place.
A remark upon shadows.
How to represent little children.
How to represent old men.
How to represent old women.
How to represent women.
How to paint a night-piece.
How to represent a tempest.
How to represent a battle.
How to represent remote objects.
The lower parts of the air brighter than the upper.
How to give figures a great relief, and make them appear standing out from the ground of the painting.
Of representing objects in their natural bigness.
What figures to be the most finished.
What light sets faces off with the most advantage.
Of the reverberation or relief's of light.
Places where no light is reflected.
Of relief's.
Of relief's thrown upon shadows.
Where relief's appear the most, and where the least.
What part of a relief will be the brightest.
Of the colour reflected from flesh.
Where relief's are the most sensible.
Of double and triple relief's.
The colour of a relief seldom simple, but mixed out of several colours.
The colour of a relief composed of the colour of the body whence it proceeds, and of that on which it falls.
In what place a relief is the most vivid and sensible.
Of reflected colours.
Of the position of figures.
Preliminaries to the painting of history-pieces.
How to proportion the height of the first figure in a history-piece.
Of the relief of figures in a history-piece.
Of the shortenings of figures.
Of diversity of figures in a history-piece.
How to study the motions of human bodies.
The method to be taken in learning to paint history-pieces.
Of the variety necessary in history-pieces.
The faces in a history-piece to be diversified.
How to match the colours in such a manner as that they give a grace to each other.
How to make colours appear vivid.
Of the colour of the shadow of any colour.
The variety observable in colours, as they are nearer, or more remote.
At what distance the colour of a body disappears.
The colour of the shadow of white.
What colour produces the darkest shadow.
A colour sometimes seen with the same force at different distances, and in airs of different densities.

Of the perspective of colours.

How a colour may appear without any alteration, tho' seen in different places, and where the air is differently dense.

Different colours may appear equally obscure, by means of the same shadow.

Why the eye cannot discern some objects, though really illumined.

An object never appears of its genuine colour, unless it receive its light from a colour of the same kind.

Colours receive some alteration by the opposition of the ground they are upon.

The changes of transparent colours, in being laid upon others.

The degree of lustre in which each colour appears the most beautiful.

The lights of any colour more beautiful than its shadows.

What colours the most apparent.

What part of a colour, ought to be the most beautiful.

The most beautiful part of a colour to be placed in the light.

Of verdigris.

How to augment the beauty of verdigris.

Of the mixture of colours one with another.

Of the surfaces of dark bodies.

What surface the most proper for receiving colours.

A body will be the most tinged with the colour of its nearest object.

What body will appear of the most beautiful colour.

Of the carnation of faces.

How to design from relief's, and to prepare the paper for that purpose.

Of the hanges observable in colours according to their greater or less distance from the eye.

Of the verdure seen in the country.

What bodies do not show their real colours.

What bodies do best discover their natural colours.

The light of a landscape.

Of the perspective of the air, and the diminution of colours seen at a distance.

Of air seen in the water of a landscape.

Colours diminished by the medium.

The ground suitable both for lights and shadows.

What remedy to take when one white terminates upon another.

The different effects of colours serving as grounds to white.

Of the grounds proper in painting.

Of grounds.

A common mistake in painting country-pieces.

Of the colours of objects far distant from the eye.

Degrees of colour in painting.

The sea of different colours, when seen from different places.

The effects of drapery on carnations.

Colour of the shadows of bodies.

Diminution of colours in dark places.

Of the perspective of colours.

Of colours.

Whence the air derives its azure.

What colours most liable to change.

Of colours seen in obscure places.

The ground encompassing a figure.

White no colour.

The colour reflected from fire.

Of an opaque body placed between two lights.

Of the colour of shadows.

On what occasions a bright ground is necessary in painting.

How to suit your grounds to your figures.

Of simple colours and their composition.

Remarks on colours.
Of the colour of mountains.
How a painter may put in practice the perspective of colours.
Of the aerial perspective.
Remark on the proportions of a human body.
The different proportions in the body of a man, and that of a child.
Children have their Junctures contrary to those of men, with regard to bulk and grossness.
A remarkable difference in the measures of a man and a child.
The junctures of fingers.
The motion of shoulders.
Of the shoulders.
No universal measure to be prescribed for the breadths of figures.
The arm longer when bent, than when stretch'd out.
The parts of an animal to be made suitable to one another.
Of the juncture of the hand with the arm.
Of the juncture of the foot.
Of the knee.
Of the members of nudities.
Whence an arm moves with the greatest violence.
Of the motion of man.
Of attitudes, members, and their motions.
The motions of the neck to be observ'd.
The members to be made fit for their office.
Of the motions of the face.
Observations for the designing of faces.
A method of remembering faces.
Of the beauty of a face.
Of the equilibrium of figures.
The motions of a figure to express the sentiment of its mind.
How to touch the muscles of a nudity.
A remark on the motion of a man.
Of the different heights of the shoulders observable in Animals when in motion.
Objection.
The stretching out of an arm changes the equilibrium of the body.
Of the centre of gravity in animals.
Of a man bearing a burden on his shoulders.
The equilibrium of a man, when standing on one foot.
Of a man walking.
Of the equilibrium of an animal standing on its feet.
Of the bends and turnings in the body of man.
Of the flexures or bends of the members.
Of the equilibrium, or counterpoise of the body.
Different ways of moving the same weight.
All motion produced from the loss of the equilibrium.
Of the equilibrium of a figure.
Of the gracefulness of the members.
Of the disposition of the members, in turning the body round.
How to dispose the members of a single figure.
The most important parts of the figure.
How a body preserves its equilibrium.
How a figure lifts or bears a burden.
Of the attitude.
Difference of attitudes.
How a painter may attain to give suitable attitudes to his figures.
Of the actions of those present and any remarkable event.
A rule in painting a nudity.
Whence the muscles become thick and short.
Fat men never have gross muscles.
Remarks on the muscles.

A nudity whose muscles do all appear, must be without motion.

The muscles of a nudity never to be too exact and laboured.

Of the extensions and shortenings of the muscles.

The ligaments of the wrist, without any muscle.

Little bones formed in the ligaments of some of the junctures.

Of the muscle between the breasts and the lower ventricle.

The greatest contortion of a man, in looking at his hind parts.

How near the elbows may be drawn together, behind the back.

Of the disposition of the members, when a man is preparing to strike with violence.

Of the force of the arms.

In which action a man has the greatest strength, whether in thrusting or pulling.

Of the flesh around the junctures which are bent.

The leg not to be turned sidewise, without the thigh.

Of the wrinkles in the bend of a juncture. Of simple motion. Of compound motion.

Of simple motion.

Of compound motion.

Of the motions suitable to the action in which a figure is employ'd.

Of the motions of figures.

Of the gesture of a man pointing at anything.

Of the variety of faces.

Of the motions suitable to the intentions of figures.

The motions of the body arising from the sentiments of the mind, easy and natural.

Of the motion arising from the view of the object.

Of common motions.

Of the motion of animals.

Every member to be suitable to the whole of which it is a part.

Decency and decorum to be observed in your figures.

Of the mixture if figures different in age, etc.

Of the quality of the persons in a history-piece.

How to represent a person speaking to a multitude.

How to represent a man in a rage.

How to represent a desperate man.

Of the motions made in laughing and crying and their difference.

Of the postures of children and old men.

Of the postures of women and young people.

Of a man leaping.

Of a man throwing anything from him with violence.

Why a man pulling anything out of the earth, or darting it in, raises the leg opposite to the arm, which acts, and bends it in the knee.

Of the equilibrium of a body at rest and out of motion.

Of a man standing on his feet, and resting more on one than on the other.

Of the position of figures.

Of the equilibrium of a man standing firm on his feet.

Of local motion.

Of quadrupeds and their motion.

Of the relation which one half of the body bears to the other half.

Three several motions in a man who leaps.

Every member of an animal capable of an infinite number of different views.

Nature the foundation on which a painter ought always to proceed.

Of the judgement which a painter forms of his own, or other mens works.

The precautions necessary, to enable a painter to judge of his own performances.

The use of a mirror in painting.

What manner of painting the most excellent.

The first aim and design of a painter.

The distribution of the lights and shadows requires more thought and address than designing the contours.
Rules for managing the lights of your figures.
Where a person ought to place himself to view a painting.
How high to place the point of view.
Little figures never to appear bold and finished.
Of the grounds proper for figures.
Of lights and shadows, and in particular of the shadows of carnations.
Rules for country pieces.
How to make an imaginary animal appear like a natural one.
How to give a grace and relieve to faces.
How to raise and loosen a figure from its ground.
The different effects of lights, as they are differently large.
Disproportions in the circumstances and less considerable parts of a painting to be avoided.
Of the extremes of a body called profiles or contours.
The effect of the removal of an object with regard to the design.
The effect of the removal of objects with regard to the colours.
The effect of one body bounding on another.
Of a man walking against the wind.
Of the window at which a painter works.
Why in measuring a face, and painting after the measures, the picture will appear larger than the life.
How the surface of every opaque body partakes of the colour of its object.
Of the motion.
Of animals, and in particular of the flight of birds.
A figure may appear forty fathoms high, which yet is painted on one wall of half that height.
How a painter may design a figure that may appear twenty four fathoms high, on a wall only twelve fathoms high.
Remarks relating to lights and shadows.
The effect of an universal light on a multitude of bodies.
Of a plane surface on a ground of the same colour with itself.
The difference with regard to painting between a surface and a solid.
The smallest parts of an object, are those which in its removal from the eye, disappear the first.
Why the same champaign appears larger at sometimes than at others.
Miscellaneous observations on perspective and colours.
Of cities and other objects seen in a gross air.
Of the rays of the sun passing through the interstices of clouds.
Of objects seen in a mist or thick air.
Of buildings seen through a gross air.
Of objects seen at a distance.
How a city appears in a gross air.
Of the lower bounds, or extremities of remote objects.
Of remote objects.
Of the azure of remote objects.
What parts of a body are the first which disappear at a distance.
Why bodies are less distinguishable at greater distances.
Why faces and other objects become obscure at a distance.
Which parts of bodies removed to a distance disappear the first, and which the last.
Of linear perspective.
Why objects appear larger than they are in effect, when seen in a fog.
Of the tops and bottoms of buildings seen in a fog.
Of buildings seen in the morning or evening through a gross air.
The highest objects seen at a distance and in a fog appear more obscure than those which are lower.
Of the shadows seen in bodies viewed at a distance.
Why the shadows projected on a white wall towards the close of the day appear azure.
Of smoke.
Of dust.
Miscellaneous rules and precepts for painting.
A painted figure will not appear at an equal distance with the natural object though both seen under the same angle.
Of the grounds in paintings.

How to judge of a painting.

Objects appear with less relievo as they are more remote.

Where the contours are the most visible.

Of the bounds or extremes of bodies.

Of the shadows of remote objects.

Various rules and precepts in painting.

Why a painting, though imitated with the greatest perfection from nature, does not appear with as much relievo as the natural objects whence it is copied.

A light ground preferable to a dark one with regard to raising and loosening your figures from bottom of the painting.

An universal light more advantageous to a figure than a particular one.

In painting a landscape, regard to be had to the climate and the quality of the place.

What is to be observed in representing the Autumn.

A rule to be observed in representing the wind.

How to represent the beginning of a shower.

Of the shadows of bridges thrown on the water underneath them.

Of the use of perspective in painting.

Of the equilibrium of figures.

How to make a statue.

How to secure a painting from decay, and to preserve it always fresh and unfaded.

How to apply colours upon linen.

Of the use of perspective in representing objects that appear dim, either on account of distance or of the density of the medium.

The effect of the distance of objects.

Of the medium between the eye and its object.

Of the draperies wherewith figures are clothed.

Of the different ways of representing the folds in drapery.

How to conduct the folds of a drapery.

Rules for designing a drapery.

Of the folds seen in the draperies of members that are shortened.

Of the shadows of the folds.

The folds of the drapery to correspond to the attitude of the figure.

Of the horizon appearing in the water.
SECTION HEADINGS FROM A TREATISE OF PAINTING - RIGAUD EDITION

DRAWING

PROPORTION
1. What the young student in painting ought in the first place to learn.
2. Rule for a young student in painting.
3. How to discover a young man's disposition for painting.
4. Of painting, and its divisions.
5. Division of the figure.
6. Proportion of members.
7. Of dimensions in general.
8. Motion, changes, and proportion of members.
9. The difference of proportion between children and grown men.
10. The alterations in the proportion of the human body from infancy to full age.
11. Of the proportion of members.
12. That every part be proportioned to its whole.
13. Of the proportion of the members.
14. The danger of forming an erroneous judgement in regard to the proportion and beauty of the parts.
15. Another precept.
16. The manner of drawing from relievos, and rendering paper fit for it.
17. Of drawing from casts or nature.
18. To draw figures from nature.
19. Of drawing from nature.
20. Of drawing academy figures.
21. Of studying in the dark, on first waking in the morning, and before going to sleep.
23. The method of retaining in the memory the likeness of a man, so as to draw his profile, after having seen him only once.
24. How to remember the form of a face.
25. That a painter should take pleasure in the opinion of every body.

ANATOMY
26. What is principally to be observed in figures.
27. Mode of studying.
28. Of being universal.
29. A precept for the painter.
30. Of the measures of the human body, and the bending of members.
31. Of the small bones in several joints of the human body.
32. Memorandum to be observed by the painter.
33. The shoulders.
34. The difference of joints between children and grown men.
35. Of the joints of the fingers.
36. Of the joint of the wrist.
37. Of the joint of the foot.
38. Of the knee.
39. Of the joints.
40. Of the naked.
41. Of the thickness of the muscles.
42. Fat subjects have small muscles.
43. Which of the muscles disappear in the motions of the body.
44. Of the muscles.
45. Of the muscles.
46. The extension and contraction of the muscles.
47. Of the muscle between the chest and the lower belly.
Of a man's complex strength, but first of the arm.
In which of the two actions, pulling or pushing, a man has the greatest power.
Of the bending of members, and of the flesh round the bending joint.
Of the naked body.
Of a ligament without muscles.
Of creases.
How near behind the back one arm can be brought to the other.
Of the muscles.
Of the muscles.
Of the bending of the body.
The same subject.
The necessity of anatomical knowledge.

MOTION AND EQUIPOISE OF FIGURES
Of the equipoise of a figure standing still.
Motion produced by the loss of equilibrium.
Of the equipoise of bodies.
Of positions.
Of balancing the weight round the centre of gravity in bodies.
Of figures that have to lift up, or carry any weight.
The equilibrium of a man standing upon his feet.
Of walking.
Of the centre of gravity in men and animals.
Of the corresponding thickness of parts on each side of the body.
Of the motion of animals.
Of quadrupeds and their motions.
Of the quickness or slowness of motion.
Of the motion of animals.
Of a figure moving against the wind.
Of the balance of a figure resting upon its feet.
A precept.
Of a man standing, but resting more upon one foot than the other.
Of the balance of figures.
In what manner extending one arm alters the balance.
Of a man bearing a weight on his shoulders.
Of equilibrium.
Of motion.
The level of the shoulders.
Objection to the above answered.
Of the position of figures.
Of the joints.
Of the shoulders.
Of the motions of a man.
Of the disposition of members preparing to act with great force.
Of throwing any thing with violence.
Of the motion of driving any thing into or drawing it out of the ground.
Of forcible motions.
The action of jumping.
Of the three motions in jumping upwards.
Of the easy motions of members.
The greatest twist which a man can make, in turning to look at himself behind.
Of turning the leg without the thigh.
Postures of figures.
Of the gracefulness of the members.
That it is impossible for any memory to retain the aspects and changes of the members.
The motions of figures.
Of common motions.
Of simple motions.  
Complex motion.  
Motions appropriated to the subject.  
Appropriate motions.  
Of the postures of women and young people.  
Of the postures of children.  
Of the motion of the members.  
Of mental motions.  
Effect of the mind upon the motions of the body, occasioned by some outward object.

LINEAR PERSPECTIVE
Of those who apply themselves to the practice, without having learnt the theory of the art.  
Precepts in painting.  
Of the boundaries of objects, called outlines or contours.  
Of linear perspective.  
What parts of objects disappear first by distance.  
Of remote objects.  
Of the point of sight.  
A picture is to be viewed from one point only.  
Of the dimensions of the first figure in an historical painting.  
Of objects that are lost to the sight in proportion to their distance.  
Errors not so easily seen in small objects as in large ones.  
Historical subjects one above another on the same wall to be avoided.  
Why objects in painting can never detach, as natural objects do.  
How to give the proper dimensions to objects in painting.  
How to draw accurately any particular spot.  
Disproportion to be avoided, even in the accessory parts.

INVENTION OR COMPOSITION
Precept for avoiding a bad choice in the style or proportion of figures.  
Variety in figures.  
How a painter ought to proceed in his studies.  
Of sketching histories and figures.  
How to study composition.  
Of the attitudes of men.  
Variety of positions.  
Of studies from nature for history.  
Of the variety of figures in history painting.  
Of variety in history.  
Of the age of figures.  
Of variety of faces.  
A fault in painters.  
How you may learn to compose groups for history painting.  
How to study the motions of the human body.  
Of dresses, and of draperies and folds.  
Of the nature of folds in draperies.  
How the folds of draperies ought to be represented.  
How the folds in draperies ought to be made.  
Fore-shortening of folds.  
Of folds.  
Of decorum.  
The character of figures in composition.  
The motion of the muscles, when the figures are in natural positions.  
A precept in painting.  
Of the motion of man.  
Of attitudes and the motions of members.

182
Of a single figure separate from an historical group.
On the attitudes of the human figure.
How to represent a storm.
How to compose a battle.
The representation of an orator and his audience.
Of demonstrative gestures.
Of the attitudes of the bystanders at some remarkable event.
How to represent night.
The method of awakening the mind to a variety of inventions.
Of composition in history.

EXPRESSION AND CHARACTER
Of expressive motions.
How to paint children.
How to represent old men.
How to paint old women.
How to paint women.
Of the variety of faces.
The parts of the face and their motions.
Laughing and weeping.
Of anger.
Despair.

LIGHT AND SHADOW
The course to be pursued.
Which of the two is the most useful knowledge, the outlines of figures, or that of light and shadow.
Which is the most important, the shadows or outlines in painting.
What is a painter’s first aim and object.
The difference of supercicies, in regard to painting.
How a painter may become universal.
Accuracy ought to be learnt before dispatch in the execution.
How the painter is to place himself in regard to the light, and his model.
Of the best light.
Of drawing by candle-light.
Of those painters that draw at home from one light, and afterwards adapt their studies to another situation in the country, and a different light.
How high the light should be in drawing from nature.
What light the painter must make use of to give most relief to his figures.
Advice to painters.
Of shadows.
Of the kind of light proper for drawing from relieves or from nature.
Whether the light should be admitted in front or sideways, and which is most pleasing and graceful.
Of the difference of lights according to the situation.
How to distribute the light on figures.
Of the beauty of faces.
How, in drawing a face, to give it grace, by the management of light and shade.
How to give grace and relief to faces.
Of the termination of bodies upon each other.
Of the back-grounds of painted objects.
How to detach and bring forward figures out of their back-ground.
Of proper back-grounds.
Of the general light diffused over figures.
Of those parts in shadows which appear the darkest at a distance.
Of the eye viewing the folds of draperies surrounding a figure.
Of the relief of figures remote from the eye.
Of outlines of objects on the side towards the light.
How to make objects detach from their ground, that is to say, from the surface on which they are painted.

CONTRASTE AND EFFECT

A precept.

Of the interposition of transparent bodies between the eye and the object.

Of proper back-grounds for figures.

Of back-grounds.

REFLEXES

Of objects placed on a light ground, and why such a practice is useful in painting.

Of the different effects of white, according to the difference of back-grounds.

Of reverberation.

Where there cannot be any reverberation of light.

In what part the reflexes have more or less brightness.

Of the reflected lights which surround the shadows.

Where reflexes are to be most apparent.

What part of a reflex is to be the lightest.

Of the termination of reflexes on their grounds.

Of double and treble reflexions of light.

Reflexes in the water, and particularly those of the air.

COLOURS AND COLOURING

COLOURS

What surface is best calculated to receive most colours.

What surface will shew most perfectly its true colour.

On what surfaces the true colour is least apparent.

What surfaces show most of their true and genuine colour.

Of the mixture of colours.

Of the colours produced by the mixture of other colours, called secondary colours.

Of verdigris.

How to increase the beauty of verdigris.

How to paint a picture that will last almost for ever.

The mode of painting on canvass, or linen cloth.

Of lively and beautiful colours.

Of transparent colours.

In what part a colour will appear in its greatest beauty.

How any colour without a gloss, is more beautiful in the lights than in the shades.

Of the appearance of colours.

What part of a colour is to be the most beautiful.

That the beauty of a colour is to be found in the lights.

Of colours.

No object appears in its true colour, unless the light which strikes upon it be of the same colour.

Of the colour of shadows.

Of colours.

Whether it be possible for all colours to appear alike by means of the same shadow.

Why white is not reckoned among the colours.

Of colours.

Of the colouring of remote objects.

The surface of all opaque bodies participates of the colour of the surrounding objects.

General remarks on colours,

COLOURS IN REGARD TO LIGHT AND SHADOW

Of the light proper for painting flesh colour from nature.

Of the painter's window.
The shadows of colours.
Of the shadows of white.
Which of the colours will produce the darkest shade.
How to manage, when a white terminates upon another white.
On the back-grounds of figures.
The mode of composing history.
Remarks concerning lights and shadows.
Why the shadows of bodies upon a white wall are bluish towards evening.
Of the colour of faces.
A precept relating to painting.
Of colours in shadow.
Of the choice of lights.

COLOURS IN REGARD TO BACK-GROUNDS
Of avoiding hard outlines.
Of outlines.
Of back-grounds.
How to detach figures from the ground.
Of uniformity and variety of colours upon plain surfaces.
Of back-grounds suitable both to shadows and lights.
The apparent variation of colours, occasioned by the contrast of the ground upon which they are placed.

CONTRASTE, HARMONY, AND REFLEXES, IN REGARD TO COLOURS:
Gradation in painting.
How to assort colours in such a manner as that they may add beauty to each other.
Of detaching the figures.
Of the colour of reflexes.
What body will be the most strongly tinged with the colour of any other object.
Of reflexes.
Of the surface of all shadowed bodies.
That no reflected colour is simple, but is mixed with the nature of the other colours.
Of the colour of lights and reflexes.
Why reflected colours seldom partake of the colour of the body where they meet.
The reflexes of flesh colours.
Of the nature of comparison.
Where the reflexes are seen.

PERSPECTIVE OF COLOURS
A precept of perspective in regard to painting.
Of the perspective of colours.
The cause of the diminution of colours.
Of the diminution of colours and objects.
Of the variety observable in colours, according to their distance or proximity.
At what distance colours are entirely lost.
Of the change observable in the same colour, according to its distance from the eye.
Of the blueish appearance of remote objects in a landscape.
Of the qualities in the surface which first lose themselves by distance.
From what cause the azure of the air proceeds.
Of the perspective of colours.
Of the perspective of colours in dark places.
Of the perspective of colours.
Of colours.
How it happens that colours do not change, though placed in different qualities of air.
Why colours experience no apparent change, though placed in different qualities of air.
Contrary opinions in regard to objects seen afar off.
Of the colour of objects remote from the eye.
Of the colour of mountains.
Why the colour and shape of objects are lost in some situations apparently dark, though not so in reality.

Various precepts in painting.

AERIAL PERSPECTIVE

Aerial perspective.

The parts of the smallest objects will first disappear in painting.

Small figures ought not to be too much finished.

Why the air is to appear whiter as it approaches nearer to the earth.

How to paint the distant part of a landscape.

Of precise and confused objects.

Of distant objects.

Of buildings seen in a thick air.

Of towns and other objects seen through a thick air.

Of the inferior extremities of distant objects.

Which parts of objects disappear first by being removed farther from the eye, and which preserve their appearance.

Why objects are less distinguished in proportion as they are farther removed from the eye.

Why faces appear dark at a distance.

Of towns and other buildings seen through a fog in the morning or evening.

Of the height of buildings seen in a fog.

Why objects which are high, appear darker at a distance than those which are low, though the fog be uniform, and of equal thickness.

Of objects seen in a fog.

Of those objects which the eyes perceive through a mist or thick air.

Miscellaneous observations.

LANDSCAPE

Of objects seen at a distance.

Of a town seen through a thick air.

How to draw a landscape.

Of the green of the country.

What greens will appear most cast.

The colour of the sea from different aspects.

Why the same prospect appears larger at some times than at others.

Of smoke.

In what part smoke is lightest.

Of the sun-beams passing through the openings of clouds.

Of the beginning of rain.

The seasons are to be observed.

The difference of climates to be observed.

Of dust.

How to represent the wind

Of a wilderness.

Of the horizon seen in the water.

Of the shadow of bridges on the surface of the water.

How a painter ought to put in practice the perspective of colours.

Various precepts in painting.

The brilliancy of a landscape.

Why a painted object does not appear so far distant as a real one, though they be conveyed to the eye by equal angles.

How to draw a figure standing upon its feet, to appear forty Braccia high, in a space of twenty Braccia, with proportionate members.

How to draw a figure twenty-four Braccia high, upon a wall twelve Braccia high.
Why, on measuring a face, and then painting it of the same size, it will appear larger than the natural one.

Why the most perfect imitation of nature will not appear to have the same relief as nature itself.

Universality of painting; a precept.

In what manner the mirror is the true master of painters.

Which painting is to be esteemed the best.

Of the judgment to be made of a painter's work.

How to make an imaginary animal appear natural.

Painters are not to imitate one another.

How to judge of one's own work.

Of correcting errors which you discover.

The best place for looking at a picture.

Of judgment.

Of employment anxiously wished for by painters.

Advice to painters.

Of statuary.

On the measurement and division of statues into parts.

A precept for the painter.

On the judgment of painters.

That a man ought not to trust to himself, but ought to consult nature.
Appendix 3

SECTION HEADINGS FROM A TREATISE OF PAINTING - MCMAHON EDITION

PART ONE
PARAGONE; OF POETRY AND PAINTING

Painting is science.
1 Whether or not painting is a science.

Basic principles of painting as science.
2 Basis of the science of painting.
3 Of the first principle of the science of painting.
4 Of the second principle of painting.
5 What does the science of painting include?

Painting is natural philosophy.
6 How he who disparages painting loves neither philosophy nor nature.

Vision is the most accurate sense and its loss the most severe damage.
10 How painting encompasses the surfaces, forms, and colours of natural bodies, but philosophy includes only their natural properties.
11 How sight is less deceived than any other sense, in the perception of luminosity, transparency, and uniform media.
12 Of the eye.
13 Which is the more damaging to a man, to lose his sight or his hearing?

Painting, Astronomy, and Geometry.
14 How painting embraces all the surfaces of bodies and includes them.
15 How the science of astronomy is born of the eye, because it was created by the eye.

Is painting a mechanical art?
17 What science is most useful and of what does its utility consist?
18 Of imitable sciences.
19 Which science is mechanical and which is not?

A comparison of painting and poetry.
20 Of painting and poetry.
21 Exposition of difference between painting and poetry.
22 The painter argues with the poet.
23 Comparison between poetry and painting.
25 Why painting is not numbered among the sciences.

A comparison of vision and hearing.
28 Reply of King Mathias to a poet who competed with a painter.
29 Difference between painting and poetry.
30 How painting goes beyond all the works of man because of the subtle reflections that pertain to it.

Arguments on behalf of painting in comparison with poetry.
31 Of the poet and the painter.
32 Argument of the poet against the painter.
33 Dispute between the poet and the painter and what difference there is between poetry and painting.
34 Conclusion of the dispute between the poet and the painter.
35 How the painter is master of all sorts of people and of all things.
37 Difference between poetry and painting.
Painting is superior to music.
39    How music must be called a sister, a younger sister, of painting.
40    What difference there is between painting and poetry.
41    Conclusion of the dispute among poet, painter, and musician.

Comparison of painting with poetry and music.
42    Of the difference and similarity of painting and poetry.
43    The musician speaks with the painter.
44    The painter gives the degrees of things presented to the eye as the musician gives the degrees of voices presented to the ear.

Inferiority of sculpture to painting.
46    How sculpture is indebted to light but painting is not.
47    How sculpture requires less intelligence than painting and how many aspects of nature are lacking in it.
48    Of the sculptor and the painter.

Sculpture is a mechanical art.
49    Beginning discussion of sculpture and whether or not it is a science.
50    Comparison of painting and sculpture.
51    Difference between painting and sculpture.
52    Apologia of the sculptor.

A comparison of painting and sculpture.
54    The difference between painting and sculpture.
55    Comparison of painting and sculpture.
56    The painter and the sculptor.
57    Parallel of painting and sculpture.

PART TWO
OF RULES FOR THE PAINTER

Training of the painter in youth.
59    What the student should learn first.
60    What rule should be given to boys who paint?
61    Rules for the painter.
62    What study the young should follow.
63    That diligence should be learned before quick execution.
64    Characteristics of the youth disposed toward painting.

Exercise of the imagination and the memory.
65    Of studying when you awake or before you go to sleep in bed in the dark.
66    How to memorize well.

Science and practice.
67    How to study.
69    How should a young man proceed in his study?
70    Of the error of those who practise without science.
71    What should the mind of the painter be like?

Advice to painters.
73    Whether or not it is better to draw in the company of others.
74    Of the life of the painter in his study.
75    Of games that designers should play.
76    Way to augment and stimulate the mind toward various discoveries.
77    Of imitating other painters.
78    Of the painter and his rules.
Of the sad illusion of those who havethemselves falsely called painters.

Of those that blame him who designs on feast days and investigates the works of God.

Of the painter's judgement.

How the painter should be disposed to listen to everybody's judgement while he is at work.

How painters are often misled.

Of the self-deception experienced in judging parts of the body.

Of the greatest defect of painters.

Precepts: the painter should not deceive himself in selecting the figure that he considers normal.

How errors are not noticed in small objects as they are in large.

Rule of the painter.

Of shunning the calumnies and varying judgements of those who practise painting.

Universality and versatility.

A statement of rules of the painter.

Precepts of the painter.

On being universal.

That a painter is not praiseworthy unless he is versatile.

Of being versatile.

Of the variety of figures.

Origin and division of painting.

How the first picture originated.

Of the first eight parts into which painting is divided.

How painting is divided into five parts.

Of painting and its division.

Of the parts of painting.

Proportion of parts of the body.

Form and its division.

Relative importance of the divisions of painting.

Which requires greater consideration and is more useful: the lights and shadows of bodies or their contours?

Which is more difficult: shadow and light, or good design?

Which is of greater importance: that the form should abound in beautiful colours, or display high relief?

Levels of painting.

Which is of greater importance: movements originating from the mental conditions of living creatures, or their shadows and lights?

Line drawing.

Program of representation.

To represent a nude or other object from nature.

Of representing an object.

Of pictures in outline.

Aids in the practice of drawing.

Of the representation of relief.

Of representation.

How to draw a site correctly.

To learn to draw from a well-posed figure.

Proportions and divisions of the figure.

Life drawing.

Of drawing the nude.

When one should consider the selection of material.

Of attitudes.

How it is necessary for the painter to know the inner structure of man.
On posing figures.
Precepts of the painter.
Memorandum by the author to himself.

Light suitable for painting.
- Of the kind of light.
- How the light should be high in drawing from nature.
- Of painting.
- Way to represent a relief at night.
- Of representing the shadow of bodies by the light of a candle or oil lamp.
- How the painter should place himself with respect to the light and relief.
- How to select an atmosphere to make faces attractive.
- What method of painting it is best to employ to make objects stand out.
- Of the quality of light in which to represent relief, natural or simulated.
- Under what conditions a face is to be represented to give it grace through shadow and light.
- Whether the light should be in front or come from the side of the figure, and which lends more attractiveness.

Light and shadow should be consistent with the location of figures.
- How to represent landscapes.
- What lights should be selected for drawing the shapes of bodies?
- How to represent shadow, both simple and compound.
- Defect of painters who depict an object in relief indoors in one light and then place it in the country or elsewhere where there is another light.
- Of the light in which to represent the flesh tones of faces or nudes.

Objects and their backgrounds.
- Of the backgrounds of painted objects.
- Of the backgrounds of the figures of bodies in painting.
- Of objects placed against a light background and why this practice is useful in painting.
- Of backgrounds which are suitable for shadows and lights.
- Of the backgrounds of figures.
- How to solve the problem when white borders on white or dark on dark.
- Of colours which vary in their nature through contrast with their backgrounds.
- To cause forms to detach themselves from their backgrounds.
- Backgrounds.
- Of the nature of colours in the background behind white.
- Shun profiles, that is, sharp edges for objects.
- Of reverberation.
- Where there cannot be any luminous reverberation.
- Of the colour of lights, incident and reflected.
- What part of a reflected light will be the brightest?
- Of double and triple reflected lights.
- Of the colour of reflected lights.
- Of the reflections of light that surround shadow.

Reflected light and shadow.
- Where reflected light is most seen.
- Where reflected lights are most readily perceived.
- Where reflected lights are of greater or less brightness.
- Of reflected lights.
- How reflected lights are very rarely of the colour of the body at the point where they meet it.
- How no reflected light is simple but is mingled with the visual images of the other colours.
- Reflection of light.
- Which side of the body will be tinged most with the colour of the object opposite?
- Of reflected lights.
Of the edges of reflected lights against their background.
Of the reflected colours of flesh.
Of reflection.

**Harmony and contrast of colour.**
Of the colours that result from the mixture of other colours, which are called secondary.
Of colours.
Of the mixture of colours, one with another, which extends to infinity.
Of the mutation of transparent colours placed upon or super-imposed over divers colours with the varying ways in which they veil the first colours.
Of colours.
Of colours.
Of the nature of contrasts.
Of putting colours together in such a way that each makes the other attractive.

**Colour in light and shadow.**
How every colour that does not shine is more beautiful in its illuminated parts than in those shadowed.
How the beauty of colour must be in the lights.
Of colours.
What part of a colour looks most beautiful in a painting?
How to make the colours in your painting vivid and beautiful.
Of the brightness of landscapes.
Of colours.
Whether different colours can appear to be of uniform obscurity because of a common shadow.
Why the colours and forms of bodies are lost through what seems to be darkness but is not.

**The colour of a body and the object opposite it.**
Of colours.
How nothing seems its true colour if it does not have light from another, similar colour.
What part of the surface of bodies appears most beautiful in colour?
What part of a colour ought, according to reason, to be the most beautiful?
Of the colour of the shadows of any colour.
Of the surface of every shadowed body.
Of the colour of the shadows of any body.
Of the colours of shadows.

**White and its shadow.**
Why white is not a colour.
What surface is most receptive to colours?
Colour of the shadow of white.
What colour will create the blackest shadow?

**Reflected light and the colour of surfaces.**
Of true colour.
What body will show you its true colour most?
Which is the surface which shows you its true colours less than others?
On colours mirrored on lustrous objects of varied colours.
Of objects reflected in the waters in landscapes, beginning with air.
Of the reflection and colour of sea water seen from various points of view.

**Two green pigments.**
Of the green colour made of oxidised copper.
Increasing the beauty of copper green.

**A single point of view in painting.**
How a painting should be seen from only one window.
of definite and indistinct objects.
218 Rules of painting.
219 Of representing the sizes of painted objects.
220 Why a painting can never appear to have as much relief as do objects in nature.

Objects seen at a distance.
222 Diminution of colours through the medium lying between them and the eye.
223 Of the perspective of colours in dark places.

The perspective of colour.
224 At what distance from the eye the colours of objects are lost.
225 Whence comes the blue of the air?
226 Common perspective and the diminution of colour at a great distance.
227 How the air should be lighter the lower you depict it.
228 Of the gradations in the same colour seen at different distances.
229 At what distance the colours of objects are entirely lost.
230 Of the way to deal with distant objects in painting.
231 Of the perspective of colours.
232 Of colour which does not display any difference in varying densities of air.
233 Of colour that does not change in different densities of air.

Applications of aerial perspective.
234 Perspective of colours.
235 Of the differences in colours according to their distance or nearness.
236 How the painter ought to put the perspective of colours into practice.
237 Of those who, painting in the country, represent the most distant object as the darkest.
238 Of aerial perspective.

Modifications of aerial perspective.
239 Of the visibility of colours.
240 Of the flesh tones of faces.
241 Of the colours of things distant from the eye.
242 Of colours.
243 Of the colours of bodies.
244 Of the colour of mountains.
245 Of verdure seen in the country.
246 What verdure will seem bluest?

Human gestures.
247 How a good painter must depict two things: man and his mind.
248 How to learn the movements of man.
249 Of movements and various opinions about them.
250 Rules of painting.
251 How small children should be represented.
252 How women should be represented.
253 How old men should be represented.
254 How old women should be represented.

The composition of narrative painting.
255 How a man engaged upon an important work should never trust his memory so much that he will not deign to draw from nature.
256 Rule.
257 Of the method of learning to compose figures in narrative paintings.
258 Of the composition of narrative paintings.
259 Figures separated from one another should not appear to be joined together.
260 Rules on the composition of narrative paintings.
261 Method of composing narrative paintings.
262 Of placing a figure in the first plane of a narrative painting.

193
Of representing figures for narrative paintings.

Why depicting rows of figures one above the other is a method of working to be avoided.

Of composing narrative paintings.

Considerations in narrative painting.

Of the components of narrative paintings.

Of variety in narrative paintings.

Consistency among the parts of narrative paintings.

Variety among the people in narrative paintings.

Of varying the vigour, age, and complexion of bodies in narrative paintings.

Of history.

Of diversifying the expression of faces in narrative paintings.

Of the defect which those masters have who repeat the same expressions in faces.

Beauty of the face.

Of not ornamenting the figures in narrative paintings.

Of the selection of beautiful face.

Of beauty and ugliness.

Of beauty.

Of judges of various beauties of equal excellence in various bodies.

Descriptions of storm, battle, night, and fire.

Pleasure of the painter.

How to represent a storm.

How one ought to represent a battle.

How one ought to represent night.

PART THREE

OF THE VARIOUS STATES AND MOVEMENTS OF THE HUMAN BODY

The proportions of the parts of the body.

Of the changes in the measurements of man from his birth to the end of his growth.

Of the proportions of the parts of the body.

That every part of the body should in itself be in proportion to the whole of the body.

Of the composition of limbs of creatures.

Of the difference in measurements of children and men.

How children's joints differ in size from those of men.

Of the general measurements of bodies.

Changes in the measurements of the body as it moves.

Of the changes in the measurements of man through movement of his limbs in different directions.

Of man's bending and stretching.

Of the motion of animals.

Of the relation in size of each half of a man to the other half.

Of the measurements of the human body and the flexings of the limbs.

Of limbs of the body that bend and the function of the flesh that covers them where they bend.

Of the joints of the shoulders and their increase and decrease.

Of the joints of the fingers.

Of the joint of the hand with the arm.

Of the joints of the feet and their increase and decrease.

Of limbs that diminish when they are bent, and increase when they are extended.

Of limbs that become thicker in the joints when they are bent.

Of bending.

When muscles are emphasized.

Of the lengthening and shortening of muscles.
Of the muscles between the chest and pubis.
Of placing the parts of the body.
Of composition of the parts of the bodies of nudes and their functioning.
Of not including all the muscles of figures unless they are exerting great force.
Of the limbs of nude men.
Of the disposition of limbs in relation to forms.
Which are the muscles that disappear in the diverse movements of man.
Of the display or concealment of the muscles of each part in the attitudes of living creatures.
Where tendons without muscles are found in man.
Of the eight bones which exist in the middle of the tendons in various joints of man.
Of creases in the flesh.
Of parts of the body.

Exaggerated muscles should be avoided.
That the muscles of nude figures should not be stressed too much.
Of the quality of parts of the body in relation to age.
Of muscles.
Of the composition of the parts of animals.
Of the harmony of limbs.
How nature tries to conceal the bones of animals, insofar as the arrangement of their parts permits.
How muscular men are short and thick.
How fat men do not have thick muscles.
Of the muscles of animals.
That the nude with evidence is without motion.
How it is necessary for the painter to know anatomy.

Balance of standing figures.
Of balancing the weight about the centre of gravity in bodies.
Of the balance of a man standing on his feet.
The balance of bodies not in motion.
Precept.
Of the poses of figures.
Of attitudes.
Of the balance of figures.
Of the man who poses on two feet, resting more weight on one foot.
What are the principal requirements with regard to the figure?

Balance of standing figures.
Of the distribution of man's weight upon his feet.
Of equilibrium.
Of figures that have to handle or carry weights.
Of the man who carries a weight on his shoulders.
How the whole distribution of a man's weight changes when an arm held against the side is extended.
Of four-footed animals and how they move.
Of the balance of weight on its legs of any motionless animal.

Loss of balance and motion.
Of motion created by the destruction of balance.
Of the motion in man and other animals when running.
Of man in motion.
Of man and other animals whose centre of gravity is not too remote from their supports when they move slowly.
Of more or less rapid motion from position.
When, during a man's actions, the difference in the height of his shoulders is greatest.
Of the motion and course of animals.
Of bodies which move by themselves.
Of the figure which moves against the wind.
Of the movements of man and other animals.

Types of movement and their infinite variations.
Of man's simple movement.
Of man's compound movement.
Of the joints of limbs.
Of the shoulders.
Of human motion.
Of the same action seen from varied points.
Of the movements of man and other animals.
That it is impossible for any memory to preserve all the aspects and changes of the parts of the body.

Pushing and pulling.
Of the motion of figures in pushing and pulling.
Of the compound force of a man, and first that of his arms will be discussed.
Which is the greater power in a man, that of pulling or pushing?

Forceful motions.
Of motions appropriate to men's actions.
Of the use of force by a man who would strike a great blow.
Of powerful motions of man's limbs.
Why he who drives an iron spear into the ground raises the opposite leg in a curve.
Of the man who would throw an object away from himself with great energy.
That those who are inclined to be fat, increase a good deal in strength after their early youth.
Of the movements of man.
Of the eighteen positions of man.
Of turning the leg without turning the thigh.
How there are three movements when a man jumps upward.
Of jumping and what helps the jump.
Of a man's rising up from sitting on level ground.
Of the furthest twist that a man can make in looking backward.
How near one arm can be brought to the other, in back.
How far the arms can be brought over the chest with the elbows over the centre of the chest.

Grace and variety in figures.
Of the grace of limbs.
Of the freedom of limbs.
Of the attitudes and movements of limbs.
Of the motions of figures.
Of a single figure not in narrative painting.

Decorum and propriety.
Of the observation of decorum.
Of motions appropriate to men of varying ages.
Variety of attitudes.
Of the poses of children.
Kinds of men in narrative composition.
Of the poses of women and girls.
Of the age of figures.
Of the attention of bystanders at an unusual event.
Each motion of the figure should be painted in such a way that it gives a lifelike effect.
How the hands and arms must, in all their actions, display the intention of the mind that moves them.
Of the variety of faces.
Of the gestures of figures.
Of the attitudes of men.

How the figure is not praiseworthy if it does not display the passion of the spirit.

Of motions appropriate to the mind of him who moves.

Of the movements of the parts of the body when man is represented, and that these should be appropriate.

If the figures do not express the mind, they are twice dead.

Of the attitudes of figures.

Gestures appropriate to emotions.

Of movements.

Of common motions.

Of the same emotions that occur in men of diverse ages.

Of motions appropriate to the mind of one who moves.

How mental stimuli move a person with the greatest facility and ease.

Of the motion occasioned in the mind by some object.

Of great and small degrees of emotion.

Of attitudes.

Of the beauty of faces.

Quality of expressions of faces.

Method for remembering the shape of a face.

Of making a man's portrait in profile after having seen him only once.

Of the features and description of the face.

Expressions of the face.

Of the motions of features.

Of movements in the human face.

Of laughing and weeping and the difference between them.

Of the same.

How the figure of an angry man is depicted.

How a man in despair is depicted.

Of representing one who speaks among a number of persons.

Of physiognomy and chiromancy.

Conditions and requirements of painting.

Painting, its division and components.

Of the ten functions of the eye, all pertaining to painting.

Of the judgement that you have to make upon a painter's work.

How a good painting is to be recognised and what qualities it must have to be good.

Of the first four parts that are required of the figure.

How the true picture exists on the surface of the flat mirror.

How the mirror is master of painters.

Which painting is the more laudable.

What is the primary objective of the painter.

Which is of more importance in painting: shadows or outlines.

Painting and its definition.

To judge and avoid errors and defects.

How figures often resemble their masters.

Of the arrangement of the parts of a man's body.

Of the painter's judgement of his own work and that of others.

Of the painter's judgement of his own work.

Of the practice sought with great anxiety by the painter.

Discourse upon practice.

The lighting of figures.

How figures should be illuminated.
444 Precept.
445 Of painting.
446 Precept of painting.
447 Of objects.
448 Of the side of the opaque body.
449 Of the difference of forms in shadows and lights, in diverse situations.
450 Of the windows of rooms in which figures are drawn.
451 Of places which should be selected in order to give objects relief and grace.
452 Painting in a universal light.

The backgrounds of figures.
453 What background a painter should use for his works.
454 Of backgrounds proportioned to the bodies against them, and first of plane surfaces of a uniform colour.
455 Of dividing and detaching figures from their backgrounds.
456 Painting.
457  Of making objects appear detached from their backgrounds, that is from the walls on which they are depicted.
458 Of the edges of illuminated objects.
459 Painting. Of form and body.
460 Of the outlines of a white object.
461 Of the natures of contours of bodies upon other bodies.
462 Painting.

Colour and relief.
463 Painting.
464 Precept.
465 Of the relief of forms distant from the eye.
466 Of flesh tones and shapes distant from the eye.
467 Whether the surface of every opaque body takes on the colour of the opposite object.

Mist and smoke.
468 Of cities or buildings seen at evening or in the morning in the mist.
469 Of smoke.
470 Where smoke is brighter.
471 Of the smoke from cities.
472 Of smoke and dust.

Lights and shadows when the sun is in the West.
473 Of the solar rays that penetrate openings in the clouds.
474 Why the shadows of bodies on white walls are blue at sunset.
475 Of dust.
476 Precept of painting.
477 Precept.
478 Precept.
479 Precept.

Perspective in space.
480 Discussion of painting.
481 Which seems in higher relief, the relief near the eye or that far from the eye.
482 Precept.
483 Why objects perfectly drawn from nature do not seem to be in the same relief as the natural object.
484 Precept.
485 Why, if two objects of equal size, will the painted one seem larger than the one in relief.

Decrease of size in perspective.
486 Precept of painting.
487 Of linear perspective.
Why the convergence of all the visual images that come to the eye occurs at a single point.

Precept.

Precept.

Why, when measuring a face and then painting it life size, it will appear larger than nature.

To make a figure on a wall 12 braccia appear to be 24 braccia in height.

To make a figure which appears to be forty braccia high in a space of twenty braccia, with the corresponding members, the figure to stand straight on its feet.

Of avoiding disproportion in the surroundings.

**Loss of distinctness with distance.**

How high the point of sight ought to be placed.

Painting. That part of the body loses its distinctness first which is of least extension.

Which are those parts of bodies which lose distinctness because of distance.

Why a man seen at a certain distance is not recognised.

Why objects, the more they are removed from the eye, are the less perceived.

Of the parts of surfaces which first are lost through distance.

Of outlines.

Precept of painting.

Of objects seen from afar.

Which are the parts which first are lost to notice in bodies which are removed from the eye, and which are preserved the longest.

How, according to reason, small figures should not be finished.

Of the boundaries of bodies called outlines or contours.

**Perspective of colour.**

Why faces seem obscure from a distance.

Of the nature of the medium lying between the eye and the object.

Effects of the medium which is enclosed by a common surface.

Of the interposing of transparent bodies between the eye and the object.

Of blue, which distant landscapes appear to be.

Of painting.

Precept on perspective in painting.

Of surface conditions that are lost first in receding from shadowed bodies.

Of spots of shadows that appear on distant bodies.

Of water clear and transparent down to the bottom below the surface.

Of the foam of water.

**Conflicts between perspectives.**

Of the diminution of colours and bodies.

Why the same countryside sometimes looks larger or smaller than it is.

The eye placed at a high level which sees objects high and low.

The eye placed at a low level which sees objects low and high.

**Distortions of perspective.**

Of objects that they eye sees below it, combined with mist or thick air.

Of cities and other things seen through thick air.

Of bodies seen in the mist.

Of the view of a city in thick air.

Of buildings seen in thick air.

Of the lower contours of distant objects.

Why objects placed higher in the distance are more obscure than those that are lower, even when the mist is uniform in thickness.

Which object is apparent from afar.

Why parallel towers appear in the mist to be narrower at the foot than at the top.

Of the heights of buildings seen in the mist.
Reflections in water.
542 Of objects reflected in the water.
543 Of objects reflected in muddy water.
544 Of objects reflected in running water.
545 Of the shadows cast by bridges upon water.
546 Of the likenesses, bright or dark, that are imprinted upon places shadowed and illuminated found between the surface and the bottom of clear waters.

Natural phenomena.
547 Precept.
548 Of portraying the four seasons of the year or things connected with them.
549 Of portraying the parts of the world.
550 Of representing a wooded place.
551 Of painted wind.
552 Of the beginning of a shower.
553 Of the arrangement of a storm of winds and of rain.
554 How one ought to make an imaginary animal seem natural.

Technical advice.
555 Where he who looks at a painting ought to stand.
556 Of sculpture.
557 To make a painting with an everlasting varnish.
558 How to use colour on linen.

PART FOUR
OF DRAPERIES

Folds of draperies.
559 Of draperies that clothe figures.
560 Of folds of draperies in foreshortening.
561 Of draperies that clothe figures in much-folded or stiff manner.
562 Of draperies.
563 Of the nature of the folds in draperies.
564 Of the draperies that clothe figures, and their folds.
565 Of the eye which sees the folds of drapery that surround a man.

Fabrics and folds.
566 Opinion regarding draperies and their folds, which are of three sorts.
567 Of draperies in motion or static.

Figures and their drapery.
568 Of clothing figures gracefully.
569 Of making few folds in draperies.
570 Of the folds of draperies.
571 Of folds.
572 How folds should be made in draperies.

Decorum and grace in draperies.
573 Of the way to clothe figures.
574 Of ways of clothing figures and of diverse garments.

PART FIVE
OF SHADOW AND LIGHT

Definition and divisions of shadow and light.
575 What is shadow?
Of the essence of shadow in itself.
What are shadow and light?
Of shadow and light.
From what does shadow derive?
What are shadow and darkness?
What difference there is between shadow and darkness.
What differentiation is there from shadow to darkness.
Into how many parts is shadow divided?
Of shadow and its division.
How many kinds of shadow are there?
Of derivative light.
How many are the sorts of primary shadow.
In how many ways does primary shadow vary?
What difference is there between simple shadow and compound shadow?
Of two kinds of shadows and into how many parts they are divided.
What is the difference between compound light and compound shadow?
How compound light and compound shadow always border on one another.
What difference is there between a shadow attached to a body and one which is separated from it?
Whether shadow can be seen through the air.
How many sorts of shadow there are.
Of lights.

Attached shadows.
Of shadows and lights and colours.
Of the variations of shadows when the sizes of the lights that create them vary.
Which body takes on the greatest quantity of shadow.
Which body, exposed to light, increases its shadowed side.
Which body takes on the greatest quantity of light.
Of lights and shadows.
What luminous body is it from which only half of a shadowed sphere is seen?
Whether it is possible that at any distance a luminous body can illuminate only half of a shadowed body smaller than itself.
Equality of shadows on unequal shadowed and illuminated bodies at various distances.
Of variations in the shadow without diminution of the light that causes it.
Which body, the closer it approaches the light, diminishes the more on its shadowed side.
Which body it is that does not increase or diminish its shadowed or its luminous side whatever the closeness of the body that illuminates it.

Cast shadows and their shapes.
Of compound derivative shadow.
Of the termination of the simple shadow.
What shadow does the light make which is equal to the shadowed body in the form of its shadows?
How many shapes does the derivative shadow have?
Of derivative shadow and where it is greatest.
That derivative shadows are of three kinds.
Of the simple derivative shadow.
Of the three varying forms of derivative shadows.
Variations in each of the three derivative shadows mentioned.
Of the pyramidal shadow.
Each shadowed body lies between two pyramids, one dark and the other illuminated, the one seen and the other not, and this happens only when the light enters through a window.
In how many ways is the impact of the derivative shadow transformed?
In how many ways does the extent of the impact of the shadow vary from the original shadow?
That derivative shadows are of three sorts.
Impact of the derivative shadow and its conditions.
Of the shapes of shadows.
How the separate shadow is never similar in size to its cause.
Why the shadow larger than its cause is disproportionate.

Of the derivative shadow created by a light of long shape which strikes on an object similar to itself.

That the body which is nearer the light makes the larger shadow and why.

Of shadows.

Of the outlines of a compound shadow.

That the outline of a simple shadow will be less clear than the outline of a compound shadow.

Nature of the derivative shadow.

On the extension of the derivative shadow.

What shadow does a shadowed body cast which is greater than the luminous body.

Between bodies of equal size that which is illuminated by the greater light will have a shorter shadow.

Every shadow, with all its differentiations, which, with distance, increases in width more than its source, has external lines which converge between the light and the shadowed body.

Each shadow cast by bodies in a room is directed along the line of its centre to a single point created by the intersection of the luminous lines in the centre of the breadth and depth of the window.

Bodies scattered about in a room illuminated by a single window will have shorter or longer derivative shadows depending on whether they are more or less in line with that window.

The centre line of each derivative shadow lies in a straight line with the centre of the original shadow, with the centre of the shadowed body with that of the derivative light, with the centre of the window and finally with that part of the meridian deriving from the celestial hemisphere.

The amount of light and shadow varies with the position of the eyes.

Of the medium shadow contained between the principal lights and shadows.

Of the position of the eye that sees more or less shadow depending on the movement that it makes around the shadowed body.

In what position the shadow of spherical bodies is never seen.

Which that light is whose shadow can never be seen even when the eye is farther away from the shadowed sphere than is the light and is behind the light.

Of the eye which at a great distance will never have its view of the shadow of the shadowed body blocked when the luminous body is smaller than the shadowed body.

That position or rather that distance around the spherical body at which there is never lack of shadow.

Of the shadows and lights of cities.

Shadows in landscape vary with the position of the sun and of the eyes.

Of the sun and the eye placed in the east.

When the sun is in the east and the eye is toward the north or south.

Of the sun in the east, and the eye in the west.

Reminder to the painter.

Of the distinctness of the shadows in landscapes and of the objects located therein.

Movement of shadow.

Of the motions of shadows.

Of the shadow that moves with greater velocity than its shadowing body.

Of the derivative shadow which is much slower than the primary shadow.

Of the derivative shadow which is equal to the primary shadow.

Of the motion of a shadow.

Of the remoteness and nearness when a man leaves and approaches the same light and of the variations in his shadows.

Of the changes which a fixed light brings to the shadows which are created on bodies that, without moving their feet, bend over, or down, or arise.

Of the human body which turns in place and receives the same light on various sides and gives rise to infinite variations.

Of the location of lights and shadows of objects seen in the country.

Brightness of illuminated bodies.

Rule for giving the proper shadows and the proper lights to a form or body with several sides.

On what surfaces is true and equal light to be found.

Of the brightness of derivative light.
What part of the illuminated surface will be of the greatest brightness.
Of the particular light of the sun or other luminous body.
How one should know what part of the body ought to be more or less luminous than the rest.
Light which falls on shadowed bodies between equal angles has the greatest degree of brightness, and that body is in greater darkness which receives light between less equal angles; both light and shadow function through pyramids.
Of that part of a body which will be most illuminated by a light of even quality.
Which part of the sphere is more illuminated.
Of the nature of the light that illuminates shadowed bodies.
Precept of painting.
Of the universal light of the air where the sun does not strike.

Position and degree of shadows.
Of the qualities of lights and shadows on shadowed bodies.
Of the universal light mixed with a particular light of the sun or other light.
Of the imperceptible outline of shadows.
What part of an opaque sphere is least illuminated.
Of the shadow of the opaque sphere placed in the air.
Of the shadow of the opaque sphere which is placed on the earth.
Of the quality of obscurity in shadows.
Which part of the sphere is least illuminated.

Darkness of different shadows.
Whether a large light of little strength is as strong as a small light of great strength.
Of the light that is changed into shadow.
Of the shadow that is changed into light.
Of simple shadow of the first degree of obscurity.
What light makes the shadows of bodies most different from their lights.
What body is it which, with the same colour and distance from the eye, has lights that least differ from its shadows?

Comparison of shadows.
How primary and derivative shadows are connected.
Of the death of the derivative shadow.
Where the derivative shadow is most obscure.
Of the maximum power of the derivative shadow.
Which shadow is darkest.
Of the various degrees of obscurity of the shadows surrounding the same shadowed body.
Of the shadow made by one body between two equal lights.
Where the derivative shadow is darkest.
Of a derivative shadow created on another derivative shadow.
Of the compound derivative shadow.
How the simple shadow is connected with the compound shadow.
Of the simple and compound primary shadow.
Whether the primary shadow is stronger than the derivative shadow.
Which shadow is darker, the primary or the derivative.
How the derivative shadow, when it is surrounded wholly or in part by an illuminated background, is darker than the primary shadow.
How the primary shadow which is not attached to a plane surface is not of even darkness.

Reflected lights in shadows.
Nature or condition of shadow.
What an augmented shadow is.
Conditions governing objects darkened by each shadow.
Of the proportion of illuminated parts of bodies to their reflected lights.
Of the medium shadow which falls between the illuminated and the shadowed parts of bodies.
Of the darkest side of shadow on spherical or columnar bodies.
Where the reflection of light must be dimmest.

Of shadow interposed between incident light and reflected light.

Why reflected light is seen little or not at all under universal light.

In what way reflected light is created under universal light.

Of the different degrees of shadow portrayed in painting.

How bodies surrounded by universal light create specific lights on many of their own sides.

Distinctness in the edges of shadows.

Which derivative shadow will show the sharpest outlines.

Of shadow and light.

Why a shadow which is larger than its cause has indistinct outlines.

Whether a derivative shadow is darker in one place than in another.

Of the derivative shadow distant from the primary shadow.

Of the outlines of the derivative shadow.

Shadows affected by the density and colour of bodies.

Quality of shadows.

Of the shadows of somewhat transparent bodies.

What body takes on the deepest shadow.

Of the shadow of the verdure of meadows.

Of shadows and in what bodies they cannot be very dark and so also of lights.

Which colours vary most from light to shadow.

What surface shows the greatest difference between brightness and darkness.

Darkness of shadow related to background and context.

What background makes shadows darker.

Of lights between the shadows.

Of shadows.

Of shadows depicted on the shadowed side of opaque bodies.

Of the appearance of lights and of shadows.

Of lights.

Of outlines of bodies through the medium of background.

How bodies accompanied by shadow and light always differentiate their contours from the colour and light of that which borders their surface outlines.

Why the borders of shadowed bodies sometimes look brighter or darker than they are.

Why the illuminated area around a derivative shadow seems brighter inside a house than in the open country.

That shadows should always participate in the colour of the shadowing body.

Lights and shadows: original and derivative.

Of shadows on a body and which primary shadows are darkest.

Which side of the surface of a body is most impregnated with the colour of its object.

Every shadow produced by a shadowed body smaller than the original light will cast a derivative shadow tinted with the colour of its origin.

That part of a shadowed body is least luminous which is in view of the least quantity of light.

Of the outlines which surround derivative shadows at their impact.

What variations does the derivative shadow possess.

Of small lights.

The strength of lights and shadows.

In what part of shadowed bodies the colours will appear to be of greatest beauty.

Of the quality of shadows and lights.

Of the quality of the air in shadows and lights.

Of the colour of shadows and how dark they become.

Of the false colour of the shadows of opaque bodies.

Which part is of medium shadow on the surface of a shadowed body.

Precept.
Lustre.
769 Of illumination and lustre.
770 Of shadowed bodies which are polished and lustrous.
771 Of universal lights on polished bodies.
772 Of those bodies which have light without lustre.
773 What difference there is between the illuminated part of the surface of shadowed bodies and the lustrous part.
774 What difference there is between lustre and light.
775 How lustre generated upon a light field is of little power.
776 Of the size of lustres on polished bodies.
777 Of the lustres of shadowed bodies.
778 How lustre is more powerful against a black background than against any other.
779 Of the highest points of light which turn and change as the eye that sees the body changes.
780 Of light and lustre.
781 Which bodies those are that will possess lustre but not an illuminated part.
782 Of lustre.

Reflected colour in shadows.
783 Where and in what colour shadows lose most of the natural colour of the shadowed object.
784 Which colour of body will make a shadow more different from light; that is, which will be darker.
785 Which object most tinges with its likeness the white surface of opaque bodies.
786 How white bodies should be represented.
787 Which principal shadow on the surfaces of bodies will have less and which more difference from the luminous sides?
788 How every shadowed body creates as many shadows as there are luminous parts that surround it.
789 Of the colours of lights that illuminate shadowed bodies.
790 Of the colours of the visual images of objects which tinge the surfaces of opaque bodies.
791 Of shadow and light.

The colours of shadows in relation to composition and representation.
792 Of conditions of the surfaces of bodies.
793 Of lights and shadows and their colours.
794 Of shadows and lights on objects.
795 Of the consistency of shadows with their lights.
796 Which part of the surface of a shadowed body it is on which the colours of the objects are mingled.
797 Of the light on shadowed bodies which are almost never of the true colour of the illuminated body.
798 Of shadows which are not consistent with the illuminated side.
799 Precept.
800 Which are the objects related to the flesh which cause them to show shadows in harmony with the lights.
801 How shadows with lights appear when they are in contrast to one another.
802 Of the shadows of faces when seen along streets that are wet, and which do not seem to be consistent with the flesh-tones.
803 What is really the true shadow of the colours of bodies?

General observations on perspective.
804 Of perspective.
805 How the contours of shadowed bodies seen by the pupil of one eye are not in the same place on that body.
806 Of the outlines of opaque bodies.
807 Of the contours of bodies which lose clarity first.
808 How that opaque body will have the most indistinct outlines which is nearest the eye that sees it.
809 Of the error of the painter regarding the size of trees and other objects in the country.
810 Common perspective.
The perspective of colour, air, and shadow.

811 Of white objects distant from the eye.
814 Of the shadows of distant objects and their colours.
815 All colours in distant shadows are unknown and indistinguishable.
816 How shadows appear at great distance.
817 Of various objects near to one another seen at a great distance.
818 Of the eye that is in a bright light and looks toward a dark place.
819 Of the eye that sees objects in a bright place.
820 Of the position where the object appears darkest.
821 Is the greatest difference between shadows and lights in near or in distant objects?

Brightness and shadow on mountains.

823 Of the summits of mountains that are revealed to the eye, one above the other, and how their proportions with regard to distance are not in accord with their proportions with regard to colour.
824 Of the peaks of mountains as seen from above.
825 Of air which makes the bases of mountains appear brighter than their peaks.
826 Why distant mountains appear darker at the summit than at the base.
827 Why mountains seen at a great distance appear darker at the summit than at the base.
828 Why mountains appear to have summits that are darker than their bases when seen at a great distance.
829 Of mountains.
830 Of mountains and their treatment in painting.
831 Of the air that is seen between mountains.
832 How mountains shadowed by clouds take on a blue colour.
833 Of the summits of mountains that do not diminish in colour according to the distances between these summits.
834 How one should not represent mountains as though they looked as blue in winter as in summer.
835 Of mountains.

The shape and colour of mountains.

836 Of lights and shadows which tinge the surfaces of the countryside.
837 Painting which shows the necessary shaping of the Alpine mountains and hills.
838 Painting, and how mountains grow.
839 Painting and portraying the characteristics and component parts of mountainous landscapes.

Light, shadow, and relief.

840 Of bright and dark.
841 Of the four fundamentals which must be considered primarily in painting shadows and lights.
842 Of brightness and darkness.
843 Of the principal shadow which falls between direct and reflected light.
844 Why the true shape of a body that is enveloped in light and shadow and with outlined surfaces is recognizable.
845 Of giving aid by means of artificial lights and shadows to the simulation of relief in painting.
846 Of surrounding bodies with varying lines of shadows.
847 Of lights and shadows.
848 Of shadows and lights.
849 What lights make the shape of muscles appear clearest and sharpest.
850 Of the shadow and light of shadowed bodies.
851 Of the breadth of shadows and of primary lights.
852 Of the greater or lesser density or of shadows.

Specific lights.

853 Where shadows deceive the judgement which determined their greater or lesser density.
854 Where lights deceive the judgement of the painter.
855 Of specific light.
856 How the shadows cast by specific lights are to be avoided because their ends are like their beginnings.
Brief rules regarding lights.
857 Of light.
858 Of reflected light.
859 Precept.

The lights in narrative paintings.
861 Of bodies illuminated by the air without the sun.
863 Of the shadows on bodies.
864 Of the shadows and lights by means of which natural objects are imitated.
865 Of the illumination of the lowest parts of bodies crowded together, as in picturing men in battle.
866 Of giving the proper lights to illuminated objects according to their locations.

Advice on the representation of lights and shadows.
867 The manner in which shadows made by objects should terminate.
868 Of placing lights.
869 Rule for placing the true brightness of lights on the sides of the aforesaid body.
870 Way of making the shadow on bodies consistent with the light and the body.
871 Precept for depicting shadows.
872 Of the representation of colours at any distance.

PART SIX
OF TREES AND VERDURE

The structure of plants.
874 Of the branches of plants.
875 Of the branches of plants and their foliage.
876 Of the branches of plants.
878 Of the branches of trees.
882 Of the centre of the thickness of trees.

The growth of leaves, stems, branches, and trunks of trees.
883 Of the proportion of branches to their nourishment.
884 Of the form that trees have where they approach their roots.
885 Of the growth of trees and in which direction they grow most.
886 Which branches of trees are those which grow most in one year.
887 Of growth of leaves upon their stems.
888 Of the branches of trees.
889 Of the growth of branches on plants.
890 Of the diversity that branchings of trees show.
891 Of plants that send forth their branches opposite to one another.
892 Of chance which bends the aforesaid plants.

The bark of trees.
893 Of the bark of trees.
896 Of the branching of trees.
897 Of the branching of trees.

The age of trees.
898 Of the branching which, during the same year, is sent forth again on the end of branches that have been cut.
899 Of the proportion that the branchings of plants have to one another.
900 Of the branching of trees.

Analysis of the elm and walnut.
901 Description of the elm.
902 Of the leaves of the walnut.
The structure of trees and the effects of light, wind, and position.

903  Precept.
904  Of the smaller branchings of trees.
905  Precept on trees.
906  What tree is most deformed in regard to its thickness and of least height and most durability.
907  Which tree in forests grows with the most consistent thickness and to the greatest height.
908  Of the bark of trees.
909  Of the north side of the trunks of trees.

Visual conditions of trees.

910  Of the states of the foliage of trees.
911  Of the ends of branches of leafy trees.
912  Of the sparse tops of trees.
913  Of trees that send forth straight branches.
914  Of the universal light that illuminates trees.
915  Which part of the branch of the tree will be more shadowed.
916  Of the sizes of shadows and lights on leaves.

The illumination and shadow of trees.

917  Of the illumination of trees.
918  Of trees below the level of the eye.
919  Of the difference of shadows of trees in the same light in a landscape under a specific light.
920  Of plants in the south.
921  Of the shadows of trees.
922  Of the shadows of trees.
923  Of trees in the east.
924  Of trees in the east.
925  Of the shadows of trees in the east.

The transparency of leaves and the colour of their shadows.

926  Of the colour of leaves.
927  Of dark leaves in front of transparent ones.
928  Of the transparency of leaves.
929  Of trees.
930  Of the green of leaves.
931  Of the aspects of landscapes.
932  Of trees seen from below.
933  Of trees that are between the eye and the light.
934  Of lights on dark leaves.
935  Of the high lights on the foliage of trees.
936  Of trees that are illuminated by the sun and by the air.
937  Of the light on foliage of verdure tending toward yellow.
938  Of the shadow of the leaf.
939  Of the darkness of a tree.

Shrubs and grass.

941  Discussion of kinds of blossoms in the flowering branches.
942  Of meadows.
943  Of grass.
944  Of the grass of meadows.
945  Precepts concerning plants and verdure.

The colour and brightness of trees as affected by distance.

946  Of the illuminated side of verdure and mountains.
947  Of the incidental colour of trees.
948  Branches and twigs of trees at diverse distances.
Of the luminous parts of the verdure of plants.

Why the same trees seem brighter near at hand than at a distance.

Why trees at a certain distance are brighter the farther away they are.

Of the light of branches and foliage.

Distance and clarity in the contours of trees.

Of trees.

What outlines distant trees display against the air which forms their background.

Of the part of trees at a great distance which remains clear.

Of the withdrawal of the country into the distance.

How trees acquire blueness with distance.

Of distances more remote than those aforementioned.

Of the azure colour which distant trees acquire.

Of landscapes.

Why the shadow of leafy branches does not appear powerful at their luminous parts as in the parts opposite.

Of the openings through trees.

Of trees which cover the perforations of one another.

Of the appearance of chance conditions.

Description of misty landscapes.

Painting of the mist which covers the landscape.

Of landscapes in the mist at the rising or at the setting of the sun.

Advice on the representation of light and shade in landscape.

Of landscapes in painting.

Reminder to the painter about trees.

Of trees.

Of the view of trees.

The difficulty of depicting transparent leaves.

Of foliage.

Of the shadows of transparent leaves.

Of the shadows and transparencies of leaves.

Of the sun which illuminates the forest.

Of young trees and their leaves.

Of never portraying foliage transparent to the sun.

Advice on painting landscapes.

Of trees and their lights.

Of composing the colour of the underpainting of trees for painting.

Of the shadow of verdure.

Precept, for imitating the colour of leaves.

The selection and treatment of planks.

Why planks are many times not straight in their grain.

Of the planks which keep straight best.

Of trees and sawn planks which never bend of themselves.

Of the cracking of planks when they dry.

Of planks which do not open up when they dry.

PART SEVEN

OF CLOUDS

The origin and weight of clouds.

Of the creation of clouds.
988  Of the clouds and their heaviness and lightness.
989  Of clouds.
990  Why clouds are made of mist.

The redness of clouds.
991  Of the redness of clouds.
993  Of clouds.
994  Of the shadows of clouds.

The shadows of clouds.
995  Of air all cloudy.
996  Of clouds.
997  Of clouds beneath the moon.

PART EIGHT
OF THE HORIZON

The position of the horizon.
998  What is the true location of the horizon.
999  Of the horizon.
1000 Of the true horizon.

The horizon and the height of the observer.
1001 Of the horizon.
1003  The eye that sees the horizon of the sea when a man stands with his feet at the level of the sea, sees the horizon lower than itself.
1005 Of the horizon.

The horizon and its reflection on water.
1006 Of the horizon mirrored in running water.
1007  Where the horizon is mirrored on the wave.

Redness near the horizon.
1008  Why the dense air near the horizon becomes red.
Appendix 4

THE CONCORDANCE

This Concordance relates sections to each other from the following editions:

1. The Du Frèsne editions, which were published in Paris in 1651 in Italian and French.
2. The first English edition, which was published in 1721.
4. The 1882 edition in German of the full text of the *Codex Urbinas* translated by Heinrich Ludwig.
5. The 1956 first English translation of the complete *Codex Urbinas* by Philip McMahon.

The 1721 edition does not have section or chapter numbers, but section headings have been listed in Appendix 1 in the order in which the sections appear in the edition. Numbers have been run in against this listing, and these are the ones that appear in the Concordance.
<table>
<thead>
<tr>
<th>Du Frèse</th>
<th>1721</th>
<th>Rigaud</th>
<th>Ludwig</th>
<th>McM.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>47</td>
<td>59</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>175</td>
<td>48</td>
<td>62</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>2</td>
<td>49</td>
<td>60</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>3</td>
<td>51</td>
<td>64</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>29</td>
<td>52</td>
<td>91</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>130</td>
<td>53</td>
<td>69</td>
</tr>
<tr>
<td>7</td>
<td>27</td>
<td>54-55</td>
<td></td>
<td>67-68</td>
</tr>
<tr>
<td>8</td>
<td>6</td>
<td>360</td>
<td>58a</td>
<td>72</td>
</tr>
<tr>
<td>9</td>
<td>6</td>
<td>349</td>
<td>60</td>
<td>93</td>
</tr>
<tr>
<td>10</td>
<td>6</td>
<td>180</td>
<td>61</td>
<td>94</td>
</tr>
<tr>
<td>11</td>
<td>8</td>
<td>363</td>
<td>62</td>
<td>82</td>
</tr>
<tr>
<td>12</td>
<td>9</td>
<td>15</td>
<td>63</td>
<td>61</td>
</tr>
<tr>
<td>13</td>
<td>10</td>
<td>131</td>
<td>64</td>
<td>257</td>
</tr>
<tr>
<td>14</td>
<td>11</td>
<td>356</td>
<td>65</td>
<td>78</td>
</tr>
<tr>
<td>15</td>
<td>12</td>
<td>358</td>
<td>65a</td>
<td>84</td>
</tr>
<tr>
<td>16</td>
<td>13</td>
<td>163</td>
<td>66</td>
<td>76</td>
</tr>
<tr>
<td>17</td>
<td>14</td>
<td>21</td>
<td>67</td>
<td>65</td>
</tr>
<tr>
<td>18</td>
<td>15</td>
<td>181</td>
<td>70</td>
<td>63</td>
</tr>
<tr>
<td>19</td>
<td>16</td>
<td>25</td>
<td>75</td>
<td>83</td>
</tr>
<tr>
<td>20</td>
<td>17</td>
<td>365</td>
<td>76</td>
<td>256</td>
</tr>
<tr>
<td>21</td>
<td>18</td>
<td>129</td>
<td>78</td>
<td>97</td>
</tr>
<tr>
<td>22</td>
<td>19</td>
<td>28</td>
<td>79</td>
<td>96</td>
</tr>
<tr>
<td>23</td>
<td>20</td>
<td>112</td>
<td>80</td>
<td>70</td>
</tr>
<tr>
<td>24</td>
<td>21</td>
<td>354</td>
<td>81</td>
<td>77</td>
</tr>
<tr>
<td>25</td>
<td>22</td>
<td>19</td>
<td>83-84</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>23</td>
<td>188</td>
<td>84a</td>
<td>109</td>
</tr>
<tr>
<td>27</td>
<td>24</td>
<td>186</td>
<td>85</td>
<td>129</td>
</tr>
<tr>
<td>28</td>
<td>25</td>
<td>262</td>
<td>86</td>
<td>140</td>
</tr>
<tr>
<td>29</td>
<td>26</td>
<td>190</td>
<td>87</td>
<td>136</td>
</tr>
<tr>
<td>30</td>
<td>27</td>
<td>20</td>
<td>88</td>
<td>121</td>
</tr>
<tr>
<td>31</td>
<td>28</td>
<td>17</td>
<td>89</td>
<td>116</td>
</tr>
<tr>
<td>32</td>
<td>29</td>
<td>126</td>
<td>90</td>
<td>118</td>
</tr>
<tr>
<td>33</td>
<td>30</td>
<td>325</td>
<td>91</td>
<td>139</td>
</tr>
<tr>
<td>34</td>
<td>31</td>
<td>184</td>
<td>92</td>
<td>132</td>
</tr>
<tr>
<td>35</td>
<td>32</td>
<td>195</td>
<td>93</td>
<td>137</td>
</tr>
<tr>
<td>36</td>
<td>33,106</td>
<td>249,240</td>
<td>95</td>
<td>143</td>
</tr>
<tr>
<td>37</td>
<td>34</td>
<td>135</td>
<td>96</td>
<td>264</td>
</tr>
<tr>
<td>38</td>
<td>35</td>
<td>18</td>
<td>100</td>
<td>113</td>
</tr>
<tr>
<td>39</td>
<td>36</td>
<td>362</td>
<td>101</td>
<td>120</td>
</tr>
<tr>
<td>40</td>
<td>37</td>
<td>182</td>
<td>103</td>
<td>133</td>
</tr>
<tr>
<td>41</td>
<td>38</td>
<td>183</td>
<td>104</td>
<td>128</td>
</tr>
<tr>
<td>42</td>
<td>39</td>
<td>14</td>
<td>105</td>
<td>85</td>
</tr>
<tr>
<td>43</td>
<td>40</td>
<td>59</td>
<td>106</td>
<td>124</td>
</tr>
<tr>
<td>44</td>
<td>41</td>
<td>140</td>
<td>108</td>
<td>86</td>
</tr>
<tr>
<td>45</td>
<td>42</td>
<td>128</td>
<td>109</td>
<td>87</td>
</tr>
<tr>
<td>46</td>
<td>43</td>
<td>185</td>
<td>110</td>
<td>142</td>
</tr>
<tr>
<td>47</td>
<td>44</td>
<td>4</td>
<td>111</td>
<td>101</td>
</tr>
<tr>
<td>48</td>
<td>45</td>
<td>5</td>
<td>112</td>
<td>105</td>
</tr>
<tr>
<td>49</td>
<td>46</td>
<td>6</td>
<td>113</td>
<td>104</td>
</tr>
<tr>
<td>50</td>
<td>47</td>
<td>165</td>
<td>115</td>
<td>250</td>
</tr>
<tr>
<td>51</td>
<td>48</td>
<td>263</td>
<td>116</td>
<td>156</td>
</tr>
<tr>
<td>Du Frèse</td>
<td>1721</td>
<td>Rigaud</td>
<td>Ludwig</td>
<td>McM.</td>
</tr>
<tr>
<td>---------</td>
<td>------</td>
<td>--------</td>
<td>--------</td>
<td>------</td>
</tr>
<tr>
<td>52</td>
<td>49</td>
<td>122</td>
<td>117</td>
<td>88</td>
</tr>
<tr>
<td>53</td>
<td>50</td>
<td>124</td>
<td>118</td>
<td>220</td>
</tr>
<tr>
<td>54</td>
<td>51</td>
<td>123</td>
<td>119</td>
<td>135</td>
</tr>
<tr>
<td>55</td>
<td>52</td>
<td>187</td>
<td>120</td>
<td>106</td>
</tr>
<tr>
<td>56</td>
<td>53</td>
<td>176</td>
<td>121</td>
<td>127</td>
</tr>
<tr>
<td>57</td>
<td>54</td>
<td>32</td>
<td>126</td>
<td>216</td>
</tr>
<tr>
<td>58</td>
<td>55</td>
<td>152</td>
<td>127</td>
<td>216</td>
</tr>
<tr>
<td>59</td>
<td>56</td>
<td>119</td>
<td>130</td>
<td>252</td>
</tr>
<tr>
<td>60</td>
<td>57</td>
<td>189</td>
<td>135</td>
<td>130</td>
</tr>
<tr>
<td>61</td>
<td>58</td>
<td>166</td>
<td>142</td>
<td>254</td>
</tr>
<tr>
<td>62</td>
<td>59</td>
<td>167</td>
<td>143</td>
<td>253</td>
</tr>
<tr>
<td>63</td>
<td>60</td>
<td>168</td>
<td>144</td>
<td>255</td>
</tr>
<tr>
<td>64</td>
<td>61</td>
<td>169</td>
<td>145</td>
<td>284</td>
</tr>
<tr>
<td>65</td>
<td>62</td>
<td>162</td>
<td>146</td>
<td>281</td>
</tr>
<tr>
<td>66</td>
<td>63</td>
<td>157</td>
<td>147</td>
<td>282</td>
</tr>
<tr>
<td>67</td>
<td>64</td>
<td>158</td>
<td>148</td>
<td>282</td>
</tr>
<tr>
<td>68</td>
<td>65</td>
<td>308</td>
<td>149</td>
<td>230</td>
</tr>
<tr>
<td>69</td>
<td>66</td>
<td>307</td>
<td>150</td>
<td>227</td>
</tr>
<tr>
<td>70</td>
<td>67</td>
<td>266</td>
<td>151</td>
<td>152</td>
</tr>
<tr>
<td>71</td>
<td>68</td>
<td>125</td>
<td>152</td>
<td>219</td>
</tr>
<tr>
<td>72</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>73</td>
<td>69</td>
<td>272</td>
<td>154</td>
<td>217</td>
</tr>
<tr>
<td>74</td>
<td>70</td>
<td>191</td>
<td>155</td>
<td>138</td>
</tr>
<tr>
<td>75</td>
<td>71</td>
<td>213</td>
<td>156</td>
<td>157</td>
</tr>
<tr>
<td>76</td>
<td>72</td>
<td>214</td>
<td>157</td>
<td>158</td>
</tr>
<tr>
<td>77</td>
<td>73</td>
<td>275</td>
<td>158</td>
<td>167</td>
</tr>
<tr>
<td>78</td>
<td>74</td>
<td>216</td>
<td>159</td>
<td>163</td>
</tr>
<tr>
<td>79</td>
<td>75</td>
<td>215</td>
<td>160</td>
<td>166</td>
</tr>
<tr>
<td>80</td>
<td>76</td>
<td>218</td>
<td>161</td>
<td>160</td>
</tr>
<tr>
<td>81</td>
<td>77</td>
<td>280</td>
<td>162</td>
<td>174</td>
</tr>
<tr>
<td>82</td>
<td>78</td>
<td>217</td>
<td>163</td>
<td>165</td>
</tr>
<tr>
<td>83</td>
<td>79</td>
<td>220</td>
<td>164</td>
<td>161</td>
</tr>
<tr>
<td>84</td>
<td>80</td>
<td>277</td>
<td>165</td>
<td>169</td>
</tr>
<tr>
<td>85</td>
<td>81</td>
<td>279</td>
<td>166</td>
<td>168</td>
</tr>
<tr>
<td>86</td>
<td>82</td>
<td>282</td>
<td>167-170</td>
<td>164,172,170,175</td>
</tr>
<tr>
<td>87</td>
<td></td>
<td></td>
<td>171</td>
<td>162</td>
</tr>
<tr>
<td>88</td>
<td>83</td>
<td>219</td>
<td>172</td>
<td>173</td>
</tr>
<tr>
<td>89</td>
<td>84</td>
<td>85</td>
<td>175</td>
<td>125</td>
</tr>
<tr>
<td>90</td>
<td>85</td>
<td>141</td>
<td>173</td>
<td>258</td>
</tr>
<tr>
<td>91</td>
<td>86</td>
<td>120</td>
<td>174</td>
<td>263</td>
</tr>
<tr>
<td>92</td>
<td>87</td>
<td>256</td>
<td>176</td>
<td>262</td>
</tr>
<tr>
<td>93</td>
<td>88</td>
<td>164</td>
<td>177</td>
<td>266</td>
</tr>
<tr>
<td>94</td>
<td>89</td>
<td>136</td>
<td>178</td>
<td>20</td>
</tr>
<tr>
<td>95</td>
<td>90</td>
<td>142</td>
<td>179-180</td>
<td>249,248</td>
</tr>
<tr>
<td>96</td>
<td>91</td>
<td>132</td>
<td>181</td>
<td>259</td>
</tr>
<tr>
<td>97</td>
<td>92</td>
<td>137</td>
<td>183-185</td>
<td>268,272,269</td>
</tr>
<tr>
<td>98</td>
<td>93</td>
<td>139</td>
<td>186-187,189</td>
<td>273,271,261</td>
</tr>
<tr>
<td>99</td>
<td>94</td>
<td>271</td>
<td>190-190a</td>
<td>185,183</td>
</tr>
<tr>
<td>100</td>
<td>95</td>
<td>232</td>
<td>191</td>
<td>191</td>
</tr>
<tr>
<td>101</td>
<td>96</td>
<td>251</td>
<td>192</td>
<td>200</td>
</tr>
<tr>
<td>102</td>
<td>97</td>
<td>287</td>
<td>193</td>
<td>235</td>
</tr>
<tr>
<td>103</td>
<td>98</td>
<td>288</td>
<td>194</td>
<td>229</td>
</tr>
<tr>
<td>Du Frèsne</td>
<td>1721</td>
<td>Rigaud</td>
<td>Ludwig</td>
<td>McM.</td>
</tr>
<tr>
<td>----------</td>
<td>------</td>
<td>--------</td>
<td>--------</td>
<td>------</td>
</tr>
<tr>
<td>104</td>
<td>99</td>
<td>252</td>
<td>196</td>
<td>206</td>
</tr>
<tr>
<td>105</td>
<td>100</td>
<td>253</td>
<td>197</td>
<td>207</td>
</tr>
<tr>
<td>106</td>
<td>101</td>
<td>298</td>
<td>198</td>
<td>232</td>
</tr>
<tr>
<td>107</td>
<td>102</td>
<td>293</td>
<td>199</td>
<td>231</td>
</tr>
<tr>
<td>108</td>
<td>103</td>
<td>297</td>
<td>200</td>
<td>233</td>
</tr>
<tr>
<td>109</td>
<td>104</td>
<td>243</td>
<td>201</td>
<td>294</td>
</tr>
<tr>
<td>110</td>
<td>105</td>
<td>302</td>
<td>202</td>
<td>195</td>
</tr>
<tr>
<td>111</td>
<td>106</td>
<td>240</td>
<td>203</td>
<td>197</td>
</tr>
<tr>
<td>112</td>
<td>107</td>
<td>269</td>
<td>204</td>
<td>151</td>
</tr>
<tr>
<td>113</td>
<td>108</td>
<td>233</td>
<td>205</td>
<td>179</td>
</tr>
<tr>
<td>114</td>
<td>109</td>
<td>234</td>
<td>206</td>
<td>190</td>
</tr>
<tr>
<td>115</td>
<td>110</td>
<td>235</td>
<td>207</td>
<td>187</td>
</tr>
<tr>
<td>116</td>
<td>111</td>
<td>236</td>
<td>208</td>
<td>239</td>
</tr>
<tr>
<td>117</td>
<td>112</td>
<td>237</td>
<td>209</td>
<td>199</td>
</tr>
<tr>
<td>118</td>
<td>113</td>
<td>238</td>
<td>210</td>
<td>188</td>
</tr>
<tr>
<td>119</td>
<td>114</td>
<td>228</td>
<td>211</td>
<td>214</td>
</tr>
<tr>
<td>120</td>
<td>115</td>
<td>229</td>
<td>212</td>
<td>215</td>
</tr>
<tr>
<td>121</td>
<td>116</td>
<td>226</td>
<td>213</td>
<td>178</td>
</tr>
<tr>
<td>122</td>
<td>117</td>
<td>276</td>
<td>214</td>
<td>201</td>
</tr>
<tr>
<td>123</td>
<td>118</td>
<td>222</td>
<td>215</td>
<td>205</td>
</tr>
<tr>
<td>124</td>
<td>119</td>
<td>274</td>
<td>216</td>
<td>171</td>
</tr>
<tr>
<td>125</td>
<td>120</td>
<td>223</td>
<td>217</td>
<td>198</td>
</tr>
<tr>
<td>126</td>
<td>121</td>
<td>259</td>
<td>218</td>
<td>240, 144</td>
</tr>
<tr>
<td>127</td>
<td>122</td>
<td>16</td>
<td>219</td>
<td>144</td>
</tr>
<tr>
<td>128</td>
<td>123</td>
<td>289</td>
<td>220</td>
<td>228</td>
</tr>
<tr>
<td>129</td>
<td>124</td>
<td>326</td>
<td>221</td>
<td>245</td>
</tr>
<tr>
<td>130</td>
<td>124</td>
<td>327</td>
<td>222</td>
<td>247</td>
</tr>
<tr>
<td>131</td>
<td>125</td>
<td>224</td>
<td>223</td>
<td>210</td>
</tr>
<tr>
<td>132</td>
<td>126</td>
<td>225</td>
<td>224</td>
<td>209</td>
</tr>
<tr>
<td>133</td>
<td>127</td>
<td>343</td>
<td>225</td>
<td>192</td>
</tr>
<tr>
<td>134</td>
<td>128</td>
<td>284</td>
<td>226</td>
<td>226</td>
</tr>
<tr>
<td>135</td>
<td>129</td>
<td>221</td>
<td>227</td>
<td>212</td>
</tr>
<tr>
<td>136</td>
<td>130</td>
<td>285</td>
<td>228</td>
<td>222</td>
</tr>
<tr>
<td>137</td>
<td>131</td>
<td>268</td>
<td>229</td>
<td>148</td>
</tr>
<tr>
<td>138</td>
<td>132</td>
<td>254</td>
<td>230</td>
<td>150</td>
</tr>
<tr>
<td>139</td>
<td>133</td>
<td>212</td>
<td>231-231a</td>
<td>154, 155</td>
</tr>
<tr>
<td>140</td>
<td>134</td>
<td>255</td>
<td>232</td>
<td>149</td>
</tr>
<tr>
<td>141</td>
<td>135</td>
<td>200</td>
<td>233</td>
<td>145</td>
</tr>
<tr>
<td>142</td>
<td>136</td>
<td>299</td>
<td>234</td>
<td>237</td>
</tr>
<tr>
<td>143</td>
<td>137</td>
<td>300</td>
<td>235</td>
<td>241</td>
</tr>
<tr>
<td>144</td>
<td>138</td>
<td>270</td>
<td>236</td>
<td>110</td>
</tr>
<tr>
<td>145</td>
<td>139</td>
<td>328</td>
<td>237</td>
<td>213</td>
</tr>
<tr>
<td>146</td>
<td>140</td>
<td>281</td>
<td>238</td>
<td>184</td>
</tr>
<tr>
<td>147</td>
<td>141</td>
<td>241</td>
<td>239</td>
<td>202</td>
</tr>
<tr>
<td>148</td>
<td>142</td>
<td>294</td>
<td>240</td>
<td>223</td>
</tr>
<tr>
<td>149</td>
<td>143</td>
<td>295</td>
<td>241</td>
<td>234</td>
</tr>
<tr>
<td>150</td>
<td>144</td>
<td>239</td>
<td>242</td>
<td>189</td>
</tr>
<tr>
<td>151</td>
<td>145</td>
<td>292</td>
<td>243</td>
<td>225</td>
</tr>
<tr>
<td>152</td>
<td>146</td>
<td>296</td>
<td>244</td>
<td>242</td>
</tr>
<tr>
<td>153</td>
<td>147</td>
<td>242</td>
<td>245</td>
<td>193</td>
</tr>
<tr>
<td>154</td>
<td>148</td>
<td>198</td>
<td>246</td>
<td>146</td>
</tr>
<tr>
<td>155</td>
<td>149</td>
<td>244</td>
<td>247</td>
<td>204</td>
</tr>
<tr>
<td>Du Fréne</td>
<td>1721</td>
<td>Rigaud</td>
<td>Ludwig</td>
<td>McM.</td>
</tr>
<tr>
<td>-----------</td>
<td>------</td>
<td>--------</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>156</td>
<td>150</td>
<td>245</td>
<td>248</td>
<td>196</td>
</tr>
<tr>
<td>157</td>
<td>151</td>
<td>278</td>
<td>249</td>
<td>159</td>
</tr>
<tr>
<td>158</td>
<td>152</td>
<td>261</td>
<td>250</td>
<td>203</td>
</tr>
<tr>
<td>159</td>
<td>153</td>
<td>211</td>
<td>251</td>
<td>147</td>
</tr>
<tr>
<td>160</td>
<td>154</td>
<td>210</td>
<td>252</td>
<td>153</td>
</tr>
<tr>
<td>161</td>
<td>155</td>
<td>227</td>
<td>254</td>
<td>176</td>
</tr>
<tr>
<td>162</td>
<td>156</td>
<td>248</td>
<td>225-227</td>
<td>192,226,212</td>
</tr>
<tr>
<td>163</td>
<td>157</td>
<td>301</td>
<td>260-260a</td>
<td>244,246</td>
</tr>
<tr>
<td>164</td>
<td>158</td>
<td>341</td>
<td>261</td>
<td>236</td>
</tr>
<tr>
<td>165</td>
<td>159</td>
<td>304</td>
<td>262</td>
<td>238</td>
</tr>
<tr>
<td>166</td>
<td>160</td>
<td>8</td>
<td>263</td>
<td>292</td>
</tr>
<tr>
<td>167</td>
<td>161</td>
<td>10</td>
<td>264</td>
<td>285</td>
</tr>
<tr>
<td>168</td>
<td>162</td>
<td>34</td>
<td>265</td>
<td>290</td>
</tr>
<tr>
<td>169</td>
<td>163</td>
<td>9</td>
<td>266</td>
<td>289</td>
</tr>
<tr>
<td>170</td>
<td>164</td>
<td>35</td>
<td>267</td>
<td>299</td>
</tr>
<tr>
<td>171</td>
<td>165</td>
<td>33</td>
<td>268</td>
<td>298</td>
</tr>
<tr>
<td>172</td>
<td>166</td>
<td>87</td>
<td>269</td>
<td>359</td>
</tr>
<tr>
<td>173</td>
<td>167</td>
<td>7</td>
<td>270</td>
<td>291</td>
</tr>
<tr>
<td>174</td>
<td>168</td>
<td>30</td>
<td>271</td>
<td>296</td>
</tr>
<tr>
<td>175</td>
<td>169</td>
<td>11</td>
<td>272</td>
<td>286</td>
</tr>
<tr>
<td>176</td>
<td>170</td>
<td>36</td>
<td>273</td>
<td>300</td>
</tr>
<tr>
<td>177</td>
<td>171</td>
<td>37</td>
<td>274</td>
<td>301</td>
</tr>
<tr>
<td>178</td>
<td>172</td>
<td>38</td>
<td>275</td>
<td>302</td>
</tr>
<tr>
<td>179</td>
<td>173</td>
<td>39</td>
<td>276</td>
<td>303</td>
</tr>
<tr>
<td>180</td>
<td>174</td>
<td>51</td>
<td>180</td>
<td>248</td>
</tr>
<tr>
<td>181</td>
<td>175</td>
<td>92</td>
<td>278</td>
<td>369</td>
</tr>
<tr>
<td>182</td>
<td>176</td>
<td>133</td>
<td>279</td>
<td>373</td>
</tr>
<tr>
<td>183</td>
<td>177</td>
<td>86</td>
<td>280</td>
<td>384</td>
</tr>
<tr>
<td>184</td>
<td>178</td>
<td>149</td>
<td>281</td>
<td>358</td>
</tr>
<tr>
<td>185</td>
<td>179</td>
<td>154</td>
<td>282</td>
<td>438</td>
</tr>
<tr>
<td>186</td>
<td>180</td>
<td>285</td>
<td>283</td>
<td>317</td>
</tr>
<tr>
<td>187</td>
<td>181</td>
<td>23</td>
<td>284</td>
<td>418</td>
</tr>
<tr>
<td>188</td>
<td>182</td>
<td>63</td>
<td>285</td>
<td>417</td>
</tr>
<tr>
<td>189</td>
<td>183</td>
<td>23</td>
<td>289</td>
<td>416</td>
</tr>
<tr>
<td>190</td>
<td>184</td>
<td>24</td>
<td>290</td>
<td>415</td>
</tr>
<tr>
<td>191</td>
<td>185</td>
<td>194</td>
<td>291</td>
<td>413</td>
</tr>
<tr>
<td>192</td>
<td>186</td>
<td>63</td>
<td>295</td>
<td>335</td>
</tr>
<tr>
<td>193</td>
<td>187</td>
<td>151</td>
<td>296-298</td>
<td>402,395,401</td>
</tr>
<tr>
<td>194</td>
<td>188</td>
<td>56</td>
<td>302-303</td>
<td>308,313</td>
</tr>
<tr>
<td>195</td>
<td>189</td>
<td>82</td>
<td>305</td>
<td>347</td>
</tr>
<tr>
<td>196</td>
<td>190</td>
<td>83</td>
<td>306</td>
<td>351</td>
</tr>
<tr>
<td>197</td>
<td>191</td>
<td>84</td>
<td>306</td>
<td>351</td>
</tr>
<tr>
<td>198</td>
<td>192</td>
<td>79</td>
<td>307</td>
<td>343</td>
</tr>
<tr>
<td>199</td>
<td>193</td>
<td>68</td>
<td>308</td>
<td>349</td>
</tr>
<tr>
<td>200</td>
<td>194</td>
<td>80</td>
<td>309</td>
<td>342</td>
</tr>
<tr>
<td>201</td>
<td>195</td>
<td>66</td>
<td>310</td>
<td>339</td>
</tr>
<tr>
<td>202</td>
<td>196</td>
<td>67</td>
<td>311</td>
<td>348</td>
</tr>
<tr>
<td>203</td>
<td>197</td>
<td>60</td>
<td>312</td>
<td>345</td>
</tr>
<tr>
<td>204</td>
<td>198</td>
<td>57</td>
<td>313</td>
<td>293</td>
</tr>
<tr>
<td>205</td>
<td>199</td>
<td>58</td>
<td>314</td>
<td>304</td>
</tr>
<tr>
<td>Du Frèsne</td>
<td>1721</td>
<td>Rigaud</td>
<td>Ludwig</td>
<td>McM.</td>
</tr>
<tr>
<td>----------</td>
<td>------</td>
<td>--------</td>
<td>--------</td>
<td>------</td>
</tr>
<tr>
<td>206</td>
<td>197</td>
<td>81</td>
<td>315</td>
<td>340</td>
</tr>
<tr>
<td>207</td>
<td>198</td>
<td>88</td>
<td>316</td>
<td>360</td>
</tr>
<tr>
<td>208</td>
<td>199</td>
<td>61</td>
<td>317</td>
<td>346</td>
</tr>
<tr>
<td>209</td>
<td>200</td>
<td>78</td>
<td>318</td>
<td>336</td>
</tr>
<tr>
<td>210</td>
<td>201</td>
<td>99</td>
<td>319</td>
<td>382</td>
</tr>
<tr>
<td>211</td>
<td>202</td>
<td>95</td>
<td>320</td>
<td>383</td>
</tr>
<tr>
<td>212</td>
<td>203</td>
<td>155</td>
<td>321</td>
<td>386</td>
</tr>
<tr>
<td>213</td>
<td>204</td>
<td>26</td>
<td>322</td>
<td>388</td>
</tr>
<tr>
<td>214</td>
<td>205</td>
<td>64</td>
<td>323</td>
<td>330</td>
</tr>
<tr>
<td>215</td>
<td>206</td>
<td>65</td>
<td>324</td>
<td>341</td>
</tr>
<tr>
<td>216</td>
<td>207</td>
<td>133</td>
<td>325</td>
<td>299</td>
</tr>
<tr>
<td>217</td>
<td>208</td>
<td>134</td>
<td>326</td>
<td>389</td>
</tr>
<tr>
<td>218</td>
<td>209</td>
<td>156</td>
<td>327</td>
<td>404</td>
</tr>
<tr>
<td>219</td>
<td>210</td>
<td>161</td>
<td>328</td>
<td>394</td>
</tr>
<tr>
<td>220</td>
<td>211</td>
<td>40</td>
<td>329</td>
<td>318</td>
</tr>
<tr>
<td>221</td>
<td>212</td>
<td>41</td>
<td>330</td>
<td>325</td>
</tr>
<tr>
<td>222</td>
<td>213</td>
<td>42</td>
<td>331</td>
<td>326</td>
</tr>
<tr>
<td>223</td>
<td>213</td>
<td>43</td>
<td>332</td>
<td>312</td>
</tr>
<tr>
<td>224</td>
<td>214</td>
<td>45</td>
<td>333-333a</td>
<td>321</td>
</tr>
<tr>
<td>225</td>
<td>215</td>
<td>55</td>
<td>336</td>
<td>328</td>
</tr>
<tr>
<td>226</td>
<td>216</td>
<td>44</td>
<td>337</td>
<td>319</td>
</tr>
<tr>
<td>227</td>
<td>217</td>
<td>46</td>
<td>341</td>
<td>305</td>
</tr>
<tr>
<td>228</td>
<td>218</td>
<td>52</td>
<td>342</td>
<td>315</td>
</tr>
<tr>
<td>229</td>
<td>219</td>
<td>31</td>
<td>343</td>
<td>315</td>
</tr>
<tr>
<td>230</td>
<td>220</td>
<td>47</td>
<td>344</td>
<td>306</td>
</tr>
<tr>
<td>231</td>
<td>221</td>
<td>96</td>
<td>345</td>
<td>379</td>
</tr>
<tr>
<td>232</td>
<td>222</td>
<td>54</td>
<td>346-347</td>
<td>380,381</td>
</tr>
<tr>
<td>233</td>
<td>223</td>
<td>89</td>
<td>348</td>
<td>368</td>
</tr>
<tr>
<td>234</td>
<td>224</td>
<td>48</td>
<td>349</td>
<td>365</td>
</tr>
<tr>
<td>235</td>
<td>225</td>
<td>49</td>
<td>350</td>
<td>366</td>
</tr>
<tr>
<td>236</td>
<td>226</td>
<td>50</td>
<td>351</td>
<td>297</td>
</tr>
<tr>
<td>237</td>
<td>227</td>
<td>97</td>
<td>352</td>
<td>375</td>
</tr>
<tr>
<td>238</td>
<td>228</td>
<td>53</td>
<td>353</td>
<td>316</td>
</tr>
<tr>
<td>239</td>
<td>229</td>
<td>103</td>
<td>354</td>
<td>356</td>
</tr>
<tr>
<td>240</td>
<td>230</td>
<td>104</td>
<td>355</td>
<td>337</td>
</tr>
<tr>
<td>241</td>
<td>231</td>
<td>105</td>
<td>356</td>
<td>367</td>
</tr>
<tr>
<td>242</td>
<td>232</td>
<td>101</td>
<td>357</td>
<td>385</td>
</tr>
<tr>
<td>243</td>
<td>233</td>
<td>160</td>
<td>361</td>
<td>412</td>
</tr>
<tr>
<td>244</td>
<td>234</td>
<td>170</td>
<td>365</td>
<td>397</td>
</tr>
<tr>
<td>245</td>
<td>235</td>
<td>106</td>
<td>370</td>
<td>408</td>
</tr>
<tr>
<td>246</td>
<td>236</td>
<td>110</td>
<td>371</td>
<td>409</td>
</tr>
<tr>
<td>247</td>
<td>237</td>
<td>111</td>
<td>372</td>
<td>410</td>
</tr>
<tr>
<td>248</td>
<td>238</td>
<td>102</td>
<td>373</td>
<td>406</td>
</tr>
<tr>
<td>249</td>
<td>239</td>
<td>70</td>
<td>374</td>
<td>294</td>
</tr>
<tr>
<td>250</td>
<td>240</td>
<td>12</td>
<td>375</td>
<td>287</td>
</tr>
<tr>
<td>251</td>
<td>241</td>
<td>149</td>
<td>377</td>
<td>387</td>
</tr>
<tr>
<td>252</td>
<td>242</td>
<td>138</td>
<td>378</td>
<td>393</td>
</tr>
<tr>
<td>253</td>
<td>243</td>
<td>150</td>
<td>379</td>
<td>391</td>
</tr>
<tr>
<td>254</td>
<td>244</td>
<td>159</td>
<td>380</td>
<td>424</td>
</tr>
<tr>
<td>255</td>
<td>245</td>
<td>173</td>
<td>381</td>
<td>422</td>
</tr>
<tr>
<td>256</td>
<td>246</td>
<td>174</td>
<td>382</td>
<td>423</td>
</tr>
<tr>
<td>257</td>
<td>247</td>
<td>172</td>
<td>384-385</td>
<td>420-421</td>
</tr>
<tr>
<td>Du Frêne</td>
<td>1721</td>
<td>Rigaud</td>
<td>Ludwig</td>
<td>McM.</td>
</tr>
<tr>
<td>---------</td>
<td>------</td>
<td>--------</td>
<td>--------</td>
<td>------</td>
</tr>
<tr>
<td>258</td>
<td>248</td>
<td>108</td>
<td>386</td>
<td>390</td>
</tr>
<tr>
<td>259</td>
<td>249</td>
<td>107</td>
<td>390</td>
<td>377</td>
</tr>
<tr>
<td>260</td>
<td>250</td>
<td>93</td>
<td>387</td>
<td>392</td>
</tr>
<tr>
<td>261</td>
<td>251</td>
<td>90</td>
<td>392</td>
<td>371</td>
</tr>
<tr>
<td>262</td>
<td>252</td>
<td>91</td>
<td>393</td>
<td>370</td>
</tr>
<tr>
<td>263</td>
<td>253</td>
<td>62</td>
<td>394</td>
<td>322</td>
</tr>
<tr>
<td>264</td>
<td>254</td>
<td>77</td>
<td>395</td>
<td>337</td>
</tr>
<tr>
<td>265</td>
<td>255</td>
<td>98</td>
<td>396</td>
<td>334</td>
</tr>
<tr>
<td>266</td>
<td>256</td>
<td>75</td>
<td>397</td>
<td>331</td>
</tr>
<tr>
<td>267</td>
<td>257</td>
<td>72</td>
<td>398</td>
<td>350</td>
</tr>
<tr>
<td>268</td>
<td>258</td>
<td>71</td>
<td>399</td>
<td>344</td>
</tr>
<tr>
<td>269</td>
<td>259</td>
<td>69</td>
<td>400</td>
<td>295</td>
</tr>
<tr>
<td>270</td>
<td>260</td>
<td>94</td>
<td>401</td>
<td>376</td>
</tr>
<tr>
<td>271</td>
<td>261</td>
<td>100</td>
<td>402</td>
<td>363</td>
</tr>
<tr>
<td>272</td>
<td>262</td>
<td>359</td>
<td>405</td>
<td>441</td>
</tr>
<tr>
<td>273</td>
<td>263</td>
<td>364</td>
<td>406</td>
<td>439</td>
</tr>
<tr>
<td>274</td>
<td>264</td>
<td>355</td>
<td>407</td>
<td>440</td>
</tr>
<tr>
<td>275</td>
<td>265</td>
<td>350</td>
<td>408,410</td>
<td>432,431</td>
</tr>
<tr>
<td>276</td>
<td>266</td>
<td>351</td>
<td>411</td>
<td>433</td>
</tr>
<tr>
<td>277</td>
<td>268</td>
<td>177</td>
<td>412</td>
<td>434</td>
</tr>
<tr>
<td>278</td>
<td>296</td>
<td>179</td>
<td>413</td>
<td>435</td>
</tr>
<tr>
<td>279</td>
<td>269</td>
<td>193</td>
<td>414</td>
<td>443</td>
</tr>
<tr>
<td>280</td>
<td>270</td>
<td>357</td>
<td>415</td>
<td>555</td>
</tr>
<tr>
<td>281</td>
<td>271</td>
<td>118</td>
<td>416</td>
<td>500</td>
</tr>
<tr>
<td>282</td>
<td>272</td>
<td>306</td>
<td>417</td>
<td>510</td>
</tr>
<tr>
<td>283</td>
<td>273</td>
<td>209</td>
<td>418</td>
<td>454</td>
</tr>
<tr>
<td>284</td>
<td>274</td>
<td>260</td>
<td>419</td>
<td>446</td>
</tr>
<tr>
<td>285</td>
<td>275</td>
<td>338</td>
<td>420</td>
<td>550</td>
</tr>
<tr>
<td>286</td>
<td>276</td>
<td>353</td>
<td>421</td>
<td>554</td>
</tr>
<tr>
<td>287</td>
<td>277</td>
<td>196</td>
<td>422</td>
<td>452</td>
</tr>
<tr>
<td>288</td>
<td>278</td>
<td>199</td>
<td>423</td>
<td>456</td>
</tr>
<tr>
<td>289</td>
<td>279</td>
<td>192</td>
<td>424</td>
<td>450</td>
</tr>
<tr>
<td>290</td>
<td>280</td>
<td>127</td>
<td>425-425a</td>
<td>499</td>
</tr>
<tr>
<td>291</td>
<td>281</td>
<td>114</td>
<td>426</td>
<td>511</td>
</tr>
<tr>
<td>292</td>
<td>282</td>
<td>121</td>
<td>427</td>
<td>505</td>
</tr>
<tr>
<td>293</td>
<td>283</td>
<td>291</td>
<td>428</td>
<td>522</td>
</tr>
<tr>
<td>294</td>
<td>284</td>
<td>197</td>
<td>429</td>
<td>463</td>
</tr>
<tr>
<td>295</td>
<td>285</td>
<td>74</td>
<td>430</td>
<td>354</td>
</tr>
<tr>
<td>296</td>
<td>286</td>
<td>250</td>
<td>431</td>
<td>451</td>
</tr>
<tr>
<td>297</td>
<td>287</td>
<td>347</td>
<td>432</td>
<td>496</td>
</tr>
<tr>
<td>298</td>
<td>288</td>
<td>247</td>
<td>433</td>
<td>469</td>
</tr>
<tr>
<td>299</td>
<td>289,290</td>
<td>73</td>
<td>434-435</td>
<td>352,353</td>
</tr>
<tr>
<td>300</td>
<td>291</td>
<td>345</td>
<td>436</td>
<td>498</td>
</tr>
<tr>
<td>301</td>
<td>292</td>
<td>346</td>
<td>437</td>
<td>497</td>
</tr>
<tr>
<td>302</td>
<td>293</td>
<td>257</td>
<td>438a-b</td>
<td>636,741</td>
</tr>
<tr>
<td>303</td>
<td>294</td>
<td>201</td>
<td>440</td>
<td>453</td>
</tr>
<tr>
<td>304</td>
<td>295</td>
<td>267</td>
<td>441</td>
<td>455</td>
</tr>
<tr>
<td>305</td>
<td>267</td>
<td>178</td>
<td>442</td>
<td>461</td>
</tr>
<tr>
<td>306</td>
<td>297</td>
<td>305</td>
<td>443</td>
<td>501</td>
</tr>
<tr>
<td>307</td>
<td>298</td>
<td>329</td>
<td>444</td>
<td>529</td>
</tr>
<tr>
<td>308</td>
<td>299</td>
<td>322</td>
<td>445</td>
<td>457</td>
</tr>
<tr>
<td>309</td>
<td>300</td>
<td>312</td>
<td>446</td>
<td>533</td>
</tr>
<tr>
<td>Du Frène</td>
<td>1721</td>
<td>Rigaud</td>
<td>Ludwig</td>
<td>McM.</td>
</tr>
<tr>
<td>---------</td>
<td>------</td>
<td>--------</td>
<td>--------</td>
<td>------</td>
</tr>
<tr>
<td>310</td>
<td>301</td>
<td>332</td>
<td>447</td>
<td>476</td>
</tr>
<tr>
<td>311</td>
<td>302</td>
<td>321</td>
<td>448</td>
<td>539</td>
</tr>
<tr>
<td>312</td>
<td>303</td>
<td>311</td>
<td>449</td>
<td>536</td>
</tr>
<tr>
<td>313</td>
<td>304</td>
<td>323</td>
<td>450</td>
<td>539</td>
</tr>
<tr>
<td>314</td>
<td>305</td>
<td>324</td>
<td>451</td>
<td>535</td>
</tr>
<tr>
<td>315</td>
<td>306</td>
<td>313</td>
<td>452</td>
<td>537</td>
</tr>
<tr>
<td>316</td>
<td>307</td>
<td>117</td>
<td>453</td>
<td>508</td>
</tr>
<tr>
<td>317</td>
<td>308</td>
<td>290</td>
<td>454</td>
<td>518</td>
</tr>
<tr>
<td>318</td>
<td>309</td>
<td>116</td>
<td>455</td>
<td>502</td>
</tr>
<tr>
<td>319</td>
<td>310</td>
<td>315</td>
<td>456</td>
<td>504</td>
</tr>
<tr>
<td>320</td>
<td>311</td>
<td>316</td>
<td>458</td>
<td>514</td>
</tr>
<tr>
<td>321</td>
<td>312</td>
<td>314</td>
<td>460</td>
<td>509</td>
</tr>
<tr>
<td>322</td>
<td>313</td>
<td>115</td>
<td>461</td>
<td>491</td>
</tr>
<tr>
<td>323</td>
<td>314</td>
<td>320</td>
<td>462</td>
<td>534</td>
</tr>
<tr>
<td>324</td>
<td>315</td>
<td>318</td>
<td>463</td>
<td>541</td>
</tr>
<tr>
<td>325</td>
<td>316</td>
<td>317</td>
<td>464</td>
<td>470</td>
</tr>
<tr>
<td>326</td>
<td>317</td>
<td>319</td>
<td>465</td>
<td>538</td>
</tr>
<tr>
<td>327</td>
<td>318</td>
<td>202</td>
<td>466</td>
<td>523</td>
</tr>
<tr>
<td>328</td>
<td>319</td>
<td>258</td>
<td>467</td>
<td>478</td>
</tr>
<tr>
<td>329</td>
<td>320</td>
<td>331</td>
<td>468</td>
<td>472</td>
</tr>
<tr>
<td>330</td>
<td>321</td>
<td>336</td>
<td>469</td>
<td>479</td>
</tr>
<tr>
<td>331</td>
<td>320</td>
<td>330</td>
<td>470</td>
<td>471</td>
</tr>
<tr>
<td>332</td>
<td>322</td>
<td>342</td>
<td>471</td>
<td>465</td>
</tr>
<tr>
<td>333</td>
<td>323</td>
<td>344</td>
<td>481</td>
<td>488</td>
</tr>
<tr>
<td>334</td>
<td>324</td>
<td>265</td>
<td>482</td>
<td>464</td>
</tr>
<tr>
<td>335</td>
<td>325</td>
<td>352</td>
<td>483</td>
<td>428</td>
</tr>
<tr>
<td>336</td>
<td>326</td>
<td>204</td>
<td>484</td>
<td>467</td>
</tr>
<tr>
<td>337</td>
<td>327</td>
<td>205</td>
<td>485</td>
<td>460</td>
</tr>
<tr>
<td>338</td>
<td>328</td>
<td>264</td>
<td>486</td>
<td>506</td>
</tr>
<tr>
<td>339</td>
<td>329</td>
<td>246</td>
<td>487</td>
<td>468</td>
</tr>
<tr>
<td>340</td>
<td>330</td>
<td>303</td>
<td>488</td>
<td>445</td>
</tr>
<tr>
<td>341</td>
<td>331</td>
<td>348</td>
<td>494</td>
<td>487</td>
</tr>
<tr>
<td>342</td>
<td>332</td>
<td>206</td>
<td>497</td>
<td>458</td>
</tr>
<tr>
<td>343</td>
<td>333</td>
<td>207</td>
<td>498</td>
<td>444</td>
</tr>
<tr>
<td>344</td>
<td>334</td>
<td>335</td>
<td>500</td>
<td>549</td>
</tr>
<tr>
<td>345</td>
<td>335</td>
<td>334</td>
<td>501</td>
<td>548</td>
</tr>
<tr>
<td>346</td>
<td>336</td>
<td>337</td>
<td>502</td>
<td>551</td>
</tr>
<tr>
<td>347</td>
<td>337</td>
<td>333</td>
<td>503</td>
<td>552</td>
</tr>
<tr>
<td>348</td>
<td>338</td>
<td>340</td>
<td>505</td>
<td>545</td>
</tr>
<tr>
<td>349</td>
<td>339</td>
<td>113</td>
<td>509</td>
<td>490</td>
</tr>
<tr>
<td>350</td>
<td>340</td>
<td>76</td>
<td>510</td>
<td>333</td>
</tr>
<tr>
<td>351</td>
<td>341</td>
<td>361</td>
<td>512</td>
<td>556</td>
</tr>
<tr>
<td>352</td>
<td>342</td>
<td>230</td>
<td>513</td>
<td>557</td>
</tr>
<tr>
<td>353</td>
<td>343</td>
<td>231</td>
<td>514</td>
<td>558</td>
</tr>
<tr>
<td>354</td>
<td>344</td>
<td>283</td>
<td>517</td>
<td>521</td>
</tr>
<tr>
<td>355</td>
<td>345</td>
<td>310</td>
<td>526-526a</td>
<td>447,513</td>
</tr>
<tr>
<td>356</td>
<td>346</td>
<td>286</td>
<td>527</td>
<td>525</td>
</tr>
<tr>
<td>357</td>
<td>346</td>
<td>208</td>
<td>528-528a</td>
<td>517,449</td>
</tr>
<tr>
<td>358</td>
<td>347</td>
<td>143</td>
<td>532</td>
<td>564</td>
</tr>
<tr>
<td>Du Frène</td>
<td>1721</td>
<td>Rigaud</td>
<td>Ludwig</td>
<td>McM.</td>
</tr>
<tr>
<td>------------</td>
<td>------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>359</td>
<td>348</td>
<td>144</td>
<td>536</td>
<td>566</td>
</tr>
<tr>
<td>360</td>
<td>349</td>
<td>145</td>
<td>537</td>
<td>563</td>
</tr>
<tr>
<td>361</td>
<td>350</td>
<td>146</td>
<td>538</td>
<td>572</td>
</tr>
<tr>
<td>362</td>
<td>351</td>
<td>147</td>
<td>540</td>
<td>560</td>
</tr>
<tr>
<td>363</td>
<td>352</td>
<td>203</td>
<td>542</td>
<td>565</td>
</tr>
<tr>
<td>364</td>
<td>353</td>
<td>148</td>
<td>543,544</td>
<td>570,571</td>
</tr>
<tr>
<td>365</td>
<td>354</td>
<td>339</td>
<td>943</td>
<td>1007</td>
</tr>
</tbody>
</table>
Appendix 5

KEY DATES

At this point it is useful to consider a few key dates in Leonardo's life; with particular reference to his studies and the development of his thought and writing.465

1452 Leonardo da Vinci was born on 15 April 1452 in Vinci, near Empoli in Tuscany.

1470 When he was 15, he was taken to Florence by his father and apprenticed to Andrea Verrocchio, whose studio was near to that of the Pollaiuolo brothers. He was a pupil of Verrocchio from 1470 to 1477. When he turned twenty in 1472, he was admitted to the Florentine painters guild.

1473 There exist five paintings from this period in Verrocchio's studio; The Annunciation which is dated to about 1473, and was thought to be by Ghirlandaio until 1869, when it was attributed to Leonardo; The Madonna Benois dated sometime between 1472 and 1476, and the Madonna and Child with a vase of flowers from about 1474; Another painting from about 1474 is the Head of a woman, thought to be of Ginevra de'Benci; from about 1476 there is the Baptism of Christ, which was painted by Verrocchio, and partly by Leonardo who appears to have painted the angel on the left, parts of the drapery and the mountains behind.

1477 In about 1477 Leonardo set up his own studio, and worked as an independent artist under the patronage of Lorenzo the Magnificent.

In 1478 Leonardo started writing the notes that he compiled until 1518. He stayed in Florence another five years which proved to be turbulent. Lorenzo de' Medici had fallen out with Pope Sixtus IV, and in 1478, when Leonardo was 26, a nephew of the Pope masterminded an attempt to assassinate Lorenzo. In the attempt, his brother, Giuliano de' Medici, was stabbed to death, and this led to war between the Florentines and the Pope. It was this background of conflict that promoted Leonardo's interest in designs for machines of war, and fortifications.

1478 On the 10th January, Leonardo was commissioned to paint the altar-piece of the St. Bernard chapel in the Palazzo Vecchio. In December he began the two Virgin Marys.

1480 Three paintings date from between 1480 and 1483, being the Madonna Litta (c.1480-1481), which appears to be a copy of Leonardo's original which no longer exists; the St. Jerome (c.1481-1483), and the Adoration of the Magi (c.1481). In March 1481 the Monastery of San Donato commissioned Leonardo to paint an Adoration of the Magi, to be delivered within 24 months. Leonardo left Florence sometime in 1482 without finishing it.

1482 In 1482 Leonardo went to Milan for the first time to work for the Duke, Ludovico "Il Moro" Sforza. Incidentally, it has been suggested that Ludovico was known as 'Il Moro', the Moor, because he was dark skinned. There seems to be no foundation to this and his portraits do not show it. 'Moro' is also the Italian word for a Mulberry, and the Mulberry Tree was the insignia of the house of Sforza, which is a more probable origin of his nickname.

Why did Leonardo go to Milan from Florence, where he spent the next seventeen years? There is no good answer, and no explanation can be found of any good commission or offer. Perhaps he had tired of Florence, and maybe his restless nature found the much larger city of Milan an attraction, or maybe he wanted to move away from unfinished commissions, and start afresh in another city.

465 Material in this section can be found in three standard references, being:


It was sometime between 1482 and 1483 that Leonardo painted the picture Portrait of a musician. This unfinished portrait is the only one Leonardo ever painted of a man. Leonardo remained in Milan from his thirtieth to his forty-eighth year. When he first went to Milan, his Florentine style was greatly influenced by the prevailing Milanese school in the works of painters such as Bramantino, Borgognone and Zenale. But his own approach was to very deeply influence the younger members of this school, such as Luini, Giampetrino, Bazzi, Cesare da Sesto and the Lombard school.

It was on 25th April 1483 that Leonardo was commissioned to paint the Louvre version of the Virgin of the Rocks, and finished it in about 1490, when he started the version which is in the National Gallery, London.

**1484**

Leonardo started work on the Horse for the Sforza monument. An epidemic swept through Milan in 1484/5, and Leonardo approached Ludovico Sforza with plans for reconstructing the city on improved sanitary principles. He also started Architectural work on the Cathedrals of Milan and Pavia, and on the Castello in Milan.

He started work on his painting Lady with an Ermine in about 1485, and finished it in about 1490. This is possibly a portrait of Cecilia Gallerani, Il Moro’s mistress from 1481 until her marriage in 1491.

On the 23rd April 1485 he was commissioned to paint a Nativity for Matthias Corvinus.

**1487**

He intensified his studies of anatomy, biology, mathematics, physics and mechanics, and also began experiments in human flight. He intended these studies to develop into treatises on Architecture, Anatomy and Mechanics, and the first date that appears in Leonardo’s notes dealing with Anatomy is the following:

"On the second day of April 1489 book entitled Of the Human Figure."

From this period there is a sheet known as Windsor 12,604 which is only one page of a lost manuscript from Leonardo’s early period, about 1487-1490. At about this time he started Manuscript B which contains drawings of engines of war and architectural studies, domed churches, and engineering ideas. On folio 42v there is the date 2nd April 1489, and the manuscript runs to 84 sheets. He may have begun this manuscript as early as 1482.

It was during this period, starting in 1489, that Leonardo wrote many of his notes on painting that were later collected together by his friend and apprentice, Francesco Melzi, to form a treatise on painting. The first manuscript copy of this treatise became known as the Codex Urbinas 1270, and an abridged edition was subsequently printed as the Trattato della pittura, and then the Treatise of Painting.

It was also in 1487 that Leonardo started the Codex Trivulzianus which he was to finish in 1490.

In the same year (23rd April) he began writing what is now known as Manuscript C, the treatise on light and shade, which was to become an integral part of the Treatise of Painting.

**1490**

It was also in about 1490 that Leonardo started the version of the Virgin of the Rocks that hangs in the National Gallery, London, and finished it on 18th August 1508.

An important section of 17 folios from Codex Madrid II dates from 1491 and 1493, with notes on the design, casting and transporting of the great Horse monument to Francesco Sforza. There is a note that on 17th May, the Horse was ready for casting.

**1492**

This was a busy time in which Leonardo began Manuscript A and Manuscript Ashburnham 2038, both in about 1492. There then followed Manuscripts H1, H2, and H3 from 1493 to 1495.

**1493**

It was in 1493 that Leonardo completed the model of the gigantic horse for the Sforza’s monument which he had started in 1484. This was 26 foot high and stood in the courtyard of the Castello.

**1494**

Leonardo began his Latin studies at Pavia so that he could read the works of Euclid, Galen, Celsius, Ptolemy, Pliny, Vitruvius and Archimedes.

**1495**

This is the date of La Belle Ferronnière, erroneously named after a mistress of King Henry II of France, and more likely to be a portrait of Lucrezia Crivelli, who was the mistress of Ludovico Sforza in the 1490’s.
The Last Supper, arguably the most famous painting of the High Renaissance, was started in 1495 in the Monastery of Santa Maria delle Grazie in Milan, and was completed in 1497. Leonardo started the notes in 1497 that were to be Manuscript I, and completed them in 1518, and also began the notes for Codex Madrid I which he completed in 1499, dealing with theoretical and applied Mechanics.

Luca Pacioli arrived in Milan when Leonardo had finished the Last Supper, and was still completing the Sforza horse which now needed casting. Luca Pacioli helped Leonardo with calculations for the casting of the bronze. Pacioli had published his book Summa de Arithmetica, and both he and Leonardo started together on the next book De divina proportione.

1498

Charles VIII of France died in April 1498. The Duke of Orléans succeeded him, becoming Louis XII. He was the grandson of Valentinois, and was therefore a descendant of the Visconti family with a claim to the duchy of Milan.

In the summer of 1498, Ludovico Sforza commissioned Leonardo to decorate the interior of the Castello Sforzesco in Milan, and in particular the Sala delle Asse (Room of the Boards). He was then called away as chief military engineer to inspect and maintain canals and waterways.

Political upheaval again interrupted Leonardo's life. Ludovico was in trouble. Louis XII of France, the Pope and Venice had formed a plan to capture the Milanese and divide it between them. Ludovico had countered this by forming a league with the northern principalities of Italy, and by plotting with the Turks against Venice, and by plotting with the Germans and Swiss against France. The Germans and Swiss fell out with each other, and Ludovico travelled to Innsbruch to intervene in September 1499. In his absence King Louis XII invaded Milan, where the garrison gave in without a fight in October 1499.

1499

Leonardo left Milan with Luca Pacioli in December 1499, knowing that Ludovico was planning to return and went back to Florence via Mantua, where he drew Isabella Gonzaga's portrait (Marchioness Isabella d'Este), and then travelled on to Venice. He spent his time in Venice studying Mathematics and Cosmography.

Ludovico Sforza returned to Milan with Swiss mercenaries, and recaptured it in February 1500. But in April he had to fight the French again at the battle of Novara, and his mercenaries deserted him over a pay dispute, precipitated by the fact that they would have to fight against other Swiss mercenaries. Ludovico was captured, sent to France, and died there. Milan was sacked.

In April Leonardo heard of the second defeat of Ludovico Sforza, gave up the thought of returning to Milan, and pressed on to Florence.

The soldiers of Louis XII used the model of the great Horse in Milan as a practiseing target, gradually damaging it. Two years later the Duke Ercole of Ferrara petitioned the French governor of Milan for the damaged remains, but this request was not granted, and it was eventually destroyed.

Leonardo began Manuscript M in about 1500, and had completed it by 1502.

He was commissioned to paint the Madonna with St. Anne as an altar-piece for the Church of the Annunziata and only the cartoon was completed by 1501, after which the monks gave the commission back to Filippo, and on his death to Perugino.

1501

Madonna with the yaruminder (or distaff) was begun in 1501. There are a number of copies, and Leonardo may well have painted parts of the best surviving copy.

In 1501, Leonardo was employed by Cesare Borgia, Duke of Romagna, (the Duke of Valentinois) as an Architect and Military engineer. In the following year from July 1502 to March 1503, Leonardo travelled over much of central Italy, through Emilia and the Marches in his capacity as Chief Inspector of Military Buildings. This entailed extensive travel through Umbria, Romagna and Tuscany, and formed the basis for many of his notes on architecture, fortifications and cartography. He went to Piombino, Siena and Urbino, then through Pesaro and Rimini to Cesena. Two months were spent between Cesena and Cesenatico managing canal and harbour works, and the restoration of the palace of Frederic II. Leonardo then went on to Imola, Sinigaglia, and Perugia, and finally through Chiusi and Aquapendente to Orvieto and maybe even Rome, where Caesar Borgia arrived on 14th Feb, 1503. Then in March Leonardo left Cesare Borgia and went to Florence.
The *Mona Lisa* was begun sometime between 1501 and 1503. Madonna Lisa was the Neapolitan wife of Zanobi del Giocondo. This portrait is now known to be a portrait of Isabella of Aragon, but was claimed by Vasari to be Madonna Lisa, and so the name persisted.

In Florence, Leonardo pursued his interest in Mathematics and Anatomy, and began studying flight. But this stimulated wider research, and his studies of flight led to studies on Hydraulics and the movement of water.

It was between 1503 and 1505 that Leonardo wrote the bulk of *Codex Madrid II*. Francesco Melzi used 14 sections from this Codex in the *Trattato della Pittura*.

Leonardo now started two major enterprises, both of which failed. One was a design and plan to divert the River Arno, making it navigable to Florence. The other was the picture of the *Battle of Anghiari*, fought in 1440, and painted on one wall of the Palazzo della Signoria (Palazzo Vecchio), in competition with Michelangelo's *Battle of Cascina* on the other wall. He did not finish it, but nevertheless influenced the style of the younger Michelangelo. Leonardo worked on the cartoon in the Sala del Papa at Santa Maria Novella and finished it within two years. It was exhibited with Michelangelo’s cartoon, and created a sensation. It was to strongly influence Raphael, Fra Bartolommeo and other leading Florentine painters. Leonardo transferred the cartoon to the wall in about 1506, and had devised a new method of fixing his colours to the ground and to the wall with the application of heat. It had worked in his test but not in the large scale final painting, and his colours ran or scaled from the wall. The unfinished and damaged painting lasted for about fifty years and was then over-painted by Vasari.

The cartoon did not survive. Parts of it were cut up, and the remaining pieces were left in deposit at the hospital of Santa Maria Nuova, and it then disappeared.

Most of the notes in *Codex Madrid II* date from this time, 1503-1505, and include military engineering notes relating to Piombino, ideas on a canal linking Florence to the sea, and notes on painting the *Battle of Anghiari*.

*Manuscript K* was begun in about 1504 and was completed in about 1507, and the *Codices Forster I, II and III* were begun in 1505, although there is a view that they date from 1493-1497. A lost painting by Leonardo from this period is the *Angel of Annunciation*. This was very similar to the *St. John*, except for the different position of the upraised arm, and the conception is more appropriate to its subject than the *St. John* is with its mysterious effete atmosphere. This angel was based on a drawing dated to about 1505, which must have culminated in a finished painting, because several copies exist.

The *Codex On the Flight of Birds* was written in Florence between 14th March and 15th April 1505. During these years Leonardo worked on the *Mona Lisa* and brought it to completion in 1506. King Francis I of France later bought it for four thousand gold florins.

In 1506 Marshal of France and of the French Governor of Milan. In May 1506 he invited Leonardo to return to Milan but the Council of Florence did not wish to release him as he still had to finish his painting of the *Battle of Anghiari* for them. In the end they gave him three months leave. Then Chaumont asked them for a further three months leave, which they agreed to as France had protected Florence against Cesare Borgia. They refused a further request for three month's leave. King Louis XII of France intervened in 1507, by instructing the Florentine ambassador to write to the Council telling them he wished to employ Leonardo as Royal painter and engineer. Louis XII followed this with his own letter, and the Council of Florence gave way.

Thus began Leonardo's second stay in Milan which lasted for seven years, from 1506 to 1513. During this period he completed most of his Anatomical studies, and concentrated on Biology, using his skill in drawing to illustrate his now dominant interest in the sciences. It was at the end of 1507 that Leonardo wrote his well known notes about the death of the centenarian and his subsequent dissection of the corpse:

"A few hours before his death he told me he was over a hundred years old and he said he was conscious of no failure of body, only feebleness. And then, sitting on a bed at the hospital of Santa Maria Nuova in Florence, without any untoward movement or sign, he passed out of this life. And I made an anatomy to discover the cause of a death so sweet....." (Anatomical Ms.B, f.10v).
Leonardo began the Codex Leicester, now named Codex Hammer, in about 1506 and completed it in 1509. Leonardo was also making progress on the Codex Atlanticus which was to occupy him for several more years.

During this second Milanese period he also studied Nature, Geology, Hydrology and Aerology. From 1506 to 1511 Leonardo had to visit Florence repeatedly to settle legal wrangles. His father, Ser Piero, had died in 1504, and his seven younger legitimate half-brothers disputed the inheritance from both his father and an uncle, and this dispute dragged on. Leonardo was in Florence for six months during the winter of 1507-8 when he helped Giovanni Francesco Rustici with his bronzes of St. John the Baptist Teaching for the Baptistery in Florence.

Although the original painting of Leda is lost, sketches and copies indicate that it must have been painted sometime between 1506 and 1515.

1508
Leonardo began five manuscripts at about this time:
The Codex Arundel in the British Museum, which has at the beginning, "begun at Florence in the house of Piero di Braccio Martelli, on the 22nd day of March, 1508". He completed it in 1518; Manuscript F which has a note claiming it was begun in Milan on Sept. 12th, 1508; Manuscript D which was completed in 1509; Folio Resta which was completed in 1510; and Libro A which was completed in about 1515. This was the manuscript rediscovered by Carlo Pedretti.

Leonardo wrote to Charles d'Amboise in the Spring of 1508 to tell him that his legal troubles were now over, and also that he had two Madonnas of different sizes that he meant to bring to Milan with him. There is no record telling us which these Madonnas were, and both appear to be lost. One may have been the Madonna of the Cherries. Which was the other? It could have been the Madonna with St. Anne now in the Louvre.

He then designed a mausoleum for Marshal Trivulzio, also never finished.

It was also at this time that Francesco Melzi joined him as a friend and pupil, and Leonardo often visited the Melzi Villa at Vaprio.

A lot of his attention was taken up with work on the irrigation works in Lombardy, but he continued with his interest in the Natural Sciences, and especially Anatomy.

He was nearly sixty, and he probably did the famous red chalk portrait of himself at this time, or was it, as has been suggested, a portrait of his father? The self-portrait first appeared in Italy in the 1840's.

The earliest date for the St. John is 1509. There is a suggestion that this was painted as late as 1515, or even when Leonardo was in France, but this is unlikely. It is more probably dateable to Leonardo's final years in Italy, and inspired several copies.

1510
Manuscript G was written approximately between the years of 1510 and 1515, and it was in 1510 that Leonardo was working on Anatomical Ms.A. Salvator Mundi, which was recorded as being at Fontainebleau in 1642, was painted between 1510 and 1515, but no longer survives. Leonardo drew some red chalk preparatory details for this painting which give us some idea of what it must have looked like.

1511
In 1511 Charles d'Amboise, Lord of Chaumont, died, and Pope Julius II formed an alliance with the Venetians, the Spaniards and the Swiss, enabling him to finally drive the French from Italy.

With the French gone, Massimiliano Sforza, the son of Ludovico, now ruled Milan. Leonardo was no longer in favour with the Court and had to move in with the Melzi family.

In 1511 Leonardo met the anatomist Marcantonio della Torre, a Professor at Pavia, but this never led to any collaboration as the young anatomist died shortly afterwards.

1513
St. John-Bacchus of about 1513 is partly by Leonardo and is based on his drawing of St. John which dates to between 1510 and 1512. It is suggested that Cesare da Sesto may have also worked on this painting as it is congruent with his style and he worked with Leonardo at this time.

Manuscript E - Libro B can be dated to about 1513-14, and deals with plants and trees. In 1513 Pope Julius II died and was succeeded on 11th May by Giovanni de'Medici, one of Lorenzo's three sons, who took the name Pope Leo X. Leonardo, now sixty, decided in September of 1513 to go to Rome as he could expect no further patronage in Milan. On 24th
September he left for Rome with four pupils, Francesco Melzi, Salai, Lorenzo and Fanfoia. He was installed in the Belvedere of the Vatican by Giuliano de' Medici, younger brother of the new Pope Leo X, who also provided him with a monthly income. Leonardo was back in Florence on 10th October, and deposited 300 gold florins at Santa Maria Nuova. He returned to Rome in December where he established a studio in the Belvedere palace with the help of the architect Giuliano Leni.

It is possible that Leonardo went to Rome several times, but there is evidence for only two trips; one in early 1505 when he was consulted on the minting of new coins for Pope Julius II; the other was his longer final stay in Rome from 1513 to 1516.

This was an unpleasant time for Leonardo. Younger artists were now at their peak, especially Raphael and Michelangelo, the latter being particularly hostile towards Leonardo. Michelangelo was working on the tomb of Pope Julius, Raphael was painting the Papal Apartments, and many younger artists were working on various commissions. Bramante who was designing St. Peter's, was an exception. He resumed his friendship with Leonardo for a brief while, but then in 1514 he died. His work on St. Peter's passed through the hands of several architects over the years until Michelangelo took it on in 1546, twenty seven years after Leonardo had died.

Leonardo's notes mention nothing of the artistic activity that surrounded him in Rome. He was withdrawn, and concentrated on his scientific studies, producing sketchbooks full of Mathematical, Anatomical and Mechanical studies. He also did some engineering work on the harbour and defences of Civita Vecchia, and drew a map of the Pontine Marshes, apparently as part of a project to drain them.

There is a curious record of two small paintings done for a member of the Papal Court at this time - one of a child, the other of a Madonna, but both are now lost, and there is no other reference to them.

He had remained in Rome for three lonely years which proved unrewarding. It was time for him to leave. Cecil Gould suggests Leonardo's withdrawal and eventual departure from Rome was because he realised he could no longer compete with the younger talented artists who had been attracted there by Papal commissions, but MacCurdy suggests another reason. He claims Leonardo left Rome in 1515 because papal favour was withdrawn following the malicious spread of rumours that Leonardo practised dissection. Two German assistants living in Leonardo's apartments laid charges against him for impiety and body-snatching, which was of course related to his Anatomical research, and led to the favour of the Pope being withdrawn. Dissection of corpses had been banned by the Church, but by the end of the fifteenth century this was rarely enforced. Leonardo had watched autopsies as early as 1489, and then did many of his own dissections, ignoring the Church's view that this was sacrilege.

1515

Louis XII died at the end of 1514, and the new King, Francis I, made a surprise crossing of the Alps into Italy to re-capture what he considered to be his lost territories. Pope Leo X ordered his brother Giuliano to lead Papal forces into the Emilia as a precaution against Francis I. Leonardo accompanied them. Giuliano suddenly fell ill and went to Florence, and died there in March 1515, but Leonardo stayed with the Papal forces in Piacenza. The battle of Marignano resulted, after which Francis I and Pope Leo X agreed to meet in Bologna, at the end of the year. The fierce competition between Michelangelo and Leonardo erupted again. The Pope was travelling to Bologna via Florence, and while there, considered giving the commission for the new Laurentian Library to Leonardo. Michelangelo hurried from Rome to Florence, and managed to secure the commission for himself. Leonardo then went to Bologna from Piacenza, and was presented to the young French King. This was the start of a strong friendship between them, and Leonardo accompanied Francis I on his return journey as far as Milan.

1516

King Francis I offered Leonardo a pension of 7000 scudi a year, and "a palace of his own choice in the most beautiful region of France". Leonardo decided to accept this generous invitation to live in France, at the Chateau Cloux near Amboise. One view is that Leonardo set out for France with Francis I in January 1516. On the way they met the Queen Mother, Louise of Savoy, who offered Leonardo a manor house she had recently bought at Cloux (later named Clos-Lucé), near Blois. There is doubt about this as it is not known exactly when Leonardo went to France. It is clear that he was still in Rome in August 1516, because in the Codex Atlanticus (folio 162v) he gives measurements of the Basilica of San Paolo which include the date.
It is clear that he was at Cloux in the spring of 1517 as Cardinal Louis of Aragon visited him there, and Leonardo showed him three pictures which appear to have been the Mona Lisa, the Madonna with St. Anne, and a young John the Baptist.

An enigmatic reference occurs in the words of Antonio de' Beatis, the secretary to Cardinal Louis of Aragon, who visited Leonardo in France in 1517. He recorded his meeting Leonardo, and the journey there, in a diary which is in the Biblioteca Nazionale of Naples, and said that the Cardinal was shown

"three pictures; one of a certain Florentine lady, done from the life, at the instance of the late Magnificent, Giuliano de'Medici,..."

This casts doubt on its being the Mona Lisa as she was not commissioned by Giuliano. Yet Cassiano dal Pozzo saw the Mona Lisa at Fontainebleau in 1685, and described it. It then went to Versailles, and to the Louvre after the French revolution. Pierre Gauthiez had strong views on which paintings Leonardo took with him to France, and wrote,

"He carried in his luggage not only the cartoon of the St Anne (a second cartoon, that of 1507, which was never executed in paint, is now in the Royal Academy of London), but also two finished paintings, the Leda and La Belle Ferronnière, as well as two other works which were almost completed, the Gioconda and the St. John. The first two were left at Fontainebleau; the two latter Leonardo could not bear to part with."

When the Cardinal saw Leonardo's Anatomical studies, he was told by him that he had dissected "more than thirty bodies, both of men and women....".

The Cardinal's secretary, Antonio de' Beatis, recorded the visit as follows:

"On the tenth of October, 1517, Monsignor and the rest of us went to see, in one of the outlying parts of Amboise, Messer Leonardo Vinci the Florentine, an old man more than seventy years, the most excellent painter of our time, who showed his Eminence three pictures, one of a certain Florentine lady painted from life at the instance of the late Magnificent, Giuliano de' Medici, another of Saint John the Baptist as a youth, and one of the Madonna and the Child in the lap of Saint Anne, all most perfect, and from whom, since he was then subject to a certain paralysis of the right hand, one could not expect any more good work."

He recorded a discussion of Leonardo's notes, as follows:

"He also wrote concerning the nature of water, of divers machines and other things - according to what he says, an infinity of volumes, and all in the vulgar tongue, which when they are published will be useful and most interesting".

Leonardo spent the last two years of his life in France, dying on the second of May, 1519, reputedly in the arms of the French King. This has been shown to be fiction as King Francis I was at his court of Germain-en-laye at the time. Leonardo's grave is now lost.
BIBLIOGRAPHY

Research copies
LEONARDO DA VINCI *Treatise of painting.*

English editions
1721 The first English edition.
1796 Resetting of 1721.
1802 A new edition by Rigaud.
1835 Reprint of 1802.
1877 Resetting of 1835.
1892 Reprint of 1877.
1906 Reprint of 1892.
1956 The first English translation of the complete *Codex Urbinas Latinus 1270* by Philip McMahon.
1995 Libro di Pittura, a facsimile of the *Codex Urbinas* with transcriptions ed. C. Pedretti, 2 vols (Giunti, Florence).

Other editions
Italian
1723 First Italian printing of the Du Frèsne edition.
1733 Reprint of 1723
1786 Resetting of 1651
1792 From the manuscript of Stefano della Bella
1804 Conforms to 1651 (Amoretti).
1805 1651 Text with Orsini additions.
1817 The Manzi edition - The first printed edition of the full text of *Codex Urbinas 1270*.
1859 Edited combination of Amoretti (1804) and Manzi (1817).
1890 Milanesi version based mainly on Manzi.
1914 An edition edited by Angelo Borzelli based on the *Codex Urbinas*.
1923 Based on Arconati’s compilation of writings on water.
1924 Reprint of Angelo Borzelli edition (1914).
1939 Resetting of Du Frèsne (1651)
1995 Libro di Pittura, a facsimile of the *Codex Urbinas* ed. C. Pedretti, 2 vols (Giunti, Florence).

French
1651 The first Du Frèsne edition
1716 Resetting of French edition of 1651
1796 Resetting of 1716 (Giffart)
1803 Gault de St. Germain edition
1803 Resetting of 1716 (Giffart).
1910 Translation and rearrangement by Péladan of Manzi edition (1817).

German
1724 Translation of the 1651 French and Italian editions.
1747 Resetting of 1724.
1786 Revised and modernised edition of 1724.
1882 Full text of *Codex Urbinas* translated by H. Ludwig in four volumes.
1909 A condensation of the *Codex Urbinas* by W. Von Seidlitz.
1909 M. Herzfeld’s edition of Ludwig text of 1882.
References – Vincian Codices and Manuscripts

Codex 967 in the Bibliothèque Nationale, Paris.
Codex Arundel (1508) in the British Museum, London.
Codex Atlanticus (c.1478-1518) in the Ambrosiana, Milan.
Codex Barberinus in the Vatican Library, Rome.
Codex Casanatense 5018 in the Biblioteca Casanatense, Rome.
Codex Casanatense 968 in the Biblioteca Casanatense, Rome.
Codex Corsini in the Biblioteca dell’ Accademia dei Lincei, Rome.
Codex Forster I, II and III (c.1493-1497) Victoria and Albert Museum, London.
Codex Huygens in the Pierpont Morgan Library, New York.
Codex Laurenzianus in the Biblioteca Medicea Laurenziana, Florence.
Codex Leicester, now Codex Hammer (c.1506-1509) owned by Bill Gates of Microsoft Corporation.
Codex Madrid I (1497-1499) in the Biblioteca Nacional, Madrid.
Codex Madrid II (1503-1505) in the Biblioteca Nacional, Madrid.
Codex on the Flight of Birds (Manuscript ‘Su Volo degli Uccelli’).
Codex Ottobonianus in the Vatican Library, Rome.
Codex Pinellitanus in the Ambrosiana, Milan.
Codex Riccardianus in the Biblioteca Riccardiana, Florence.
Codex Trivulzianus (Libro E) (c.1487-1490) Museums of Castello Sforzesco, Milan.
Codex Urbinas in the Vatican Library, Rome.
Folio Resta (c.1508-1510).
Libro A (c.1508-1515) (reconstructed from Codex Urbinas and Codex Leicester).
Manuscript 228 inf. in the Ambrosiana, Milan.
Manuscript 297 in the Biblioteca Etrusca, Cortona.
Manuscript A (c.1492) in the Institut de France, Paris.
Manuscript Ashburnham 2037 (c.1492) in the Institut de France, Paris.
Manuscript Ashburnham 2038 (c.1492)
Manuscript B (c.1488) in the Institut de France, Paris.
Manuscript B.271 in the Biblioteca dell’ Archiginnasio, Bologna.
Manuscript Belt 35 in the Elmer Belt Library, Los-Angeles.
Manuscript Belt 36 in the Elmer Belt Library, Los-Angeles.
Manuscript C (c.1490) in the Institut de France, Paris.
Manuscript C.III 43. in the Raccolta Vinciana, Milan.
Manuscript D (c. 1508-1509) in the Institut de France, Paris.
Manuscript de Noailles (17th Century) sold in 1795, thereafter unknown.
Manuscript E (Libro B) (c.1513-1514) in the Institut de France, Paris.
Manuscript F (c.1508) in the Institut de France, Paris.
Manuscript Furini in the Biblioteca Estense, Modena.
Manuscript G (c.1510-1515) in the Institut de France, Paris.
Manuscript Hermitage in the Hermitage Museum, St. Petersburg.
Manuscript H1, H2, and H3 (c.1493-1495) in the Institut de France, Paris.
Manuscript H 227 inf. in the Ambrosiana, Milan.
Manuscript H 229 inf. in the Ambrosiana, Milan.
Manuscript H 267 in the Bibliothèque de la Faculté de Médecine, Montpellier.
Manuscript I (c.1497-1518) in the Institut de France, Paris.
Manuscript Ital Lanino in the Biblioteca Marciana, Venice.
Manuscript Ital Nani in the Biblioteca Marciana, Venice.
Manuscript L (c.1502) in the Institut de France, Paris.
Manuscript M (c.1500-1502) in the Institut de France, Paris.
Manuscript Sandrart (now lost).
Manuscript 'Sul Volo' - On Flight Enrico Fatio Collection, Geneva.
Manuscript XII D.79 in the Biblioteca Nazionale, Naples.
Zaccollini Manuscripts (1630s) in the Biblioteca Laurenziana, Florence.

References and bibliography
AGLIONBY, W. 1685. Painting illustrated in three dialogues; containing some choice observations upon the art; together with the lives of the most eminent painters, from Cimabue to the time of Raphael and Michael Angelo, etc. London: printed by John Gain for the Author.

229


ARISTOTLE, 1621. *Physiognomica,* In Physiognomica Aristotelis commentarii a Camillo Baldo ... lucubrati. Opus ... Hieronymi Tamburini diligentia & sumptibus in lucem edium. [With the text.]. Apud S. Bononium: Bononiae.


BAUDELAIRE, C. 1926. *Les fleurs du mal (The flowers of evil).* Translated by Lewis-Piaget Shanks.


BERENSON, B. 1903. *The drawings of the Florentine painters classified, criticised and studied as documents in the history and appreciation of Tuscan art.* London: John Murray.


BORGHINI, R. 1584. *Il riposo ... in cui della pittura, e della scultura si fauella, de’ più illustri pittori, e scultri, e delle più famose opere loro si fa mentione;* Edited by Antonio Maria Biscioni, with a preface and notes by Giovanni Gaetano Bottari. Florence: G.Marescotti.


231


CARDUCHO, V. 1633. Dialogos de la pintura, Madrid: Martinez.


232


DOLCE, L. 1557. *Dialogo della pittura intitolato L’Aretino. Nel quale si ragiona della dignità di essa pittura, e di tutte le parti necessarie, che a perfetto pittore, si accompongono: con esempi di pittori antichi e moderni: e nel fine si fa menzione ... delle opere del Titiano.* Venice: G. Gielito de Ferrari

DONI, A.F. 1549. *Disegno partito in più ragionamenti ne’ quali si tratta della scolitura et pittura de’colori, de’getti, de’modelli con molte cose appartenenti a quest’aerti, ... alcune lettere che trattano della medesima materia.* Venice.


FRANCHI, A. 1739. Teorica della Pittura, ovvero trattato delle materie più necessarie, per apprendere con fondamento quest'arte... Lucca.


237


MORTIMER, T. 1763. A list of the principal booksellers of London and Westminster. The Universal Director, or the nobleman and gentleman’s true guide to the masters and professors of the liberal and polite arts and sciences, and of the mechanic arts, manufactures. London. pp.166-170.


PINO, P. 1548. *Dialogo della pittura... nuovamente dato in luce.* Venice: [Scritori d'Italia; no. 291. Bari, G. Laterza.]


239


RIDOLFI, C. 1648. Le Maraviglie dell'arte, overo le vite degli illustri pittori Veneti, etc. (Wonders of Art). Venice: G. Vedova.


ROSAND, D. 1988. The meaning of the mark: Leonardo and Titian. Spencer Museum of Art, University of Kansas, Lawrence, KS.


SORTÉ, C. 1580. *Osservazioni nella pittura*. Venice: [Scrittori d'Italia. no. 219.]


THEOPHILUS, 1847. *The various arts (De diuersis artibus).* Translated ... with introduction and notes by C. R. Dodwell. London: Thomas Nelson.


241


VILLANI, F. 1904. *Liber de origine civitatis Florentiae et eiusdem famosis civibus*. 1381-82. [Indagini di storia letteraria e artistica. no. 5.] Casciano: Rocca.


WRIGHT, E. 1764. Some observations made in travelling through France, Italy, etc; in the years MDCCXX, MDCCXXI and MDCCXXII. London: A.Millar.


ZUCCARO, F. 1607. L'idea de' pittori, scultori, ed architetti, divisa in due libri. Turin.


243