The Idealised Style of Vesalius’s Fabrica Illustrations

Art, Nature and Aesthetics

Hannah Rose Burgess

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Abstract

Vesalius wrote nothing about the aesthetics of the anatomical illustrations found in his *De humani corporis fabrica* (1543). There are, however, two passages in this work that offer a starting point for an investigation into the illustration’s idealised style. In discussing the body that is best for a public dissection Vesalius says that it must be one that resembles the ‘Canon of Polycleitus’, and later, he refers to his pursuit of the *historia absoluti hominis* or *historia* of the perfect man. These two passages lie at the heart of a solution to questions concerning the style of Vesalius’s illustrations.

This thesis seeks to investigate the role that visual material (art) played in determining the visual character of Vesalius’s natural philosophical illustrations. In antiquity art and nature were generally thought to be opposed. This distinction was undermined in the sixteenth century as images came to play a role in acquiring and conveying knowledge about the natural world. The role that art played in determining the visual character of Vesalius’s illustrations, I argue, constitutes another facet of the undermining of the ancient opposition between art and nature that occurred in the sixteenth century. The relationship between art and nature forms the basis of my investigation into the style of Vesalius’s illustrations.

I examine three separate but interrelated avenues which, I suggest, played a role in determining the style of the *Fabrica* illustrations. The first derives from the history of natural philosophy and medicine. I suggest that the concepts art, nature, teleology, form and beauty as they are found in Plato’s *Timaeus*, and Marsilio Ficino’s sixteenth-century commentary on that work, provide an epistemology and account of the body that is also found in Galen’s *On the Usefulness of the Parts of the Body*, and subsequently reflected in both the text and illustrations of the *Fabrica*. This epistemological underpinning is entirely in keeping with the method of proportional representation of the body and associated aesthetic advocated in Polycleitus’s *Canon*.

The second avenue concerns the role that both ancient and Renaissance artworks played in determining the style of the *Fabrica* illustrations. While the
illustrations embody the ideal and typical form advocated in the *Canon* they also embellish this, and contain stylistic features derived from Hellenistic sculpture and found in High Renaissance art. I argue for specific parallels between Hellenistic sculpture, Michelangelo’s nudes in his Sistine Chapel frescos and Vesalius’s illustrations.

Thirdly, I consider Renaissance artwriting and aesthetics as a source for understanding the idealised style of the Vesalian illustrations. In particular I examine Leon Battista Alberti’s tabulation of the ideal man and his aesthetic principle *concinnitas*. This offers a Renaissance account of beauty and the ideal that is analogous to the *Canon* of Polycleitus, is central to an understanding of Italian Renaissance art and aesthetics, and has a particular application to Vesalius’s illustrations and their teleological underpinnings. I suggest that *contrapposto* as the expression of antithesis in art offers a theoretic parallel for the augmentation of the austere classical style found in Vesalius’s own use of *contrapposto* and his interest in musculature and movement.

Throughout, this thesis is concerned with relationships between visual materials. I elaborate on this theme through an investigation of the influence that Vesalius’s illustrations had on a selection of anatomical illustrations that came in its wake. I construe the relationships that obtain between these illustrations as analogous to those which occur in what are termed art historical ‘movements’.
Chapter One: The Idealised Style of Vesalius’s Illustrations; Outline, Aims and Parameters of the Thesis

Introduction

Andreas Vesalius’s anatomical treatise *De humani corporis fabrica libri septem* was printed in Basel in 1543. Woodcut illustrations adorn the six hundred and sixty-three pages that comprise the folio. These anatomical illustrations play a crucial role in this natural philosophical work, and in its ability to convey knowledge about the natural world. My intention in the present thesis is to investigate the role that visual material, that is *art*, and aesthetic theory, played in determining the idealised style of the illustrations found in Vesalius’s *Fabrica*; the role that natural philosophy and medicine played in determining this idealised style; and the role that Vesalius’s own illustrations (as visual art) played in determining the style of a selection of subsequent anatomical illustrations.

Vesalius wrote nothing about the aesthetics or style of his anatomical illustrations. There are, however, two key passages in his *Fabrica* that provide clues. In discussing the type of body that is best for a public dissection, Vesalius says that it should be one best for comparison with other bodies, like the ‘statue of Polycleitus’.¹ And, secondly, in discussing the role of a canonical body in public dissection he refers to his pursuit of the *historia absoluti hominis* or *historia* of the perfect man.² These two references to the perfect and canonical human form constitute the basis of my investigation into the idealised style of Vesalius’s illustrations.

The illustrations in Vesalius’s *Fabrica* are generally, but not exclusively, representative of an idealised type. While they can be thought to illustrate a

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² I discuss this in chapter four. Also, see Kusukawa, “The Canon of the Human Body: Vesalius’s De Humani Corporis Fabrica.”
classical ideal of human anatomy, in some instances they also display an interest in, and a representation of, anatomical variation and diversity. Indeed, the growth of Vesalius’s interest in diversity is evident through comparison of the 1543 and 1555 editions. What appears to complicate the notion that the Fabrica illustrations represent a classical ideal, is the sense in which many of the illustrations appear to be influenced by Hellenistic sculpture, and embody a High Renaissance style. Vesalius himself, and his period, drew no distinction between classical and Hellenistic art, and indeed it is entirely consistent to see Vesalius’s illustrations as embodying the Polycleitan theory of proportional representation and its associated aesthetic as well as stylistic features of Hellenistic art and the art of the High Renaissance. Establishing this point is central to an understanding of the Vesalian style.

Both the iconographical content (for example, the specific anatomical detail) and the idealised style of the Fabrica illustrations derive from an array of different sources. The anatomical detail contained within the illustrations was based upon ideas and theory from the history of medicine and natural philosophy; upon post-mortem examination of bodies (of adults and of still-born foetuses); animals were dissected and observed; bones from cemeteries were examined; and this mixture of pre-established ideas and observations were checked against the bodies of executed criminals, used in public dissections.

A factor central in determining the visual character of the Vesalian illustrations, in particular their idealised style and their poses, is the use of ancient and Renaissance artworks as models. In this thesis I examine the degree and extent to which Vesalius and his draftsman modelled the Fabrica illustrations on ancient sculpture, Renaissance painting and sculpture and Renaissance copies.

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4 See Garrison, “Anatomical Variability.”
6 There is disagreement in the literature concerning the draftsman of the Fabrica illustrations. I address this issue in chapter two.
of ancient works. Moreover, I claim that the *style* of the Vesalian illustrations is informed not only by actual artworks but also by ancient and Renaissance art theory, aesthetics and art criticism. Art and artwriting helped to inform Vesalius’s search for the *‘historia absoluti hominis’*\(^7\) and in particular its representation. The connection between ancient art, the Polycleitan *Canon*, and the Vesalian illustrations has been made in the literature.\(^8\) I examine and elaborate on this connection, as well as look to fifteenth and sixteenth-century artworks and artwriting, in an attempt to situate the Vesalian illustrative style and its aesthetic within its Renaissance context. A broad ranging sweep of the history of ideas is required to understand the Vesalian illustrations.

The ancient distinction between art and nature constitutes the conceptual setting for this thesis. Art has a long history of being mistrusted. In the Bible Moses found his people adoring a representation of a golden calf they had manufactured (Exodus 32). So troubled at seeing the value and honour being conferred upon this representation of an animal, he turned it to dust and ordered the Levites to put to death the thousands of false Israelites who had committed this idolatry.\(^9\) This story was discussed in artwriting in the Renaissance. In antiquity art and nature were thought to be in opposition. Famously, Plato condemned the arts for their ability to deceive, ranking them at the bottom of his epistemological ladder. In the sixteenth century the use of images in natural philosophical or early scientific texts grew. Visual material came to play an unprecedented role in the formation of scientific knowledge, as the *Fabrica* itself illustrates. Important work addressing this subject has recently been done.\(^10\) I hope to build upon this body of literature, by examining

\(^7\) I discuss this in detail in chapter four.


\(^10\) See my discussion in the section entitled ‘existing scholarship’ in this chapter.
the way that artworks themselves could function as models for determining the style of visual material contained in early scientific texts. My investigation focuses on Vesalius’s *Fabrica*, but I believe could suggest a broader trend in illustrated early scientific texts.

In the Renaissance nature provided the fundamental model for art, and ancient art proved a supplementary model as it was believed to embody the laws of nature.\(^{11}\) This undermined the ancient distinction between art and nature. This opposition was also being undermined in other intellectual spheres in the sixteenth century. It has been argued that the boundary between the realms of nature and of artificial products was transgressed through the use of images in acquiring and conveying natural philosophical knowledge.\(^{12}\) I suggest that the role that art and its theory played in determining the style of the Vesalian illustrations adds another dimension to the transgression or undermining of this ancient distinction that occurred in the sixteenth century. Not only were images used in the formation, acquisition and transference of knowledge about the natural world, but their delineation was based not solely on accurate observations of the natural world but on artworks themselves. Art served as a model for images conveying knowledge about nature.

The highly idealised style of the Vesalian illustrations is determined not only by the role that art and aesthetics played in determining their visual character, but also the history of natural philosophy and medicine. I argue for a mirroring between the visual idealisation of the illustrations and the theoretical understanding of teleology and form in nature that can be found in Plato and Galen and the text of the *Fabrica* itself. This second, but interrelated, avenue for explaining the idealised style of the Vesalian illustrations is, I claim, entirely in keeping with the view that the illustrations embody the proportional relation of parts to each other and the whole recommended by the Polycleitan *Canon*. I consider Plato’s *Timaeus* and Galen’s *De usu partium corporis humani* (*On the Usefulness of the Parts of the Body*). Specifically, I focus on what I term the ‘consciousness-based teleology’ that underpins these texts and Plato’s


\(^{12}\) See my discussion in the section entitled ‘existing scholarship’ in this chapter.
theory of forms, and consider its expression in Marsilio Ficino’s sixteenth-century translation of, and commentary on, the Timaeus. The concepts ‘art’ and ‘nature’ and the relationship between them play an important role here too as I seek to provide a basis for the idealised style of the Vesalian illustrations.

Just as art served as a stylistic model for Vesalius’s natural philosophical illustrations, his illustrations in turn functioned as models for subsequent anatomical illustrations. I examine the influence that Vesalius’s illustrations had on anatomical illustrations that followed in the Fabrica’s wake. Again, we see visual material serving as a model for other visual material. This provides another facet to the relationship between art and nature in early modern scientific texts, and to the role of the visual in transmitting knowledge.

In this introductory chapter I shall make some preliminary remarks about terminology; note some apparent tensions in the Fabrica; point towards relevant existing scholarship in order to situate my own work; and outline the structure of the thesis.

**Tensions in Vesalius’s Illustrations and Relevant Terminology**

Whether the Fabrica should collectively be understood as art in the service of science or science in the service of art has been the subject of much debate.\(^{13}\) The tension between art and science is just one of a number of inherent tensions that underpin the Fabrica illustrations. These illustrations are natural philosophical diagrams constructed with a didactic end in mind. They are designed according to a brief which includes the requirement that they convey knowledge about anatomy.\(^ {14}\) Yet, at the same time they are clearly designed with an eye to aesthetic considerations. The tension between, on the one hand, specific scientific ends (and the requirement that the illustrations convey accurate knowledge about the world) determining iconographic content and, on the other, aesthetic concerns about style, is mediated in the Vesalian case

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\(^{13}\) See, for example, Ivins, “What About the ‘Fabrica’ of Vesalius?”; Panofsky, “Artist, Scientist, Geni us.”

\(^{14}\) Michael Baxandall has offered a charge/brief model derived from a consideration of Benjamin Baker’s Fourth Bridge in Scotland. He applied this model to Picasso’s Portrait of Kahnweiler thereby demonstrating the applicability of an end-directed, scientific/technological model of explanation to artworks. This model for art interpretations could be usefully applied to the Vesalian illustrations. See Michael Baxandall, *Patterns of Intention: On the Historical Explanation of Pictures* (New Haven: Yale University Press, 1985).
by the specific style and aesthetic being a thoroughly teleological one. Unlike Enlightenment and post-Enlightenment aesthetics, teleology and knowledge of nature lie at the heart of ancient and Renaissance aesthetics.

The style of the Vesalian illustrations is visually pleasing, while the subject matter itself might evoke in viewers a strong sense of disgust. Aestheticians debate whether the feeling of aesthetic delight and the feeling of disgust are compatible ones, or whether the latter might not cancel out, as it were, a positive aesthetic response. Glenn Harcourt has proposed that Vesalius presents his illustrations as visually analogous in form to antique sculptural fragments precisely to overcome the disgusting reality of the subject matter represented, namely the dissected human corpse. I discuss Harcourt’s view in chapter seven. That we have the ability to abstract away from feelings and judgements about the subject matter of a work of art when aesthetically responding to it is evidenced by the numerous works of art that are celebrated as beautiful (by many people from different eras and places) despite their subject matter evoking a negative emotional response. From Jacques David’s Death of Marat (1793) to Salvador Dali’s The Lugubrious Game (1929), the history of art is full of examples of works where the subject matter evokes negative feelings while the style evokes a positive aesthetic response. The tension between the response that might be occasioned by the subject matter of the Vesalian illustrations and that which might be occasion by their style is one aspect of a broader tension, between the illustrations’ evident ‘naturalism’ and ‘idealisation’.

I refer to the Vesalian illustrations as ‘naturalistic’, that some degree of visual verisimilitude pertains between the anatomy represented in the illustrations and that which can be found in typical human bodies. Their naturalism directly

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15 Leon Battista Alberti’s teleological aesthetic principle concinnitas (and its relationship to the Polycleitan Canon and Vesalius’s illustrations) is discussed in chapter eight.

16 Famously Immanuel Kant argued that disgust was the only feeling that could preclude the possibility of an aesthetic judgement. In section 48 of the third Critique he writes: ‘For in this singular sensation, which rests on mere imagination, the object is represented as it were obtruding itself for our enjoyment, while we strive against it with all our might. And the artistic representation of the object is no longer distinguished from the nature of the object itself in our sensation, and thus it is impossible that it can be regarded as beautiful’ in Immanuel Kant, Critique of Judgment, trans. J. H. Bernard, The Hafner Library of Classics (New York, N.Y: Hafner Press, 1951), sec. 48.

17 Harcourt, “Andreas Vesalius and the Anatomy of Antique Sculpture.”
relates to their accuracy as scientific diagrams that are intended to represent actual human anatomy. Throughout the Fabrica Vesalius insists upon the importance of hands-on dissection and observation in the obtainment of anatomical knowledge, and while Vesalius criticised Galen for mixing up the anatomy of humans with that of animals, features of animal anatomy can be found in some of Vesalius’s own illustrations of the human form. In some cases this was a mistake. For example, figure 30 in book five represents the placenta of a dog presenting it as that of a woman. Three years later Vesalius wrote that this mistake was due to the fact that he had no access to a human placenta. In the second 1555 edition of the Fabrica he amends this.

Recently Sachiko Kusukawa has discussed instances where animal anatomy has been included within the representation of the human form in Vesalius’s illustrations. She argues that the inclusion of animal anatomy is deliberate, and functions as a form of visual argument. She notes that the discrepancies with Galen’s descriptions meant that Vesalius needed to proceed carefully in his argument. Here too, Vesalius exploited pictures, by juxtaposing human and animal structures. One such juxtaposition sees a human skull resting upon a canine skull (I discuss this further in chapter two, also see fig. 1), while two others occur in Vesalius’s muscle figure series. As Kusukawa points out, the muscle labelled as X in table V. of the muscle figure series occurs in dogs but not in humans (see fig. 10). Vesalius noted his intention behind the inclusion of this muscle: ‘As this area in man is fully portrayed in table VII, we have, with excessive devotion to Galen’s teaching, depicted here a muscle which is found in dogs but not in man and is regarded by Galen as the third moving the

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thorax’. 22 Vesalius elaborated on his inclusion of the rectus abdominis in this illustration, in his 1555 edition. 23

Kusukawa also points out the muscle in table VI. of the muscle figure series (at O-Γ-P-Q) occurs in dogs but not humans (see fig. 11). 24 Vesalius wrote:

The part of the chest and neck should have been drawn as in the following table; but I decided that it would not be entirely pointless to depict here from a dog the muscles mentioned by Galen that takes its origin (marked O) from the transverse processes of the cervical vertebrae; it is fleshy as far as the fourth rib, but at the point marked P it becomes a membranous tendon marked Q, and this extends further down to some of the ribs. 25

I discuss Vesalius’s inclusion of animal anatomy in greater detail in chapter two. Here, I mention this in order to consider how the inclusion of animal anatomy affects claims about the naturalism and idealisation of Vesalius’s illustrations.

The intentionality of the inclusion of animal anatomy in these illustrations has positive consequences for their functionality as diagrams – it demonstrates that they convey more knowledge than was previously thought. Indeed they reveal knowledge not only about human anatomy, but also about its history. But, does it affect the degree of ‘naturalism’ we might attribute to them? Naturalism in art refers to the relationship between the visual appearance of the world and that of the artwork. We might call an artwork naturalistic if what it depicts resembles the way that things appear in the world. For example, objects should be set within a perspectival space, and colours should appear as they do in nature. However, it not necessary that naturalistic works depict reality or things that really exist. Perspective in painting makes what is represented appear the way that we would see it (in Euclidian space), but it does not represent the way that the world really is. Parallel lines do not meet

23 He writes: ‘The wide tendon and this fleshy part are the muscles that Galen counts the third of those moving the thorax, but this is not to be seen in humans as it is in caudate apes and dogs. We have nevertheless drawn it here so that Galen can be understood’. Quoted in Daniel Garrison, “Animal Anatomy,” 2013, http://vesalius.northwestern.edu/essays/.
in reality, but they do according to our vision and according to the rules of perspective in painting. Furthermore, it is not necessary that a naturalistic representation be based on direct observation of the world at a particular place or time, or for a naturalistic portrait to be based on the observation and delineation of an actual, particular person. Naturalistic works can represent fictional peoples, times and places. Vesalius’s illustrations include standing, animated skeletons, flayed muscle figures set in poses derived from art, torso figure presented as fragments of classical sculpture, anatomical simplification for didactic purposes and, as was mentioned, animal anatomy can be found in the representation of a human. These factors do not demonstrate that we cannot understand the Vesalian illustrations as naturalistic. Rather, they preclude the attribution of complete realism.

Unlike naturalism, realism in art does not refer to a relationship between the visual appearance of the world and that of the artwork. The heavily abstracted works of analytic Cubism, for example, aimed at realism – at representing real features of our experience of the world, not solely confined to the visual. Abstract scientific diagrams can be understood as realist if they accurately represent something about the world. The Vesalian illustrations are realist. Insofar as the anatomy that is represented corresponds to actual human anatomy, they are realist, but cease to be so where the bodies are represented as standing, animated cadavers in the poses of ancient sculptures, and where human and animal anatomy is mixed. Given that naturalism refers to appearance not reality we can understand Vesalius’s illustrations as naturalistic. Naturalism is not at odds with idealism, or the representation of forms more perfect than those found in nature. Realism and idealism could be thought to be at odds, however, were not thought to be by Plato or by various Renaissance thinkers and artwriters whom I shall consider. The debate concerning the relationship between realism and idealism was a live one in the artwriting of Vesalius’s time.

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The main objective of this thesis is to explain the idealised visual character or style of the Vesalian illustrations. The nature of the Vesalian style is intended to become clear throughout my discussion. However, I shall briefly make some introductory remarks here. Idealisation in art is particularly characteristic of ancient art of the classical period and of *quattrocento* art. Sometimes contrasted with realism, idealism presents something as in a sense better or more perfect than particular examples of things as they are found in nature. However, in both art theory and natural philosophy it has often been claimed that ideal forms of things are found within the very forms of nature itself, dispersed throughout it. The ideal in art is highly mathematical, and concerns the harmonious, fractional relationship of parts to each other and to the whole (what is sometimes called *symmetria*). It is intrinsically related to the representation of a norm or type of form rather than to a realistic depiction of a particular. The way in which an ideal form can be better than particular forms found in nature, but also embody what is typical or normal about a class of natural things, constitutes another apparent tension applicable to the Vesalian illustrations. They represent an *ideal* and *typical* form. Natural philosophical and aesthetic considerations which I examine demonstrate that the representation of the ideal and the typical in art can be understood to be aspects of one and the same representational end.

**Existing Scholarship**

This thesis focuses mainly upon art historical literature, aesthetic theory and artwriting (both contemporary and sixteenth-century). However, the central premise, concerning the role of art and aesthetics in determining the style of scientific illustration (thus undermining the art/nature distinction) draws upon scholarship from the history of science.

The role that art, or the visual, played in conveying knowledge about the natural world has been the topic of important recent work. *Transmitting Knowledge: Words, Images and Instruments in Early Modern Europe* investigates the role that words, images and instruments played in
transmitting knowledge in the early modern period.\textsuperscript{27} In both her essay in this volume as well as in her recent publication \textit{Picturing the Book of Nature: Image, text and Argument in Sixteenth-Century Human Biology and Medical Botany} Sachiko Kusukawa investigates the role that pictures play in the formation and communication of knowledge in sixteenth-century printed books.\textsuperscript{28} The role that visual material plays in the formation of knowledge about nature, discussed in detail by Kusukawa, provides a springboard for my consideration of the role that art and aesthetics played in determining the visual character of Vesalius’s illustrations. Other recent works which consider the role played by images in the formation and communication of knowledge include \textit{The Power of Images in Early Modern Science};\textsuperscript{29} \textit{The Nature of the Book: Print and Knowledge in the Making};\textsuperscript{30} and \textit{Picturing Knowledge: Historical and Philosophical Problems Concerning the Use of Art in Science}.\textsuperscript{31}

The undermining of the distinction between art and nature involved in the sixteenth-century use of images in natural philosophical texts is taken up in the edited collection \textit{Merchants and Marvels: Commerce, Science and Art in Early Modern Europe}\textsuperscript{32} and, in particular, in Pamela O. Long’s chapter ‘Objects of Art/Objects of Nature: Visual Representation and the Investigation of Nature’.\textsuperscript{33} Long writes:

> The use of images to further knowledge about the natural world represents a significant cultural development. For both philosophical and historical reasons, ancient and medieval thought tended to separate things made by human artifice – paintings and drawings, as well as constructed objects such as machines – from the natural world. In part, this reluctance to use visual images to


\textsuperscript{28} Kusukawa, \textit{Picturing the Book of Nature}.

\textsuperscript{29} Wolfgang Lefèvre, Jürgen Renn, and Urs Schoepflin, \textit{The Power of Images in Early Modern Science} (Basel: Birkhäuser, 2003).


\textsuperscript{31} Brian S. (Brian Scott) Baigrie, \textit{Picturing Knowledge: Historical and Philosophical Problems Concerning the Use of Art in Science} (Toronto: University of Toronto Press, 1996).


demonstrate claims about the world came out of the Aristotelian view that art and nature were opposed to one another.34

Long’s essay examines the way that art and nature came to be associated in the period between the 1490s and the 1540s, and shows how analogies between art and nature meant that art was used to demonstrate truth and knowledge about nature. My claims concerning the role that art and aesthetics played in determining the style of Vesalius’s illustrations complements Long’s thesis concerning the analogies between art and nature in the late-fifteenth and early-sixteenth-century, and the undermining of the ancient opposition between art and nature.

The relationship between art and nature is relevant not only to my claims about the role of art and aesthetics in determining the style of Vesalius’s illustrations, but also to my discussion of the Platonic and Galenic nature of the teleology found in Vesalius’s text, and reflected in the idealisation of his illustrations. In his work Promethean Ambitions: Alchemy and the Quest to Perfect Nature William R. Newman employs the art/nature distinction to frame his discussion of the history of alchemy.35 Ultimately he sees the history of alchemy, and the relations between art and nature that are central to his account of it, through an Aristotelian lens. In contrast to Newman’s Aristotelian emphasis I view Vesalius’s epistemology and the art/nature relations that underpin it as Platonic and Galenic.

Vesalius’s reference to the Canon of Polycleitus and the historia absoluti hominis have been considered in depth by Kusukawa36 and Glenn Harcourt.37 That Vesalius’s illustrations represent antique sculptural fragments more generally is addresses by Harcourt.38 The relationship between the Vesalian illustrations and antique art constitutes an important thread in the art historical literature on Vesalius which I discuss in chapters two and seven.39

34 Ibid., 63.
38 Ibid.
39 See, for example, Janson, “Titian’s Laocoön Caricature and the Vesalian-Galenist Controversy”; Ivins, “What About the ‘Fabrica’ of Vesalius?,” 43–98; James Ackerman, “Early Renaissance ‘Naturalism’ and Scientific Illustration,” in Distance Points: Essays in Theory and Renaissance Art and Architecture (Massachusetts: MIT
intended to build upon the existing literature by suggesting that Vesalius’s illustrations have much in common with the style and poses found in Hellenistic sculpture and art from the High Renaissance – in particular Michelangelo’s painted nudes found in his Sistine Chapel frescos. It has been recognised firstly, that Vesalius refers to the Polycleitan Canon and that the classical aesthetic associated with it is evident in the style of his illustrations, and secondly, that figure twenty-two from chapter five is based upon the Hellenistic Belvedere Torso (see fig. 38). These, however, represent what appear to be two different styles – the austere rules of the Canon and the embellishment of such rules involved in Hellenistic and High Renaissance style. I attempt to reconcile this apparent tension in Vesalius’s illustrations through a consideration of both ancient and Renaissance artworks upon which it is possible that the Fabrica illustrations are based, and through a consideration of Renaissance aesthetics. My focus centres on the artwriting of Leon Battista Alberti, and my discussion of antithesis in art as embellishment draws heavily upon the work of David Summers.40

In chapter nine I consider the influence that the Vesalian illustrations had on examples of subsequent anatomical illustration, and the relationships that visual images have to each other. I consider the forms of copying that occurred as analogous to the forms of influence that occur in art historical movements. The work of Michael Baxandall41 and James Elkins42 in particular provides the impetus for my thinking about relationships between pictures. Here I focus on a number of primary sources, and my interest lies primarily with the illustrations not the text.

**Structure**

I begin, in chapter two, by introducing Vesalius, his context, and his illustrations. While I discuss the illustration in detail throughout the thesis, in this chapter I introduce the main groups of illustrations, situate them within

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41 Baxandall, Patterns of Intention.
the *Fabrica*, and suggest some possible iconographic and stylistic art historical precedents. I also consider the continuity between medieval medical illustrations and the Vesalian illustrations. I suggest that the abstraction in the former and the idealisation in the latter allow them both to function diagrammatically, as their respective styles impart them with a generalising quality.

In chapter three I introduce the art/nature debate. This is central to my claim concerning the role that art and aesthetics played in determining the style of Vesalius’s illustrations, and its undermining of the ancient distinction between art and nature. Moreover, it is central to my consideration of the consciousness-based teleology found in both Plato and Galen, in Vesalius’s text, and reflected in the idealised style of his illustrations. The relationship between art and nature forms the basis for the influence that both art and aesthetics, and natural philosophy and medicine, had on the style of the illustrations in Vesalius's *Fabrica*. Firstly, I introduce the historical foundations of the art/nature debate. I consider definitions and origins of the terms ‘art’ and ‘nature’, and introduce three main modes of relation between them that circulated in antiquity (plus an additional relation that is of particular relevance to Vesalius). I suggest that while art and nature were generally thought to be opposed the preconditions for the sixteenth-century undermining of the distinction can in fact be found in the ancient art/nature relations. Secondly, I outline William R. Newman’s discussion of the art/nature debate and his alchemical case. Newman views the history of alchemy, and art/nature relations that are central to it, through an Aristotelian lens. This provides the background against which my claims in chapters five and six, concerning the Platonic and Galenic nature of Vesalius’s thinking, take place.

In chapter four I introduce Vesalius’s references to the *Canon* of Polycleitus and the *historia absoluti hominis*, remarks which point towards a theory for the artistic representation of the body and to an associated aesthetic. The Vesalian illustrations are both typical and ideal and insofar as Vesalius’s illustrations embody the principles of the *Canon* this provides a basis for the attribution of these properties. This tradition in human proportionality encompasses both the mean or average human form as well as the beautiful one. Having considered Vesalius’s own references to Polycleitus, the *homo*
absolutus and the Canon I then examine the sources that we have for the Polycleitan Canon and the terminology that is involved in these references. This is followed by an examination of contemporary views about the Canon and the Doryphoros (the Canon’s exemplary sculpture) in the secondary literature – including the notion of symmetria and the debate concerning the contrapposto pose of the Doryphoros.

While my main focus throughout this thesis is on the illustrations in the Fabrica in chapters five and six I turn my attention to a selection of passages from the text. In chapter five I suggest a framework derived from Plato’s Timaeus and Galen’s On the Usefulness of the Parts of the Body – that is, from the history of natural philosophy and medicine – that offers a theoretical basis for understanding the idealised style of Vesalius’s illustrations. In both of these works the anatomical forms that are described are directly analogous to the Canon of Polycleitus. These texts, I claim, constitute a direct lineage of thought and an account of nature, teleology and form that influenced Vesalius. More specifically, I claim that Plato’s theory of forms and what I refer to as his ‘consciousness-based teleology’ offers an account of nature, beauty and the human body that is consistent with that found in Vesalius’s Fabrica. In addition to twentieth-century translations of Plato I consider Marsilio Ficino’s Renaissance translation of the Timaeus and his commentary on it (his Compendium in Timeum) which has been described as the ‘definitive Renaissance interpretation’.43 I also rely here on Arthur Farndell’s translation of Ficino’s commentary.44 In Ficino’s Compendium in Timeum the term absolutus is used to designate a specific form of perfection. Furthermore, in his commentary on Plato’s Symposium on Love we find an account of temperament or ‘temperatissimum’ and the relationship of internal and external perfection. These are the very terms employed by Vesalius to refer to the Polycleitan-like body that he says is best for public dissection, and, by extension, that which is represented visually in his illustrations. I suggest that there is also a clear sense in which the beautiful and absolute Platonic forms are analogous to the Polycleitan Canon.

Also in chapter five, I propose that Plato’s consciousness-based teleological account of nature and the human body underpinned Galen’s account of human anatomy, its forms, functions and purposes as it is found in his On the Usefulness of the Parts. I consider Galen on nature and the soul and suggest that his view that the construction of art is the ultimate end of human nature offers an original interpretation of the art/nature relationship, and one that is adopted by Vesalius. Galen is an important source for our knowledge of the Polycleitan Canon. In his De Placitis Hippocratis and his De Temperamentis Galen say that beauty resides in the commensurability of parts to each other and to the whole as is written in the Canon of Polycleitus and implies that Polycleitan proportions were all directed towards the end of capturing the mean in whatever form was being represented. I suggest that the methodology employed by Galen in his On the Usefulness of the Parts, to discover the ‘true’ function of each part of the body, employs the Polycleitan principle of symmetria. This he also associates with beauty. Indeed, the body described in Galen’s On the Usefulness of the Parts is the perfect, true and beautiful human form, arrived at through a method analogous to that described in Galen’s description of the Canon of Polycleitus.

In chapter six I turn my attention to certain passages in the text of the Fabrica. I argue that the teleology and notion of form found in Plato and Galen underpins Vesalius’s own epistemology and his account of anatomy. Insofar as the consciousness-based teleology and account of ideal forms, in Plato and Galen, is compatible with the Canon of Polycleitus, and is adopted by Vesalius, there occurs a mirroring between the body that Vesalius suggests is best for public dissection (analogous to the Canon of Polycleitus), the idealised style of Vesalius’s illustrations, and the epistemology that underpins his account of anatomy as it is expressed in the text.

The second half of this thesis focuses on the relationship that ancient and Renaissance artworks and Renaissance aesthetic theory have to Vesalius’s illustrations. In chapter seven I consider the role that artworks played in determining the style of Vesalius’s illustrations. This chapter is intended to provide evidence for my premise concerning the undermining of the art/nature distinction, as I claim that artworks served as models for Vesalius’s scientific illustrations. While Vesalius’s illustrations represent Polycleitan
principles of proportional representation, they do not just embody an austere classical aesthetic, but an embellished form of it. I argue that Vesalius’s illustrations are specifically influenced by stylistic aspects (and specific poses) found in Hellenistic sculptures. The distinction between classical and Hellenistic sculpture was not made in Vesalius’s time meaning that this influence must have been governed by shared stylistic interests and representational ends. I suggest that the inflated musculature, poses, and obsession with representing movement found in Hellenistic works appealed to Vesalius’s own ambitions. Specifically, I suggest that the contrapposto stances of some of the Vesalian muscle figures echo those found in Hellenistic representations of kings in sculpture, and that the contemplative pose of Vesalius’s side view of the skeleton in toto is based upon Hellenistic representations of poets and philosophers. I propose that parallels exist between the hand gestures found in Hellenistic sculpture and Vesalius’s illustrations. Moreover, I propose specific ancient models upon which the Vesalian torso figures could be thought to be based, and consider Renaissance copies of ancient sculptures as a possible source of influence.

I suggest that Vesalius may also have been influenced by the painted nudes found in Michelangelo’s Sistine Chapel frescoes. This is consistent with the Hellenistic hypothesis as Michelangelo himself adopted a decidedly Hellenistic style. Indeed, Kusukawa notes that ‘Michelangelo ... is reputed to have called the so-called Belvedere Torso the ‘most perfect’ (absolutissimum) sculpture in Rome, and used it as a model for one of the seated male nudes in the Sistine Chapel’. Furthermore, according to David Summers ‘Michelangelo perceived the realisation of his own aims in it [the Belvedere Torso] – so much so that it came to be called Michelangelo’s torso’ – and magnified his conception of the human figure accordingly’. I also suggest that the nude figure clinging to the column in Vesalius’s title page may be based upon the nude figures in Michelangelo’s Last Judgement which cling to the column where Jesus was flagellated.

In chapter eight I consider ideal human proportionality and beauty in Renaissance artwriting, specifically that of Leon Battista Alberti. Alberti’s artwriting has a particular relevance to Vesalius’s idealised and teleological representation of the human form and to the relationship between art and nature. For Alberti there is no tension or contradiction between representing nature accurately and representing a perfect and beautiful ideal. Firstly, I examine human proportionality in his *De Statua*.

I consider Alberti’s system for representing proportionality in the human form and how it differs from the *Canon*; Alberti’s tabulation of ideal proportions; his account of the ‘perfect beauty distributed by nature’ and his ‘task of recording the dimensions of man’; his description of the artist’s ability to perfect nature and of art’s end as the imitation of nature; his belief that there is no tension between representing nature accurately and representing a perfect and beautiful ideal; and his account of the idea of beauty and his method for attaining it. Lastly, I examine his aesthetic principle *concinnitas* and its relation to the Polycleitan *Canon*. *Concinnitas* is, for Alberti, the absolute and perfect law of nature. Its representation in art can be thought of as the representation of nature in art, and of the representation of beauty and perfection towards which natural particulars strove.

That Vesalius’s illustrations embody the *Canonical* rules of proportional representation and an augmented classical aesthetic characteristic of Hellenistic art and High Renaissance style has a theoretic parallel. In Renaissance artwriting and theory *contrapposto* was construed as a pictorial expression, and indeed offspring, of antithesis in rhetoric. In the second half of chapter eight I build upon claims made by David Summers, and suggest that the expression of antithesis in art (as a stylistic principle and compositional device) augments *concinnitas* (as an aesthetic principle, but also as a principle of nature and mind). *Concinnitas* as Alberti says ‘flourishes in Nature’ and is the ‘spouse of the soul and of reason’. By contrast the expression of antithesis in

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47 The date for the composition of this work is unknown and debated. Cecil Grayson suggests that it was most likely produced between *De Pictura* and *De Re Aedificatoria*. For a discussion of this see Cecil Grayson, ‘Introduction’ to Leon Battista Alberti, *On Painting and On Sculpture: The Latin Texts of De Pictura and De Statua*, trans. Cecil Grayson (London: Phaidon, 1972), 18–26.

48 Summers, “Contrapposto.”

painting is only achieved through art, and is an expression of the artificial. We might, therefore, interpret the strong use of contrapposto in the Vesalian illustrations as an expression of the artificial in his illustrations.

I suggest various ways in which Vesalius’s use of contrapposto (as the expression of antithesis in visual art) emphasises the artificial aspect of his illustrations through style. Firstly, the dead and partially dissected cadaver is depicted as standing and animated and the muscles are represented as in movement and in tension. This pairing results in the animated dead, which gains meaning through antithesis. It takes the illustrations beyond that which would be found in nature, and beyond the representation of the laws of nature in art. The presentation of the dissected body as art (as antique sculptural fragments), can also be construed as the representation of pictorial antithesis. The body is presented both as natural and as artificial, as an accurate representation of human anatomy but also as prints modelled upon sculptural fragments.

Lastly, in chapter nine, I investigate a selection of anatomical illustrations that followed in the wake of the publication of the Fabrica. I attempt to differentiate between the forms of copying that occurred, and endeavour to dispel charges of plagiarism that have been levelled against the cases that I consider. I suggest that the nature of this influence might be re-evaluated through re-description as a movement such as those that occur in the history of art. Throughout the thesis I seek to map relationships between images and to consider ways that visual material can serve as models for other visual material. This is also my intention in chapter nine. My case studies include illustrations from the work of Thomas Geminus (1510-1562), Juan Valverde de Hamusco (1525-1588), Caspar Bauhin (1560-1624), Giulio Casserio (1561-1616), Adriaan van der Spiegel (1578-1625) and John Browne (1642-1702). I conclude by suggesting that Govard Bidloo’s (1649-1713) illustrations, and his representation of the cadaver as dead, can be construed as signifying the origination of a new anatomical model. Where Vesalius’s intentionally disguises the reality of the subject matter, Bidloo makes this explicit.
Chapter Two: Art and Knowledge in the Renaissance; Vesalius, His Publications, Illustrations and Historical Context

Introduction

In 1543, the same year that Copernicus published his *De revolutionibus orbium coelestium*, Andreas Vesalius published his major anatomical atlas *De humani corporis fabrica libri septem*. Vesalius’s biographer C.D. O’Malley has referred to his work as ‘one of the greatest treasures of Western civilization and culture’. The *Fabrica* is valued not only for the numerous medical advances elaborated within its pages. Vesalius’s methods are significant including the role that observation played in his means of acquiring anatomical knowledge. It is also prized as a masterpiece of early printing. Vesalius’s uses of illustrations to convey scientific knowledge in this work is unprecedented. It is generally maintained that these illustrations were designed in the workshop of Titian in Venice, under the careful instruction and control of Vesalius. The woodcuts produced from the designs were then printed by Johannes Oporinus in his printing press in Basel. On every account the *Fabrica* is a masterpiece of craftsmanship.

In this chapter I shall introduced Vesalius’s publications and the illustrations contained therein. While I discuss the *Fabrica’s* illustrations in detail throughout the thesis, here I introduce the main groups of illustrations in it and suggest some possible iconographic and stylistic art historical precedents. I consider the continuity between medieval medical illustrations and those of Vesalius. The abstraction in the former and the idealisation in the latter both allow them to function diagrammatically, imparting them with a generalising quality. Vesalius’s illustrations are intended to function as diagrams, and I argue that the aesthetic idealisation is not at odds with this function, but, in

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51 I discuss this below in the section entitled ‘Jan Steven van Kalkar and the Design of the Fabrica’.
fact, conditions its possibility. The particular aesthetic associated with the Vesalian illustrations (that expressed in Polycleitus’s *Canon* and that characteristic of Renaissance art) offers an idealisation that expresses a mean or average human form. This stylistic idealisation gives the Vesalian illustrations a diagrammatic quality, allowing them to stand in as representations of a typical human form. This visual idealisation of the Vesalian illustrations is mirrored in the theoretical understanding of art, nature, teleology and form that can be found in the textual element of the *Fabrica*.

**Andreas Vesalius of Brussels (1514-1564)**

Andreas Vesalius was born in Brussels in December, 1514.\(^{53}\) In 1528 he commenced study of the Liberal Arts at the University of Louvain. There he studied Greek, Latin and Hebrew. In 1533 Vesalius began his medical education in Paris. During this time he was taught by the great medical humanists and avid Galenists Jacobus Sylvius (1478-1555) and Johann Guinther of Andernach (1487-1574). The University of Paris was a famous medical institution during the time Vesalius attended it. Compared to Padua it could mistakenly be understood as a conservative medical school. This was not the case. Like other medical schools of the time human dissections were rare in Paris and teachers such as Sylvius drew particularly on the texts of Galen. Arnaldo Benini and Susan Bonar suggest that ‘During his three years in Paris, Vesalius saw no more than three or four dissections’.\(^{54}\) In reality, being a Galenist at this time was advanced. Before 1514 most medical texts were derived from Medieval Arabic translations of, and commentaries on, classical authorities such as Aristotle, Plato and Galen, not from translations of the originals. O’Malley points out that during Vesalius’s time in Paris the medical syllabus relied heavily on the collection of texts called the *articella*. This included texts such as ‘Hippocrates, Galen, Theophilus – *On Urines* and *On the Pulse* – Isaac – *De viatico* – Avicenna, Averroes, Avenzoar, Rhazes, and the precepts of the Salernitan School’.\(^{55}\)

\(^{53}\) Harvey Cushing notes that ‘The horoscope of Vesalius cast by his contemporary, Jerome Cardan … is the authority for Vesalius’s birth date’ in Harvey Cushing, *A Bio-bibliography of Andreas Vesalius* (Hamden, Conn: Archon Books, 1962), xxiv. In this book Cushing also offers a translation of this horoscope as an appendix, see page xxxviii.

\(^{54}\) Arnaldo Benini and Susan Bonar, *Spine* vol. 21 (11), 1 June, 1996, 1388-1393.

During Vesalius’s time in Paris Galenic teaching came to dominate medical education. Here in 1541, the texts of Galen were translated directly from the ancient Greek by Nicolò Leoniceno (1428-1524). Developments in humanism in Renaissance medicine provided an important impetus for Vesalius, as did the emphasis placed on the writing of Galen by his teachers. Guinther also had translated Galen’s *On Anatomical Procedures* in 1531, not long before Vesalius arrived in Paris, and Vesalius himself was involved in editing the work of Galen, and translating it from Greek into Latin.  

Sylvius has become the best known of Vesalius’s teachers because of Vesalius’s rejection of the latter’s methodology. In the preface to the *Fabrica* Vesalius had said that the ‘famous Jacobus Sylvius’ can ‘never be praised too highly’. By 1546, he had come to think otherwise. In his China Root Epistle Vesalius tells us how Sylvius deliberately covered over inconsistencies in Galen and only dissected animals. He writes:

> he omitted the subsequent books [of Galen’s *On the Usefulness of the Parts*] as far as the fourteenth and then read the following. As a result he completed a book in five or six days without ever calling our attention to the fact that Galen contradicts himself elsewhere, as he frequently does, and without indicating that Galen said things which are false. He brought nothing to the school except occasionally bits of dogs. We were so sedulous in following the dissections of our teacher that after his lectures he often tested our ability. It happened one day that we showed him the valves of the orifice of the pulmonary artery and of the aorta, although he had informed us the day before that he could not find them. Since Sylvius omitted the chapters dealing with the vertebrae, as well as many others, during his so called course – which he was then giving for the thirty-fifth time – and read nothing else anatomical except the books *On the movements of muscles*, in which he everywhere agreed with Galen, it is not astonishing that I write that I have studied without the aid of a teacher.  

Vesalius’s denunciation of Sylvius’s complete acceptance of Galenic anatomy does not however preclude the character of Vesalius’s own anatomical

methodology and illustrations from being Galenic. As I discuss in chapters five and six, Vesalius was himself deeply indebted to Galen.

Vesalius did have some experience of human dissection while in Paris. In 1535 he assisted in a demonstration, and in the following year he was allowed to complete one almost unaccompanied. In 1537 when the King of Spain, Charles V, invaded France Vesalius left Paris and return to Louvain. He remained there for about a year, completing the degree he did not get to finish in Paris, before moving on to Padua, to obtain a doctorate of medicine at the university. While in Padua Vesalius gave many lectures and anatomical demonstrations. Rather than reading from an ancient text while a barber surgeon dissected the cadaver, Vesalius completed the anatomical dissections himself. The importance that Vesalius placed on the physician using his own hands is evident in the letter to the Emperor that serves as a preface to the Fabrica. After receiving his medical degree in 1537 Vesalius was offered the chair of surgery and anatomy at the university in Padua which he took up immediately. It was during the time that Vesalius occupied this chair that the Tabulae anatomicae sex, Fabrica, and Epitome were published. After the publication of the Fabrica and Epitome Vesalius went on to a career as a military surgeon and then as physician to Charles V. It was during this later period that he wrote the China Root Epistle. By 1564 Vesalius had given up on his imperial duties and embarked on a pilgrimage to Palestine. From this he never returned. The details concerning his death are sketchy but it seems most likely that he died in a shipwreck.

Vesalius’s Works

While my concern lies with the Fabrica I shall first briefly introduce Vesalius’s other works. In 1538 Vesalius’s first great work the Tabulae anatomicae sex was published in Venice. It was intended as a device to assist teaching methods and to aid but not replace observation made of dissection. The Tabulae consisted of six large anatomical tables, three of which were designed by Vesalius himself, while the other three, Vesalius tells us, were designed by Jan

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61 O’Malley, Andreas Vesalius of Brussels, 1514-1564, 311.
Steven van Kalkar.  

Each table has an image in the centre, or on one side of the page, and text alongside it. Like Vesalius, Kalkar was from Brussels, but it is likely that he and Vesalius met in Venice. Only two complete original copies of this work survive today. This is unfortunate but it testifies to their use, as these tend to wear out. The success of the *Tabulae* is also evidenced by the numerous copies of it that occurred immediately after its publication. Vesalius himself discussed the copying of the *Tabulae* that occurred, in his letter to Johannes Oporinus, professor of Greek Literature at Basel, and printer of the *Fabrica*. In this letter, which appears with the letter to Charles V at the beginning of the *Fabrica*, Vesalius discusses the way that booksellers and publishers took little notice of the imperial documents, then known as ‘privileges’, which forbade the printing of illustrations without consent. He states that ‘this is abundantly demonstrated in the case of my *Anatomical Tables*, first published three years ago in Venice and since then pirated in many other places in deplorably bad editions’.

The first three illustrations in the *Tabulae* are all designed by Vesalius, and the physiological system that is represented is Galenic. *Tabula I* includes a representation of the five-lobed liver that is described by Galen, and is common to medieval anatomy. Letters are placed on top of the illustration, and names corresponding to the parts are listed alongside it. *Tabula II* depicts the system according to which the blood is distributed about the body. Again the five-lobed liver is present, and dominates the centre of the illustration. The veins of the body are represented, and set out in a roughly human shape. They too are labeled with letters, while the corresponding names are listed down the side of the page, alongside the illustration. *Tabula III* depicts the *rete mirabile* at the top of the image. This is shaded in such a way as to resemble a

63 Saunders and O’Malley note that: ‘Since Padua was under the rule of Venice it was only natural that Vesalius should make frequent visits to the famous capital city which was only some twenty miles away ... It is not unlikely that Vesalius while on one of these visits first made the acquaintance of his fellow countryman, the artist Jan Stefan van Kalkar, who was later to be associated with some of the Vesalius publications. Kalkar was himself a new arrival in Venice where he had entered the school of Titian’ in Saunders and O’Malley, *The Illustrations from the Works of Andreas Vesalius of Brussels*, 16.
64 One of which is housed in the University of Glasgow’s Special Collections.
65 I discuss this further in chapter nine.
net, referring to the *rete mirabile* or ‘marvelous net’ that Vesalius believed (at this time) lay at the base of the brain and converted vital spirits to psychic spirits. The arteries of the body are represented along with the heart; the vena cava; the pulmonary vein; the pulmonary artery; and the kidneys. Again, the system of letters and corresponding labels is employed.

The final three tables, Vesalius tells us, are by Kalkar. He writes:

> ‘To them [the first three tables already described] we have annexed others comprising three representations of my skeleton, which I have set up to the gratification of the students, rendered from the three standard aspects by the distinguished contemporary artist, John Stephen [van Kalkar].’

All three illustrations depict a human skeleton *in toto*. The first of these, *Tabula IV*, depicts an anterior view of a skeleton. *Tabula V* depicts a side view, and, lastly, *Tabula VI* depicts a posterior view. Unlike the illustrations in the *Fabrica* it is known that these were drawn from a single model skeleton that Vesalius has prepared himself (as is evidenced by the quotation above). These three skeleton figures were the most naturalistic versions of their kind that had ever been depicted in the history of medical illustration.

In 1538 Vesalius published, alongside the *Tabulae*, a revised edition of Guinther’s *Institutionum Anatomicarum secundum Galeni Sententiam ad Candidatos Medicinae Libri Quatuor*. This revised synopsis of Galenic anatomy and physiology reveals, at this time, Vesalius’s commitment to Galenic views. 1539 saw another publication by Vesalius, which is known as his ‘Venesection Letter’. This letter shows Vesalius participating in an important medical debate of the day. Venesection, a standard medical practice since antiquity, involved the letting of blood which was thought to be necessary for the restoration of the proper balance of humours in a patient. Throughout the middle ages the Arabic practice of letting blood from a point in the body as remote from the point of ailment as possible was the common practice. With the developments in humanism and the rediscovery of the original classical texts it was realised that this style of blood-letting was at odds with that which was recommended in the Hippocratic Corpus. In the early sixteenth-century debate over this point

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raged and Vesalius’s venesection letter sees him coming down on the side of Pierre Bissot and the classical texts. The venesection letter is famous, however, not for its support of the classical views but for its emphasis on direct observation. In it Vesalius included an illustration of the azygos system of veins, that he designed himself. It has been claimed that the venesection letter ‘enables us to trace the transition to the observational method which [is central to] his great masterpiece, the Fabrica’.69

In 1543 Vesalius published his De humani corporis fabrica and its abbreviated companion the Epitome. I shall consider the Fabrica and its illustrations separately, in the following section. The Epitome, which was intended to be read in conjunction with, rather than instead of, the Fabrica is an essentially visual publication. O’Malley notes how it was intended to function as a sort of visual ‘index’ to the Fabrica.70 This large but slender volume measures 38cm wide by 56cm high. It consists of some images printed from the same woodcuts as the Fabrica and others that are original to it including the famous Adam and Eve figures which represent both male and female external anatomy. Some of the original editions of the Epitome were hand painted in colour.71 In total it contains just six skeleton and muscle figures, five of which are original to it, while the sixth is a reprint of the side profile skeleton figure from the Fabrica. After the Adam and Eve figures there appears an intricate flap-figure involving seven flaps and twelve layers representing the veins, arteries and internal organs. Not surprisingly, but to Vesalius’s disappointment nonetheless, the spectacular and somewhat cheaper Epitome was far more of a selling success than its parent, the Fabrica.

A second edition of Vesalius’s Fabrica appeared in 1555, with revisions. While Vesalius occupied the post of physician to Charles V, he wrote his last publication the China Root Epistle. This work, which is in fact two letters, concerns the materia medica known as china root. Charles V had requested this treatment, and Vesalius obliged. Then, having the seal of approval from the king, other physicians had become curious about its properties and had written to Vesalius questioning him on it. The China Root Letter is Vesalius’s

69 Saunders and O’Malley, The Illustrations from the Works of Andreas Vesalius of Brussels, 18.
70 O’Malley, Andreas Vesalius of Brussels, 1514-1564, 184.
71 Andreas Vesalius, Andreae Vesalij ... Suorum de Humani Corporis Fabrica Librorum Epitome. (Basil, 1543).
reply to one of these queries, which was to be published by Oporinus, in Basel, in 1546. In the first letter, which is a reply to his friend Joachim Roelants, we find Vesalius’s view on the china root. In essence he seems dubious about its therapeutic properties, despite the fact that the King’s health had actually improved after using it. In the second letter Vesalius discusses his reply to a letter from Sylvius, where the latter had criticised those aspects of the Fabrica where Vesalius had departed from the teachings of Galen. In this letter Vesalius makes clear his belief that one must trust the evidence of one’s own senses, rather than blindly adhere to the teaching of Galen. He writes:

I began my letter to Sylvius by saying that I was less upset by his remarks because I had seen many very learned physicians and philosophers who had been just as angry as he because I had said such things about Galen. These men could not believe that the father of medicine had made such mistakes in the anatomical books he felt he had written with so much care and accuracy, the more so since it was a subject in which he had acquired greater authority than anyone else, even during his own lifetime. Gradually, however, they began to change their attitude, and there was not one among them who, with the cadaver before him, could continue to defend Galen. However reluctantly, they came to put more faith in their eyes than in the words of Galen. It is my hope that eventually Sylvius too, will change his mind as he reads through what I have written and that he will not deny me his good will and friendship. However, as I wrote, whatever the case may be I should consider it as merely one of the misfortunes of mortals that must be borne, as I have not yet learned to speak counter to my own belief.72

This letter also contains an account of discoveries that Vesalius had made since the publication of the first edition of the Fabrica, which were incorporated into the second edition of 1555. That same year Charles V abdicated and was replaced by Phillip II of Spain.

The Fabrica and its Illustrations

Some of the most well-known illustrations in the Fabrica include the three skeleton figures and the fourteen muscle figures (see figs. 3-19). These, however, only constitute a small portion of its illustrative content. There are, for example, 171 illustrations of bones, 39 details of muscles, 50 details of

individual organs, 38 details of veins and arteries, 21 illustrations of the brain and 21 of the eye. The Fabrica also contains five vein figures, and twelve torso figures illustrating the viscera. In the odd instance an illustration is repeated more than once. There are just four representations of female anatomy. These include the infamous representation of a uterus cut away from the body, two female torso figures, and the cadaver being dissected on the title page of the book. In this section I shall consider both the style and iconography of the illustrations in Vesalius’s Fabrica. In this thesis I suggest that artworks play a central role in determining the visual character of the Vesalian illustrations. I argue for this explicitly in chapter seven. Here, I introduce the illustrations by way of some introductory visual analysis, their place within the book, and through the introduction of some art historical precedents. 73

Illustrations of the Bones

The bones and the ligaments (the ‘supports’ and ‘braces’ of the body) constitute the subject matter of the first book of the Fabrica. This is unsurprising given the centrality Vesalius placed upon them. As Galen had before him, Vesalius employs a typically architectural metaphor, when describing their function: ‘What walls and beams provide in houses, poles in tents, and keels and ribs in ships, the substance of bones provides in the fabric of man’. 74 Galen had also suggested that they provide the fundamental structure or form of the human body. 75 The bones are represented by Vesalius in great detail, down to the representation of individual teeth.

Before arriving at the well-known skeleton figures, the reader of the Fabrica encounters sixty-three illustrations or clusters of illustrations mainly, but not exclusively, of the bones. Some are set in the centre of the page (each page measures c. 43cm x 30 cm), others in the margins, while some clusters occupy entire pages. One cluster of illustrations depicts five different shapes of the

73 All of my descriptions of the illustrations and the page numbers correspond to the 1543 edition of the Fabrica. See, Andreas Vesalius, De Humani Corporis Fabrica Libri Septem (1543) (Basel: Ex officina I. Oporini, 1543).
75 Architectural metaphors appear throughout Galen’s On the Usefulness of the Parts. This is perhaps not surprising given that his father was an architect. For a discussion of Galen’s architectural metaphors see the section entitled ‘The Teleological Basis of Vesalian Anatomy’ in chapter six.
human skull (see fig. 20).\textsuperscript{76} This is worth noting as an exception to the overall tendency towards representing one, idealised human type. Here we see five possible human types represented.\textsuperscript{77} It has been pointed out that while all of the skull shapes illustrated here ‘fall within the range that is today considered normal variability, Vesalius admits only the first (upper left) as ‘natural’ describing the other four as non naturalis’.\textsuperscript{78} We see the skull of Vesalius’s homo absolutus represented by only the first one. That it represents the most perfect and natural form amongst the variety found in nature is highlighted by its juxtaposition with the other four skulls. Bones are represented from various angles, and set together as they appear in the body, as well as set apart so as to see their individual form. For example, the lower jaw and teeth represented on page 43 are set beside each other and represented both from the anterior and posterior view (see fig. 21).\textsuperscript{79} The three illustrations of the skull representing its internal aspects on pages 48 and 49 (pages which appear opposite each other in the same spread) demonstrate the second tendency (see figs. 22 and 23). On page 47 a human skull appears resting upon the skull of a dog (see fig. 1). As Vesalius notes, this is intended to visually demonstrate the inaccuracy of Galen’s description of the bones.\textsuperscript{80} He writes that he has: ‘portrayed a dog’s skull beneath the human one so that Galen’s description of the bones of the upper jaw may be more easily understood by anyone’.\textsuperscript{81} Kusukawa offers this as a further example of the way that Vesalius’s illustrations can be understood as visual argumentation. She writes: ‘What was in fact shown here was how Galen’s description of the sutures better fitted the canine jaw than a human one’.\textsuperscript{82}

The Fabrica contains three standing, animated skeleton figures that represent the skeleton in toto (figs 3-5). These appear at the end of the first book, as its

\textsuperscript{76} Vesalius, De Humani Corporis Fabrica Libri Septem (1543), 18.
\textsuperscript{77} Siraisi, “Vesalius and Human Diversity in De Humani Corporis Fabrica,” 60-88.
\textsuperscript{78} Garrison, “Anatomical Variability.”
\textsuperscript{79} Here the text and illustrations are at odds. Where the text says ‘left’, the right is in fact being referred to. This suggests that Vesalius’s descriptions were written before the printing process, and the reversal of the images which occurs with it. Saunders and O’Malley, The Illustrations from the Works of Andreas Vesalius of Brussels, 60.
\textsuperscript{80} Saunders and O’Malley note that ‘the primary purpose of the illustration was to reveal that Galen had described the premaxillary bone and suture of the dog as though present in man and thus could not have been familiar with human anatomy’ in ibid., 58.
\textsuperscript{82} Kusukawa, Picturing the Book of Nature, 222.
culmination. The first anterior figure is set in a slight contrapposto stance; its left arm is held out, palm facing forward and slightly upward; the right arm rests on what could be interpreted as a grave digger’s shovel; and the head is tilted to the left and upward, as the empty eye sockets gaze towards the sky (fig. 3). In this illustration, unlike the other two skeleton figures, the perspectival vanishing point is set so as to offer a subtle di sotto in sù perspective. The viewer looks directly towards the feet of the skeleton and is made to look upward towards the rest of the figure, reinforcing the subject’s upward gaze and gesture, and perhaps suggesting the dignity of the subject of anatomy.

The second full representation of the skeleton presents its side-on view (fig. 4). It stands with legs crossed alongside a tomb. Atop of the tomb a skull, hyoid bone, and two bones from the middle of the ear, the malleus and the incus, are placed. The figure rests one hand upon the skull while using the left arm as a chin prop. The pose of the figure is clearly one of contemplation. Upon the side of the tomb the words Vivitur ingenio, caetera mortis erunt appear: ‘Genius lives on, the rest is mortal’. The notion of the triumph of fame over death was a prevalent one in the Renaissance. Francesco Petrarch’s (1304-1374) poem Trionfi, popular in the Renaissance, describes a series of six allegories including the triumph of fame over death. The theme of fame triumphing over death is relevant to Vesalius’s own fame achieved by the publication of the Fabrica, however, it seems to me entirely in keeping with the numerous visual quotations to artworks within the Fabrica, that Vesalius might include a literary reference to this poem.

The third skeleton figure presents the posterior view of the skeleton (fig. 5). It turns away from the viewer, weeping. The fingers of the figure are steeped together before the eyes, and the legs are set apart in an unorganised pose, suggesting a lack of bodily composition indicative of grief.

One possible artistic precedent for the subject matter of standing animated skeleton figures is the Dance of Death murals that were represented on the wall surrounding the Cemetery of the Innocents in Paris. It is known that

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83 In chapter seven I argue that this contemplative pose derives from examples of Hellenistic sculpture that were available to be viewed by Vesalius and his draftsman.
Vesalius himself visited this cemetery to examine bones. In the twelfth century walls were erected around three separate cemeteries to the right of the Seine, in an area known as Les Champeaux. By the fourteenth century this cemetery served almost all of Paris, and it was crowded with bones of the dead. Eventually passages were built around the insides of the walls of the cemetery and bones were piled into their attics. Underneath these passages stalls were set up. In 1423 a mural was painted upon the arcades facing towards the cemetery representing the Dance of Death. The Cemetery of the Innocents was destroyed in 1789, and the bones were moved from the cribs above the passageways and placed in catacombs. Vesalius would have seen this mural depicting a procession of human and skeleton figures.

Vesalius may have also been acquainted with an early printed book, printed by Guy Marchant (or Guyot Marchand), for the publisher Geoffroi de Marnef, in 1485. This book contains verses in French and woodcut illustrations (of figures symbolising professions being led by prancing skeletons) believed to be copies of the murals in the Cemetery of the Innocents. This book went through numerous editions and was extremely popular. Indeed, the year after it was published a version representing a Dance of Death of women was published (the original had contained only men). A 1490 Latin edition of the procession or ‘dance’ of death contains twenty-four wood-cuts of male figures accompanied by skeletons. Figures representing professions or positions in society are depicted and most often appear in pairs. Examples include the Pope and the Emperor; the Bishop and the Gentleman; the Physician and the Lover; the Lawyer and the Musician; the Halberdier and the Fool; and the Author Seated, with a dead King at his feet (for example, see fig. 24). The figures are accompanied by skeletons which tug at them, leading them away.

These illustrations were designed for a general audience. The central message, it seems, is the inevitability of death, no matter of one’s place or status within society. Slapstick permeates the illustrations. The physician, for example, is led

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84 Kusukawa, Picturing the Book of Nature, 219; 231.
86 Ibid.
by the crotch. Each image appears as if on a stage, framed with columns on each side. In some instances the skeletons stare out toward the viewer, as is the case in the illustration depicting the Fool. In the representation containing the Jailer the skeleton on the left holds a shovel and a scythe. Other Dance of Death illustrations and paintings were executed, including woodcuts by Hans Holbein the Younger. However, it is the woodcuts by Guy Marchant that are thought to be copies of those murals that Vesalius would have seen on the arcades facing the Cemetery of the Innocents.

The woodcut illustrations of Hans Holbein the Younger are, nonetheless, art historical precedents relevant both to Vesalius’s skeleton figures as well as the illustrated letters, five of which appear at the beginning of each of the seven chapters of the Fabrica, and seventeen smaller ones which appear at the beginning of the numerous chapter headings (for example, see fig. 25). Holbein’s Dance of Death illustrations were first published the same year as his Images of the Old Testament in 1538, under the title Les Simulachres et historiées faces de la Mort and later as Les Images de la Mort, or Icones Mortis. These woodcut engravings designed by Holbein and cut by Hans Lützelburger (in the years before Lützelburger’s death in 1526) employ the negative method of cutting that was most frequently practised at the time, cutting away the areas to appear white, and leaving the relief image that is to appear, reversed, in black ink. Further illustrations were made throughout the following twenty years, and the complete set appeared in 1562.

Holbein’s Dance of Death illustrations depict the origins of death, figures that symbolise either a job or position within society, or a specific age or time within a lifespan. For example, we find Adam and Eve being expelled from Eden, Merchant, Knight, Sailor, Earl, Old Man, Child, Robber and Fool represented. In each case the figure is depicted within a scene representative of its subject along with an animated skeleton figure representing death. In many cases death tugs at the figure or leads it away. Often death plays a musical instrument indicative of the dance or procession being represented. In

some of the illustrations death holds an hourglass. In the cut representing the astronomer, death presents the astronomer with a skull but he nonetheless looks above this to an orrery showing the movement of the planets around the earth (see fig. 26). This image can be contrasted with Vesalius’s contemplative skeleton figure (fig. 4). While Holbein’s astronomer looks to the orrery, ignoring death, Vesalius’s figure, a skeleton itself, directly contemplates it as it gazes at the skull.

Holbein’s *Dance of Death* also included a series of small woodcut *Initials with the Dance of Death*. These include one of each letter and measure 25mm square. Each illustrated initial includes the same subjects as the larger illustrations. The *Fabrica* includes large illustrated initials that appear at the beginning of chapters and smaller ones at the beginning of headings. These do not comprise the whole alphabet set, as some letters are not required for the headings. A separate set was made for the second edition, distinguishable as they are surrounded by only one, not two, lines. In both editions there is an additional L. This has been identified as a copy of a Holbein.\(^ {89}\)

The Vesalian initials depict, along with each letter, *putti* acting out medical scenes as well as some of the more gruesome aspects of anatomical practice (see, for example, fig. 25). Scenes include the lowering of a body from the gallows after hanging, body-snatching, the handling of a bone box, the decapitation of a head, the hanging and clubbing of a dog for dissection, using a stomach as a bagpipe, venesection, treatment of a head disease and vivisection of a pig – to name just a few. Unlike other physicians Vesalius himself clearly had no trouble with the more gruesome aspects of anatomy. As he reports, he often kept bodies in his own quarters for weeks in order to study them.\(^ {90}\) Indeed, he recounts with relish some of his own exploits into the more repugnant aspects of anatomical acquisition.\(^ {91}\) Harcourt has argued that Vesalius presents his torso figures as antique sculptural fragments so as to disguise the disgusting nature of the subject matter. For example, he writes: ‘the idealized, classical forms of the figures, the fact that they of not read as actual cadavers, sets up a foil within the structure of the illustrations that

\(^ {90}\) Harcourt, “Andreas Vesalius and the Anatomy of Antique Sculpture,” 35.
\(^ {91}\) For an account of this see Park, *Secrets of Women*, 215–218.
mitigates the deadening, objectifying force of the accompanying narrative’. It is interesting that Vesalius presents a number of the more abhorrent, but what he surely viewed as both central and necessary, aspects of anatomy in these illustrated initials – tucked away, and represented as practiced by putti, but nonetheless present throughout the entire text. These initials reinforce Vesalius’s message that physicians must get their hands dirty.

Other standing, animated skeleton figures and therefore possible illustrative precedents for the Vesalian skeleton figures come from the history of medicine itself. For example, illustrations of skeletons can be found in a number of late-thirteenth and fourteenth-century manuscripts from Munich, Basel and Dresden. In a French MS (19994, 1459) from the Bibliothèque Nationale at Paris we find the model for the well-known Richard Helain skeleton figure from Nuremberg, from 1493. Berengario da Carpi’s Commentaria ... super Anatomia Mundi from 1521 contains a posterior view of a standing skeleton figure, which holds two skulls in its raised hands. It stands upon the lid of its opened tomb, looking back towards a village. This fascinating illustration is figurative but apparently largely inaccurate. This same text also contains illustrations of the right hand and the left foot. Also in the sixteenth century Johannes Eichmann (or Dryander) depicted the human skull in his Anatomiae, hoc est corporis humani dissectionis in 1537. This illustration depicts a human skull resting upon an hour-glass and a vertebra. On the podium upon which this depiction rests the words ‘inevitabile fatum’ are inscribed. Exquisite details of an articulated skeleton appear in the Notebooks of Leonardo da Vinci (c. 1510). However, Leonardo does not represent the skeleton in toto and thus not standing and animated, nor did he publish his illustrations.

**Illustrations of the Muscles**

The figures representing the successive layers of muscles that appear in book two of the Fabrica are presented quite differently from the skeleton figures.

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93 Ludwig Choulant, History and Bibliography of Anatomic Illustration (New York: Schuman’s, 1945), 68–72.
94 Ibid., 71–72.
Rather than appearing consecutively at the end of the chapter they are set throughout it. Of the fourteen figures seven represent the anterior view, one the side view and six the posterior view. One important innovation is what Martin Kemp has called ‘the system of continuous revelation’ of the muscles. He writes:

The remarkable system of ‘continuous revelation’ employed by the muscle-men could likewise have only been manipulated in the necessary detail by Vesalius, since the muscle-men are ultimately organised on a minutely methodological basis of scientific description. The underlying method of book two is simple enough. Two factors have changed between plate one and the next: progressively deeper structures have been revealed by the removal of the overlying tissues; and the three dimensional relationships of the various parts have been clarified by the ingeniously controlled changes of pose.

As Kemp explains, the changes that occur between that which is depicted from one muscle-figure to the next, combined with the manipulation of poses, allows for progressively deeper structures to be revealed. While the poses derived from those found in artworks (as I shall argue in chapter seven), changes between them also serve a didactic end. The muscle-figures function together providing an experience analogous to that had by attending a public dissection.

The Vesalian muscle figures clearly mediate a space between scientific illustration and forms of art concerned with aesthetic or stylistic ends. Their didactic purpose is evident, for example, in the way that the order in which the muscles are displayed and discussed corresponds to the order in which they were examined in a public dissection, as is evident by comparison with Baldasar Heseler’s eyewitness report of Vesalius’s first public dissection at Bologna. Upon each representation of the muscles Greek and Roman letters are placed so as to form a correspondence between the text and the

97 Martin Kemp, “A Drawing for the Fabrica; and Some Thoughts Upon the Vesalius Muscle-men,” Medical History 14, no. 3 (July 1970): 281.
illustrations. The figures are set within a landscape, one which, when they are reversed, forms a continuous scene.99

I discuss art historical precedents for the poses of a number of these figures in chapter seven. Here, I shall introduce a parallel that has been suggested in the secondary literature. It is widely, but by no means unanimously, believed that Jan Steven van Kalkar played a role in the design of the Fabrica illustrations.100 Whether or not Kalkar played a role, it is believed that they were designed in the studio of Titian in Venice, before being taken across the Alps and printed in Basel. In a chapter entitled ‘Counterpoint: Medieval and Classical Formulae in Disguise’ Erwin Panofsky first noted the resemblance between Titian portrait Allocution of Alfonso d’Avalos, Marchese del Vasto (c.1540) and Vesalius’s second muscle figure that represents the side-view (see figs 7 and 27). Panofsky argues that the pose in Titian’s portrait of Del Vasto very closely resembles the pose of the famous bronze statue from the second century BC, the Arringatore. This statue depicts a man in a toga and sandals, raising an arm in an oratorical pose. Indeed, this pose is also evident in both Titian’s painting and Vesalius’s muscle figure. Panofsky notes that this is part of a larger tendency in Titian, towards the employment of classical formulae in his painting. He writes that ‘This ‘transplantation’ – as opposed to adaptation – of a classical composition resulted in a kind of ‘ classicism in disguise’ which is magnificently exemplified by the Allocution of Alfonso d’Avalos, Marchese del Vasto’.101 This ‘transplantation’ of classical compositions, I argue, occurs throughout the Fabrica illustrations. Panofsky’s identification of Titian’s use of classical composition and pose, and Vesalius’s subsequent use of it perfectly exemplifies the role that both ancient and Renaissance art plays in determining the visual character of the Vesalian illustrations.

The role of anatomy in art was of central importance in Renaissance painting and sculpture. As Kemp notes: ‘The major obligation placed on a Renaissance artist was to exhibit a mastery of the human figure, providing fit subjects for

99 This was first discovered by G. A. Lindeboom in G. A. Lindeboom, Andreas Vesalius 1514-1564 (Haarlem: De Erven F. Bohn nv., 1964). It is also discussed in George Stanley Terence Cavanagh, The Panorama of Vesalius: a “Lost” Design from Titian’s Studio (Athens, Ga: Sacrum Press, 1996).
100 For a discussion of this see the section in this chapter below entitled ‘Jan Steven van Kalkar and the Design of the Fabrica’.
devotion and, in the case of narratives, knowing how to use gestures and expressions with due eloquence’. Among that which was deemed appropriate (as decorum dictated) for representation in painting included historical scenes featuring people exhibiting a variety of poses and gestures. Representation of the human figure was central to Renaissance art, and the best way to accurately represent the surface of the body, and its various movements, gestures and poses was through a thorough understanding of the anatomy of the muscles. Leonardo da Vinci, and other artists of the quattrocento and cinquecento dissected bodies themselves in an effort to better understand the human figure. Vesalius’s muscle figures were intended to aid artists in their endeavors as well as medical students. He specifically notes that he intends the illustrations that represent the outer layers of muscles to be of use to artists. It may also be the case that artistic representation of muscles influenced the style of Vesalius’s own muscle figures. In chapter seven I argue for a link between Michelangelo’s representation of muscles and movement in his figures in the Sistine Chapel and some of Vesalius’s illustrations.

The Portrait and Title Page

The portrait of the author that appears at the front of the Fabrica shows Vesalius standing alongside a larger than life, upright cadaver (see fig. 28). It has been suggested that Vesalius’s small size compared to the large cadaver indicates his ‘special interest in anatomical variability’. Daniel Garrison writes:

Though it had long been customary to normalize and even improve on any human subject in making a portrait, this Vesalius is far from normal. Placed next to a table that comes up to his waist, his arms are in unmistakable contrast to that of the cadaver he is dissecting, and his general proportions are unusual, as several observers of the portrait have remarked.

However, it seems to me that it is not so much that Vesalius is small, but that the cadaver is large (judging their sizes against other objects in the picture). The cadaver in this portrait, as in many of his other illustrations, is upright. It is

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103 Saunders and O’Malley, The Illustrations from the Works of Andreas Vesalius of Brussels, 92.
104 Garrison, “Anatomical Variability.”
not representative of an actual cadaver but of the *homo absolutus*, the ideal or perfect human form. The portrait is divided into two. On one side there is Vesalius. The curtain that hangs behind him serves to flatten the pictorial space around him, bringing him to the very foreground of the image. The right realm of the image is divided off from the left by the Ionic column (which is perhaps also a reference to the classical dignity of his enterprise). The idealised cadaver appears literally suspended off the ground, within, but also above, the natural world. By employing the internal and spatial evidence of the picture, perhaps we can interpret the right domain on the image as the divine realm of Platonic forms, and the left as the earthly domain, literally jutted forward by the flattening pictorial device of the curtain.\(^{105}\)

We could also interpret the largeness of the cadaver against the smallness of Vesalius as an expression of the Renaissance interest in *varietà*. The juxtaposition of opposites was a central stylistic principle in Renaissance art theory (derived from the embellishment of antithesis in the ancient rhetorical tradition). As I discuss in chapters seven and eight this is expressed in painting and sculpture in rules of pictorial composition such as *contrapposto* and *chiaroscuro*. But, specific advice was also given to juxtapose ‘an infant ... next to an old man ... or next to a man a woman; next to a giant a dwarf, or next to a beautiful girl an ugly old woman ...’\(^{106}\) The juxtaposition of the large with the small adds to the *varietà* of the portrait – something which, I argue, is expressed in both the poses of the Vesalian figures and the making of the internal and invisible external and visible through the use of art.

Vesalius is demonstrating the flexor tendons and muscles in the hand and arm, which Martin Kemp interprets as a reference to the importance of the hand in medical history.\(^{107}\) As Kusukawa points out, the portrait also shows Vesalius using his hands. She writes: ‘The very fact that Vesalius is holding the arm of the muscles with his own hands reinforces the point in his preface that

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105 Michael Baxandall advocates the use of what he calls ‘internal evidence’ in interpreting pictures. See in particular his discussion of Piero della Francesca’s *Baptism of Christ*. Baxandall, *Patterns of Intention*, 131–135.


beginners in anatomy should ‘use their hands ... as the Greeks did and as the essence of the art demands’. On the table there is an ink pot and sheet of parchment. What is written on the parchment contains the first line from the chapter in the Fabrica that addresses the muscles of the hands (book 2, chapter 43). This portrait demonstrates the relationship between the hands-on dissection and observation endorsed by Vesalius of cadavers (that is, of real particulars found in nature), the text of the Fabrica, and the idealised images.

Moving from the portrait of the Fabrica to the title page, Andrew Cunningham has called it a visual manifesto of the Vesalian project (see fig. 29). This title page was used in both the Fabrica and the Epitome. It depicts a public dissection taking place outside a Palladian-style building. Vesalius is located at the centre of the picture dissecting the cadaver of a female criminal who lies on the dissecting table. With his right hand he gestures at the exposed viscera and with his left he points upward possibly gesturing towards the Platonic realm of ideas and towards the Christian heaven. Vesalius and the subject of the dissection are surrounded by a tumultuous crowd. Many of the figures watch intently while some peer down at what are presumably classical texts. The seething crowd occupies two thirds of the pictorial space. The upper space is occupied by the Renaissance building with Corinthian columns leading up to an upper viewing level. The woodcut itself is beautifully cut. The cross hatching used in depicting the chiaroscuro is faultlessly precise. A skeleton is represented at the top-centre of the crowd. The central role of the skeleton in anatomy, for Vesalius, is reflected in its occupying the central place in the picture. For the 1555 edition of the Fabrica a new title page was made. Unfortunately the overall effect is less successful. Minor changes occur for example a goat is added to the foreground and the nude figure clinging to the column on the left in the 1543 edition becomes clothed in this one. I discuss

108 Kusukawa, Picturing the Book of Nature, 204.
111 Sanders and O’Malley note that dissection took place until 1583-1584 and that a permanent anatomical theatre was not built until 1594 in Saunders and O’Malley, The Illustrations from the Works of Andreas Vesalius of Brussels, 42.
Jan Steven van Kalkar and the Design of the Fabrica Illustrations

There is no doubt as to who is responsible for the design of the anatomical illustrations that appear in Vesalius’s *Tabulae anatomeae* sex. Not only does the Netherlandish-born Italian painter Jan Steven van Kalkar’s name appear as the publisher of the work, but it also appears in Vesalius’s dedication of the work to Doctor Narcissus Parthenopeus. Vesalius speaks of the ‘three representations of my skeleton, which I had set up to the gratification of the students, rendered from the three standard aspects by the distinguished contemporary artist, John Stephen [van Kalkar].’ The other three plates that appear in the *Tabulae* are known to be designed by Vesalius himself.

By contrast there remains no agreement as to who designed the illustrations that appear in Vesalius’s *Fabrica*. Recent authorities on Vesalius including Martin Kemp and Francisco Guerra hold Kalkar responsible for the design of the *Fabrica* illustrations. Kemp says of the Vesalian muscle figures: ‘The Titianesque male heroes of this drama were drawn by Jan Steven van Kalkar, who spent a period in the great Venetian painter’s workshop demonstrating that the reference to Titian himself as author of the illustrations is mistaken.’ Elsewhere Kemp refers to ‘the openly pictorial representations supplied by Jan Steven van Kalkar’. In ‘The Identity of the Artists Involved in Vesalius’s *Fabrica*’ Francisco Guerra suggests that Jan Steven van Kalkar can be identified as the designer of the illustrations and Francesco Marcolino de Forli can be understood as the cutter. Kusukawa suggests that a number of artists, of whom Kalkar was likely one, were involved in the production of the images. She suggests that similarities between Kalkar’s *Portrait of Melchior von

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Brauweiler (1490), now housed in the Louvre in Paris and the portrait of Vesalius in the Fabrica offer reason for attributing the Fabrica portrait to him.\textsuperscript{117}

A number of mid-twentieth-century arguments have been made against the Kalkar attribution (or suggest that his role was minor), for example, those made by Charles Singer, C. Rabin,\textsuperscript{118} J. B. de C. M. Saunders and Charles D. O’Malley.\textsuperscript{119} Saunders and O’Malley argue that the best (but, nonetheless dubious) evidence for the claim that the illustrations are by van Kalkar is found in the Renaissance art historian Giorgio Vasari’s work. Vasari, who was a friend of van Kalkar, made two references to the subject. He wrote: ‘the eleven large plates of anatomical studies which Andreas Vesalius engraved after the designs of Jan van Kalkar’ and ‘Jan van Kalkar ... by his hand ... were the designs for anatomical studies which the most admirable Andreas Vesalius caused to be engraved on copper and published with his work’.\textsuperscript{120} Saunders and O’Malley, however, dismiss this evidence as unreliable on the grounds that these claims were only found in the 1568 edition of Vasari’s Lives, published twenty years after Kalkar’s death, and not in the 1550 edition. Vasari’s mistaken identification of the woodcuts being engraved on copper not cut on wood, they suggest, offers further reason for doubting the accuracy of his claims. They maintain that stylistic differences between the skeletons in the Tabulae and those in the Fabrica are too great to plausibly maintain that they are by the same hand. They believe that the works in the Fabrica were designed in the studio of Titian, and suggest that Titian would have been ultimately responsible for the artistic innovations and his students (possibly including Kalkar) would have carried out their delineation. They also suggest that, as he did in the Tabulae, Vesalius designed some of the illustrations for the Fabrica himself. G.S. Terence Cavanagh has argued for a similar position.\textsuperscript{121} This does not exclude the possibility of Kalkar’s involvement as he was in the studio of Titian. However, it does suggests that if he played a role it was minor.

\textsuperscript{117} Ibid., 206.
\textsuperscript{118} Saunders and O’Malley, The Illustrations from the Works of Andreas Vesalius of Brussels, 25–29.
\textsuperscript{119} Singer and Rabin, A Prelude to Modern Science, iii–xii.
\textsuperscript{120} Saunders and O’Malley, The Illustrations from the Works of Andreas Vesalius of Brussels, 27.
\textsuperscript{121} He writes: ‘In that time and place there was one clear choice: Titian should be his contractor. Such a supposition, and it is undocumented, does not exclude the participation of Kalkar for he too was in Titian’s studio’ in Cavanagh, The Panorama of Vesalius, 8.
The stylistic difference between the skeletons in the *Tabulae* and those in the *Fabrica* are not so marked that they could not be accounted for by further exposure to anatomy and further artistic practice in delineating the subject. Unfortunately little remains of Kalkar’s *oeuvre*. Saunders and O’Malley cite this as a reason for thinking that it must not have been worth preserving, implying that he cannot have been the draughtsman of the *Fabrica* illustrations. Conversely, that he spent his time on the *Fabrica* illustrations may explain the general absence of other works. It seems likely that Kalkar, amongst others, played a role in the design of the Vesalian woodcuts. However, due to the ambiguity, throughout this thesis I refer only to the ‘draftsman’.

**Anatomical Illustration before Vesalius**

Vesalius’s illustrations constitute a significant innovation in the history of medical illustration. In many respects Vesalius’s illustrations were unlike anything that had come before. However, they share with earlier illustrations a diagrammatic, generalising function imparted to medieval medical illustrations by their abstracted form and to the Vesalius’s illustrations by their idealisation. The abstracted style of medieval medical illustrations, like the idealised style of the Vesalian illustrations, both allow them to represent the idealised style. Medieval medical illustrations were highly conceptual and often functioned symbolically. Like geometry, they represent an abstraction from particular, physical objects in nature. They tended to represent a concept, a body of concepts, or a text, rather than the visual appearance of something in the world. In some instances a relation of visual resemblance obtains between an illustration and objects in the world, but, being based on concepts rather than observation they are always visually abstracted from the appearance of the world and sometimes completely abstract.

Many medieval medical illustrations which involve the representation of the human body function as diagrams. The body is represented in just enough detail to recognise its parts and the information that is intended to correspond with those parts. The Vesalian illustrations are stylistically very different in terms of their naturalism and idealisation. However, their idealisation serves a similar generalising function just as the abstracted nature of earlier medieval medical illustrations did. Both stylistic features, despite their differences, allow
the representation to function as diagrams that generalise about particulars. The diagrammatic form of medieval medical illustrations allows them to present generalised information that can be applied to any given individual, and the human form that is delineated is consequently a ‘type’ that stands in for, as it were, the human type. Similarly, while the Vesalian illustrations are stylistically different in form, they too retain the generalising nature of the diagram. The stylistic idealisation (derived ultimately from classical and Renaissance art, art theory and aesthetics) imparts them with a similar generalising tendency. It is their idealised visual form that allows them to represent the human ‘type’. The stylistic idealisation of the Vesalian illustrations, like the stylistic abstraction of the medieval medical illustrations, imparts the illustrations with the necessary visual cues that allow the illustrations to function diagrammatically, to stand in as representations of the human ‘type’. Idealisation in art is itself a form of abstraction from physical objects.

Common medieval medical representations of the body included what are known as ‘five-picture series’. These consisted of a series of illustrations, often more than five, representing different parts of human anatomy. Other common medieval medical representations of the body included what are referred to as the ‘zodiac man’, the ‘wound man’ and the ‘disease man’. The form of diagram known as the zodiac man is based on the ancient belief that the human body is a microcosm of the larger macrocosm. One such zodiac man is found in a late fourteenth-century girdle book (a book that was intended to be tied to the belt of a physician, and contained diagrams that functioned as memory aids). The zodiac man represented below and the lunar tables above, allowed the physician to determine the position of the moon in the heavens and therefore whether or not a procedure should be carried out. This illustration was informative and instructive, functioning as a guide to medical choices. The human body itself is figurative yet clearly not based on direct observation of one particular individual. It represents the type or concept ‘human form’, and indicates how the information contained within

122 Singer, A Short History of Anatomy from the Greeks to Harvey, 65.
123 Wellcome Institute, London. A reproduction and description of this girdle book can be found in John Emery Murdoch, Antiquity and the Middle Ages (New York: Scribner, 1984), 318.
it could be applied to any given individual. In this example the signs of the zodiac are superimposed on the human body, on the body parts to which they were thought to relate.

An example of a fourteenth-century wound man is housed in Universitui Kuihova’s collection in Prague. This illustration depicts the human form with wound marks at various locations around the body. These points were supposed to be either curable or incurable as is indicated by the words written around the figure and matched up to the points on the body by lines. The human figure in this case is simply delineated, with just an outline and no shading. Again, while it is figurative it is also abstracted (and, therefore, generalising) and not based on the observation of a particular human body.

A famous example of a disease man appears in a late-fourteenth-century manuscript which was collected by Johannes de Ketham and compiled into his Fasciculus medicinae. Like others of its kind this disease man functions as a catalogue of disease. Here the diseases are represented on top of the human figure located on the part of the body to which they correspond. This figure is also abstracted in form and not based on actual direct observation, by the artist, of an actual subject in the world. The human figure also appears in other forms of medieval medical illustration, for example, in illustrations representing the best places to cauterize the body, and also to let blood, while some show figures engaged in the act of blood-letting.

Medieval medical illustrations were usually copied from one manuscript to the next. Tomlinson and Roberts have located the origins of such chains of copying in the great medical school that existed in Alexandria around 300BC. This school is most famous for the human dissection that probably occurred there. The delineation of the figures that appear in these diagrams is clearly not based upon direct observation, but concepts, or how we think through the appearance of a body. It is not that the human body could not be represented in a naturalistic manner at this time. There are numerous examples from the history of painting that demonstrate that it could. It is rather that naturalistic

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124 Late-fourteenth-century. Wound Man. Universitui Kuihova, Prague. MS Raudnitz. Fc. 29. Fol. 98v. This image is reproduced and discussed in Ibid., 320.
125 MS BN lat 11229, fols, 37v, 31r. This image is reproduced and discussed in Ibid., 304.
representation had not been needed nor employed in medical illustration. As is often the case, function determines form. Medieval medical illustrations served didactic functions and were used as memory aids. Images such as Johannes de Ketham’s were perfectly fitted to this function. As the practice of medicine changed, so did its illustrations. In Johannes de Ketham’s famous fifteenth-century woodcut depicting a dissection he represents the anatomist reading from Galen while the barber surgeon cuts the body. Vesalius dissected human bodies himself as his title page makes immediately clear (fig. 29). He realised that a naturalistic representation of the body would be useful for learning about it. As art came to play a more fundamental role in the formation of knowledge about the natural world a higher degree of naturalism was required in medical illustration. While the generalising, diagrammatic function of medical illustration remains in Vesalius’s work (through the idealisation), the illustrations become more naturalistic.

Charles Estienne’s De dissectione partium corporis humani was an illustrated anatomy book that was being written around the same time as Vesalius’s Tabulae although was not published until 1545. There are examples of standing, animated cadavers, set in landscapes that appear in printed books and pre-date Vesalius. These include the skeleton and muscle figures in Giacopo Berengario da Carpi’s Isagoge breves, 1522, and the skeletons from the Latin translation of Galen’s De ossibus published in 1535. Berengario da Carpi’s Commentaria on Mundinus, 1521, is the first illustrated anatomical textbook. It includes figures that represent the abdominal muscles, veins in the extremities of the body, and the uterus and surface markings. His Isagoge breves published the following year combines the figures from his earlier publication with additional illustrations of the heart and the female reproductive organs. The two standing figures that pull back their skin revealing their abdominal muscles are particularly noteworthy. Like the Vesalian images, they are standing, animated cadavers, and significantly, they remove their own skin. Berengario made many significant advances in his

127 I refer to the woodcut representing a dissection scene from Johannes de Ketham’s Fasciculo de medicina, Venice, 1493. This image is discussed and reproduced in Ibid., 37.
anatomical work, some of which were adopted by Vesalius while others were not.\textsuperscript{128}

The Function of Vesalius’s Illustrations

The illustrations in Vesalius’s \textit{Fabrica} clearly have a didactic function. They are primarily scientific diagram. Their visual form is determined by the author’s intention that they convey accurate knowledge about the human body. It is also determined by aesthetic considerations. Visually the body is presented as an ideal anatomical form or \textit{homo absolutus} that is analogous to the statue of Polycleitus. These goals are not at odds with each other, as this visual idealisation, and the presentation of the human form as a mean or typical form (amounting to a beautiful form by ancient and Renaissance accounts) imparts the illustrations with their generalising and therefore diagrammatic quality.

The Vesalian illustrations play an important role in conveying the scientific knowledge contained within the \textit{Fabrica} and knowledge about nature. They are intended to aid in the study of nature but not to replace direct observation. Vesalius intended his illustration to be not only of use to medical students but also to those non-medical intellectuals. In the preface to the \textit{Fabrica} Vesalius writes:

\begin{quote}
But in addition our pictures of the parts of the body will give particular pleasure to those people who do not always have the opportunity of dissecting a human body or who, if they do have the opportunity, are by nature so squeamish (a very inappropriate quality in a physician) that, although they are fascinated and delighted by the study of man (which attests, if anything does, to the wisdom of the infinite Creator of the world), yet they cannot bring themselves to the point of ever actually attending a human dissection.\textsuperscript{129}
\end{quote}

\begin{footnotes}
\textsuperscript{128} Charles Singer and C. Rabin note that Berengario’s \textit{Isagoge breves} ‘initiates one excellent and fatigue-saving practice, unfortunately abandoned by Vesalius and his followers. Berengar inscribes the name of the organ on its figure and is not content with mere lettering. For introducing this simple and effective device the weary student should continuously bless his name. Berengar is the first to describe the figure and axis adequately, the first to produce intelligible figures of the structure of the heart, the first in modern times to distinguish the chyliferous vessels as distinct from the veins, the first to describe the lachrymal duct, the first to show experimentally that no branches of the renal veins open into the excretory ducts, the first to describe the vermiform appendix, the first to see the arytenoids as separate cartilages, the first to recognise the larger proportional size of bony thorax in the male and of pelvis in the female, the first to give a clear account of the thymus gland’ in Singer and Rabin, \textit{A Prelude to Modern Science}, xxxiii.
\end{footnotes}
Vesalius himself describes the intended function of his illustrations in both the *Tabulae* and the *Fabrica*. In the *Tabulae* he explains how he originally came to depict the six tables or fugitive sheets, how they came to be published, the function he intended for them, and what they are not intended to replace. He writes:

I had come to explain the views of the divine Hippocrates and of Galen on Revulsion and Derivation and had made incidentally a drawing of the veins, thus displaying what Hippocrates had meant by *kat’ ixin* [referring to the venesection controversy]. I showed that this was easy enough ... And this figure of the veins so pleased the professors and students of medicine that they pressed me for a similar delineation of the arteries and nerves. Since the conduct of dissections were part of my duty, and knowing this kind of drawing to be very useful to those attending the demonstrations, I had to accede to this request. Nevertheless I am convinced that it is very hard – nay, futile and impossible – to obtain real anatomical or therapeutic knowledge from mere figures or formulae, though no one will deny them to be capital aids to memory.\(^{130}\)

In the *Tabulae* Vesalius is clear that the illustrations are intended to function as teaching aids for use while attending dissections and as memory aids for learning. Furthermore, he is also very adamant that they are not intended to function as replacements for the experience of actual hands-on dissection.

The intended function of the illustrations in the *Fabrica* is explained in detail in the preface to that work. Vesalius writes:

I am not unmindful of the opinion of certain people, who strongly deny that even the most exquisite delineations of plants and of parts of the human body should be set before students of the natural world; they take the view that these things should be learnt, not from pictures but from careful dissection and examination of the actual objects. In adding to the context of my discourse such detailed diagrams of the parts (and God grant that the printers will not ruin them!) it was never my intention that students should rely on these without ever dissecting cadavers; rather, I would, as Galen did, urge students of medicine by every means at my command to undertake dissections with their own hands. If the custom of the ancients, who trained their lads at home in carrying out dissections as much as in writing the alphabet and in reading, had been brought down to the present time, I would be very happy that we like the

ancients, should dispense not only with pictures but with commentaries as well; for the ancients only began to write about anatomical procedures when they decided that it was permissible to communicate the art, not only to one’s children but also to grown men from other families who were taken on because of their good qualities ... In fact, illustrations greatly assist the understanding, for they place more clearly before the eyes what the text, no matter how explicitly, describes. This fact is well known in respect of geometry and other branches of mathematics.\textsuperscript{131}

Again, Vesalius expresses his belief that the illustrations in his text should not replace actual experience of dissections. Here, however, he is more explicit about their positive function, identifying the way that illustrations can demonstrate, at once, much more than text can.

The outdoor space where Vesalius performed his first public anatomy at Padua was designed so that two hundred people could watch. The dissection took place over several days. Baldasar Heseler observed this dissection and his notes provide the only existing first-hand account of any Vesalian dissection.\textsuperscript{132} The demonstration he reports went on for days and every so often a new body would replace to last due to putrefaction. A public dissection was a slow process, and illustrations would be a useful aid, allowing students to relate the parts seen in a particular demonstration to that which had gone before and that which was to come. It is unlikely that students would have taken copies of the Fabrica along to dissections but may have taken copies of the Epitome due to its more slender size. The Epitome sold many copies especially in comparison with the Fabrica. It cost less than the Fabrica and also offered a greater simplification of the text and the images, with each image containing much anatomical information. As we have seen, Vesalius himself refers to it as a visual index. Vesalius understood that a primary merit of his illustrations lay in their ability to communicate a great variety of detail about the human body at once. The illustrations in Vesalius’s Epitome are perhaps even more successful in this ambition than those in the Fabrica. In his eyewitness account Heseler mentions Vesalius’s use of illustrations in his demonstrations. He writes: ‘With many illustrations he [Vesalius] showed us the form and shape of the muscles, sketching with a bit of charcoal on the anatomy table, especially

\textsuperscript{131} Vesalius, \textit{On the Fabric of the Human Body}, 1998, 1:i\textsuperscript{vi}.

\textsuperscript{132} See, Heseler, \textit{Andreas Vesalius’ First Public Anatomy at Bologna}, 1540.
that of the muscle of the scapulae or the shoulder blade, how it is big and broad, triangular in shape, with its fibers, performing namely an opposite action, according to Galen’s description’.\textsuperscript{133} This reinforces the role that illustrations played for Vesalius, not just in learning, but also in teaching too.

**Humanism and the Revival of Classical Texts**

The revival of ancient learning is one of the defining features of the Renaissance. Just as ancient artworks were being unearthed, ancient texts were rediscovered and translated from the original Greek into Latin, and, less often, into the vernacular.\textsuperscript{134} In this section I shall introduce medical humanism and the revival of classical texts that occurred both in Vesalius’s time and in his immediate circles.

The revival of the classical past began not in the sixteenth century, but with the educational reforms that occurred in the eleventh and twelfth centuries. Throughout the course of the twelfth century the number of new translations of Greek and Arabic texts steadily increased. The intellectual life of the thirteenth century has been characterised by an attempt to assimilate this new body of knowledge. As David Lindberg suggests: ‘The task [of thirteenth-century scholarship] was to come to terms with the contents of the newly translated texts – to master the new knowledge, organize it, assess its significance, discover its ramifications, work out its internal contradictions, and apply it (wherever possible) to existing intellectual concerns’.\textsuperscript{135} By the fifteenth century, much ancient knowledge had been assimilated into the western tradition, and further discoveries were being made at a steady pace. In an essay entitled ‘Medical Humanism – A Historical Necessity in the Era of the Renaissance’ Walter Pagel has construed the activities of the fifteenth-century medical humanists as essentially constituting the preparatory ground

\textsuperscript{133} Ibid., 137.

\textsuperscript{134} As Vivian Nutton has notes in his essay on Greek science in the sixteenth century: ‘It should be stated at the outset that, in medicine and science, the classical sources that mattered were Greek, not Latin ... although the influence of the new Galen and Hippocrates was diffused mainly through the medium of Latin translations, these translations only became possible through the prior existence of Greek texts, whether in manuscript or in printed form’ in Vivian Nutton, “Greek Science in the Sixteenth-century Renaissance,” in *Renaissance and Revolution: Humanists, Scholars, Craftsmen and Natural Philosophers in Early Modern Europe*, ed. Judith Veronica Field and Frank A. J. L. James (Cambridge: Cambridge University Press, 1993), 16.

for later, more important, discoveries. Since the publication of this essay, the works of fifteenth-century medical humanism have been demonstrated, by Vivian Nutton amongst others, to be significant in their own right.

Several texts were important in transforming early modern medicine. For example, in 1426 Celsus’s (second century AD) treatise De medicina was discovered, and both its content and Latin prose style exerted a profound influence over the medical humanists. Knowledge of ancient Greek had been poor amongst western scholars, and it was only when Manuel Chrysolorus (d. 1415) arrived in Italy with the Byzantine Emperor Manuel Paleologus in 1396 that the Greek revival of the fifteenth century began. In 1490 Nicolò Leoniceno, the medical humanist teaching at the University of Ferrara, wrote On the Errors of Pliny and other Doctors in Medicine. This text played a crucial role in establishing the importance of the ancient Greek tradition in medicine thus replacing the Arabic tradition. As Vivian Nutton has noted, this text ‘provoked a Europe-wide controversy which ... dethroned Avicenna as prince of physicians and replaced him and Pliny with Dioscorides, Galen and Hippocrates’.

Two of the most eminent translators of Galen included Johannes Guinther of Andernach (1505-1574) and the Englishman Thomas Linacre (c. 1460-1524). The majority of the Latin versions of Galen that were available in the West during the middle ages had been translated from the Arabic versions of Galen by Hunain and Hubaish, amongst others. There are only a handful of medieval Latin translations of Galen that were translated from the original Greek. The most influential of such translators was the fourteenth-century scholar Niccolò da Reggio. During the fifteenth century the medical humanists not only began translating the already known texts of Galen from Greek to Latin, but they also discovered some hitherto unknown texts including On the

140 These included William of Moerbeke and Peter of Abano in the thirteenth century. See, Ibid., 233.
Doctrines of Hippocrates and Plato and On Anatomical Procedures. On the Doctrines of Hippocrates and Plato is essentially an attempt, by Galen, to demonstrate the consistencies between the writings of the Hippocratic Corpus and those of Plato, and their continuity with his own thinking. Nutton has shown that Vesalius undoubtedly read this text.  

Guinther, one of Vesalius teachers at Paris, began translating the works of Galen as early as 1527. It has been noted that unlike previous translators of Galen, Guinther did not simply translate word for word, but used his discretion and, in his own words, ‘tried always to be faithful to the author’s meaning, now looking to the letter, now to the spirit, so as not to do violence to the Latin’. The other most prominent translator of Galen, Thomas Linacre, was an Englishman who worked in Italy, France and England. He translated six of Galen’s works from Greek to Latin, including On the Usefulness of the Parts. Linacre’s translations are not however confined solely to Galen, for example he translated the astronomical treatise of Proclus’s, De sphaera, in 1499. Translations of Galen from the Greek were at their height from 1525 to 1560, coinciding directly with Vesalius’s career. Nutton notes that:

The floodgate of this Hellenizing movement in medicine spans a single generation, from 1525, when the first collected edition of Galen in Greek appeared from the Aldine Press in Venice, until 1557, the year of publication by Martinus Juvenis at Paris of a medical text by the Byzantine author Johannes Actuarius. After this date, Greek editions of the classical medical authors become very rare, with the exception of Hippocrates, whose collected works were issued in sumptuous bilingual editions by the Juntine press in 1588 and again by the Wechel press in 1595.  

While some translations into vernacular languages appeared from the 1530s, these remained relatively rare. The sixteenth-century revival of classical medicine coincided exactly with Vesalius’s career. Indeed, not only were his

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144 William Osler, Thomas Linacre (Cambridge, 1908), 12.
teachers at Paris some of those medical humanists responsible for translating Galen from the Greek to Latin, but Vesalius himself was too. As I mentioned in chapter one he was involved in editing a 1541 Latin edition of Galen’s work.

Renaissance humanism also saw the re-discovery of the corpus of Platonic texts. The ideas of Platonism, Stoicism and Skepticism were famously introduced to the Renaissance through the writings of the Roman author Cicero. The Neo-Platonist Marsilio Ficino (1433-1499) was the first author to translate the whole of Plato’s corpus into Latin. It was Ficino’s Plato that Vesalius would have read and for this reason his translations that I employ in chapter five. Indeed, Nancy Siraisi has suggested that:

Vesalius probably also knew at first hand the anatomical and physiological sections of the *Timaeus*: indeed, given his evident familiarity with most ancient works with any bearing on anatomy, it would have been surprising if he had omitted it. A direct quotation of a passage about the uterus in Book 5 of the *Fabrica* strongly suggests that he read the work in Marsilio Ficino’s Latin translation. Other passages, which refer to the teaching of Plato on flesh, on the diaphragm, on the heart and blood, and on the rational soul, allude to views expressed in the *Timaeus* but may come either from a direct reading or via Galen. To the last of these ideas, Vesalius gave a decidedly Christian twist, claiming that Plato had said we have the rational soul “in common with angels”. Perhaps Vesalius also looked at Ficino’s commentary on the *Timaeus*, which has been characterised as “the definitive Renaissance interpretation”.147

In my attempt to construe the idealisation of Vesalius’s illustrations as influenced by a Platonic and Galenic view of nature and form I focus on Ficino’s Plato.

**Conclusion**

In the Renaissance art and aesthetics were considered to deal in the same terms as knowledge, and both employed the rules of logic and mathematics at their very core. Judgements about beauty were mathematical judgements concerning means and averages of particulars found in nature. Visual representation on a plane surface, it was discovered, operated according to the principles of Euclidian geometry, as the natural world did, meaning nature

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could be accurately represented visually. The gap between art and nature narrowed as natural philosophers and artists discovered that both were imbued with the same rules, patterns and formulae.

Within this context Vesalius work emerged. In this chapter I introduced his publications and the illustrations contained therein. While I discuss these in detail throughout the thesis, here my intention was to introduce the main groups of illustrations and some art historical precedents, both iconographic and stylistic.

I also considered the continuity between medieval medical illustrations and those of Vesalius. The abstraction in the former and the idealisation in the latter both allow them to function diagrammatically, imparting them with a generalising quality. Vesalius’ illustrations are intended to function as diagrams, and I have argued that the aesthetic idealisation is not at odds with this function, but, in fact, conditions its possibility. The particular aesthetic associated with the Vesalian illustrations (that expressed in Polycleitus’s Canon and that characteristic of Renaissance art) offers an idealisation that expresses a mean or average human form. This stylistic idealisation gives the Vesalian illustrations the diagrammatic quality, to stand in as a representation of a typical human form. This visual idealisation of the Vesalian illustrations is mirrored in the theoretical understanding of art, nature, teleology and form that can be found in the textual element of the Fabrica. This, I argue in the chapters five and six, is derived from a Platonic and Galenic framework.
Chapter Three: Art and Nature

Introduction

In 1515 the German artist Albrecht Dürer designed, and transferred to a woodcut, a visual and verbal description of a Rhinoceros.\textsuperscript{148} Prints of it were widely circulated throughout Europe and it appeared in numerous works of scientific illustration.\textsuperscript{149} Dürer himself applied the term abkunterfet to his representation of it which suggests that it is ‘copied from life’.\textsuperscript{150} However, it is likely that he copied the image from another image and from a report that had been sent to Nuremberg from Lisbon.\textsuperscript{151} Dürer’s famous Rhinoceros, clad in armour reminiscent of a medieval knight, points to a number of complexities that surround the relationship between art and nature in the early modern period. That this illustration, supposed by contemporaries to be realistic and copied from life, was in fact in part based upon another work of art is particularly relevant. In antiquity art and nature were generally taken to be fundamentally opposed.\textsuperscript{152} In the sixteenth century this opposition was being transgressed as images came to play an important role in formulating and conveying early scientific knowledge. These images, intended to express knowledge about the natural world, were often thought to be based on accurate observation of natural particulars. In fact, it appears that they were often based on art.

The relationship between art and nature plays two separate, but interrelated roles in this thesis. It offers the conceptual setting for both my claims about the role of art in determining the idealised style of the Vesalian illustrations, as well as for the role that natural philosophical and medical concepts play in

\textsuperscript{148} For a recent discussion of Dürer’s rhinoceros see: Susan Dackerman, \textit{Prints and the Pursuit of Knowledge in Early Modern Europe} (New Haven: Yale University Press, 2011).
\textsuperscript{150} Peter Parshall, “Imago Contrafacta: Images and Facts in the Northern Renaissance,” \textit{Art History} 16, no. 4 (December 1993): 554–579.
informing their idealised style. The concepts art and nature, and the debate concerning their relationship, were central to ancient, medieval and Renaissance thought. Many different theories circulated in antiquity, and found expression in numerous fields, including medicine, poetry, natural philosophy, and the practical manuals of artisans. I do not intend to offer a complete survey of these theories here. Rather, I introduce the foundations of the history of the debate as it is found in natural philosophy and medicine. I focus especially on those aspects of the debate crucial to an understanding of the undermining of the distinction that occurred in the sixteenth century, and to my claims concerning the role that art played in determining the idealised style of the Vesalian illustrations. I argue that while art and nature were generally thought to be opposed in antiquity, the very assumptions about nature and art necessary for the eventual undermining of the opposition can in fact be found in ancient art/nature relations themselves. The relationship between art and nature forms the basis for the influence that both art and aesthetics and natural philosophy and medicine had on the style of the illustrations in Vesalius's Fabrica.

In his book Promethean Ambitions: Alchemy and the Quest to Perfect Nature, William R. Newman examines the art/nature debate in the history of alchemy, from 1200 to 1700. The framework for the art/nature debate, in Newman’s alchemical case, is predicated on Aristotelian natural philosophy. There are good reasons for this. Aristotelian natural philosophy and, in particular, his hylomorphism, provides the ideal framework within which the history of alchemy can be understood. There are, however, further facets to the art/nature debate that come into focus when it is examined through the lens of the history of medicine and, more specifically, medical illustration.

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154 Newman, Promethean Ambitions.
The concepts of art and nature, and their relationship, have a unique application to early modern anatomical theory and its illustration. I argue that a wider theoretical framework than that employed in Newman’s alchemical case is needed to understand the theoretical underpinnings of the idealisation found in the Vesalian illustrations – one that is derived specifically from Plato and Galen. This framework is integral to my account of the role of images in determining that visual character of Vesalius’s illustrations, as well as that of natural philosophy and medicine.

Firstly, I introduce the historical foundations of the art/nature debate. I consider definitions and origins of the terms ‘art’ and ‘nature’, and introduce three main modes of relation between them that circulated in antiquity (plus an additional relation that is of particular relevance to Vesalius). These, I suggest are prerequisite for the eventual undermining of the distinction that occurred in the sixteenth century (of which the role of images in the formation of knowledge is a part). Secondly, I outline Newman’s discussion of the art/nature debate and his alchemical case. Newman’s work on the art/nature debate, its application to alchemy, and its Aristotelian framework, provide the background against which my claims in chapters five and six take place.

**The History of the Art/Nature Debate**

The relationship between nature (φύσις or physis) and art (τέχνη or techne) in antiquity is a complex one. I shall consider ancient uses of the terms ‘nature’ and ‘art’ then consider three ways in which they were thought to be related. In antiquity ‘nature’ is typically used to designate the natural world, which exists apart from human construction. And, equally often, it is used to refer to human nature, both physical and mental. Nature was generally thought to function teleologically and to exhibit regular and unchanging laws. It is difficult to generalise about ancient uses of the term as it was employed in numerous different ways. However, R.G. Collingwood has offered an excellent account of the ancient usages of the term ‘nature’. Furthermore, in an appendix to *Primitivism and Related Ideas in Antiquity* Arthur Lovejoy and George Boas

offer sixty-six different usages of the term ‘nature’ in antiquity. From these sources I have identified eight main tendencies in the ancient usages of the term. These include:

1. Inborn and persistent qualities of a human being, including internal character, temperament, and talent, and external physical appearance. This is often in contrast to those aspects of a person that might be learnt or taught.

2. Objective, unchanging reality, or things as they are in themselves, rather than subjective or fleeting appearance.

3. The world as a whole in its entirety, and as a unified scheme.

4. As a personified causal power, as the first cause of phenomena.

5. As that which is not art, or that which does not arise out of purposive human action.

6. The intrinsic meaning or essence of a thing.

7. An internal principle of causation.

8. As an end or final cause.

‘Art’ or techne was generally employed to designate any artificial human action, or the products of such action. A.J. Close has offered a particularly good definition of art as it was understood from classical antiquity to the Renaissance:

as any rationally organized activity which has a practical rather than a speculative end (e.g. rhetoric, carpentry, politics, painting, drama), and the system of theoretical knowledge or the intellectual expertise or the technical proficiency which such activities presuppose.  

This definition presupposes Aristotle’s operative/speculative distinction. Art was a broad category encompassing both the acts and products of purposive human action (where events, actions and objects are brought about according


\[^{157}\text{Close, } “Commonplace Theories of Art and Nature in Classical Antiquity and in the Renaissance,” 467.}\]
to an idea and a process of reasoning). An element of skill is also required. Art
refers to skillful human action, rather than that which is the outcome of
chance. It also presupposes practicality, doing, making, and action, rather than
contemplation. As can be seen in the definitions in the preceding paragraph,
nature was conceived in teleological terms. So too was art. Although the end of
a natural object was thought to be internal to it, the end of an artificial object
was thought to be external to it, lying in the mind of the person who created it.
Not always, but usually, art was evaluated as inferior to nature, as a less
successful imitation of its processes, modes of operation and appearance.

There are three main modes, found in ancient literature, in which art can be
thought to imitate nature. I discuss these separately, but they are in fact
interrelated. The first is the imitative relation, the second the mimetic relation,
and the third the perfective relation (later I introduce a fourth negative relation
that is particularly relevant to Vesalius). In antiquity the proposition that art
imitates nature usually refers to the first of these relations. Here it is meant
that art imitates nature’s teleological mode of production, not its external
appearance. It is not, for example, naturalism in painting or sculpture that is
referred to by this relation. Aristotle is most famous for discussing this
relation, but it is also found in the Hippocratic Corpus and in Plato.

The first relation differs significantly from the second two in the following way.
The imitative relation, which claims that art imitates nature’s mode of
production, applies to all art. The very essence of art is that it imitates the
teleological mode of operation, and fittingness of form and function to ends,

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158 Francis Wolff has discussed this in detail in his article 'Three Pleasures of Mimesis According to Aristotle's Poetics'. He notes that 'For Aristotle, this statement [art imitates nature] is not only intended to clarify how art proceeds, but also how nature proceeds. What he means is that we can understand nature if we consider art as its explicative model, since art takes nature as its real model in its modus operandi. It does this in two ways: first, like natural production, every artistic production 'informs' a material, that is, it organizes several parts into a whole, which would indicate that the material cause is subordinated to the formal cause; second, in natural production as in artistic production, the successive operations are subordinated to their end, that is, in both cases the chronological order of productive causality is opposed to the rational order of real causality, meaning that the efficient cause is subordinate to the final cause. We can see the extent to which modern thinkers misunderstood the Aristotelian expression in having made it the slogan, justification and essence of fine arts. In reality, the expression 'art imitates nature' is not prescriptive, but descriptive. It does not indicate what art should intend, nor what any particular work of art should represent, it simply characterizes an operating mode' in Francis Wolff, 'Three Pleasures of Mimesis According to Aristotle's Poetics,' in The Artificial and the Natural: An Evolving Polarity, ed. Bernadette Bensaude-Vincent and William R. Newman (Cambridge, Mass: MIT Press, 2007), 54.

that characterises nature. This is a relation which informs us about the epistemic status of art. The mimetic relation, by contrast, applies to a specific type of relationship between nature and art that does not necessary apply to all art objects and acts. The mimetic relation usually refers to a visual resemblance that obtains between a painting or sculpture and the natural world. But, it could also refer to a piece of music that imitates natural rhythms and sounds, or to poetry and plays. Vitruvius famously advocated this mimetic relation. His De Architectura is full of references to it, including his story about the origins of building. There he tells of humans imitating nature by building ‘refuges of mud and branches in which to shelter in imitation of the nests of swallows and their way of building’. An artwork can stand in both mimetic and imitative relations to nature, the first in virtue of the artwork’s visual relationship of resemblance to the visual appearance of nature, and the second in virtue of it being art, and, like, nature, teleological. The third perfective relation also applies to various types of art rather than all art objects and acts. Medicine and moral philosophy are both archetypal examples of this relation. In both cases the art brings about an end that could not have been realised by nature alone. This end is not in conflict with that of nature, rather, it fulfills an end that is already found in nature. In W.D. Ross’s translation of Physics II 8 (199a 16-17) Aristotle writes that ‘generally art partly completes what nature cannot bring to a finish, and partly imitates her’. While this passage is rendered differently in other translations, I merely want to point here to the perfective relation in Aristotle’s thought, and the way that it interacts with the first imitative relation. I will briefly elaborate these relations, using one or two central examples from the ancient literature.

While art and nature were generally opposed in antiquity, these ancient art/nature relations in fact contain the preconditions for the eventual

\[\text{162 Philip H. Wicksteed and Francis M. Cornford translate this passage as ‘the arts either, on the basis of Nature, carry things further than Nature can, or they imitate nature’. This offers quite a different meaning, as it suggests an exclusive disjunction between the imitative and perfective relations. But as I have suggested, the first imitative relation, I believe, for Aristotle, applied to all art, including those thought to be imitative and perfective. Aristotle, The Physics, trans. Philip Henry Wicksteed and Francis Macdonald Cornford (London: Heinemann, 1929), 92.}\]
undermining of the opposition. In these ancient relations we find the necessary conditions for the role that images would come to play in the formation and communication of knowledge in the sixteenth century. That art is the same in kind as nature (in imitating its teleological mode of production) and that it can visually imitate and represent the visual appearance of the world are two crucial assumptions, if visual art is to play a role in forming and communicating knowledge about the natural world. That art can perfect nature’s ends also plays an important role in transgressing the boundary between nature and art.

The Imitative Relation: Art Imitates Nature’s Mode of Production

The imitative relation between art and nature has it that art imitates nature in terms of its teleological mode of production. As was mentioned above this relation applies to all art forms, acts and objects. Aristotle clearly articulates this relation. For Aristotle nature is teleological. Everything within nature, and nature as a whole, is conceived in teleological or end-directed terms. The four elements in the Aristotelian universe (fire, air, water and earth) have their own natural places and natural principles of movement. The material, formal, efficient and final causes could be applied to any object to understand it. The material cause is the matter that an object is made up of; the formal cause is the form, archetype or essence of an object, what makes it the type of thing that it is; the efficient cause is the source of the change that brought it into being; and the final cause is that for the sake of which it exists: that is, its end or purpose. For Aristotle, all things

163 In book one, chapter two of “On the Heavens” Aristotle explains that there are two kinds of locomotion, straight and circular, and that ‘all simple motion, then, must be motion either away from or towards or about the centre’ in “On the Heavens” in Aristotle, The Basic Works of Aristotle, trans. Richard McKeon (New York: Random House, 1941), 339.
164 For Aristotle’s doctrine of the four causes see book two, part three of “Physics” and book five, part two of “Metaphysics”.
165 Aristotle defines the four causes as follows: 1. [The material cause is] that out of which a thing comes to be and which persists, is called ‘cause’, e.g. the bronze of the statue, the silver of the bowl, and the genera of which the bronze and the silver are species. 2. [The formal cause is] the form of the archetype, i.e. the statement of the essence, and its genera, are called ‘causes’ (e.g. the octave the relation of 2:1, and generally
are made up of form and matter. Form makes something the type of thing that it is. Matter, by contrast, is what that thing is made of and is the principle of individuation. For example, the form of a silver bowl is its concave shape, the shape that it has determines that it is a bowl, while the matter is the silver that it is made of.

A significant difference exists between the forms of nature and those of art. The forms of art are what Aristotle calls accidental forms. Their efficient cause is a person, and they can be altered by human action. For example a silver bowl can be melted down and cast into the form of a cup. What the object is can be changed through artificial manipulation of the accidental form. However, the matter, the silver, remains the same. Unlike the accidental forms of human artifice, nature has what has come to be known as substantial forms. These are forms of natural substances that cannot be altered by human action. For Aristotle form and matter are inseparable. The form of an object can never exist without being embedded in matter of some kind, and all of matter must have some form. The form makes something the type of thing that it is, and the matter provides the principle of individuation, making it the particular thing that it is.

In his Physics II 192b 7-19 Aristotle distinguishes nature from art according to the former’s possession of an internal principle which gives it the ability of self-generation and change. He writes:

Of things that exist, some exist by nature, some from other causes. ‘By nature’ the animals and their parts exist, and the plants and the simple bodies (earth, fire, air, water) – for we say that these and the like exist ‘by nature’. All the things mentioned present a feature in which they differ from things which are not constituted by nature. Each of them has within itself a principle of motion and of stationariness (in respect of place, or of growth and decrease, or by way of alteration). On the other hand, a bed and a coat and anything else of that

number) and the parts in the definition. 3. [The efficient cause is] the primary source of the change or coming to rest; e.g. the man who gave advice is a cause, the father is the cause of the child, and generally what makes of what is made and what causes change of what is changed. 4. [The final cause is] in the sense of end or ‘that for the sake of which’ a thing is done. e.g. health is the cause of walking about. The same is true also of all intermediate steps which are brought about through the action of something else as a means towards the end, e.g. reduction of flesh, purging, drugs and surgical instruments are means towards health. All these things are ‘for the sake of’ the end, though they differ from one another in that some are activities, others instruments’ in Aristotle, The Basic Works of Aristotle, 204.
sort, *qua* receiving these designations – i.e. in so far as they are products of art – have no innate impulse to change.\textsuperscript{166}

For Aristotle, art has no internal principle of change, as nature does, but it imitates its method of production and its adaptation of function and form to ends. In the case of art it is clear on reflection that the object or act is brought about according to an idea in the mind of a person. We all have experience in bringing an act or object about according to a specific idea, and an elaborate process of reasoning that follows back from this idea. Even in such a case as building a simple shelter, the idea of shelter comes first, and the specific process of construction follows accordingly. In the case of art the person is the efficient cause, and the idea according to which it was created is the final cause, that governs its form. Art, for Aristotle, provides a model for understanding nature. We, as efficient causes of art, have inside knowledge of the relationship of final cause to form. Aristotle’s claim that ‘art imitates nature’, therefore, offers art as a model for understanding the mode of production and operation of nature. As is evident in the quotation above, the principle of change in nature, or the efficient cause, is internal to the natural event or object, whereas in the case of art it is external. A normative thesis is bound up with this view. Nature is superior to art because it has its own internal principle of generation and growth. Natural objects can grow, regenerate their own bodies, and generate new versions of themselves. Nature is alive, art is not. However, that art imitates nature’s teleological mode of production makes room for it to play an active role in the formation of knowledge.

**The Mimetic Relation**

The second art/nature relation, the *mimetic relation*, is best exemplified in antiquity by Plato. In his *Laws X*, *Republic X*, and the *Sophist* Plato discusses a number of different art/nature relations, including the mimetic one. The mimetic relationship usually applies to what is traditionally referred to as the fine arts. Most often it designates a relationship of visual resemblance between an art object, and the visual appearance of nature. If a mimetic

relation obtains, the art object will be referred to as naturalistic. Realism in visual art, by contrast, refers to the representation of reality, but not necessarily the visual appearance of it. Mimesis pertains to naturalism in visual art, not realism. This relation often, but not always, refers to the sense in which art looks like nature.

Plato is infamous for his negative evaluation of mimesis in the representational arts, in particular in painting and poetry. In Plato’s Laws X we find the views that nature is divine art, human art is an inferior version of divine art and mimetic representational art is the lowest in a hierarchy of human arts. According to the Athenian that appears in this dialogue, nature and chance are the original creative forces in the cosmos. He states: ‘We are told, you know, that everything whatever which comes, has come, or will come into existence, is a product either of nature, or of art, or of chance.’ Nature is rational, orderly, comprehensible, and created by the gods. Conversely, the order and regularity that we see in nature is that which offers us reason for believing that gods exist. Nature and chance describe the forces at work in the natural world, and art describes those inferior products produced by humanity. The divine art of nature functions as a model for human art. Art imitates nature, but its manner of doing so, and the products that result from it, remain vastly inferior. Again the Athenian in Plato’s Laws says that:

Evidently, so they say, all the grandest and fairest of things are products of nature and chance, and only the more insignificant of art. Art takes over the grand primary works from the hands of nature, already formed, and then models and fashions the more insignificant, and this is the very reason why we call them artificial.

This quotation is useful in that it points both to the sense in which art imitates nature and the sense in which the former is inferior to the latter. Later on, in Laws X, a distinction is drawn between ‘painting, music and the other fellow crafts’ and those that ‘if there are arts which really produced anything of

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168 In discussing the grounds upon which to believe that gods exist in the “Laws” Clinias says: ‘Why, to begin with, think of the earth, and sun, and planets, and everything! And the wonderful and beautiful order of the seasons with its distinctions of years and months! In “Laws X” ibid., 886 a, 1441.

genuine worth, they are those that lend their aid to nature, like medicine, husbandry, gymnastics.\footnote{Plato, “Laws X” Ibid., 889 d, 1445.} This second type refers to the perfective relation, which is discussed in the following section. The first, however, refers to the mimetic relation.

The negative view that Plato has of mimetic representational art is expressed nowhere more clearly than in book X of the Republic. Here Plato carefully distinguishes between the art of the divine Craftsman, that of craftspeople, such as the carpenter, and that of the painter. God is the creator of all of the original forms that exist outside of space and time in what is commonly referred to as Plato’s Heaven. For example, God is the creator of the idea of a sofa, which is the first and original form of a sofa. All carpenters, when constructing sofas, have this original idea of a sofa in their heads, according to which any particular sofa is brought into being. Particular sofas are then copies of the original idea of a sofa. The original idea of a sofa is more real, in Plato’s view, than that which is constructed by the carpenter. A painting of a sofa is at a further remove from its most real form, and is imitative twice over, for in delineating a pictorial representation of the carpenter’s sofa it imitates an imitation of the real idea. Painters are what Plato calls ‘imitators’, who copy and represent, in their work, the world of appearance rather than that of reality. Naturalistic painting, according to Plato, is also deceitful. He writes:

> The mimetic art is far removed from truth, and this, it seems, is the reason why it can produce everything, because it touches or lays hold of only a small part of the object ... a painter, we say, will paint us a cobbler, a carpenter, and other craftsmen, though he himself has no expertness in any of these arts, but nevertheless if he were a good painter, by exhibiting at a distance his picture of a carpenter he would deceive children and foolish men, and make them too believe it to be a real carpenter.\footnote{Plato, “Republic” Ibid., 598 b–c, 823.}

Plato’s epistemological ladder sees the mimetic art of painting, along with tragic poetry, located squarely on the bottom rung. However, one consequence of Plato’s view is that nature and art are not opposed, but continuous. There is no radical division, as was the case with the Sophists. For Plato, all art is a pale and imitative copy of nature, but it is not completely

\begin{footnotesize}
\begin{enumerate}
\item Plato, “Laws X” Ibid., 889 d, 1445.
\item Plato, “Republic” Ibid., 598 b–c, 823.
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different from it or opposed to it. This point is crucial to the present thesis, as it makes room for art to play a fundamental role in the formation and communication of knowledge about the natural world.

As is the case in Plato, the concept of mimesis in Aristotle applies not solely to artistic acts. Yet, this is the sense of mimesis that I am concerned with, and, in both cases it is this usage that dominates discussions about it. As we have seen, all art, on Aristotle’s view, imitates nature’s teleological mode of production, and adaptation of form and function to ends. Yet, mimetic art differs from perfective art, not just normatively, but also in terms of its ends. In the fragmentary Protrepticus Aristotle locates the very end of humanity as lying in the cultivation of the soul, achieved through the art of philosophy, and, in particular, the teaching of ethics. As we will see in the following section, philosophy and ethical education, for Aristotle, function in the same way that medicine does, for they perfect the ends that are already established by nature. Moral philosophy is at the apex of the hierarchy, the perfective arts such as medicine and gymnastics come second, and the mimetic representational arts come last. Rather than realising a preexisting end in nature, mimetic art produces images of what Stephen Halliwell terms ‘possible worlds’. That is, they represent imaginative ways that the world could possibly be. Halliwell elaborates on the various relations that mimetic representational art can have to nature. He writes:

The status of the world depicted in a mimetic artwork is not, however, for Aristotle, something constant, as is made clear above all by his statement in Poetics 25 that mimetic art (and he cites visual art here alongside poetry) can make any of three things the object of its mimesis: “the sorts of things that were or are the case, the sorts of things that people say and think to be the case, or the sorts of things that should be the case”. Thus the relationship between the world within the work and the world of the artist or audience is variable and potentially complex; and its variations span a spectrum that runs from the true to the fictional, from the close reflection of known reality to the representation of the purely imaginary.173

173 Ibid., 154–155.
Mimetic representational art on Aristotle’s view necessarily relates to a state of affairs in nature, but, unlike Plato, this relation is not necessarily one of direct visual imitation of an actual state of affairs.

**The Perfective Relation**

Medicine and moral philosophy are archetypal examples of the perfective art/nature relation that can be found in the ancient literature. This relation is found in the Hippocratic Corpus, in Plato, and in Aristotle, and generally it refers to those arts that complete ends that already exist in nature. In the Hippocratic Corpus the claim that the art of medicine perfects the ends of nature is found alongside the claim that it forces or compels nature against its ends. The natural state or end of the human body was generally conceived in these texts as being constituted by its natural, healthy state. According to Hippocratic medicine the natural, healthy state of the body was determined by a proper balance of the humours – phlegm, blood, yellow bile, and black bile. Every individual had their own particular balance of humours that constituted their maximally health state. Illness was thought to come about when an imbalance of humours occurred, and the end or goal of Hippocratic medicine in general was to bring this back into balance. Insofar as the end of medicine was to restore the body to its natural health state its end was to restore the original end of nature.

The perfective art/nature relation is also found in Plato and in Aristotle. As I mentioned above, in *Laws X* Plato distinguishes mimetic art from those that ‘if there are arts which really produced anything of genuine worth, they are those that lend their aid to nature, like medicine, husbandry, gymnastics’. Similarly, Aristotle identifies the perfective relation, stating: ‘generally art partly completes what nature cannot bring to a finish, and partly imitates her’. For Aristotle, a range of arts cooperate with natural processes to complete, or perfect, unfulfilled ends in nature. Perfective arts are continuous

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174 For example, both of these relations are discussed in *On the Techne*.  
with nature, and their ends are in harmony with those of nature. They are therefore distinct from other forms of art, whose ends are at odds with nature, or have ends that nature could not have arrived at. For example, a lever could not occur naturally, and its end involves the lifting of that which is heavy above that which is light. This is unnatural according to Aristotelian physics. In the reconstructed fragments of the *Protrepticus* Aristotle develops the notion that philosophical wisdom is the central virtue and basis of happiness. Like medicine and athletics, moral philosophy perfects the ends of nature which have not been fully achieved. Yet, philosophy is more highly ranked because it serves the highest end, namely the cultivation of the soul. He writes:

For just as the sophisticated doctors and most sophisticated athletic trainers pretty much agree that those who are good doctors or trainers must be experienced about nature, so good lawmakers too must be experienced about nature – and indeed much more than the former. For some are producers of virtue only in the body, while others, being concerned with the virtues of the soul and pretending to be experts in the success and failure of the state, need philosophy much more.  

The models for laws such as justice are found in nature, and philosophy imitates these. Cultivating and contemplating such laws not only brings about ends already evident in nature, but also helps humanity to achieve its ultimate end, the cultivation of the soul. The means of achieving this highest end is the art of philosophy, and, for Aristotle, we can achieve this end due to the fact that nature has endowed humanity with hands and intelligence – the very things necessary for the production of art.  

**Art Forcing Nature against its Ends**

The notion of art acting against nature, found in the Hippocratic Corpus alongside the perfective relation, has particular relevance to Vesalius. There are instances throughout the Hippocratic Corpus where the art of medicine is described as forcing or compelling nature against its internal ends. In *On the
Art medicine is described as forcing nature to make what is internal and invisible, external and visible. The author writes:

when this information [symptoms] is not afforded, and nature herself will yield nothing of compulsion, whereby nature is constrained, without being harmed, to give up her secrets; when these are given up she makes clear, to those who know about the art, what course ought to be pursued. The art, for example, forces [nature] to disperse phlegm by acrid foods and drinks, so that it may form a conclusion by vision concerning those things which before were invisible. Again, when respiration is symptomatic, by uphill roads and running it compels nature to reveal symptoms. It brings on sweats by the means already stated, and forms the conclusions that are formed through fire when it makes hot water give out steam. There are also certain excretions through the bladder which indicate the disease better than those which come out through the flesh. So medicine has already discovered drinks and food of such a kind that, becoming warmer than natural heat, melt the matters that I spoke of, and make them flow away, which they never would have done without this treatment.  

The art of medicine is described as bringing about ends that are at odds with those of nature. The verbs that are used to describe the actions of medicine upon nature are those of violence, not harmony and cooperation. In Vesalius’s own art, the art of dissection, he too compelled nature against its ends – making the internal and invisible aspects of anatomy external and visible. In chapter eight I suggest that there is a parallel between the way that Vesalius’s own art (namely, dissection) compels nature against its own ends by making the internal and invisible external and visible and through the stylistic expression of antithesis in his illustrations.

Summary

There is an overall sense in which art and nature were thought to be opposed in antiquity. However, within the art/nature relations that have been considered here we find the seeds necessary for the role that images would come to play in the formation of knowledge in the early modern period. Firstly, the Aristotelian conception that art imitates nature’s teleological mode of production construes art objects as inferior ones whose accidental forms have

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no inner principle of life. However, art on this view offers us insight into the workings of nature, and given that it is also similar in kind to nature (both are teleological) makes room for art to play an active role in forming knowledge about nature. Secondly, Plato’s account of mimesis construes the forms found in the representational arts as deceitful copies of copies of real ideas. This does not appear to bode well for their role in providing knowledge about nature. However, this is not the case. That Plato construes the forms of visual art and those of Platonic ideas as only different in degree in fact makes room for visual art to play a role in the formation of knowledge. Lastly, the perfective art/nature relation offers a description of the way that human art in a broad sense can manipulate nature. Similarly, the negative art/nature relation also sees art manipulating nature to reveal knowledge about it that would otherwise remain invisible.

**William R. Newman’s Alchemical Case**

In his book *Promethean Ambitions: Alchemy and the Quest to Perfect Nature* William R. Newman examines the art/nature debate in the history of alchemy from 1200 to 1700. This work draws on a large number of medieval and early modern texts, carving out a detailed history of the dialogue between art and nature in western thought, as well as that of alchemy itself. The art/nature debate, as it is examined by Newman, is predicated on Aristotelian natural philosophy. Unlike Newman, my examination of the art/nature debate is focused on early modern medical illustration, not alchemy. The art/nature debate and its application to early modern medical illustration, I argue, requires a different theoretical framework than that employed by Newman and his alchemical case. In chapter four I offer a framework based on Plato and Galen. In this section I intend to tease out the reasoning involved in Newman’s Aristotelian focus. After antiquity Aristotelianism was preserved and elaborated by the Islamic world. It reentered Europe in the early middle ages and dominated thinking in western universities until the seventeenth century. Numerous other classical texts were re-discovered, and translated into Latin during the Renaissance, including many by Plato and Galen, but the grip of Aristotelianism remained firm. Like Aristotelian thought generally, Aristotle’s position on the art/nature distinction remained the dominant one. The numerous commentaries on Aristotle, and works attributed to him, elaborated
a distinction between art and nature that can be found in his work, especially in his *Meteorology, Physics*, and *Metaphysics*. Newman, however, chooses his cases carefully, and it is not the general dominance of Aristotelianism that leads him to predicate his discussion of the art/nature debate in alchemy on Aristotelianism. It is rather that Aristotelianism was the specific framework within which discussion of alchemy took place. Unlike that of medicine, and medical illustration, the case study of alchemy has particular applicability to Aristotelian natural philosophy. Alchemy and its ‘Promethean ambitions’, by contrast, require a specifically Aristotelian framework. In considering Newman’s text, I shall pull out a few examples of the Aristotelian underpinnings of his work. By contrast, the forms found in the *Fabrica* and its illustrations need concepts derived from the re-discovered texts of Plato and Galen.

Near the beginning of *Promethean Ambitions* Newman discusses the art/nature distinction in Aristotle. The first essential feature of Aristotle’s thinking that he brings to the fore is an art/nature dichotomy, or a sharp distinction between the two concepts. Newman quotes Aristotle as stating that ‘the arts, either, on the basis of nature, carry things further (epitelei) than nature can, or they imitate (mimeitai) Nature’. From this he draws a clear distinction in Aristotle, between perfective and imitative art. Newman writes: ‘This dichotomy allowed the possibility of having two distinct types of art, one that perfects natural processes and brings them to a state of completion not found in nature itself and another that merely imitates nature without fundamentally altering it’. Newman also carefully distinguishes perfective arts, like medicine and athletics, from the aim of perfecting in visual representation. While the former completes or perfects actual ends in nature, that latter represents pictorially an ideal form, more perfect than any found in nature, to create an ideal type, by combining the best parts from many particular individuals. Newman notes that this type of visual perfection in the representational arts is ‘quite alien to Aristotle’s conception, which insisted on

182 However, in a footnote Newman acknowledges that ‘Aristotle himself did not mean to present a strict disjunction between two types of art that are necessarily different ... since some arts operate by both mimicking nature and perfecting it’, Ibid.
183 Ibid.
the distinction between real material change and superficial mimesis’. For Aristotle visual art can be both perfective and mimetic in its imitation of nature, but this mimetic perfection is distinct from the perfecting of Nature’s ends that medicine, gymnastics and husbandry are capable of. However, in his Meteorology Aristotle’s view that nature cannot be altered is made clear. While perfective arts, like medicine, can mimic natural processes to complete their ends, transmutation of species is impossible.

In his Mixture Galen denied that humans could make homogeneous mixtures, meaning that the duplication of metals was impossible on his view. Likewise, in his Meteorology Aristotle’s account of the generation of homogeneous bodies leaves no room for human intervention in this process. According to Aristotle homogeneous bodies include such things as:

for instance, metals, gold, copper, silver, tin, iron, stone, and everything else of this kind and the bodies that are extracted from them; also the substances found in animals and plants, for instance, flesh, bones, sinew, skin, viscera, hair, fibres, veins (these are the elements of which the non-homogeneous bodies like the face, a hand, a foot, and everything of that kind are made up), and in plants, wood, bark, leaves, roots, and the rest like them.

Homogeneous bodies were, for Aristotle, pure substances that were generated by nature, not by artificial human action. Alchemy claimed to create, or replicate, such homogeneous natural substances, not just in such a way that they may appear to have created a substance, but actually to have created it in every sense. Alchemy was, therefore, in direct conflict with central principles of Aristotelian natural philosophy.

Because the alchemical agenda was so radical, claiming to do what was on Aristotelian principles impossible, it came to symbolise the outer-fringe of creative human action. Newman argues that ‘alchemy provided medievals and early moderns alike with a focal point for considering the limits – both moral and ontological – of natural science and technology’, and that ‘the debate

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184 Ibid., 18.
around the legitimacy of alchemy provided a focal point for the consideration of art in general’. 187 Newman shows the way that alchemy, in its rejection of commonly accepted Aristotelian principles, influenced medieval and early modern understandings, of the world, objects and human actions, as well as normative claims about human conduct. He traces Aristotle’s theory of mixture, and his rejection of the possibility of transmuting substantial form, in a sample of Islamic and scholastic, medieval manuscripts. 188 Newman identifies Avicenna’s Book of Remedy (c. 1020) as ‘the most influential attack on alchemy ever made’. 189 This text contains the claims that art is weaker than nature and that metals cannot be transmuted. Because the characteristics that determine a metal’s substantial form cannot be perceived by the human senses, Avicenna claims, humans cannot possibly alter them. Substantial form lurks beneath the sensible qualities of an object. For Avicenna, only God had knowledge of substantial forms, and therefore, only God can alter them. The religious overtones evident in this text, Newman shows, influence later thinkers, who develop them further.

Newman traces Avicenna’s influence in the work of Albertus Magnus (d. 1280). He takes Albertus as representative of the ‘scholastic tradition of using alchemy to determine the power of demons’. 190 In arguing that demons cannot induce substantial forms in transmuted bodies, Albertus, again, employs specifically Aristotelian principles, and, as Newman explains, quotes Aristotle’s Meteorology as saying that species cannot be transmuted. 191 Albertus’s student Thomas Aquinas perpetuates the view that species cannot be

188 The Aristotelian concept substantial form is also discussed in book Z of his Metaphysics. Aristotle does not actually use any term which might translate as substantial form. It is, however, used throughout the literature on Aristotle, as a way of distinguishing it from what Aristotle calls ‘accidents’. Aristotle uses the term ‘ousia’ to designate a number of ideas including substantial form. Ellen Stone Haring has noted that the term ousia is ‘used by Aristotle to name a substrate ... but it is also used to name an individual material thing, a separately existing material entity, in essence, and substantial form’. She continues: ‘An individual thing – man, plant – and a separately existing immaterial entity are both ousiai in the sense of being in their own right. An essence can also be called ousia because, real though an individual be, that reality is mainly derived from form’ in Ellen Stone Haring, “Substantial Form in Aristotle’s ‘Metaphysics’ Z, I,” The Review of Metaphysics 10, no. 2 (December 1, 1956): 308–309. doi:10.2307/20123574.
189 Newman, Promethean Ambitions, 37.
190 William Newman, Promethean Ambitions, 44.
191 Newman explains Albertus is in fact referring to Avicenna, here, and not to Aristotle. This is because Avicenna’s “De Congetazione” was attached to Aristotle’s “Meteorology”, and was for a long time supposed to be the work of Aristotle. See, Newman, Promethean Ambitions, 43.
transmuted, and, on Aristotelian principles, rejects the possibility of alchemy. Newman uses such texts to demonstrate the way that alchemy functions as a kind of measure against which all human and supernatural arts could be judged. He writes that: ‘Alchemy once again serves as a touchstone by which all arts including those of Lucifer and his minions are measured’. Further illuminating the art/nature debate’s impact on European culture, Newman discusses its relation to witchcraft and the Malleus maleficarum and the Canon episcopae – drawing a link in the middle-ages between alchemy, witchcraft and the transmutation of bodily forms. Again, this rests upon Aristotelian principles.

The arguments of the medieval alchemists themselves also rested on Aristotelian tenets. They held that their art could imbue matter with the Aristotelian principle of change, and alter substantial form. An example of a defense of alchemy, discussed by Newman, is the Book of Hermes. Here, we find an early denial of an art/nature distinction based on Aristotelian thinking. Newman notes that by the beginning of the fifteenth century many of the arguments both for and against alchemy had been framed. Throughout the medieval and early modern period the possibility and evaluation of alchemy polarised according to either a rejection or acceptance of its possibility. It is evident from Newman’s discussion that both sides of the debate are cast in strictly Aristotelian terms.

The Aristotelian world-view dominated western thought up to the seventeenth century, and the art/nature distinction, as it was drawn by Aristotle twenty centuries before continued to play a central role. A common position states that the scientific revolution of the seventeenth century, and the role of experimentation in knowledge, required a break with Aristotelian natural philosophy. Thomas Kuhn, for example, famously claimed that the worldview which supplanted Aristotelianism in the seventeenth century was completely incommensurable with it. Cartesian mechanical philosophy offered a

192 Ibid., 51.
193 Ibid., 97.
worldview at odds with that of Aristotle’s, replacing teleology with mechanism.\textsuperscript{195}

In *Promethean Ambitions* Newman argues for *continuity* between Aristotelianism, the activity of medieval alchemists and the experimentation of seventeenth-century natural philosophers. What he terms the ‘non-interventionalist fallacy’ is the widely held view that Aristotle and his followers were non-experimental, or even opposed to experiment, because it appeared to involve intervening in nature. Newman sees this view as typified by Sarah Broadie in her *Nature, Change and Agency in Aristotle’s Physics*. He writes: ‘By drawing out the implications of Aristotle’s distinction between the artificial and the natural, Broadie manages to supply a metaphysical basis to the observation that the Greeks disliked experiment because it introduced artificiality into otherwise natural processes’.\textsuperscript{196} Newman argues that this view is mistaken, and that Aristotle did in fact act like an experimental scientist. He cites Aristotle’s anatomising of eggs during various stages in their development, and his practicing of animal dissection as examples. Newman argues for a direct inheritance between Aristotle’s experimentation and the medieval alchemist’s claim that natural products could be replicated by those who had knowledge of their causes. In turn, this tradition fed directly into the experiment advocated by seventeenth-century natural philosophers such as Francis Bacon and Robert Boyle. In *Promethean Ambitions* Newman traces two polarising schools of thought – that which is for the possibility of alchemy, and that which is against it. Newman writes:

These contrasting groups represent two very different schools of scholastic thought. Although both were anchored in the philosophy of Aristotle, the former made little appeal to the Stagirite’s detailed study of the natural world ... The latter on the other hand, combed through such works exhaustively and used them to develop experimentally oriented concepts as wide-ranging as Themo’s notion of maker’s knowledge and Sennert’s defense of the artificial isolation of an experimental subject.\textsuperscript{197}


\textsuperscript{196} Newman, *Promethean Ambitions*, 240.

\textsuperscript{197} Ibid., 289.
Newman demonstrates that Aristotelianism provides a conceptual framework within which both arguments for and arguments against alchemy took place. In the hands of the alchemists, and the heirs to their traditions, Aristotelian natural philosophy, in fact provided an important basis for the experimental method so characteristic of the scientific revolution of the seventeenth century.

**Conclusion**

So far we have considered the relationship between art and nature in antiquity. Art, specifically visual art, on Aristotle’s view was thought to merely imitate the teleological mode of operation evident in nature. Visual art could perfect those forms of nature through a process of selecting the best parts from a variety of particulars, but could not actually bring about (or violate) nature’s ends as medicine could. We have seen, through an examination of Newman’s thesis, that the art/nature relations in Aristotle are crucial for understanding the history of alchemy. More pertinent to early modern medical illustration are Plato’s views about art and nature. Indeed, Plato’s epistemology, as it is found in his *Timaeus*, and the concepts art and nature and their teleological underpinning, as they are expressed in Galen’s *On the Usefulness of the Parts* provides a basis for understanding both the text and the illustrations in Vesalius’s *Fabrica*. Insofar as I seek to explain the idealised style of the Vesalian illustrations by way of reference to the influence that ancient and Renaissance art and aesthetics had on them, and by way of reference to a theoretical tradition in natural philosophy, the art/nature distinction is central to both.
Chapter Four: Vesalius on Polycleitus and the *Historia Absoluti Hominis*

Introduction

Vesalius does not directly refer to the aesthetics of his anatomical illustrations. There are, however, two remarks in the *Fabrica* which point towards a theory for the artistic representation of the body and to an associated aesthetic. Both remarks occur within the context of discussing the type of body that is best for a public dissection. In a section entitled ‘What Body is Best for Public Dissection’ Vesalius writes that it should be one that most closely resembles the statue of Polycleitus. And, later, in book seven, Vesalius refers to his pursuit of the *historia absoluti hominis* (*historia* of the perfect man), distinguishes this from abnormal or ‘monstrous’ aspects of anatomy, and relates it to the *Canon*. Both of these passages lie at the heart of a solution to the problem of idealisation in Vesalius’s illustrations. Parallels occur between Vesalius’s public anatomical demonstrations and his illustrations. For example, as Sachiko Kusukawa has pointed out, ‘*De Fabrica* was intended to, and does indeed, follow closely the order of Vesalius’s public dissections at Bologna and Padua’. The archetypal and canonical figure that Vesalius says is best for public dissection is that which is best for teaching anatomical knowledge. It is therefore exactly what we would expect to find represented visually in his *De Fabrica*.

Vesalius’s reference to Polycleitus’s *Canon* provides insight into his search for the *homo absolutus* and the connection between the properties of ancient sculpture and those of the best body for a public dissection. This connection suggests a reason why his illustrations appear as visually analogous to ancient sculpture. Namely, that it was ancient artworks themselves that Vesalius and his draftsman were examining in their attempt to represent the *homo absolutus*. An examination of Polycleitus’s *Canon* casts light upon the proportionality evident in Vesalius’s anatomical illustrations and the aesthetic that is most fitting for them. The application of the *Canon* of Polycleitus

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provides a basis for understanding their idealised style as does the general influence that ancient sculpture had on the appearance of his illustrations. Much Renaissance artwriting and criticism builds upon the Polycleitan Canon and further furnishes an account of Vesalius’s search for the homo absolutus and of the idealisation evident in his illustrations.

The Vesalian illustrations are both typical and ideal. The Polycleitan Canon also provides a basis for the attribution of these properties. It is known that Vesalius made many dissections and vivisections of animal anatomy; he read the works of Galen (amongst others) closely, accepting and rejecting various aspects of Galen’s anatomical account and representing some of his mistakes; he dissected still-born foetuses; and observed the human, adult corpse (invariably that of an executed criminal) in public dissections. The Vesalian illustrations are based on an array of observations, including those of actual human corpses, and also upon a range of theoretical ideas and preconceptions. They are, I suggest, also modelled on Polycleitus’s Canon and the proportionality, aesthetic and representational principles exemplified in it; upon aesthetic principles found within Renaissance artwriting; as well as upon ancient sculptures that were known in the Renaissance and that Vesalius and his draftsman would have seen and studied. What we find represented in the Fabrica is a body that is a typical, average, or archetypal human form. We also find an anatomical form that is more ideal than any that might be found in the actual world. Platonic forms are represented rather than forms that might be found in nature.

I hope to clarify what I refer to as the typical and the ideal aspects of the Vesalian anatomical form through an examination of the fifth-century BC Canon of Polycleitus and the Renaissance understanding of it. This tradition in human proportionality encompasses both the mean or average human form as well as the beautiful one. I also hope to provide a further facet to the art/nature relationship through an examination of the way that it was characterised in Renaissance art theory, and through the undermining of the distinction involved in the role that antique sculpture plays in determining the form of Vesalius’s illustrations. Indeed, Vesalius’s reference to Polycleitus is entirely compatible with my construal of his illustrations as representative of Platonic forms.
In this chapter I firstly shall consider Vesalius’s own references to Polycleitus, the *homo absolutus* and the *Canon*. I shall then examine the sources that we have for the Polycleitan *Canon* and the terminology that is involved in these references. This is followed by an examination of contemporary views about the *Canon* and the *Doryphoros* (the *Canon*’s exemplary sculpture, see fig. 30) in the secondary literature – including the notion of *symmetria* and the debate concerning the *contrapposto* pose of the *Doryphoros*. I then use Alberti’s *Tabulae dimensionum hominis* (discussed in chapter eight) that appears at the end of his *De statua* to compare the proportionality found in Vesalius’s first muscle figure with that represented in the *Doryphoros*.

**Vesalius’s references to Polycleitus, the *homo absolutus* and the *Canon***

In the *Fabrica* Vesalius refers once to the Statue of Polycleitus directly, and also, in a separate passage to the *Canon* and to the *homo absolutus* or perfect man. First, in a section entitled ‘What Sort of Body is Best for Dissection’, he writes:

*Corpus itaque publicae sectioni adhiberi convenit, in suo sexu quam temperatissimum, et aetatis mediae, ut ad hoc tanquam ad Policleti statuam alia corpora possis conferre.*

It is useful to compare ways in which translations of this passage differ. Richardson and Carman translate it as follows: ‘For a public dissection the best cadaver will be one that is in every way an average specimen of its own sex and is of middle age, forming a standard which, as with Polycleitus’ statue, other bodies may be compared’. Glenn Harcourt translates the same passage as stating: ‘It is desirable that the body employed for public dissection be as normal as possible according to its sex and of middle age, so that you may compare other bodies to it, as if to the statue of Policletus’. And, C.D. O’Malley, also translates ‘quam temperatissimum’ as ‘normal’. By contrast

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199 Vesalius, *De Humani Corporis Fabrica Libri Septem* (1543), 548.
Nancy Siraisi translates the passage as follows: ‘very temperate, according to the proper temperament for its sex, and of middle age, so that other bodies can be compared to this as to the statue of Polycleitus’.  

For a discussion of this see chapter five.  

Vesalius, De Humani Corporis Fabrica Libri Septem (1543), 280.

Later, in book seven, Vesalius writes:

Ado ut si quando in publicis sectionibus haec observo, ea tanquam non essent, tacite praeteream, ne artis candidati in omnibus corporibus haec observari arbitrentur. Idque tanto, non in sectionibus solum, sed modo in absoluti hominis historia persequenda, faciendum duxi studiosius, quanto pertinacius ipsos monstruosa illa admirari, experientia non semel didici: quam interim ipsis dolendum magis esset, tale ad integram sectionem corpus obtigisse, quod ab hominum canone plurium variat, nisi forte etiam crebro absolutorum et non monstruosorum hominum sectionibus astitissent, Galeni præcepta ad finem libri primi De administrandis sectionibus nobis datum nunquam negligentes.

I follow Siraisi’s translation:

So far, if I have observed these ['monstrous' aspects of anatomy] in public dissections, I would pass over them silently, in case candidates of this art would believe these to be seen in all bodies. But the more assiduously I have directed this to be done, not only in dissections, but also in pursuing the historia of the perfect man (historia absoluti hominis), the more obstinately have they marvelled at the monstrous things, as I have learnt by experience more than once. Meanwhile, it would be deplorable for these students to have happened on a body for a whole dissection which differed much from the canon of men,

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203 Siraisi, Medicine and the Italian Universities, 1250-1600, 302.
204 Ibid.
205 For the quotation in full see chapter five.
206 For a discussion of this see chapter five.
207 Vesalius, De Humani Corporis Fabrica Libri Septem (1543), 280.
unless they had assisted frequently at the dissections of perfect and non-monstrous men, not ignoring the precepts of Galen given to us at the end of the first book of the *On anatomical procedures*.  

In the first quotation Vesalius specifically refers to the statue of Polycleitus, recommending that the best type of body for a public dissection be analogous to it. He attributes to the statue the properties of being a ‘standard’ against which to compare other bodies and the attribute of being ‘normal’, an ‘average specimen’ or ‘most temperate’. In this second quotation, however, we see Vesalius identifying the *Canon* of men with the *homo absolutus*, the perfect man. It seems plausible to identify Vesalius’s reference to the ‘*Canon of men*’ with the *Canon* of Polycleitus. Elsewhere we see the phrase ‘*quod ab hominum canone plurium variat*’ translated as variation from a human ‘standard’, rather than ‘*Canon*’. Vesalius himself does use the term ‘*canon*’ referring to a model or standard, and it seems, given his earlier reference to Polycleitus, likely that this is being evoked in this context too.

The body that is best for dissection is both typical and ideal, and these features are visually identifiable in his anatomical illustrations. That is, the canonical and perfect body best suited for the didactic pursuit of public dissection was equally appropriate for the illustrations in the *Fabrica*. For public dissections the most normal and typical body was best, in contrast with private dissections, where students could learn from anomalies.

**Sources and Terminology**

Just five passages contribute to our current knowledge of the Polycleitan *Canon*. Of these five fragments which expound the principles of the *Canon* two

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209 They would, however, have more cause for regret if they got such a body for a full dissection, because it varies considerably from the human standard — unless they had also been many times present at dissections of perfect, not monstrous, humans, and were constantly heedful of Galen’s advice given us at the end of the first book of De anatomicis administrationibus’. See, Garrison and Hast, “On the Fabric of the Human Body: An Annotated Translation of the 1543 and 1555 Editions of Andreas Vesalius’ *De Humani Corporis Fabrica*,” book 3, chapter 7.
can be found in the work of Galen. I shall quote translations of these passages in full.\textsuperscript{210}

1. Many, though, have begun the construction of weapons of the same size, have made use of the same system of rules, the same types of wood and the same amounts of iron, and have kept to the same weight; yet of these some have made machines that throw their missiles far and with great force, while those made by others have lagged behind their specifications. When asked why this happened, the latter have not been able to give an answer. So it is appropriate to warn the prospective engineer of the saying of Polykleitos the sculptor: beauty, he said, comes about \textit{para micron} through many numbers. And in the same way, as far as concerns our science, it happens that in many of the items that go to make up the machine a tiny derivation is made each time, resulting in a large cumulative error. – Philo, Mech. Iv.49, 20.

2a. But those who are making progress, of whose life already, as of some temple or regal palace “the golden foundation has been wrought”, do not indiscriminately accept for it a single action, but using reason to guide them they bring each one into place and fit it where it belongs. And we may well conceive that Polykleitos had this in mind when he said that the task is hardest for those whose clay has come from the fingernail (Trans. F.C. Babbitt, slightly adapted by Andrew Stewart). – Plut. Mor. 86a.

2b. And in the arts, formless and shapeless parts are fashioned first, then afterwards all details in the figures are correctly articulated; it is for this reason that the sculptor Polykleitos said that the work is hardest, when the clay is at [or on] the fingernail (Trans. P. A. Clement, Loeb, slightly adapted by Andrew Stewart). – Plut. Mor. 636b-c.

3. This then is the mode of inquiry: to train to be able to recognise the mean [my emphasis] readily in each class of living thing, and indeed in all things, is not the task of any common man, but for the most industrious, who through long experience and comprehensive and detailed knowledge of everything arte alone is able to discover the mean. Thus do modellers, sculptors, painters, and indeed image-makers in general, paint or model the most beautiful likenesses in each case (that is, the most beautiful man, horse, cow or lion), by observing the mean in that case. And one might comment upon a certain statue, the one called the ‘Canon’ of Polykleitos, since it received this name from its having a precise

commensurability of all the parts to one another. – Galen, *De Temperamentis* I 566 (Kühn).

4. For Chrysippos showed this clearly in the statement from him quoted just above, in which he says that the health of the body is identical with due proportion in the hot, the cold, the dry and the moist (for these are clearly the elements of bodies), but beauty [my emphasis], he thinks, does not reside in the proper proportions of the elements but in the proper proportion of the parts, such as for example that of finger to finger and of all these to the hand and wrist, of these to the forearm, of the forearm to the whole arm, and of everything to everything else, just as described in the Canon of Polykleitos. For having taught us in that work all the proportions of the body, P. supported his treatise with a work of art, making a statue according to the tenets of the treatise and calling it, like the treatise itself, the Canon. So then, all philosophers and doctors accept that beauty resides in the due proportion of the parts of the body. – Galen, *De placitis Hippocratis et Platonis* v 448 (Kühn).

5. Now in every piece of work, beauty [my emphasis] is the product of many numbers, so to speak, that come to a kairos through some system of proportion and harmony, whereas ugliness is ready to spring into being immediately if only one chance element is omitted or added out of place. And so, in the particular case of a lecture, not only frowning, a sour face, a roving glance, twisting the body about, and crossing the legs, are unbecoming, but even nodding, whispering to one another, yawns, bowing the head, and all like actions are culpable and need to be carefully avoided’. – Plut. *Mor.* 45c-d (trans. F.C. Babbitt, Loeb, slightly adapted by Andrew Stuart).

Vesalius must have read the passage concerning the statue of Polycleitus in Galen, and may have encountered references to it elsewhere also, for example in Pliny the Elder’s *Natural History* (c. 77-79 CE). Following Galen, Pliny wrote that Polycleitus ‘alone of men is deemed to have rendered art itself in a work of art’. Kusukawa suggests that due to Galen’s association of the balance of humours constituting good health and the proportionality of parts of the body constituting beauty, ‘When Vesalius referred to the statue of Polycleitus, he was thus signalling an ideal human body of excellent Galenic warrant’.  


It is possible that Vesalius also encountered Polycleitan principles in the work of Plato. In his *Philebus* he writes: ‘If one were to remove from any of the arts the elements of arithmetic, proportion, and weight, what would remain of each would be negotiable indeed’.\(^{213}\) From these key passages a clear picture of the Polycleitan *Canon* emerges as a system for proportional representation of the body, achieved through the harmonious and mathematical relationship of the parts of the body to each other and to the whole, resulting in both a mean or average human form and also a beautiful one. It is interesting that Galen also specifically notes that the mean or average of a class of things is most commonly understood by practitioners of the representational arts, ‘image-makers’, who represent beautiful forms by ‘observing means’.

**Polycleitus, the *Canon* and the *Doryphoros***

Erwin Panofsky referred to Polycleitus as ‘the father, or at least the formulator, of classical Greek anthropometry’.\(^{214}\) And, J. J. Pollitt has given him the title ‘Father of Art Theory in the European artistic tradition’.\(^{215}\) As we have seen just fragments of Polycleitus’s fifth century BC writings survive, and the principles of the *Canon* are scattered in ancient literature. The original bronze sculpture that exemplified the theory does not survive. However, the Polycleitan style remained popular during the late Roman Republic and early Roman Empire, meaning that many Roman marble copies of his work exist today (indeed, fifteen of the *Doryphoros* itself), including the *Doryphoros* housed at the Museo Archeologico Nazionale in Naples (see fig. 30).

From both the textual and monumental evidence certain principles of the Polycleitan *Canon* can be drawn. *Symmetria* is the central element. This is the characteristic that all of the parts in a given body correspond to each other and to the whole. For example, the length of the palm needs to correspond to that of the fingers, the fingers to each other, and to the length of the forearm, and so forth. This mathematical commensurability of parts to each other and to the

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whole was supposed not only to result in a norm, but also in a perfect and beautiful form.

Polycleitus’s treatise is the earliest art theoretical treatise on sculpture of its kind, specifically addressing the representation of human proportion and its aesthetics. There may however have been earlier precedents. J.J. Pollitt notes:

If one assumes that there were practical workshop manuals in the Archaic period which tabulated the proportions and procedures by which a Kouroso, for example, was to be designed, Polyclit’s Canon might be viewed as a descendant of these manuals, augmented, however, by a greater knowledge of mathematics and geometry and also by a new philosophical purpose.\(^\text{216}\)

Many architectural treatises existed before it, as we know from Vitruvius listing them.\(^\text{217}\) J.M. Hurwit suggests that the notion of symmetria in the Polycleitian Canon may well be connected to discussion of it in earlier architectural treatises.\(^\text{218}\) It is not surprising that Alberti’s aesthetic principle concinnitas, examined in chapter eight, which also requires symmetria of objects that are to be deemed beautiful, appears in his book on architecture. Buildings are clearly bodies composed of a number of different parts that for practical reasons, as well as aesthetic ones, need to correspond to each other and to the whole.

Fractions, being mathematical expressions of the relationships between parts to each other and the whole, are that which govern the dimensions of the human form in the Canon. These are ultimately derived from the height of the figure represented. Importantly, this system has been referred to as ‘organic’. Unlike the Egyptian canon, Polycleitus’s does not contain a single set of prescribed equations. Panofsky writes: ‘Thus it is not a principle of mechanical identity, but a principle of organic differentiation that forms the basis of the

\(^\text{218}\) He writes: ‘The possibility that this tradition of professional treatises among architects had an important influence on the shaping of Polykleitos’ Canon has not received very much attention … [yet] the idea that there may have been some connection between theories of design in architecture and sculpture is not at all implausible’ in Ibid.
Polyclitan *Canon*. It is, in essence, teleological as the overall form and its spatial relations are determined by a central idea or principle.

What was supposed to emerge from these fractal relations was a human form that represents a norm or mean. As we have seen Galen locates the ability to identify means with artisans:

> to train to be able to recognise the mean readily in each class of living things, is not the task of any common man, but for the most industrious, who through long experience and comprehensive and detailed knowledge of everything are alone able to discover the mean. Thus do modellers, sculptors, painters, and, indeed, image-makers in general, paint or model the most beautiful likenesses in each case (that is, the most beautiful man, horse, cow or lion), by observing the mean in that case.220

These means, identifiable by artisans, Galen says, are also the ‘most beautiful likenesses’, but, likenesses to what? As I will argue in chapter five, perhaps Galen means the most beautiful likeness to a Platonic form or idea – the archetype of the thing that is being represented, in our case the human form.

The forms that resulted from the application of the Polycleitan *Canon* were also thought to be both perfect and beautiful, and these qualities are intrinsically linked. The type of perfection that is required is one that demands exactitude and precision. It must be such that no element could be added, or subtracted, or altered, without harming the overall design: ‘Beauty is the product of many numbers, so to speak, that come to a *kairos* through some system of proportion and harmony, whereas ugliness is ready to spring into being immediately if only one chance element is omitted or added out of place’.221 This idea of perfect beauty being such that nothing can be added, subtracted or altered except for the worse is taken up and developed in Renaissance artwriting.222 Galen explicitly notes the identification of *symmetria* with beauty in the *Canon*:

> but beauty [my emphasis], he thinks, does not reside in the proper proportions of the elements but in the proper proportion of the parts, such as for example

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220 Stewart, “The Canon of Polykleitos.”
221 Ibid.
222 I discuss this in chapter eight.
that of finger to finger and of all these to the hand and wrist, of these to the forearm, of the forearm to the whole arm, and of everything to everything else, just as described in the Canon of Polykleitos ... So then, all philosophers and doctors accept that beauty resides in the due proportion of the parts of the body.  

And, finally, there is the much quoted and disputed passage that: beauty, he said, comes about para micron through many numbers’.  

Beauty as it is conceived in the Polycleitan Canon is an attribute belonging to the object judged and not a subjective judgement. It is something that results from precise mathematical relationships, and exact measure. There is no attribute of an object that is more thoroughly objective than its own spatial relations or the space that it occupies. Symmetria, we could say, is essentially an objective aesthetic law.

Turning now from the literary to the monumental evidence, I shall introduce the Doryphoros and some of its general features (see fig. 30). Later, in chapter seven I examine the poses of the Vesalian figures in relation to other examples of ancient and Renaissance art. Here I shall consider that of the Doryphoros. The pose of the Doryphoros itself is particularly striking. While it clearly stands in a contrapposto stance there is little agreement as to which part of the stride is being represented. However, it seems that the figure is representing a body in motion. The head is turning to its right and is slightly tilted downward, as if the figure is looking into the distance at the height of a horizon. What is represented is a moment of action frozen in time. Unlike earlier sculptural examples, the shifting of weight from one foot to the other, and the motion that is captured, lends a serpentine line to the composition. Considering the figure from its anterior position, the viewer’s eyes meet the gaze of the Doryphoros, travels across to its left shoulder, back to the right hip, and finally to the left foot. The serpentine line is also particularly evident from the posterior view. This is enhanced by what has been called its ‘symmetrical asymmetry’. The Doryphoros is supposed to be viewed from all four angles as well as, like most sculpture that is in the round, travelled around. Its

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223 Stewart, “The Canon of Polykleitos.”
224 Ibid.
quadfrontality is evident in a complaint recorded by Pliny that ‘the Polykleitan statues were all “four-square” (quadrata)’, however, as Carpenter notes, this is due to ‘the accurate observation that only the four cardinal aspects had been the sculptor’s concern’.226

It was Pliny who first attributed the invention of the contrapposto stance to Polycleitus, writing: ‘It was purely his own invention to make his statues throw their weight on one leg’.227 There is little agreement as to whether the figure is in fact static or moving. Rhys Carpenter, for example, sees it as expressing ‘the body at rest in a moment of suspended action, of the athletic nude in heroic strength’.228 As Richard Tobin notes:

the Doryphoros figure has been interpreted as ambling, as striding, as marching, as pausing in stride, as only appearing to pause in stride, as stationary or standing, as artificially fusing action and repose, as artfully capturing the living balance at work in all attributes of the figure, active or passive, and as abstractly defining rest as a moment or a mode in the cycle of movement. And finally many studies simply ignore the issue of pose altogether ... there is still no consensus on the static or dynamic nature of the figure’s pose, nor any strong sense of our need to reach one.229

Tobin also points out that the dynamism that we see represented offers insight into the interpretation of the statue. He writes: ‘the specific kinetic moment which it represents is critical to the sculptor’s intentions, and hence to our interpretation of its import’.230 In this essay Tobin examines the pose of the Doryphoros against contemporary kinetics and kinematics. From this analysis he concludes that the figure is in fact a moving one; that it depicts an ‘upright figure in a very early stage of walking, having started from a stationary stance ... Polycleitos has depicted a slowly moving figure as it has just stepped off from a stationary stance’.231 Tobin’s argument is premised on the claim that a high degree of anatomical knowledge was available to fifth-century sculptors. This he argues for by comparing Hippocratic texts with the movement he has

226 Ibid., 107.
228 Carpenter, Greek Sculpture, 108.
230 Ibid.
231 Ibid., 55.
claimed is expressed in the sculpture. As I examine in the following chapter, the artistic problem of representing a body and its muscles as moving is central to the standing animated muscles figures in the *Fabrica*.

**Measuring Vesalius’s Illustrations and the *Doryphoros***

Vesalius’s illustrations clearly exhibit the principles set out in the *Canon* as they are expressed in the literary evidence. All of the parts of the body relate to each other and to the whole in a proportionate, harmonious and teleological way. The literary sources for the *Canon* show that it is essentially qualitative. Yet, while no actual measurements are prescribed in the literary sources they can be drawn from the monumental evidence. No particular statue had been associated with the *Canon* in Vesalius’s time, we nonetheless know that the *Doryphoros* embodies the theory to which Vesalius directly refers. In chapter eight I consider Alberti’s *Tabulae dimensionum hominis* (Table of Measurements of Man) that appears at the end of his *De statua*. This provides a means for comparing the proportionality of Vesalius’s illustrations to Alberti’s own recommendations as well as to the *Doryphoros*. Using Alberti’s fractal system of *pedes* (feet), *gradus* (degrees), and *minuta* (minutes) – which I describe in chapter eight – we see that Vesalius’s first muscle figure (fig. 6) resembles the *Doryphoros* (fig. 30) very closely in measurements of height, but deviates where muscle bulk is concerned. For example, the ratio of the distance from the foot to the navel to the total height – 60% – perfectly matches the *Doryphoros*; while the width of the thigh at 11% of the total height is greater than that of the *Doryphoros* for which the corresponding ratio is 9.6%. This is exactly what we would expect. The second half of this thesis examines the way that Vesalius’s illustrations adhere to the basic proportionality and aesthetic expressed in the *Canon*, but also embellish this in the manner typical of Hellenistic sculpture and High Renaissance style.

**Conclusion**

This chapter has introduced Vesalius’s references to the *Canon* of Polycleitus and the *historia absoluti hominis*. While Vesalius does not offer a direct

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statement about the aesthetic style of his illustrations and their idealisation, I suggest that these references to Polycleitus, his *Canon* and the ‘perfect man’ point directly to an ancient means for proportional representation of both a mean and beautiful figure. While Vesalius only mentions that this is the type of body best for public dissection, the illustrations themselves demonstrate adherence to this proportional mode of representation as well as its associated aesthetic.

While embodying the principles for the proportionate representation of a human form as they are set out in the Polycleitan *Canon* it is also clear that the Vesalian illustrations represent a style characteristic of the art of the High Renaissance. His illustrations involve stylistic embellishment that builds upon the austere rules of the *Canon*.

In chapter seven I examine ancient and Renaissance artworks in an attempt to argue that Vesalius and his draftsman looked to specific artworks in their delineation of the illustrations in the *Fabrica*. However, in the next two chapters to follow I turn my attention towards the work of Plato and Galen. That Vesalius’s text and illustrations embody a Platonic and Galenic understanding of art, nature, teleology and form is entirely consistent with the notion that they embody the principles set out in Polycleitus’s *Canon*. 
Chapter Five: Ideal Anatomical Form in Plato and Galen

Introduction

Vesalius’s references to the Canon of Polycleitus and the historia absoluti hominis constitute the starting point for my investigation into the idealised style of his illustrations. The Polycleitan Canon was not only a practical manual for tabulating ideal human proportions in art, it also contained a clear philosophical purpose. The concept of symmetria, which lies at the very heart of the Canon, and the concurrent notions of measure and order, are central components of ancient thought. In this chapter I suggest a framework derived from Plato’s Timaeus and Galen’s De usu partium corporis humili (On the Usefulness of the Parts of the Body) – that is from the history of natural philosophy and medicine – that offers a theoretical basis for understanding the idealised style of Vesalius’s illustrations. In both of these texts the anatomical forms described are directly analogous to the Canon of Polycleitus. These texts, I claim, constitute a lineage of thought and an account of nature, teleology and form that directly influenced Vesalius.

Plato’s theory of forms and what I call his ‘consciousness-based teleology’ offers an account of nature, beauty and the human body that is consistent with that found in the Fabrica. Vesalius would have had access to Marsilio Ficino’s translations and commentaries on Plato. Ficino first published the complete works of Plato into Latin in 1484. He also wrote numerous commentaries on Plato’s works which presented Plato as a prisci theologi (ancient theologian) and his work as prefiguring Christian truths. While his translations adhere closely to Plato’s original texts, his commentaries present a Christianised Plato. I argue that Vesalius represents a specifically Ficinian account of beauty and the ideal, found in his commentaries on and translations of Plato’s Timaeus and his Symposium on Love. In particular, in Ficino’s Compendium in

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233 Siraisi, Medicine and the Italian Universities, 1250-1600, 279–280.
235 Kodera notes that ‘Ficino’s translation of Plato adhered closely to the original text and was therefore highly influential well into the nineteenth century’ in Ibid., 49.
Timeum, his commentary on Plato’s Timaeus which serves as a preface to his translation (1484, 1536 and 1571), we find the term absolutus used to designate a specific form of perfection. Furthermore, in his commentary on the Symposium on Love we find an account of temperament or ‘temperatissimum’ and the relationship of internal and external perfection. These are the very terms employed by Vesalius to refer to the Polycleitan-like body that he says is best for public dissection, and, by extension, that which is represented visually in his illustrations. I suggest that there is also a clear sense in which the beautiful and absolute Platonic forms are analogous to the Polycleitan Canon.

In this chapter I suggest that the Galenic account of art, nature, teleology and form found in his On the Usefulness of the Parts of the Body derives from Plato (in particular, we see that Plato’s consciousness-based teleological account of nature and the human body underpinned Galen’s account of human anatomy, its forms, functions and purposes). I outline Galen’s conception of anatomical form, discuss its relationship to the soul and consider his account of nature and the art/nature relations that are found in On the Usefulness of the Parts. Galen’s view that the construction of art is the ultimate end of human nature offers an original interpretation of the art/nature relationship, one that is adopted by Vesalius. The translations of Galen that Vesalius would most likely have been familiar with include those of Johannes Guinther and Niccolò da Reggio.

As we have seen Galen is an important source for our knowledge of the Polycleitan Canon. In his De Placitis Hippocratis and his De Temperamentis Galen says that beauty resides in the commensurability of parts to each other and to the whole as is written in the Canon of Polycleitus and he implies that Polycleitan proportions were all directed towards the end of capturing the mean in whatever form was being represented. I suggest that the methodology employed by Galen in his On the Usefulness of the Parts, to discover the ‘true’ function of each part of the body, employs the Polycleitan principle of symmetria. This he also associates with beauty. Indeed, the body described in Galen’s On the Usefulness of the Parts is the perfect, true and beautiful human

\[\text{\footnotesize \cite{236} I refer to the 1571 edition.}\]
form, arrived at through a method analogous to that described in Galen’s own references to the *Canon* of Polycleitus.

In chapter three I introduced the art/nature debate and Newman’s discussion of it in the history of alchemy. The art/nature debate, in Newman’s alchemical case, is predicated on Aristotelian natural philosophy. However, when looked at through the lens of the history of medicine, and its illustration, further facets of the distinction come into focus. Rather than examining Vesalius’s illustrations through the lens of Aristotelian natural philosophy, I do so through the writings of Plato and Galen. I offer a framework for the Vesalian illustrations, by tracing the concepts of art, nature, form and teleology through the work of these classical authors. Of course, one ought not rule out the applicability of Aristotle to Vesalius, however, as I argue below, Newman’s narrative needs to be substantially augmented in order to capture the full richness of Vesalius’s conceptual heritage.

**Plato’s Consciousness-based Teleology, Nature, Form and Beauty**

In his *Timaeus* Plato presents an account of the creation of the universe and of everything contained therein. The divine world, as Ficino notes in his commentary on this work, is the cause and *model* of the natural world.\(^{237}\) The divine realm and that of the natural world are essentially continuous. Ficino adds, ‘Plato, while speaking of the divine world in the *Parmenides*, occasionally moves down to the natural world, and when dealing in the *Timaeus* with the natural world he quite often soars up to the divine world’.\(^{238}\) In his commentary Ficino emphasises the continuity between divinity and nature in Plato’s *Timaeus*, and the way in which knowledge of the divine world can be obtained through study of mathematics, the ‘mean between the divine and the natural world’.\(^{239}\) Pure mathematics, an abstraction from physical objects, indicates knowledge of the divine, while measurement of objects in nature provides the means for discovering the expression of the divine aspect contained within it. While the world of matter, in the Platonic tradition, is

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\(^{237}\) Ficino, *All Things Natural*, 3.

\(^{238}\) Ibid.

\(^{239}\) Ibid.
sometimes viewed negatively, it is also the first of God’s creations and always bares the imprint of the divine.\footnote{Kodera notes that ‘We may detect in the entire Platonic tradition a characteristically ambivalent attitude towards embodiment: for the individual soul, matter is a prison, but from the perspective of creation as a whole, matter is a necessary constituent of the cosmos’ in Kodera, “Matter as Mirror: Marsilio Ficino and Renaissance Neoplatonism,” 51.}\textsuperscript{240}

Vesalius’s reference to his search for the \textit{historia absoluti hominis} appears within the context of the discussion of a normal or typical human form that is best for dissection, in contrast with that which is abnormal. In the other key passage, also discussed earlier, Vesalius refers to the type of body that is best for dissection, stating that it be \textit{quam temperatissimum}. This is often translated as ‘normal’, but Nancy Siraisi translates it as ‘very temperate’, due to the role that the theory of temperaments played in medical thought contemporaneous with Vesalius.\footnote{Siraisi, \textit{Medicine and the Italian Universities, 1250-1600}, 302.}\textsuperscript{241} Through an examination of Ficino’s translations and commentaries on Plato’s \textit{Timaeus} and his \textit{Symposium on Love}; Plato’s theory of forms; his consciousness-based teleology; and in his notion of beauty I suggest that we find an epistemology that directly underpins Vesalius’s thinking. The term \textit{absolutus} can be found in Ficino’s commentary on Plato, and offers a sense in which we might understand the perfection that Vesalius was searching for (and would represent visually in his illustrations) in his quest for the \textit{historia absoluti hominis}. Furthermore, in both Ficino’s commentary on the \textit{Timaeus} and on the \textit{Symposium on Love} we find references to perfect health (the mean balance of humours) as the expression of internal perfection, while beauty is the expression of external perfection. In this section I outline Plato’s theory of forms and his consciousness-based teleology, and suggest that it is divine Platonic forms that Vesalius aims at describing verbally and representing visually in his \textit{Fabrica} – discovered through mathematic measurability of particulars in nature. While there are exceptions which have been noted in the introduction, overall the absolute or perfect form of the body (derived from Ficino’s Plato) is represented in Vesalius’s illustrations. This is, in turn, analogous to the Polycleitan form.
Plato’s Teleology

Plato’s teleology is fundamentally different to that found in Aristotle. His teleological view of the body and of nature depends in a crucial sense upon his notion of a divine Craftsman, while Aristotle’s does not. R.J. Hankinson has argued in his paper ‘Galen and the Best of All Possible Worlds’ that Galen’s teleology is akin to Plato’s ‘directed teleology’, while he is found to be ‘explicitly rejecting teleology of a more limited kind, such as that associated with Aristotle [non-directed]’. I call the form of teleology that posits a divine consciousness ‘consciousness-based teleology’. Following Hankinson, among others, I take it that Galen adopts the teleology of Plato, and his divine Craftsman. I argue that this type of teleology, that is dependent on positing a divine consciousness, underpins Vesalian anatomy and is directly relevant to the idealised style of his illustrations. The consciousness-based teleology that underpins Vesalius’s work is, I argue, influenced by that found in Plato and Galen. However, Vesalius’s Plato is Ficinian.

Plato’s *Timaeus* involves an account of the formation of the universe and all that is contained within it. This includes the soul of the world, time, space, the elements, astronomy, the creation of humanity, our psychology and physiology, and the creation of animals. According to Plato the universe and the life contained within it is intelligible. He states that it has been ‘framed in the likeness of that which is apprehended by reason and mind’. It is ultimately knowable. Plato’s universe was created by a creator God and creator gods, and it was so in their own image. Chains of the Creator’s *logismos*, its thought and reasoning, brought the universe into being, piece by piece.

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242 R.J. Hankinson explains what a directed teleology is as follows: ‘In general, a teleology is directed in this sense if the explanations which it countenances make reference, either directly or indirectly, to consciously entertained purposes. It is not enough, for a directed teleology, simply to invoke the final condition towards which a process tended as part of the explanation of that process; you need also to talk in non-metaphorical language, of the plan which is being affected, of the design that is being accomplished. Directed teleology, then, involves the positing of consciousness, which considers how things ought to go, make plans in accordance with those considerations, and then acts in accordance with those plans’ in R. J. Hankinson, “Galen and the Best of All Possible Worlds,” *The Classical Quarterly* 39, no. 1 (January 1, 1989): 208, doi:10.2307/639253.


piece, according to specific ends and purposes. The teleology that can be observed in the world was imbued within it during its very inception, and this teleology is the product of a divine, rational consciousness. Plato’s universe and human physiology on his view are thoroughly teleological.

In Ficino’s commentary on Plato’s *Timaeus* he emphasises God, or the Good, as the threefold cause of the world – the efficient, model and final cause. ‘The efficient cause is divine power, intelligence and will; the model cause comprises ideas conceived by divine intelligence, and the final cause is the Good’.246 He says that, on Plato’s view, ‘God is the maker of all, the model of all, and the end of all’.247 Nature is thoroughly teleological, and God can be understood as the threefold cause.

For Plato, the human body is seen as a microcosm of the larger macrocosm. Benjamin Jowett has observed: ‘we find much that is derived from his [Plato’s] theory of the universe, transferred to man, as there is much also in his theory of the universe which is suggested by this’.248 Plato construed the Creator of the universe, his *Demiurge*, as a Craftsman. Friedrich Solmsen notes an analogy between the creative acts of Plato’s Creator and those of artisans. He writes: ‘Many of the verbs employed by Plato suggest a carpenter’s or builder’s work’.249 Plato frequently refers to the Creator as a ‘Framer’,250 and speaks of him ‘framing the soul’251 and ‘framing the universe’.252 As is the case in the human construction of artificial products, the products of Plato’s divine Craftsman, are the product of purposive action. They have been brought into being according to an end, and can therefore be comprehended in teleological terms. The notion of God as an architect is also present in Ficino’s interpretation of Plato. He notes that way that Plato ‘often says that God, in the manner of an architect, pondered and deliberated on the construction of

247 Ibid., 14.
251 Ibid., 36d, 1166.
252 Ibid., 30b, 1163.
the work.\footnote{253 Ficino, All Things Natural, 23.} He also, speaks of God as generating the ‘various houses of creation’, and construes God as a potter who at once creates the clay, forms it into a shape, and moves the wheel.\footnote{254 Ficino, In Timaeum chapter 16, OO 1444/440: ‘Profecto si posset architectus humanus dominari materiae, postquam plura aedificia effecisset, quorum quotidianum tandem circumvallaret: Deus autem potest omnino, cum sit materiae dominus’ cited in Kodera, “Matter as Mirror: Marsilio Ficino and Renaissance Neoplatonism,” 56.} As I noted earlier, architectural metaphors also permeate Vesalius’s account of the body in the Fabrica.

Plato conceives of the human body in teleological terms. The primary purpose of the human body, according to Plato, is that it functions as a house for the immortal soul. The immortal soul, he tells us, is created in the Creator’s own image. He writes: Now of the divine, he himself [the Creator] was the Creator, but the creation of the mortal he committed to his offspring. And they, imitating him, received from him the immortal principle of the soul, and around this they proceeded to fashion a mortal body, and made it to be the vehicle of the soul’.\footnote{255 Plato, “Timaeus,” 68c, 1193.} Just as art is, on Plato’s view, an imitation of an imitation of the original ideas, we, the producers of art, are imitations of imitations of the original Creator. Plato was a mind/body dualist. The body was merely a mortal house for the soul, and when the body died the soul left it. The body, according to Plato, is built up out of the four elements. Flesh and sinews were created out of blood, and blood, in turn was the product of digested food, while a byproduct of the flesh and sinews created the bones. This process constitutes the natural, healthy state of human growth. Illness, according to the Timaeus, occurs when this process goes into reverse. Consequently, degeneration and decomposition occur.

Plato’s discussion of human anatomy and physiology, in the Timaeus, is framed in teleological terms. For example, he construes the hands and legs as ‘instruments of locomotion’ and states that it was ‘for this reason [i.e. end] that they were attached to every man’.\footnote{256 Ibid., 48a, 1173.} Elsewhere he writes: ‘God invented and gave us sight to the end that we might behold the course of intelligence in the heavens, and then apply them to the courses of our own intelligence which are akin to them’.\footnote{257 Ibid., 47b, 1175.} Plato believed in a tripartite division of the soul (as Galen
would too), and its location in the brain, heart and liver. He maintained that the diaphragm itself was put in place to serve the purpose of a wall or divide, sectioning off the heart from the liver, and the higher emotions from the lower ones. The neck he conceived as serving a similar function, sectioning off the rational part of the soul, contained in the head, from the lower parts, in particular the passions of the heart. Plato’s theory about respiration, digestion and circulation of the blood is also teleological. His physiology depends on his Pythagorean belief that the body is made up of tiny triangles and on his notion of an internal heat or fire. Digestion, for example, occurs due to the comparative sharpness of the triangles that make up the body compared to those that make up food. He says of the elements involved in the digestive process: ‘God employed [them] for the sake of distributing moisture from the belly into the veins, weaving together a network of fire and of air like a creel’. Plato also believed that the human form was perfectly fitting for its function. Given that the human form was created by a divine consciousness with specific ends in mind, the human anatomical form perfectly reflects its ends and is therefore perfectly fitted to these ends. Plato notes his belief that if the human head had been more muscular, fleshy and strong we would all live longer, healthier and more pain-free lives. But, he writes:

our creators, considering whether they should make a longer lived race which was worse, or a short lived race which was better, came to the conclusion that everyone ought to prefer a shorter span of life, which was better to a longer one, which was worse, and therefore they covered the head with thin bone, but not with flesh and sinews ... [allowing for] more wisdom and sensation than the rest of the body’. In Ficino’s commentary on Plato’s Timaeus he discusses the relationship of the body and the soul. He writes that ‘the servants of God then continued to craft the human body, fastening it together with invisible bonds to indicate that the human constitution is so tempered and so similar to the heavens that a

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258 Ibid., 69 d–e, 1193. 
259 Ibid., 78b, 1199. 
260 Ibid., 75b–c, 1197.
departure from the elemental qualities is scarcely apparent in it’. Ficino emphasises the ‘relation of humours and complexions and the miraculous artistry of the human body’. He notes that he has read about this in the writings of ‘Galen the Platonist’.

**Plato’s Theory of Forms**

Plato’s theory of forms, or theory of ideas, is not set out in any single text, but is a theory that permeates much of his writing. In both his *Parmenides* and his *Philebus* Plato is critical about the premises upon which his theory of forms rests, although here I am concerned with introducing his positive view. Plato assumes that when we apply a name to a particular thing in the world, for example ‘sofa’, we refer to something in common between the particular sofa to which we refer, and all other sofas in the world. What all particular sofas have in common is the idea or form of a sofa that exists outside of space in what is commonly referred to as ‘Plato’s Heaven’. Plato uses the terms ιδέα and ειδώς to refer to ideas or forms. He is very much a realist about them. In chapter three I discussed Plato’s negative evaluation of the mimetic representational arts. This evaluation was based upon his realism about forms. For Plato the idea of a sofa was created by God, and is the real, original, version of it. A sofa made by a carpenter, is then a copy of the original idea, and a painting representing that carpenter’s sofa is imitative twice over, as it is a copy of a copy of the original idea.

In the *Republic* Plato states simply that ‘We are in the habit, I take it, of positing a single idea or form in the case of the various multiplicities to which we give the same name’. Elsewhere, in the *Meno* Plato discusses the forms of virtue and of strength. He writes: ‘Then do the same with virtues. Even if they are many and various, yet at least they all have some common character which makes them virtues. That is what ought to be kept in view by anyone who answers the question, what is virtue?’ And, ‘If a woman is strong, will it be the same thing, the same strength, that makes her strong? My meaning is

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261 Ficino, *All Things Natural*, 90.
262 Ibid., 98.
263 Ibid.
265 Plato, “Meno” in Ibid., 72c, 335.
that in its character as strength, it is no different, whether it be in a man or woman.266 To offer one final example, in Plato’s Symposium he says of the idea of beauty:

> And now, Socrates, there bursts upon him that wondrous vision which is the very soul of beauty he has toiled for so long. It is an everlasting loveliness which neither comes nor goes, which neither flowers nor fades, for such beauty is the same on every hand, the same then as now, here as there, this way as that way, the same to every worshiper as it is to every other. Nor will his vision of beauty take the form of a face, or of hands, or of anything that is of the flesh. It will be neither words, nor knowledge, nor a something that exists in something else, such as a living creature, or the earth, or the heavens, or anything else that is – but subsisting of itself and by itself in an eternal oneness, while every lovely thing partakes of it in such sort that, however much the parts may wax and wane, it will be neither more nor less, but still the same inviolable whole.267

While there are many more examples, this small sample of quotations, points towards the meaning of Plato’s theory of forms. Forms are, for Plato, the most real types of things, to which all particular things in the world refer.

Plato’s doctrine of the immortality of the soul explains how it is that we can have knowledge of forms that exist outside of space and time. In the Meno Plato writes: ‘Thus the soul since it is immortal and has been born many times, and has seen all things both here and in the other world, has learnt everything that there is. So we need not be surprised if it can recall the knowledge of virtue or anything else which, as we see, it once possessed’.268 To demonstrate this, the character in the dialogue, Socrates, shows that a slave-boy, who has no previous knowledge of geometry, is able to complete a mathematical proof. He demonstrates that the boy has innate knowledge of things because he is able to recall the knowledge required to complete the proof, through the process of Socrates questioning him on it, without having had to be taught it. The character Socrates says that:

> Either he has at some time acquired the knowledge which he now has, or he has always possessed it. If he had always possessed it, he must have always known; if on the other hand he acquired it at some previous time, it cannot have been in

266 Plato, “Meno” in Ibid., 72e, 335.
268 Plato, “Meno” in Ibid., 81c, 364.
this life, unless someone had taught him geometry. He will behave in the same way with all geometric knowledge, and every other subject. Has anyone taught him all these? 269

The character Socrates concludes that if the truth about reality has always been in our soul, then the soul must be immortal. Forms, for Plato, are identical with the common content of a class or type of things. Accordingly, we have a priori knowledge of forms because the soul is immortal and has, at times, existed outside of space and time as the forms do, and has encountered them in previous incarnations.

Ficinian Forms

It is within the context of discussing the imperfection and deformity of forms in nature, in his Compendium in Timeum, that we find Ficino’s use of the term absolutus. He writes:

That the world is made by something other than by itself he [Plato] shows by the fact that, although it is fully complete in its physical nature, it is not totally complete in its absolute nature, since it admits of irregularities and deformities through the nature of matter, and through the nature of measurement it suffers defects in its excellence and is open to division. 270

Just as Vesalius’s use of the term homo absolutus occurs in his discussion of abnormal or ‘monstrous’ anatomical deformities, so too does Ficino refer to absolute or perfect forms in contrast to irregular and deformed forms. Elsewhere in his commentary Ficino elaborates on the absolute forms. He writes: ‘Likewise, the intellect is the first of all things to be created by God, and the intellectual aspect, that is, the absolute order of things, is the last of all to shine back from the mirror of nature, that mirror to which natural forms tend even closer as if to their end’. 271 On Ficino’s account of Plato, absolute or perfect forms are purely intellectual forms upon which the extended and

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269 Plato, “Meno” in Ibid., 85d–e, 370.
270 Ficino writes: ‘Mundum vero esse ab alio ex ea indicat, quod etsi pro natura corporea perfectissimus est tamen pro absoluta natura non est omnia perfectus, cum propter materiam patiatur informia vel deformia, propter dimensionemque subeant virtutis defectum divisionem’ in Marsili Ficino, Omnia d. Platonis opera tralatione Marsilij Ficini, & ad Graecum codicem accurata castigatione: Quae recenti hac editione nostrae multo quàm antea omatiora, & locupletiora sunt facta (Venice, 1571), p. 388, cap. 6. Translation is by Arthur Farndell. See, Ficino, All Things Natural, 11.
271 Ibid., 51.
imperfect forms of nature are modeled. Ficino offers an explanation of how it is that we can come to have knowledge of absolute forms and proportions. He writes:

Indeed, the soul would not be able to discern the universal harmony and appreciate the absolute proportions, both in air by means of music and in the body by means of nature, unless it had their cause within itself and unless there were within it a harmony rising above the harmony produced therefrom in all else. For our soul contains the proportions contained in the world soul. For this reason, both in the world-soul and in our own the ratios are not mathematical but natural; they have power, and are to be not only judged, but also constructed and produced, in accordance with mathematical proportions.272

While Ficino emphasises the continuity between the divine world and the natural world, in his commentary on the Timaeus, he also carefully distinguishes between them. Nature, or ‘the visible world’ is constantly in a state of flux and is subject to imperfections and deformities. The visible world merely resembles in form the intelligible and intellectual divine realm which contains ‘the models for all things that come into being in this visible world’.273 Ideas, on Ficino’s interpretation of Plato are intelligible thought in the language of mathematics. Their pale early copies are extended in space and time can be measured, and the divine mathematical form can be discovered.

Ficino employs a mirror metaphor (as in the quotation above)274 to convey his understanding of nature and of the relationship between the body and the soul. The image of God is, at it were, reflected in the forms found in the mirror of nature. In discussing ‘Ficino’s Narcissistic Account of Divine Creation’ Kodera writes, for Ficino:

When God looks at this shadow/matter it turns into a mirror, reflecting the image of the creator. Hence, matter is a mere (yet primordial) shadow, something without real existence that God converts into a mirror reflecting his own image. Matter is created and at the same time shaped by a divine glance. By begetting matter in this way, the supreme creator does not part with

272 Ibid., 53.
273 Ibid., 16.
274 See footnote 271.
anything, does not lose or even diminish his integrity: he only gazes at his own image.\textsuperscript{275}

The Relationship between Ideal Forms and Beauty in Ficino’s Plato

According to Ficino’s interpretation of Plato beauty is ‘an image of the eternal model’.\textsuperscript{276} Given that the natural, visible world is modeled upon, and indeed is an image of, the divine world, beauty is the expression of the divine world found in nature. While absolute or ideal forms are not found to be complete in the flux of physical nature, full of deformities and irregularities, each particular in nature, nonetheless, has a divine form as its model. Ficino explicitly states that mathematics is the link between divine and natural forms. Therefore, beauty is necessarily an intrinsically mathematical property of objects. It is also to be found in the most typical or normal expression of a given type of thing, for it is this which will most closely resemble the eternal and divine model of that form. While no exact expression of divine forms will ever be found in nature a mathematical measuring and averaging of a larger number of particulars of the same kind would offer a means for its discovery. Indeed, this method is analogous to that which is found in the Polycleitan \textit{Canon} as well as to that recommended by Alberti in his discussion of the aesthetic principle \textit{concinnitas}. That which is beautiful is that which most closely resembles the divine form upon which it is modeled and of which it is an image. Beauty can be found therefore in the most typical aspects of an object, in what a given class of things has in common.

In Ficino’s commentary on Plato’s \textit{Symposium on Love}, love is construed as the desire for ideal beauty. In his attempt to define beauty he presents both the Aristotelian and the Platonic definitions. As Sears Jayne notes: ‘The Platonists defined beauty as an abstract universal existing separately in the mind of God, whereas the Aristotelians defined beauty as an abstraction generated by the individual human mind from many particular sense experiences’.\textsuperscript{277} In his introduction to his translation of this commentary Jayne notes the way that:

\textsuperscript{275} Koder, “Matter as Mirror: Marsilio Ficino and Renaissance Neoplatonism,” 74–75.
\textsuperscript{276} Ficino, \textit{All Things Natural}, 24.
in the opening section of *De amore* (1.3-4), he [Ficino] gives as the basic working definition of beauty simply the commonsense definition which he knew that his artist friends would approve, the pragmatic Aristotelian definition employed by Alberti, that beauty is a way of ordering experience. Elsewhere, however (v.5), he also gives the Platonic definition of beauty as participating in an undefinable Ideal.\(^{278}\)

In his commentary on this work Ficino distinguishes between internal perfection (goodness) and external perfection (beauty). He says: ‘that which is completely good and beautiful we call blessed, since it is perfect in every part’.\(^{279}\) In discussing this distinction Ficino employs an interesting example. He writes:

> This distinction we can certainly observe in all things. Certainly in precious stones, as the natural philosophers say, a certain *very temperate* internal combination of the four elements produces an external sparkle. Moreover, an innate fecundity in the roots and stems clothes herbs and plants with the most attractive variety of flowers and foliage. And in animals a healthy complexion of humours producing a pleasing appearance of line and colour [my emphasis].\(^{280}\)

A temperate internal combination and balance produce external beauty. A relationship exists between the internal and the external elements of an object. For Ficino there is an immediate relationship between these internal and external aspects of a thing. Indeed, just as Galen related the internal balance of humours that constitute perfect health to the external balance and relation of parts to each other and the whole exemplified by the Polycleitan *Canon*, Vesalius also uses the term ‘*quam temperatissimum*’ or ‘very temperate’ in his reference to the type of figure that is best for dissection. There is in Ficino’s commentary, too, a mirroring between internal balance that constitutes health and external balance that constitutes beauty. He writes that our body must be ‘very similar to the heavens, the substance of which is temperate... thus celestial splendor will easily appear in the body similar to heaven. And the perfect form of man, which possesses the mind, will come

\(^{278}\) Ibid., 14.  
\(^{279}\) Ibid., 83.  
\(^{280}\) Ibid., 83–84.
about according to its nature in peaceful and obedient matter’. For Ficino, the proper internal balance of elements, humours, and temperaments and the external balance that constitutes the appearance of beauty constitute the appearance of ‘celestial splendor’ in the body.

Platonic Forms and the Polycleitan Canon

There is a direct sense in which the beautiful and absolute Platonic forms relate to the Polycleitan Canon. As I discussed in chapter four, Polycleitus’s Canon, especially as it is described by Galen, says how an ideal and beautiful human form can be achieved through fractional mathematical relations. Just as the Stoic philosopher Chrysippus had identified bodily health with the harmonic relation and balance of the humours, Galen adds that beauty for Polycleitus, analogously, lies in the perfect commensurability of the parts of a statue to each other and to the whole. Mathematically expressible proportions produce the ideal and perfect human form. Order and measurability lie at the heart of the Canon’s method for achieving the perfect and beautiful representation of the human form. Analogously, measure and beauty are virtually indistinguishable in Plato. In the Politicus (283E-284B) Plato says that measure has an absolute essence and is not simply a relative comparison of pairs of opposites. If it were, he says, the arts would be destroyed:

Well then, will we not destroy the arts themselves and all their products with this doctrine? For all these are in some degree concerned about excess and deficiency with regard to the mean (to metrion), treating it not as if it were nonexistent but as a real difficulty to be faced in the process of practical undertakings, and by preserving measure (to metrion) in this way, they produce works that are good and beautiful. 282

And in the Philebus Plato says that ‘Measure and commensurability, as it turns out, are everywhere identifiable with beauty and excellence’. Just as symmetria and measure lie at the heart of the Polycleitan account of beauty so too do they lie at the heart of Plato’s understanding of beauty and the good.

283 Plato, Philebus 64E cited in ibid.
Viewing the style of Vesalius’s illustrations as Polycleitan in character is entirely compatible with viewing them as visual representations of Platonic forms.

Galen the Platonist: The Art/Nature Debate, Teleology and Form in Galen’s On the Usefulness of the Parts

In his commentary of Plato’s Timaeus, Ficino refers to ‘Galen the Platonist’. It appears that many threads of Platonic thought were directly adopted by Galen. Galen’s De placitis Hippocratis et Platonis (On the Doctrines of Hippocrates and Plato) is clearly Platonic, involving a direct defense of Hippocrates and Plato, and a rejection of Stoicism and the views of Chrysippus that were dominant during Galen’s time. However, whether his work De usu partium corporis humani (On the Usefulness of the Parts of the Body) is Platonic has been the subject of debate. In this section I focus on Galen’s On the Usefulness of the Parts for it is here that Galen presents his most detailed account of anatomy. I maintain that this text has Platonic foundations, and that Plato’s teleological account of the body and of nature is adopted directly by Galen. Because I seek to establish the influence that this Platonic seam in Galen’s understanding of anatomy (and its underlying epistemology) had on Vesalius’s thinking I have consulted Niccolò da Reggio’s 1533 Latin translation of Galen, however, I focus upon Margaret May’s English translation.

Two important challenges to the view that Galen’s On the Usefulness of the Parts is essentially Platonic come from Vivian Nutton and R.E. Siegel. Nutton maintains that this work address anatomy in essentially Aristotelian terms. He writes:

[Galén] repeated his conclusions in two other large treatises aimed at showing the value of anatomy for philosophers interested in the human body. In On the Usefulness of the Parts he discussed his discoveries in Aristotelian terms,

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284 Ficino, All Things Natural, 98.
whereas in On the Opinions of Hippocrates and Plato he defended Plato’s ideas on physiology and psychology against the Stoics.  

Siegel has also argued that Galen’s teleology is similar to that of Aristotle’s.  

This Aristotelian attribution has been discussed by R.J. Hankinson. He writes:

some interpreters, notably R.E. Siegel, have argued that Galen’s teleology is in fact similar to that of Aristotle, and that all talk of the Demiurge is mere metaphor. Siegel cites Galen’s reference to Hippocrates’ conception of a constructive power in nature as something which ‘clearly reflects Galen’s impersonal teleological interpretation of nature’. The passage in question (On the Doctrines of Plato and Hippocrates (PHP) v. 791 Kühn) immediately follows a section in which Galen has argued that, just as it would be absurd when one saw a house or a ship but did not see the artisan responsible for it to conclude that it had arisen spontaneously, so that when one sees anything else that clearly evinces design it is rational to ascribe that design to an artisan even if you do not know who or what it is (PHP V. 798-90 Kühn). This seems to me to render Siegel’s position untenable, at least as regards the major exposition of the matter in Galen. 

Hankinson, Nancy Siraisi and Phillip De Lacy have all suggested that we can view On the Usefulness of the Parts as Platonic. Hankinson has argued that both Plato and Galen adopt a ‘directed’ teleology that depends on a divine Creator’s consciously constructed and entertained purposes. Siraisi has also suggested that, out of all of the ancient forms of teleology, that adopted by Galen in his On the Usefulness of the Parts is Platonic rather than Aristotelian. She writes:

Galen, who developed a teleological account of the human body far more fully and explicitly than any other ancient writer, followed Plato in ascribing conscious, purposeful design to a divine Craftsman. The main theme of On the Usefulness of the Parts, Galen’s most comprehensive general account of human physiology and anatomy, is the exposition in great detail and depth of the idea that every single part of the body was purposefully designed by nature or the

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288 Hankinson, “Galen and the Best of All Possible Worlds,” 213.
289 Ibid., 206–227.
Demiourgos – both terms being used interchangeably – as the best possible instrument for carrying out the functions of the soul’.290

Furthermore, in his paper ‘Galen’s Platonism’ De Lacy argues that the positing of a divine Craftsman forms an important connection between Plato and Galen. He writes:

Another Platonic doctrine of importance to Galen was the view that a divine artisan, or demiourgos, fashioned animals in accordance with a providential design. His De usu partium makes constant use of this doctrine, and in P.H.P., IX, 8, he undertakes to prove the existence of the divine artisan on the basis of an analogy between animals and artifacts’.291

Following Hankinson, Siraisi and De Lacy I argue that Galen’s On the Usefulness of the Parts is thoroughly Platonic. I examine Galen’s teleological account of anatomical form and the relationship that it bears to humanity’s rational soul. I introduce the art/nature relations that can be found in Galen, and argue that his claim that the ultimate end of humanity is the construction of art is original to him.

Galenic Anatomy

The Galenic Corpus is the largest surviving body of work by a single ancient author available today. His works exerted a profound and sustained influence throughout the history of western medicine.292 Galen’s Ars medica, which contained his major discussions of diagnostics and therapeutics, had the greatest influence on the practice of medicine in the middle ages and the Renaissance. During the fifteenth century the medical humanists in Europe began translating already known Galenic texts from the original Greek into Latin, and also discovered hitherto unknown texts including Galen two major anatomical works On Anatomical Procedures and On the Usefulness of the

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292 R. J. Hankinson has noted: ‘As late as the seventeenth century, avatars of the new science such as Descartes and Galileo still talk respectfully of Galen and Galenism, even if they sometimes take issue with it, and Galen’s demonstrations of the cerebral origins of the nerves was still being repeated in medical schools’ in ‘preface’ to R. J. Hankinson, The Cambridge Companion to Galen (Cambridge: Cambridge University Press, 2008), xvi.
Parts. The first of these texts is essentially a practical dissection manual for the medical practitioner. On the Usefulness of the Parts is a detailed and sustained demonstration of the anatomical and physiological forms and functions of the human body. Galen practiced dissection, vivisection and experimentation on animals. During Galen’s time cultural norms forbade human dissection. His knowledge of human anatomy is by and large inferred from animal dissections, but also from observing surface anatomy, and from wounds that gladiators incurred during Gladiatorial Games.  

The analogy between humans and animals, based on anatomical similarities, was of course a central tenet of the great chain of being, and provided another guarantee of the regularity and planning evident in the universe. Galen’s extensive use of animals reinforced and strengthened the analogy between animals and humans, making a virtue of necessity and firmly establishing animal experimentation as the standard method for learning about human anatomy and physiology.

Galenic medicine was a unified system. The art of medicine, for Galen, depended on a thorough knowledge of the nature of health and illness and a deep understanding of therapeutics. Throughout his work Galen cites Plato extensively and approvingly, and in On the Doctrines he praises him as first amongst the philosophers.

Galen on Anatomical Form and the Soul in On the Usefulness of the Parts

In On the Usefulness of the Parts Galen argues that the anatomical form of the body of a given animal, or person, is determined by the nature of their soul. He writes: ‘in every case the body is adapted to the character and faculty of the soul’, and adds ‘the usefulness of all of them [the parts of the body] is related

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293 From 157 Galen became surgeon to the High Priest’s gladiators. This allowed him to observe major injuries to the human body. For an account of Galen’s observation of a gladiator who died the day after an injury to the left ventricle of the heart see, Galen, Galen on the Affected Parts, trans. Rudolph E. Siegel (Basel: Karger, 1976), 139.
to the soul, and consequently animals differ greatly in respect of their parts because their souls differ. 297 The soul, nature, or character of an animal determines its anatomical form. For example, the fierce character of the lion determines its form (claws, teeth, agility, muscle structure and number of legs for speed, and so on). Every aspect of the lion’s anatomical form is determined by its nature and is perfectly fitting for its functions, one of which, in this example, is hunting prey on the African plains. The human animae ‘soul’ or natura ‘nature’, these terms are used interchangeably, is characterised by rationality and intelligence. 298 As is the case with other animals, our anatomical form is determined by the character of our soul.

Like Plato and Aristotle, Galen believed that the human form was perfectly fitted for its functions. On the Usefulness of the Parts is essentially a sustained demonstration of the perfect fit between the various parts of the human form and their particular functions. As we shall see, Galen believed that each part of the body had one true function (or set of functions) which could be determined by considering each part of the body in relation to the other parts and to the whole. The term χρεία, which appears in the title and is most commonly translated as ‘usefulness’, translates equally well as ‘fittingness’. 299 That all the parts of the body are perfectly fitted with regards to each other and the whole is evident in Galen’s discussion of the centaur. This passage also illustrates the way that the form of the body is perfectly suited for its primary function, which is for Galen the construction and practice of art. In book three, on the foot and the leg, he discusses the impossibility of mixing the human form with parts from other animals, which may on the face of it seem advantageous. In discussing the myth of the centaur, he writes:

Grant that this man with the legs of a horse could be engendered and support life, he would gain nothing from such a structure except swiftness … I should like to see a centaur build a house or a ship, scramble up the mast to the yardarm, or perform any of a sailor’s tasks. How terribly awkward he would be at all of them, and how perfectly impossible many of them would be for him … review all the other arts and imagine him working as a blacksmith, or cobbbling, weaving,

297 Galen, Galen on the Usefulness of the Parts of the Body, book 1, 1.1a, 67–68.
298 Galen and da Reggio, Claudij Galeni Pergameni, Secundum Hippocratem Medicorum Facile Principis, De Usu Partium Corporis Humani Libri XVII.
299 This point is made by Margaret May in her translator’s notes in Galen, On the Usefulness of the Parts.
mending, or writing books. How would he seat himself? What sort of lap would he have on which to rest his books, and how would he handle the other tools?  

This passage demonstrates Galen’s belief that the human body was perfectly fitted for its functions. And, these functions are the arts. For Galen, the addition, subtraction or alteration of any of the parts of the body would be disadvantageous. It is *perfect* in the sense of the word as it is found in Renaissance artwriting, where nothing can be added, subtracted or altered without harming the overall form. Rather than our anatomical form dictating the nature of the arts that we practice, for Galen, the forms and the functions of the human body (our anatomy and our arts) are determined by the rational nature of our soul.

**Galen on Nature**

Galen’s conception of nature is analogous to that found in Plato. Nature, for Galen, was the teleological product of the Creator. Throughout *On the Usefulness of the Parts* Galen refers constantly to Nature, and uses this term interchangeably with the term ‘Creator’.  

Nature is conceived by Galen as a divine, creative and just entity. He speaks of it in the following manner: ‘Thus everything about the fingernails, shows the utmost foresight on the part of nature’;  

Nature’s skill at constructing the bones is marvelous’;  

‘Nature’s workmanship makes impossible from the beginning that which would not be of use to us’; and ‘nature is just, as Hippocrates often called her’. Galenic anatomy and physiology are conceived in teleological terms. Nature, or the Creator, carefully designed the human body and its parts with specific ends in mind, which can be comprehended in terms of the functions that they perform.

Like Plato did, and Vesalius would do, Galen employs architectural metaphors to aid in his explanation of the body and the creativity of nature. For example,

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300 Galen, *Galen on the Usefulness of the Parts of the Body*, book 2, 1.34, 156.
301 The only difference is when using the term nature he uses the feminine pronoun, while in referring to the Creator he uses the masculine pronoun.
302 Galen, *Galen on the Usefulness of the Parts of the Body*, book 1, 1.23, 82.
303 Ibid., book 1, 1.29, 87.
304 Ibid., book 1, 1.46, 99.
305 Ibid., book 1, 1.59, 108.
in his discussion of the spine Galen compares it both to a structural keel in a boat which is a beam around which the hull is built. It runs down the middle of the boat from bow to stern and serves as the foundation of the structure. He writes: ‘For the spine is a keel, so to speak, for the whole body’ and ‘Nature has made the spine for animals to be like the keel of the body that is necessary for their life’. This metaphor appears five times throughout the text. We have already met with Galen’s metaphor of the bones as analogous to the beams and walls in a house. These architectural metaphors can be found throughout On the Usefulness of the Parts. They are not however mere rhetorical or heuristic devices, but highlight the consciousness-based teleology that underpins Galen’s understanding of nature and human anatomy.

Art/Nature Relations in Galen’s On the Usefulness of the Parts

In On the Usefulness of the Parts Galen offers an original account of the relationship between art and nature. The ultimate end or purpose of humanity, on Galen’s view, is the construction and practice of art. This view is most clearly expressed in Galen’s discussion of the hand. The ultimate purpose of the hand, on Galen’s view, is to grasp and the reason why it must do this is so that humanity can construct art. Following Aristotle, Galen views the hand as the instrument of instruments. Its anatomical form, and its grasping function, is determined by its end or purpose which is the construction of art. Galen writes:

Now to man – for he is an intelligent animal and, alone of all creatures on earth, godlike – in place of any and every defense weapon, she [nature] gave hands, instruments necessary for every art and useful in peace no less than war ... Indeed, Aristotle was right when he said that the hand is, as it were, an instrument for instruments, and we might rightly say in imitation of him that

306 Ibid., book 3, 1.131, 159.
307 Ibid., book 12, 11.211, 570.
308 The other three places are at: Book 12, II, 216, 573; Book 13, II, 247, 594; and Book 15, II, 359-II,360, 669-670 in Galen, Galen on the Usefulness of the Parts of the Body.
309 See chapter two. This is also discussed further in chapter six.
310 Aristotle had conceived of the hand as the ‘instrument of instruments’. He writes: ‘God has given us two instruments within ourselves, which enable us to use external instruments, providing the body with the hand and the soul with intelligence. For intelligence is among the things implanted in us by nature, being as it were an instrument’ in Problemata XXX 5 956a, in Aristotle, The Complete Works of Aristotle, trans. Jonathan Barnes (Clayton, Ga: InteLex Corporation, 1992), 14.
reason is, as it were, an art for arts. For though the hand is no one particular instrument, it is the instrument for all instruments because it is formed by nature to receive them all, and similarly, although reason is no one of the arts in particular, it would be an art for the arts, because it is naturally disposed to take them all unto itself. Hence man, the only one of the animals having an art for arts in his soul, should logically have an instrument for instruments in his body'.  

Galen is following Aristotle here, in his conception of the relationship between humanity’s rational soul and the form of the hand, and in his identification of our rationality combined with our hands being our greatest defense. However, Galen differs from Aristotle in his identification of the end of humanity as being constituted by the construction of art. Galen is following Plato in his identification of humanity as ‘alone of all creatures godlike’, and insofar as the end or purpose of humanity (our ability to construct art), and our anatomical form which is determined by this end, is the product of a divine and rational consciousness. Galen takes the connection between reason and art further than Aristotle. The second feature of the form of the human body that, for Galen, demonstrates our purpose is our ability to both stand and sit. He writes: ‘man is the only one of all the animals to stand erect, and I have shown that he is the only one to sit. All of the actions which the hands perform in the exercise of the arts require these two positions’. For Galen, the very end of humanity itself is the construction and practice of art. Art is the ultimate purpose of human nature on his view.

**Galen and Polycleitus**

As we have seen Galen is one of the most important sources that we have for the Polycleitan *Canon*. Indeed his account of anatomy in *On the Usefulness of the Parts* provides an account of the human form that shares much with his account of the *Canon*. In both his *De Placitis Hippocratis et Platonis* and his *De Temperamentis* Galen says that beauty resides in the commensurability of parts to each other and to the whole as is written in the *Canon* of Polycleitus and implies that Polycleitan proportions were all directed toward the end of capturing the mean in whatever form it was that is being represented. This

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311 Galen, *Galen on the Usefulness of the Parts of the Body*, book 1, 1.6, 71.
312 Ibid., book 3, 1.133, 160.
mean, therefore, represents an ideal and beautiful form. We could say that it is this form that is being described in Galen’s *On the Usefulness of the Parts*.

Galen’s whole system for devising the usefulness of the parts of the body rests upon the notion of *symmetria*. As we have seen, for Galen, the anatomical form of each part of the body is determined by the function that Nature or the Creator intended for it. In discussing the usefulness of the fingernails, which he says primarily aid in picking things up, he notes that the exact purposes of the parts of the body were much debated by ‘ancient’ philosophers. He writes:

> there was much difference of opinion amongst the physicians and philosophers of old concerning the usefulness of the parts (the former believed that our bodies are not formed for the sake of anything or with any skill at all, and the latter, that they are formed with some purpose and skillfully, one philosopher claiming one use for each of the parts, and another, another). \(^{313}\)

To overcome the ambiguity of the usefulness of the parts, and the possibility of attributing any purpose to any given part, Galen devised a system which directly employs the relationship of the parts of the body to each other and to the whole. He writes:

> I sought first to discover a standard for judging this difference of opinion and then to devise one universal method which will enable us to find the usefulness of each part and its attributes. Accordingly, since Hippocrates says, ‘taken as a whole, all the parts in sympathy, but taken severally, the parts in each part cooperate for its effect’ it seemed proper to me to test the saying first in those parts whose actions we know with certainty, for then we should be able to pass to the others also. And now I shall tell how I made the test, after I have first explained this saying of Hippocrates, which is too obscure for most people because it is written in the archaic style and with his customary conciseness. This is the way that it should be interpreted: *All the parts of the body are in sympathy with one another, that is to say, all cooperate in producing one effect* [my emphasis]. \(^{314}\)

Galen devises a system based directly upon the relationship between parts of the body to each other and to the whole which he employs as a means to discover the true purposes and functions of the parts of the body.

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\(^{313}\) Ibid., book 1, 1.12, 75.

\(^{314}\) Ibid., book 1, 1.12–1.13, 76.
For Galen the proposition, that all of the parts of the body are in sympathy with one another, is the basis for ‘discovering the usefulness’ and ‘confuting the errors of those who hold opinions foreign to the truth’.³¹⁵ He says, ‘Then let us make a fresh start with Hippocrates’ statement as if it were the voice of God’.³¹⁶

It is also clear that Galen equates this commensurability of parts to each other and to the whole, which he employs to discover the true purpose and function of the parts, with beauty. He says that correlating the structure of the body (that is, the parts with each other and the whole) is ‘your standard, measure, and criterion of proper form and true beauty, since true beauty is nothing but excellence of construction’.³¹⁷

Galen’s intention in *On the Usefulness of the Parts* is to describe every part of the body according to its proper function. Proper function provide an explanation for the exact anatomical form that a given part has, and each function can be known to be the correct and true one only through a detailed consideration of the relationship and *symmetria* of each part’s form and function to each other and the whole. The body described by Galen is the perfect, true and beautiful human form, arrived at through a method analogous to that described in Galen’s description of the *Canon* of Polycleitus.

**Conclusion**

In this chapter I have considered the conception of nature, teleology and form in Plato’s *Timaeus* and Galen’s *On the Usefulness of the Parts*. I have suggested that the consciousness-based teleology found in Plato can also be found in Galen and that this plays an important role in determining the form and function of anatomy. Firstly, I discussed Plato’s consciousness-based teleology and his account of nature, form and beauty. In particular I focused on Ficino’s commentary and translation of Plato’s *Timaeus* for it is the Plato that Vesalius would have encountered. I examined the consciousness-based teleology that underpins the *Timaeus*, Ficino’s account of the divine world as the cause and

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³¹⁵ Ibid., book 1, 1.14, 76.
³¹⁶ Ibid., book 1, 1.16, 78.
³¹⁷ Ibid., book 1, 1.17–1.18, 79.
model of the natural world and his conception of the divine and the natural world as continuous. I also considered Plato’s theory of Forms and Ficino’s use of the term *absolutus* in his commentary on Plato. Just as Vesalius’s use of the term *homo absolutus* occurs in his discussion of, and in contrast with, abnormal or ‘monstrous’ anatomical deformities, so too does Ficino refer to absolute or perfect forms in contrast to irregular and deformed ones. Absolute or perfect forms are, for Ficino, purely intellectual and those which the imperfect forms in nature are modeled on. I discussed the connection between ideal and beautiful forms in Ficino’s commentaries on Plato. We saw that, on his view, beauty is an expression of the divine world found in nature. This conception of beauty representing an ideal and a norm links directly to the Polycleitan *Canon* and to Alberti’s account of aesthetic judgement.

My intention has been to establish a link between Plato and Galen and to suggest that the consciousness-based teleology found in Galen, which underpins his account of nature, art and anatomy, is inherited from Plato. Whether or not Galen’s *On the Usefulness of the Parts* is Platonic or Aristotelian has been the subject of debate. However, through a consideration of his text I aimed to demonstrate that he is, in terms of the underlying teleology and account of nature, form and function, thoroughly Platonic. I have also suggested a parallel between Platonic forms and the Polycleitan *Canon* and between the body described by Galen in his *On the Usefulness of the Parts* and the Polycleitan *Canon*. This is intended to supplement the relationship between Plato and Galen and to provide the basis for the Vesalian inheritance of this tradition. While the illustrations within the *Fabrica* are my main focus in most of the remaining chapters, in the next chapter I shall consider passages from the text. I argue that the consciousness-based teleology and forms that I have discussed in Plato and Galen, and claimed are compatible with the Polycleitan *Canons* and therefore the style of the Vesalian illustrations, can also be found in the text of Vesalius’s *Fabrica*. This means that we can understand a mirroring between the body described in the text of the *Fabrica* and the style of the illustrations.
Chapter Six: How Platonic and Galenic is Vesalius?

Introduction

While the illustrations in Vesalius’s Fabrica are my main concern, in this chapter I shall turn my attention to specific passages in the text. I argue that the teleology and notion of form found in Plato and Galen, and discussed in the previous chapter, underpins Vesalius’s own epistemology and his account of anatomy. This consciousness-based teleology and account of ideal forms, I have suggested, is compatible with the Canon of Polycleitus. Therefore, insofar as this Platonic and Galenic seam can be identified in Vesalius’s text, there is a mirroring between the body that he suggests is best for public dissection (analogous to the statue of Polycleitus), the idealised style of Vesalius’s illustrations, and the epistemology that underpins his account of anatomy as it is expressed in the text.

Throughout the Fabrica Vesalius makes many references to his departures from Galen. Vesalius’s intellectual upbringing in Louvain, Paris and Padua occurred within a context of re-discovery, and reverence, of the classical past and of the works of both Plato and Galen. The Fabrica benefited from its author’s observations, based on the dissection of actual human cadavers, rather than, as Vesalius says, the ‘apes and dogs’ of Galen. Vesalius’s intense desire to represent what lay before his eyes is clear. Yet, his departures from Galen can seem, at times, over-emphasized. As Charles Singer has pointed out, while Vesalius discovered that ‘Galen and Aristotle were by no means always to be trusted … his skepticism was [however] sometimes excessive’. In this chapter I examine how Platonic and Galenic Vesalius can be thought to be.

The visual idealisation found in Vesalius’s illustrations involves both the representation of a norm or type as well as a beautiful and perfect ideal. This

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318 Vesalius writes: ‘I have not forgotten the passage in book VII of On Anatomical Procedures where Galen says that those who dissect correctly cannot fail to find the this fifth lobe; he thus implies that Herophilus and Marinus had no knowledge of this lobe, and this was indeed that case, as they had dissected human cadavers and not Galen’s apes and dogs’ in Andreas Vesalius, On the Fabric of the Human Body, trans. William Frank Richardson and John Burd Carman, vol. 5, Norman Anatomy Series (San Francisco: Novato Publishing, 2009), 59.

has so far been elaborated in terms of the *Canon* of Polycleitus and will be further elaborated in terms of theory of proportional representation of the human form, perfection and beauty in artwriting of Vesalius’s own time. Platonic forms, especially as they are conceived by Ficino also have these features. To construe Vesalius’s illustrations as representation of Platonic forms is entirely compatible with the idealisation expressed by Polycleitus’s *Canon*, Renaissance theory of proportional representation and aesthetics and indeed the appearance and function of the illustrations themselves. Like Platonic Forms, the body described by Vesalius pertains to all human bodies. It is a type and a norm. It is also, in a sense, better than actual real human bodies that are met with in the world. It hovers above real human forms, as Platonic forms do.

As we have seen, the body described by Galen is the handiwork of Nature or the Creator, and is best understood and explained in terms of the ends afforded to it by the Creator. The body described by Vesalius is not a body that deviates at all from the Creator’s intended purposes, functions and design. Because anatomy is explained and understood in these teleological terms, which depend on positing a divine consciousness, the anatomy that results from this teleological framework is that which is the most perfect and ideal representation of the Creator’s ends. Furthermore, because ends determine functions, and functions determine forms, the anatomical forms that are represented embody the perfection of the Creator’s ends. The human anatomical form is such that nothing can be added, subtracted, or altered in any way without causing harm to the overall structure. Given Vesalius’s consciousness-based teleological framework the anatomical form described in the *Fabrica* could be none other than ideal. Like Platonic Forms, the anatomy described by Vesalius that results from his consciousness-based teleological framework, surpasses actual, token, human bodies that are met with in experience. The type of perfection designated by the term ‘*absolutus*’ in Ficino’s commentary on Plato, we find represented visually on the pages of the *Fabrica*. 
The Teleological Basis of Vesalian Anatomy

As we have seen Galen’s teleological account of human anatomy in his *On the Usefulness of the Parts of the Body* is analogous to Plato’s as it appears in his *Timaeus*. Galen employs Plato’s specific version of teleology which I call a ‘consciousness-based teleology’. The consciousness-based teleology found in both Plato and Galen entails a specific understanding of nature, art and the human body. Both Plato’s and Galen’s understanding of human anatomy depend directly on the idea of Nature, as a great Artist or Craftsman, creating the world and the human body according to specific ends. In this section I argue that the *Fabrica* contains the same consciousness-based teleology, and understanding of nature and art (and their relationship) that can be found in Plato and Galen.

In the *Fabrica* Vesalius refers to Galen’s *On the Usefulness of the Parts* more frequently than he does to any other text. The framework within which the anatomy and physiology of the *Fabrica* occurs is very similar to the consciousness-based teleology found in Plato and Galen. It is difficult to go more than a page or two without encountering a reference to the design or forethought of Nature or the Creator. It appears that Vesalius uses the terms ‘Natura’ (Nature), ‘Deus’ (God) and the ‘Creator’ (Creator) interchangeably as Galen also had done with the terms ‘Nature’ and ‘Creator’.

Vesalius’s concept of Nature, like Galen’s and Plato’s, is complex and not easily defined. As in Plato and Galen, Nature for Vesalius is not only a principle residing within all living things, determining their organisation and growth, she is also endowed with omni-beneficent virtues. Nature is wise and just. A sense of Vesalius’s usage of the terms ‘Nature’, ‘God’, and ‘Creator’ can be illustrated through a selection of examples from his text. Right at the beginning of the first book on the bones Vesalius writes:

> Bone is the hardest and driest of all parts of the human body, the most earthy and cold, and, with the sole exception of the teeth, most lacking in sensation. God, the supreme maker of things, rightly made its substance of this temperament so as to supply the entire body with a kind of foundation. For
what walls and beams provide in houses, poles in tents, and keels and ribs in ships, the substance of bones provides in the fabric of man.320

Here Vesalius conceives of the Deus (God) as the *summus rerum opifex* (supreme maker, creator or architect of things). God, he says, made the bones of the body of the right, hard, substance so that they could function like a foundation for the whole body. Here Vesalius conceives of God as analogous to an architect as both Plato, Ficino’s Plato, and Galen had.321 Indeed, he directly echoes the passage from Galen’s *De anatomicis administrationibus* which states: ‘As poles to tents and walls to houses, so are bones to living creatures, for other features naturally take form from them and change with them’.322

As was the case in Galen’s *On the Usefulness of the Parts* architectural metaphors appear throughout the *Fabrica*. For example, in book two Vesalius compares the muscles and ligaments to ‘foundations and bases’ and in chapter fourteen of book one he says of the spine:

> Nature, the parent of all things, fashioned man’s spine like a sort of keel and foundation. For it is by means of the spine that we are able to walk upright and stand erect. Yet she did not give mankind a spine for this purpose alone, but just as she is accustomed elsewhere in the construction of a single member to turn it at the same time to various uses, so no less here she showed its purposeful construction.323

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321 Galen’s use of architectural metaphors is not surprising given that his father was an architect.


As we have seen Galen had identified the spine with the foundational keel of a boat five times in his *On the Usefulness of the Parts*. Galen also discusses, in the context of the spine, the way in which (following Aristotle) nature does nothing in vain. He says:

Nature has made the spine for animals to be like the keel of the body that is necessary for their life; for it is thanks to the spine that we can walk erect and each of the other animals can walk in the posture that is the better one for it ... She has, however, wished the spine to be useful not only for this. Just as her custom is always *to work artistically and employ one construction of a part for many uses at once*, so it is in this instance too [my emphasis]. 324

In both Galen’s and Vesalius’s references to the spine as analogous to a keel we find the notion that each part of the body has not one but many functions, all of which cooperate together. These passages also illustrate the sense in which, for Galen and for Vesalius, the human body was designed by a conscious mind and its form reflects specific ends and functions.

These quotations reveal Vesalius’ understanding of Nature and the Creator as a rational consciousness that organises all aspects of the human anatomical form including size, relation, shape and number, according to specific ends. As is evident particularly in the last quotation, everything that Nature creates is parsimonious. Nothing is superfluous or, as Aristotle had said, nothing is done in vain. 325 However, the teleology that organises the design and function of the human anatomical form is clearly consciousness-based as it is with Plato and Galen.

**Art as the End or Purpose of Humanity**

Just as Galen understood the end or purpose of humanity (which determines our anatomical form) as lying in the construction of art, so too did Vesalius. The concepts ‘art’ and ‘nature’ have a special application to Vesalius’s *Fabrica*. Indeed, Nature is a fundamental principle which underpins his understanding of the world and the whole of human anatomy and physiology. However, it is difficult to derive a specific definition of art on Vesalius’s view. In adopting the

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consciousness-based teleology of both Plato and Galen, Vesalius adopts the view that Nature or the Creator is an architect or craftsman, and human anatomy can therefore be comprehended in terms of the ends or functions accorded to it by the Creator. Anatomy is brought about according to specific ends, and its form is harmoniously unified accordingly. Art produced by humanity, on Vesalius’s view, is analogous to the art of the Creator. As was the case with Plato, humanity’s art is on a continuum with that of the Creator. Art and nature are variants of the same kind of purposive action. Like Galen, Vesalius considers that the ultimate end of humanity is the construction of art (surely he has his own art, the art of medicine, specifically in mind). Vesalius, like Galen, locates the purpose of the hand in the act of grasping, and the end that determines its anatomical form, and grasping function, in the creation of art.

In his discussion of the muscles of the hand Vesalius disagrees with Galen in some of the anatomical detail, but not in the overall purpose. In his account of the bones in the hand in book one Vesalius writes: ‘I believe it is no secret that we require the bones of the fingers for strength of action in grasping things, and we need many of them because of the various motions which the hands perform and the diversity of things which are grasped by them’. Furthermore, near the beginning of his discussion of the muscles of the hand in book two Vesalius clearly identifies that the function and purpose of the hand is to grasp, and locates the purpose of the grasping function in the construction of art. With regard to the former point Vesalius writes:

> It was appropriate that the hand as a grasping instrument, should receive this skin on its inner side; it is because the skin is not readily mobile that, among other things, it grasps objects more closely and firmly. It was also appropriate that the inner region of the hand should be covered with more sensitive skin than the rest of the body. For there was not to be one instrument for grasping and another for touching, nor one for lifting and carrying or in general for

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326 For example, he disagrees with Galen’s claim that the thumb flexes over the other fingers to the middle of the palm and not to the middle of the carpus. See, Andreas Vesalius, On the Fabric of the Human Body, trans. William Frank Richardson and John Burd Carman, vol. 2, Norman Anatomy Series (San Francisco: Norman Publishing, 1999), 332.

handling external objects, and yet another in addition to these for judging the nature of things grasped from their heat, coldness, hardness, softness, and other qualities that are perceived by touch. Instead it was appropriate that as soon as the hand grasped something it should simultaneously perceive its nature and should do so only by means of those inner areas by virtue of which it is an organ of grasping as well. If therefore it was necessary that it should be an organ of touching because it was an also an instrument of grasping, the hand was rightly constructed to touch by means of the same parts as it used for grasping.\[328]

In this passage we see Vesalius identifying the hand as an ‘instrumentum’ or ‘instrument’ for grasping. He does not explicitly refer to it as ‘an instrument for instruments’ as Aristotle and Galen do, although his use of the term ‘instrument’ and his identification of the hand’s end as grasping is continuous with Galen’s belief.

Vesalius, like Galen, locates the purpose of the anatomy of the hand in the creation of art. He writes:

The Creator of the world did not bestow this [fleshy] substance on the outer area of the fingers, deeming that it would be a useless weight for them to bear, seeing that this area does not need the most perfect sense of touch and never grasps around anything, and is not so often used to push needles or scalpels or such like instruments of the arts [as the inner sides of the fingers do].\[329]

He also notes that ‘by virtue of this [fleshy] substance the hand can soften, knead, and rub things that, being softish, need instruments to work and rub them; all the arts have many such things’.\[330]

Furthermore, in his discussion of the bones in the hand in book one Vesalius writes:

Of the remaining fingers it is the index and middle which come next after the thumb, not only in respect of their position but also in respect of their usefulness. We take hold of small objects with these, and it is by them that works of all the arts are created.\[331]
For Vesalius the anatomy of the hand clearly has the form that it does for the sake of the construction of *omnium artium opera* (the works of all the arts). Like Galen, for Vesalius the purpose of the hand is to grasp and its anatomy is determined by an end which is the construction of art.

When Vesalius discusses the grasping function of the hand, and locates its purpose as lying in the practice of the arts, he surely has his own art (the art of medicine generally and dissection specifically) in mind. Indeed, as we saw in the quotation above, when he speaks of the instruments of the arts he specifically mentions ‘needles or scalpels or such like instruments of the arts’. The portrait of Vesalius that appears at the beginning of the *Fabrica* illustrates this, depicting Vesalius dissecting the hand and demonstrating its grasping mechanisms, with the tools of his art on the table beside him, and words from the *Fabrica* describing the muscles of the hand on the parchment (see fig. 28).  

As I have mentioned, in the letter to the Emperor Charles V, which serves as a preface to the *Fabrica*, Vesalius discusses at length the importance of physicians using their hands. He says the reason that medicine declined after antiquity was: ‘by having its primary instrument, the application of the hand’s work in healing, so neglected that it seemed to have been handed over to common folk and to persons completely untrained in the disciplines that serve the medical art’. He recommends that ‘students of this art must be urged in every way to discount the whispers of those (if it please the gods) physicians, and *apply their hands* like the Greeks to whatever treatment the nature of their craft thoroughly instructs [my emphasis]’. He insists that memorising from books is not adequate. Only by using one’s own hands will the art of medicine ‘regain its ancient radiance’.

Indeed, Vesalius elaborates on the role of the hands in medicine in his description of the instruments for dissection. His instruction at the end of the

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332 Ibid.
333 Ibid.
334 Ibid.
335 Ibid.
book of how to articulate a skeleton suggests that he also wanted to teach other physicians how to use their hands. The use of these hands would be the first step towards making things internal and invisible external and visible. Art’s ability to manipulate the ends of nature to gain otherwise inaccessible knowledge of it lies at the heart of the art of dissection.

The Vesalian Illustrations and Platonic Form

Like Platonic forms the body described by Vesalius pertains to all human bodies. It is a type and a norm. It is also, in a sense, better than actual real human bodies that are met with in the world. It hovers above real human forms, as Platonic forms do. As we have seen, the body described by Vesalius is the handiwork of Nature or the Creator, and is best understood and explained in terms of the ends afforded to it by the Creator. The body described by Vesalius is not a body that deviates at all from the Creator’s intended purposes, functions and design. Because anatomy is explained and understood in these teleological terms, which depends crucially on positing a divine consciousness, the anatomy that results from this teleological framework is that which is the most perfect and ideal representation of the Creator’s ends. Furthermore, because ends determine functions, and functions determine forms, the anatomical forms that are represented embody the perfection of the Creator’s ends. Given Vesalius’s consciousness-based teleological framework the anatomical forms described in the Fabrica could be none other than ideal. Like Platonic forms, the anatomy described by Vesalius that results from his consciousness-based teleological framework, surpasses actual, token, human bodies that are met with in experience.

Conclusion

Like Plato and Galen, the epistemology that underpins Vesalius’s account of anatomy depends upon an account of nature that presupposes conscious, purposive design. God, Nature or the Creator is conceived as an architect that designed the human body according to specific ends and purposes. Each part of the body therefore relates to every other part and to the whole perfectly (in the sense that nothing can be added, subtracted or altered without harming the overall design). This concept of the harmony and perfection of the human
form is found in the Polycleitan *Canon* and is illustrated in the idealised style of Vesalius’s illustrations. As we shall see it is also found in Renaissance aesthetic theory.

Like Galen, Vesalius identifies the function of the hand, which determines its anatomical form, as grasping. This function serves the purpose of the practice and construction of art. For Vesalius, the use of one’s own hands is central to his own art, the art of anatomical dissection, and it is through the use of their hands that physicians can make the internal and invisible aspects of anatomy external and visible. Art can reveal previously inaccessible knowledge about nature.
Chapter Seven: Art as a Model for Scientific Illustration; The Vesalian Illustrations and Ancient and Renaissance Art

Introduction

Vesalius’s own references to the Polycleitan Canon and the historia absoluti hominis immediately suggest a proportional mode of anatomical representation and an account of beauty that can be applied to Vesalius’s illustrations. This analogy between the Polycleitan Canon and Vesalius’s illustrations is however one aspect of my broader proposal that we can understand the latter to be based not only on observation and medical thought but also upon ancient art, Renaissance art and Renaissance copies of ancient art and aesthetics. By basing his illustrations that are intended to convey real knowledge about the world on observation, existing medical theory, and on art and aesthetics, the ancient distinction between the artificial and the natural is further transgressed. Not only do illustrations come to play an important role in conveying knowledge about nature, these illustrations, I argue, are based upon works of art. Part of Vesalius’s search for the homo absolutus involved an examination of ancient and Renaissance artworks, evidenced by the visual relationship between them and his illustrations.

An important seam in the art historical literature on Vesalius concerns the relationship between his illustrations and antique sculptural fragments. Firstly, in this chapter, I consider this literature. I argue that visual references to, and parallels with, ancient art are evident in the title page of his Fabrica; the poses of the skeleton and muscle figures; the representational goal of conveying images of a moving and animated body; and the presentation of the visceral and reproductive anatomy as antique sculptural fragments. Here I build upon existing literature by offering further examples of works that his illustrations might be based upon, and focus specifically on torso contrapposto.

While Vesalius’s illustrations, like the Canon of Polycleitus, represent a mean human form and the proportional method for representing the body associated with it, they do not echo the austerity of sculpture of the classical period. In this chapter I argue that Vesalius is specifically influenced by stylistic
aspects of the *Hellenistic baroque*. Hellenistic sculpture was not identified as such in Vesalius’s time, or distinguished from classical sculpture (these categories did not exist), so its influence on the style of the Vesalian illustrations is not at odds with Vesalius’s desire to represent a form analogous to that of Polycleitus’s *Canon*. Vesalius was familiar with the theory of the Polycleitan *Canon*, through Galen, and the notion that it represents a beautiful and typical, mean human form. However, the examples of ancient sculpture that Vesalius and his draftsman would have had access to were varied. The influence of the Hellenistic *Belvedere Torso* on Vesalius is well drawn.\(^{336}\) I suggest that the inflated musculature, poses, and obsession with representing movement of (what we now identify as) Hellenistic sculpture appealed to Vesalius’s own ambitions. This is perhaps why numerous parallels exist between poses and gestures in Hellenistic art and the Vesalian illustrations. The art of the Hellenistic period is hugely varied. Idealisation is evident in Hellenistic sculpture even if it is more famous for its departures from classical austerity and the pursuit of pure aesthetic considerations.

With regard to the Hellenistic hypothesis, I argue that the *contrapposto* stance of some of the Vesalian muscle figures echo those found in Hellenistic representations of kings in sculpture; that the contemplative pose of Vesalius’s side view of the skeleton *in toto* is based on Hellenistic precedents (especially upon Hellenistic representations of poets and philosophers); I suggest that parallels exist between the hand gestures found in Hellenistic sculpture and Vesalius’s illustrations; and lastly I offer specific ancient models upon which the Vesalian torso figures could be thought to be based, and consider Renaissance copies of ancient sculptures as a possible source of influence.

Just as Vesalius modelled one of his illustrations upon the *Belvedere Torso*, Michelangelo’s representation of the nude human form was specifically influenced by it too. Indeed, the very term that Vesalius used to describe the perfect man, the *homo absolutus* was used by Michelangelo in describing the *Belvedere Torso*. As Kusukawa points out: ‘Michelangelo ... is reputed to have called the so-called *Belvedere Torso* the ‘most perfect’ (*absolutissimum*)

\(^{336}\) This is discussed below in the section entitled ‘The Influence of Ancient Sculpture on the Vesalian Illustrations as it is Described in the Art Historical Literature’.
sculpture in Rome, and used it as a model for one of the seated male nudes in the Sistine Chapel’. Furthermore, David Summers notes how ‘Michelangelo perceived the realisation of his own aims in it – so much so that it came to be called Michelangelo’s torso’ – and magnified his conception of the human figure accordingly’.

I argue for a parallel between the work of Michelangelo and that of Vesalius, in particular between the figures in Michelangelo’s Sistine Chapel fresco the Last Judgement (c. 1536-1541). This is in keeping with the Hellenistic hypothesis as Michelangelo’s own work is stylistically analogous to Hellenistic sculpture. Like Hellenistic sculpture, Michelangelo’s heavily muscled figures that adorn the walls of the Sistine Chapel represent a particular concern with representing muscles and movement. They represent a High Renaissance ideal analogous to the Hellenistic and to Vesalius’s figures. I also consider the antique components of the subject matter of Vesalius’s title page and argue that the nude figure clinging to the column may be based upon the nude figures in Michelangelo’s Last Judgement which cling to the column where Jesus was flagellated.

Vesalius’s reference to the Canon of Polycleitus and to the historia absoluti hominis suggest a mode of proportional representation of the human form and an account of beauty which offers a basis for understanding the idealised style Vesalius’s illustrations. Being products of the High Renaissance his illustrations have stylistic features that augment the austerity of the Polycleitan aesthetic. My examination of the relationship between aspects of Hellenistic sculpture, Michelangelo’s painting and Vesalius’s illustrations is intended to furnish my account of the idealised style of his anatomical forms – one that represents both a norm, augmented by the variation of pose and the representation of movement.

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The Influence of Ancient Sculpture on the Vesalian Illustrations as it is described in the Existing Art Historical Literature

An important thread in the art historical literature on Vesalius’s illustrations concerns the relationship between his illustrations and antique sculptural fragments. It is this literature that I hope to build upon, so I shall survey it here. In 1550 a woodcut caricature of the Laocoön (1st Century BC) was executed, depicting Laocoön and his sons Antiphantes and Thymbraeus as apes (see fig. 31). This woodcut, which is associated with Titian and his school, has been interpreted as a possible critique of the ‘excessive admiration for classical art present in Florence and Rome’. H.W. Janson entertains the notion that this could have been a reaction, by Titian, to Vasari’s criticism in his Vita of Titian that his art is little more than ‘simia naturae’. The caricature, could in this light be viewed as his reaction, implying that the work of the Florentine’s is little more than ‘simiae artis’. Janson notes that this sort of attitude is unlikely to have belonged to Titian, however, this anecdote does point directly to the Renaissance reverence for antique sculpture and the artistic copying of it. Janson argues that the caricature of the Laocoön refers not to matters artistic, but rather medical: specifically, the debate that followed the publication of the Fabrica concerning the accuracy of Vesalius’s claims against Galen. Vesalius had written that Galen had only dissected apes and dogs and not actual humans, and it is these apes of Galen that, Janson claims, we see represented in the caricature.

Janson discusses Sylvius’s attack on Vesalius in his pamphlet VAESANI cuiusdam calumniarum ... depulsio ‘a refutation of the calumnies of a certain madman’ (1551). Here Sylvius had defended Galenic anatomy against Vesalius, attempting to demonstrate that the anatomy described by Galen in no way describes that of apes. In some instances he admitted a difference between the cinquecento understanding of anatomy and that described by Galen, accounting for this with the claim that human anatomy must have changed over time. Janson notes that there is a good reason why sixteenth-century

thinkers would have known that the human anatomical form had not changed, for it could be witnessed in antique sculpture. He writes:

the ancients themselves had provided posterity with incontrovertible proof that the structure of the human body had remained unchanged through the ages, and no one could have been more appreciative of this fact than Vesalius. The full-length figures among the Fabrica plates of ten betray the inspiration of classical statuary in stance and proportion. The same is true to an even greater extent of the numerous if less well-known cuts of torsos, all of them strongly suggestive of the Torso Belvedere and similar pieces; the extremities are invariably treated as if they were broken off, rather than severed by a surgeon’s knife, with the jagged edges and rough surfaces characteristic of cracked marble.341

This is, to my knowledge, the first identification of the Belvedere Torso with the torso figures in Vesalius (See figs 2 and 38). Janson concludes by suggesting that the Laocoön Caricature may have even been Vesalius’s own idea.342

In a paper entitled ‘Andreas Vesalius and the Anatomy of Antique Sculpture’ Glenn Harcourt has argued that Vesalius represents his anatomical forms in the guise of antique sculptural fragments so as to evade the gross reality of the subject matter, the dissected cadaver. As had been noted initially by Janson, Harcourt points to the way in which figure twenty-two in book five of the Fabrica ‘is unmistakably based on one of the most famous antique fragments to come to light during the Renaissance, the so-called Belvedere Torso’.343 Of the ten visceral figures he notes that only one of them, the ninth in the series, is ‘given as though actually modelled on a body laid out for dissection’ and notes that ‘even here the characteristic truncation of head, arms, and legs appear rather as fractured stone than severed flesh’.344

Both Erwin Panofsky and William M. Ivins, to differing degrees and in different respects, discuss the way in which science is subservient to art in the Fabrica.345 Harcourt, by way of contrast, argues that ‘Vesalius quite consciously deploys representation to his own specifically scientific ends, and that the

341 Ibid.
342 Ibid.
344 Ibid.
demonstration of the viscera on models conceived as sculptural fragments all’ antica serves several self-evidently anatomical functions’. Primarily, Harcourt claims their presentation as sculptural fragments masks the violation of bodies that inevitably occurs in the dissection that Vesalius endorses so vigorously in the Fabrica. He writes: ‘For laymen ... not tradition but bodies were being violated’. Laypeople aside, Harcourt claims that even other physicians did not share Vesalius’s zeal for dissecting human corpses.

Furthermore, Harcourt argues that the presentation of the dissected body in the form of ancient sculpture masked the more morally ambiguous aspects associated with the art of anatomy. For example, that of body snatching and the charges of vivisection that had been attributed by Cicero in his De medicina (c. 25 CE; 1st ed., Florence, 1478) to the ancient anatomists Herophilus and Erasistratus. This, Harcourt claims, is a further facet of the ‘basic problem of violation... as that development is given form in representation’. This interpretation offers a possible reason why Vesalius represents an idealised, normative type, rather than a series of particular individuals. Unlike the particular skeleton that is represented in the earlier publication the Tabulae anatomicae sex, Harcourt claims that in the Fabrica ‘the specific and particular resonances, as well as the attendant implications of violation, have been effectively suppressed or evaded’. Harcourt then relates the norm that is represented by Vesalius, for both practical scientific as well evasive purposes, to the Canon of Polycleitus – the most ‘rigorously ‘normative’ of all antique sculptures’. He continues: ‘Even as Vesalius describes the ideal subject for public dissection in terms of an antique sculptural norm, so his draftsman presents the results of that dissection as antique sculpture literally anatomised’.

To supplement Harcourt’s suggestion that the Fabrica illustrations appear as antique sculptural fragments to disguise the gross reality of the dissected

347 Ibid., 37.
348 Ibid., 38.
349 Harcourt adds that the representation of a specifically human norm can also be understood as an attack on Galen and his discussion of dog and ape anatomy as human. Ibid., 40.
350 Ibid., 42.
351 Ibid.
352 Ibid., 43.
cadaver, I offer a practical reason why the Vesalian illustrations appear in this form. That they served, for the draftsman of the Fabrica illustrations, as the best possible example of representing animated moving musculature – the depiction of which was a central artistic problem for the Fabrica draftsman.

Ivins has pointed out the way in which the illustrations in the Fabrica fall into two categories: ‘those in which the figures are represented as dead and supported from outside, and those in which they are represented as moving’. He continues:

These latter drawings show figures that move of themselves, and are not moved by someone or something else. This is to say that they represent things that no man has ever seen, for, often as a man may have seen a dead body (or parts of it) stripped of its skin and outer layers of muscle, no one has ever seen one that stood up and made gestures. No one had ever seen a dead muscle contract or relax, and no one had ever been able to make a veridical picture of a stripped muscle contracting or relaxing except as the result of an intellectual reconstruction, i.e., as the result of a long series of inferences from its shape as seen and studied when dead.353

The problem to which Ivins refers is that of the representation of moving musculature. Indeed, the standing animated muscle figures represented by Vesalius and his draughtsman show animated, living muscles as they appear when a human body is animated and the muscles are in tension. Ivins’s intention is to celebrate and acknowledge the great skill on the part of the draftsman of the illustrations in his ability to represent such animated musculature, suggesting that that draftsman must have had a good knowledge of anatomy himself. I believe that Vesalius and the draftsman of the Fabrica illustrations may also have looked closely at antique sculptures because they contained some of the best examples available of moving musculature and surface anatomy in art. The Renaissance artist’s obsession with drawing from ancient sculpture would surely have also been a preoccupation of the Fabrica draftsman. Presented with the problem of representing standing animated muscles in movement, but only observing them in humans and animals in their sagging post-mortem state, it seems likely that the draftsman looked towards ancient sculpture as the best example of the representation of the animated

human form. Vesalius and his draftsman could have looked at actual living bodies and the surface appearance of moving muscles. However, ancient sculpture offered a solution to the problem of their representation.

The Vesalian Illustrations and Ancient and Renaissance Art

Vesalius’s presentation of his illustrations all’ antica runs throughout the Fabrica. Visual references to, and parallels with, ancient art are evident in the title page of the work; the poses of his muscle and skeleton figures; the representational goal of conveying an image of the moving body; and in the representations of visceral and reproductive anatomy in book five. Unlike the bodies used by Vesalius in public dissections that were subject to putrefaction, ancient sculptures provided a lasting model of the body that could be consulted many times. They functioned as models upon which the Fabrica illustrations could be based, just as Renaissance artists based their own paintings, illustrations and buildings upon the art of the ancients. To further advance my claim that the Vesalian illustrations are based not only on observation of nature and medical theory, but also on ancient art, I want to suggest some specific parallels between the Vesalian illustrations and ancient sculptures that were known in the Renaissance and functioned as models for artists. The use of ancient sculptures as models for his own representations is entirely in keeping with Vesalius’s desire that anatomy be restored to the position that is occupied in medicine in antiquity. As Pamela O. Long has suggested, Vesalius ‘believes that he is restoring anatomy to its ancient splendour’.354 This ambition is similarly evident in his letter to the Emperor that serves as a preface to the Fabrica. Visual parallels also exist between the Vesalian illustrations and contemporaneous Renaissance art. In this section I consider stylistic similarities that exist not only between ancient art and the Vesalian illustrations, but also between his illustrations and contemporary Renaissance art.

354 She writes: ‘In his view, medicine was destroyed when its various components such as surgery were broken off from it and relegated ‘to laymen and people with no knowledge of the disciplines that go to serve the healing art’. Similarly, the art of drugs and medicines was handed over to the apothecaries. Trained physicians only prescribed medicines and regimes for hidden or internal ailments. As a result, they shamefully cast aside the foremost and most ancient limb that above all is founded … on the study of nature’ in Long, “Objects of Art/Objects of Nature: Visual Representation and the Investigation of Nature,” 76.
Vesalius, I argue, is specifically influenced by certain stylistic aspects of the Hellenistic baroque, specifically what Phyllis Bober and Ruth Rubinstein have called ‘inflated musculature’ and ‘contorted postures’. Vesalius’s illustrations retain all of the idealism of the sculpture of the classical period, yet adopt the bold treatment and inflated anatomy of much Hellenistic sculpture as well as specific poses and gestures found in Hellenistic art. The well-drawn parallel between the second century BC Belvedere Torso and the eighth torso figure in the series in book five of the Fabrica is itself testimony to this. The Renaissance drew no distinction between classical and Hellenistic sculpture, so the choice to model the drawing upon various Hellenistic works could not have been consciously to do so, but one governed by solutions to representational problems and choices about style.

In particular I note parallels between the work of Michelangelo and the illustrations in Vesalius’s Fabrica. This is consistent with the Fabrica’s stylistic relation to Hellenistic art as Hellenistic sculpture had particular appeal to Michelangelo, whose heavily muscled figures adorned the walls of the Sistine chapel. It is unsurprising that Hellenistic sculpture – heavily muscled and obsessed with the problem of representing the movement of muscles and of the body – appealed to Vesalius and his draftsman. In this section I shall closely consider the illustrations in the Fabrica in conjunction with examples of ancient art which functioned as models for artists in the Renaissance. Parallels also exist between the Vesalian illustrations and Renaissance art.

**The Hellenistic Baroque and the Vesalian Illustrations**

The Hellenistic period dates from roughly 323 to 100 BC. Beginning approximately with the death of Alexander and ceasing with the beginning of the dominance of Rome. While the Hellenistic period has a chronological application, cultural Hellenismus has broader usage. The Hellenistic period embraces a long timeframe and a variety of localities with their own styles. However, a somewhat unified repertoire and continuity of style can be identified.

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355 Bober, Renaissance Artists & Antique Sculpture, 36.
356 These are the dates given in Gisela Marie Augusta Richter, The Sculpture and Sculptors of the Greeks (New Haven: Yale University Press, 1970), 12.
Hellenistic art shares much with earlier classical art but is often characterised by its departure from it. As with the baroque of sixteenth-century Rome, in some cases Hellenistic baroque portrays realism outside of the austere pursuit of beauty and ideal forms so characteristic of both classical and *quattrocento* ambitions. With the art of the Hellenistic period we find the first examples of portraits of individuals; genre subjects; the representation of the elderly, the infirm, and the disabled; and of what might be termed grotesque. Beauty and the ideal give way to the honest and the uncompromising. As Barbara Hughes Fowler notes:

> Hellenistic poetry brought to Western literature many of the qualities which we think of as modern: an interest in animals (especially pets), babies, children, women, and grotesques; common or working people and the tools of their trades; landscapes; cities; the passions of romantic love and of sinning; pathos; burlesque. The literature parallels the subject matter of the visual arts, where we find fishermen, hunchbacks, dancing dwarfs, drunken old women, babies, dogs, women that have died in childbirth, kitchen utensils and the expression of emotion in the faces of creatures as well as people.  

Similarly, Martin Robertson notes that while ‘Naturalistic portraiture was clearly felt by the Greek sculptors of the archaic and classical periods alike to be foreign to the individual character of their art ... [Portraiture of individuals became] regular in Greek art in the Hellenistic age’.  

The opposition between the classical and the baroque style in art is an important theoretical one that, while aptly characterising the polarising tendency evident throughout the history of art, does not always neatly categorise any particular artwork or particular artist’s oeuvre. While Vesalius’s muscle figures aspire to a classical ideal, they are at the same time visually analogous to the heavily muscled and contorted figures of the Hellenistic baroque. Through pose gesture and movement, his illustrations augment the classical ideal.

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**Muscle Figures**

A number of the Vesalian muscle figures contain features of both body action and gesture that suggest a direct relationship to Hellenistic sculpture. The first and third Vesalian muscle figures stand in a *contrapposto* stance that appears analogous to the poses found in Hellenistic representations of kings (see figs. 6, 32 and 33). Jane Anderson’s account of gesture, posture and body actions in Hellenistic art includes a discussion concerning the representation of kings. In a number of the heavily muscled, nude, representations of Hellenistic kings, she argues, we find a particular body *hexis* repertoire. She calls this ‘The Hellenistic Swagger – *tilting the Pelvis*.’ She argues that in the small bronze statuette of Ptolemy II in the British Museum and in the large statue of King Ptolemy of Mauretania we find ‘remarkable similarities in the arrangement of the lower body, despite the different material, size and date. Both figures are shown with laterally tilted hips (*contrapposto*), accompanied by the pushing forward of the pelvis, so that the back leans slightly backwards’ (see figs 32 and 33).

As she acknowledges, the pushing forward of the pelvis is not new to Hellenistic art, and is indeed a feature of Polycleitus’s work and the fifth-century BC work that he influenced. However, she argues that what is new is the positioning of the legs:

while the *Doryphoros*’ rear leg may well have been intended to indicate forward movement, the free leg of Hellenistic figures is more likely to be *to the side* of the weight-bearing leg, than behind it.

In the case of the *Doryphoros* the load-bearing leg is significantly further forward than the resting leg (see fig. 30). The knees are virtually parallel, the leg, from knee to foot, is almost at a 45 degree angle extending backward. By contrast, the statue of King Ptolemy of Mauretania the toe of the resting leg is in line with the ankle bone of the load-bearing leg. Indeed, the leg is more *to the side* than it is *behind* the body.

In the first, third, ninth and twelfth Vesalian muscle figures we see that similarly the toe of the resting leg is in line with the ankle bone of the load-

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361 Ibid.
bearing leg (see figs. 6, 8 and 14). The first, third and ninth illustrations all represent a superficial view of the muscles, with all of the skin, fat, sinews, veins and arteries cut away. In the first muscle figure the leg position is, as described, analogous to the statue of King Ptolemy of Mauretania. Unlike the Doryphoros, which could be said to represent movement forward, the first Vesalian figure appears static, presenting itself to the viewer as an object to be contemplated. The position of the arms and head also indicate this. Both arms are semi-elevated and the right palm is turned forward towards the viewer. The left points downward, but gestures in a position common to Hellenistic representations of poets and philosophers (this is discussed below). Unlike the first Vesalian muscle figure the arms of the statue of Ptolemy of Mauretania are asymmetrical in position, and the head looks directly straight ahead. Anderson suggests that rather than indicating movement the Hellenistic Swagger suggests a relaxed pose, implying that the figure is at ease. This position found in statues of Hellenistic Kings, therefore, asserts dominance.

The arm and head position of the statue of Ptolemy of Mauretania agree with this, while the positioning of the arms and head in the first Vesalian muscle figure, as I have suggested, connote that the figure is presenting itself for contemplation or examination, while the contrapposto stance remains very Hellenistic.

**Contemplation in the Vesalian Illustrations and Hellenistic Art**

Vesalius’s skeleton figure *in toto*, which represents the side view, is without doubt one of the most well-known and reproduced of Vesalius’s woodcuts (see fig. 4). The skeleton stands beside a tomb, gazing at a separate skull that rests upon it. The figure’s right arm is outstretched, and the hand rests upon the skull. The left arm is used as a prop, where the elbow is set against the tomb, the wrist is bent, and the hand is set against the cheekbone. The left leg of the figure is casually crossed over top of the supporting right leg. In the 1543 edition of the Fabrica, on the front of the tomb the words were inscribed *Vivitur ingenio, caetera mortis erunt*: ‘Genius lives on, the rest is mortal’. This figure has been interpreted in a number of ways, and has been referred to as

362 Ibid., 31.
Hamlet, contemplating death, reciting his ‘to be or not to be’ soliloquy. The pose of the skeleton figure clearly suggests intellectual contemplation. This is vindicated by the words inscribed upon the tomb, and also by the stance of the figure. While the hypothesis that the figure is contemplating is not itself in doubt, a number of Hellenistic works, upon which this figure may have been modelled, provide further support for it.

Hellenistic precedents for the thinking pose of the Vesalian skeleton figure are numerous. While the visual commemoration of intellectuals was not a Hellenistic innovation, such works increased greatly during this period. Unsurprisingly, intellectual figures such as poets, philosophers, sophists and orators are depicted in the positions of their trade – namely, those that we recognise as expressing the act of thinking. During periods of concentration it is common to use the arm and hand in such a way as to support the head.

The first representations of intellectuals are portraits of philosophers and poets from the third century BC. Here we find the earliest examples in art of figures that hunch forward in contemplation, propping their head with their arm. These are two small terra-cotta statuettes from the early third century ‘contemplative young man’ housed at the Louvre, Paris, and ‘contemplative young man’, in the Staatliche Antikensammlungen, Munich (see fig. 34). Of these two seated figures the Paris statuette more close resembles the Vesalian illustration. Here the figure props his head with his right hand and looks left in contemplation. This pose is strikingly different from any earlier known works, and especially from the contrapposto nudes of the classical period.

The representation of thinking in Hellenistic art shows it as a strenuous and laborious activity. The furrowed brow is a common indicator of the efforts of thought, as is evident in the bust portrait of Zeno of Kition (c. 333-262), housed at the Museo Nazionale, Naples (see fig. 35) and the portrait of the Stoic philosopher Chrysippus (c. 281-204), a reconstruction of which is also housed.

363 Saunders and O’Malley, The Illustrations from the Works of Andreas Vesalius of Brussels, 86.
365 Ibid., 91.
366 Ibid., 94.
at the Museo Nazionale, Naples (see fig. 36).\textsuperscript{367} However, our concern is with the thinking head-prop position. A statue of a seated philosopher (c. 250 BC, Rome, Palazzo Spada), known in the Renaissance and restored in the seventeenth century, has a striking resemblance to the contemplating Vesalian skeleton figure (see fig. 37). While the figure is seated, with his left arm tucked under his mantle (and hand clenched in a fist), his right arm set against his leg functions as a prop for his head. The hand itself rests against the cheek as is the case in the Vesalian illustration. Despite the fact that this figure is seated, a parallel exists between it and the Vesalian figure’s legs. As I noted, the Vesalian figure’s left leg crosses over its right one. Compositionally, it forms an elegant serpentine line which carries on from the shape of the spine down the leg. However, it also signals activity of the legs while the top half of the body remains still. With the statue of a seated philosopher, Zanker notes that ‘In the bronze original, this foot [the right] probably rested only on the heel, to convey a restless, swinging motion of the leg, the psycho-motor expression of the inner tension of the thought process’.\textsuperscript{368} There is strong evidence in the literature that Vesalius and his draftsman modelled at least some of the Fabrica illustrations on ancient sculpture, and the parallel between the Vesalian skeleton figure’s pose and the Hellenistic invention of the contemplative pose in its representations of intellectuals furnishes this further.

**Hand Gestures in the Vesalian Illustrations**

As we have seen, hands and their grasping function occupy a central role in the history of medicine and in Galen’s *On the Usefulness of the Parts* in particular. Indeed, the role of hands in the art of medicine was vital for Vesalius in his *Fabrica*, as he emphasised the importance of physicians using their hands in making what is internal and invisible external and visible.\textsuperscript{369} As human beings our hands, like the many complex muscles in our face that allow for expression, play an integral role in communication both consciously and unconsciously. Hands are important communicative tools in life and also in art. For example, hands appear to be a central concern in the painting of Leonardo

\textsuperscript{367} Ibid., 99.
\textsuperscript{368} Ibid., 103.
\textsuperscript{369} I discuss this further in chapter eight.
da Vinci. In his *Last Supper* (1495-1498) hands gesture furiously aiding both composition and narrative, and the central compositional difference between the two versions of his *Madonna of the Rocks* (1483-1486 and 1495-1508) is the exclusion of the pointing hand of the angel in the later National Gallery version. In Vesalius’s muscle figure series there are three illustrations that have particularly striking and unusual hand gestures.

In the first plate of this series (see fig. 6) the figure’s left hand is in a position that is distorted beyond that which would be natural, as it makes a pointing gesture towards the ground. We can tell that the hand is pointing, as it is only the index finger (*digitus secundus manus*) that is extended. Guide signs or deictic signals, to give them their scientific name, are actions which indicate direction. According to Desmond Morris the forefinger point is observable in almost all countries in the world. Usually an individual will point if they are attempting to describe the way towards something, or are indicating where they would like their interlocutor’s attention to be directed. In the case of art, pointing can serve as a compositional device, directing the viewer’s eye around the artwork in a particular direction corresponding to the direction of pointing. It seems unlikely that this is the case in the first Vesalian muscle figure. Rather, it appears that the distorted pointing gesture is functioning in two ways. Firstly, by pointing towards the ground it is perhaps gesturing towards the earth and the burial place of the dead. The titled back head and closed eyes also suggest an unanimated state. The over-extension of the index finger serves to draw the viewer’s attention to it and to the axis of its movement and grasping function.

The most unusual is the ninth plate (see fig. 14). Here the middle finger (*digitus medius*) and the ring finger (*digitus annularis*) come together and cross at the distal phalanx. Interestingly, we also find that Vesalius’s own fingers are crossed in a similar way in his portrait that appears at the beginning of the *Fabrica*. We could interpret this hand gesture, the crossing of fingers, as a reference to luck. The crossing of fingers was a common Christian motif for good luck, and has been historically used to allow believers to recognise one

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371 Ibid., 89.
another during times of persecution.\textsuperscript{372} This has relevance to the crossed fingers of the muscle figure as the subjects being dissected by Vesalius were persecuted criminals. However, it does not explain Vesalius’s crossed fingers in his portrait.

\textit{Contrapposto and the Torso Figures}

The torso figures that represent the viscera, from book five of the \textit{Fabrica} constitute an important and innovative format for representing the internal anatomy of the body. These torso figures are accompanied by a number of representations of internal organs. Like the muscle figures, the torso figures represent the viscera at progressively deeper layers. Firstly the peritoneum is represented completely intact with the abdominal muscles removed. Vesalius progressively depicts the deeper layers, and provides separate details along the way. In chapter five there are ten illustrations representing the viscera that appear as antique sculptural fragments (see, for example, figs. 38 and 39). Unlike the torso figures in chapter five, there are two ‘torso-like’ figures in chapter six which are quite different in that these figures have heads – the same individual is depicted here that appear in the illustrations of the dissection of the brain in chapter seven.

The influence that the \textit{Belvedere Torso} had on both Vesalius and his draftsman (and on Michelangelo) is symptomatic of a general shift in the taste and style of the High Renaissance. One aspect of this broad shift is a greater interest in the representation of \textit{contrapposto}. The \textit{Belvedere Torso}, like the Vesalian illustration modelled upon it, involves a dramatic twist of the torso (see figs 2 and 38). The \textit{Belvedere Torso} twists to face its left, while the Vesalian torso twists to face its right. However, if the latter is indeed modelled upon the former this is what we would expect to find for the reversal is explained by the printing process.

The seventh Vesalian torso figure that appears on the page before the eighth figure just discussed is visually analogous to the torso of the \textit{Discobolos} (see figs. 62 and 41). This sculpture has been restored beyond recognition of how it would have appeared in the Renaissance. In its restored form it appears as a

standing gladiator, twisting vigorously to its right, raising its right arm backwards, about to throw the disk that is in this hand (see fig. 41). However, a sixteenth-century sketch (dated 1513) shows how the fragment appeared in Vesalius’s time (see fig. 40). David Summers has noted firstly that this fragment ‘surfaced at an opportune moment in the development of Roman High Renaissance style’, and secondly that ‘it left much to the imagination’. This fragment was significant to High Renaissance style and insofar as it left much to the imagination (and thus invited further thought) it was perfectly suited to function as an artistic model.

The torso fragment of the Discobolos, known in Vesalius’s time, dramatically twists to its right and bends at the navel. Such a dramatic bend would have been contrary to quattrocento taste, but is found throughout the work of Michelangelo. Take, for example, the Two Slaves (above Ezekiel), and Two Slaves (above Joel) in the Sistine Chapel (see fig. 42). These nude youths, arranged in pairs and facing one another, each dramatically turn and bend at the waist, while their arms, legs and head each depict different and varied positions, almost as if they are a study in the imaginative possibilities left unanswered by the Discobolos fragment. Indeed, perhaps the Slave (above Jeremiah) represents this more than any (see fig. 43). Not only is the torso in the exact position of the Discobolos, but the top of the limbs are also in analogous positions. Apart from the ninth torso figure that lies flat, all of the torso figures in the Fabrica twist to some extent. It is only, however, the seventh figure that twists and bends at the waist (fig. 62).

One of the two female torsos (see fig. 39), that appears just before the famous representation of the uterus in isolation and represents the female reproductive organs, looks remarkably like a sketch from the school of Raphael of the Apollo Citharoedos (see fig. 44). This sketch is now housed in the Ashmolean. The original statue, sketch and Vesalian image alike have the same contrapposto to the torso. The statue was restored in the Renaissance, and its raised right arm clearly influenced Michelangelo’s Dying Slave (1513). That which most closely resembles the Vesalian illustration however, is not the restored Hellenistic statue, but the school of Raphael sketch which dates from

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373 Summers, “Contrapposto,” 337.
before its restoration. While the arms are not represented in the sketch, where they are in the Vesalian torso, there are other striking similarities. The *contrapposto* twist is, while reversed, virtually identical, as is the position of the legs and hair drapes over the shoulder. While the sketch represents a male and the Vesalian torso a female, even the breast region looks similar.

One final parallel that I shall suggest is between the *Apollo Belvedere* (c. 130 AD, see fig. 45) and the fifth, sixth and tenth Vesalian muscle figures (see figs. 10, 11 and 15). Considering the tenth, the positioning of the arms is virtually identical to the *Apollo Belvedere*, as is the Hellenistic swagger. The position of the hand is similar on the right, but slightly different on the left. The figure had been restored in the 1530s (by Michelangelo’s pupil Giovanni Angelo Montorsoli) to include the right forearm, left hand and fig-leaf. We are now once again familiar with the *Apollo Belvedere* in its handless state, after the Renaissance additions were removed (except for the fig leaf) after the Second World War. There are other ancient works that share this oratorical pose. However, the similarity between the Vesalian figure and the *Apollo Belvedere* is particularly striking.

The Title Page of the *Fabrica* and Michelangelo’s *Last Judgement*

The title page to the *Fabrica* (and to his *Epitome*) can itself be read as a tribute to the *all’ antica* style of the *Fabrica* illustrations (see fig. 29). The tumultuous crowd observing Vesalius’s public dissection of a woman’s body resembles the packed crowds so characteristic of ancient friezes. Three figures (one of which is partially concealed by another) in the foreground don the clothing of classical antiquity – known to the Renaissance as their representation was found in ancient visual art and written sources. These figures wear the *tunica* and the *dalmatica/collobium*. They occupy the foreground of the composition suggesting the centrality of the goals of the ancients to Vesalius’s own pursuits. One of the two figures that are fully seen turns away from Vesalius towards the goat that occupies the lower right-hand space, while the

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other watches the dissection closely. This could be interpreted as representing the way that Vesalius both takes and rejects elements of ancient medicine. The importance of anatomy and dissection in antiquity is suggested by the left figure’s attendance to the dissection while the other figure, distracted by the goat which literally tramples his foot, perhaps refers to the dissection of animals practiced by Galen.

A perplexing feature of the title page is the nude figure that clings to the far left column (he appears clothed in the 1555 edition’s title page). One interpretation suggests that this figure emphasises the importance of surface anatomy and ‘draws attention to the functional aspects which Vesalius is to teach’. Elsewhere, it has been suggested that it refers to the many architectural metaphors employed in the Fabrica to help explain the body, many of which Vesalius got from Galen. To me it resembles the angels clinging to the Arma Christi (‘weapons of Christ’ or ‘Instruments of the Passion’) in Michelangelo’s Last Judgement fresco in the Sistine Chapel. Specifically, the Vesalian figure appears similar to those on the right lunette of the Last Judgement fresco which cling to the column where Jesus was flagellated (see fig. 47). As I have suggested, there are also visual similarities between both the Vesalian muscle and torso figures and the figures found in the Sistine Chapel frescos.

Michelangelo’s Last Judgement fresco was completed between 1536 and 1541. Vesalius and his draftsman could not have failed to be aware of this hugely important work and its anatomically significant treatment of the human form. Even if Vesalius and his draftsman had not seen the Last Judgement in situ, it is highly likely that they would have seen a replica or print of it. Within just a few weeks of its completion the writer Nino Sernini enlisted the artist Marcello Venusti to make a small replica of the fresco, and the writer Pietro Aretino, in a letter published in 1546, reports that his criticism of the work is based on a schizzo. This literally means a sketch, but as Bernadine Barnes points out he

376 Saunders and O’Malley, The Illustrations from the Works of Andreas Vesalius of Brussels, 42.
377 This is suggested by Daniel Garrison. See, Garrison, “Metaphor and Analogy.”
probably had the print that is mentioned in a letter to Enea Vico. Such engravings were also extremely popular. Niccolò della Casa’s engraving of it from 1543 was in such demand that it was reissued five years later.

The subject matter of Michelangelo’s *Last Judgement* itself, being the ultimate end and judgement of all of humanity, has particular application to Vesalius’s *Fabrica*. The role that the bodies of executed criminals played in his public anatomies and the theme of mortality found within its illustrations both provide points of comparison. At the bottom of the *Last Judgement*, to Christ’s right, the dead are resurrected, some emerging as skeletons waiting to be clothed in their resurrected skin (see fig. 46). The resurrection of the body was a problem implicit in the dissection of the human body.

A great deal of contemporary criticism of Michelangelo’s *Last Judgement* survives from the sixteenth century. Vasari refers to the angels holding the instruments of the Passion as ‘various naked figures’, indicating that they may not have been immediately identifiable to contemporary viewers, even those familiar with artistic iconography (the *Instruments of the Passion* were common artistic motifs). The angels in the right lunette of the *Last Judgement* fresco cling to a column in a way that visually resembles the naked figure that clings to the column in Vesalius’s title page. They also express movement, which as I have said, following Ivins, is one of the central representational concerns for the muscle figures in the *Fabrica*. Vesalius’s draftsman, if not Vesalius himself, must have been looking for excellent contemporary artistic solutions to this problem. These figures were viewed in the sixteenth century as both ideal nudes and as exemplary representations of movement. Giovanni Andrea Gilio wrote in 1564 that the style of these figures was based on movements and spoke of their exaggerated *contrapposto*. While Gilio’s criticism was ultimately negative (and came after the publication of the *Fabrica*), it nonetheless shows that these figures were famous for their

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379 Ibid., 82.
380 See, Ibid.
382 Barnes, “The Last Judgment and the Critics,” 72.
383 Ibid., 85–87.
representation of movement. Furthermore, Ascanio Condivi said in his *La vita di Michelangelo raccolta dal suo discepolo* (1553) that in the *Last Judgement* Michelangelo had ‘expressed all that art is able of the human body, omitting no act or gesture’.

One question emerges: why did the nude figure clinging to the column in Vesalius’s title page become represented as clothed in the 1555 edition’s title page? One possible answer is that the criticisms of the nudes in Michelangelo’s works made in light of Counter Reformation ideology determined this change.

**Michelangelo, Human Proportion and Movement**

The representation of movement was a central concern for Michelangelo which significantly influenced the type of human form that we find represented by him in the Sistine Chapel. David Summers notes:

> Michelangelo seems to have believed that if any rule at all was to be given for the “measures and variety of the body,” it must begin from the living, moving body... Michelangelo’s proportion studies, although having much in common with other such studies, depart from most of them in their concern with movement, taking as their point of departure a Polykleitan *contrapposto* figure.

As we have seen in chapter four, it was known that the Polycleitan *Canon* called for the representation of a dynamic figure, and Pliny had identified Polycleitus as the inventor of *contrapposto*. In some instances it is known that Michelangelo based his proportionality upon that recommended by Vitruvius and elsewhere upon that recommended by Alberti. However, he also departed from these quantitative recommendations. Significantly, he used a system based upon *contrapposto* itself, using the weight-bearing leg as the module which determines the proportions in the rest of the figure. So, while

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385 Ibid., 382.
386 Pliny, *Natural History*, XXXIV, 56.
388 David Summers writes: ‘The use of the weight-bearing leg as the module by which the proportions of the figure are set perhaps explains the numerous examples in the drawings of Michelangelo and his followers in which single weight-bearing legs are shown’ in Summers, *Michelangelo and the Language of Art*, 387.
representing an austere classical aesthetic, the origins of the depiction of movement in art can be located in the Polycleitan *Canon*.

**Conclusion**

In this chapter I have considered the relationship between stylistic features of Hellenistic sculpture, Michelangelo’s figures in his Sistine Chapel frescos (particularly the *Last Judgement*) and Vesalius’s illustrations. Primarily my intention has been to build upon the art historical literature that notes a parallel between ancient sculpture and the Vesalian illustrations. I have suggested that Vesalius’s use of artworks as stylistic models for his natural philosophical illustrations forms another facet of the transgression between art and nature that occurred in the sixteenth century. Not only are illustrations playing a crucial role within the *Fabrica*, and conveying knowledge about the natural world, these illustrations are themselves based (stylistically) upon artworks.

The idealised style of Vesalius’s illustrations is one that embodies the mathematical precision of the Polycleitan *Canon* and the representation of a normal and mean form. However, it also augments this through the use of varied poses, *contrapposto*, and an emphasis on movement. While representing an ideal norm like the *Canon* of Polycleitus Vesalius’s illustrations also embody a High Renaissance style influenced by Hellenistic precedents and represented by Michelangelo and his perfect nudes. In the chapter to follow I shall consider the ideal and the perfect in fifteenth-century artwriting and aesthetics. I argue that the interplay between *concinnitas* and the visual representation of antithesis in art provides a Renaissance account of aesthetics compatible with the idealisation found in Vesalius.
Chapter Eight: The Ideal, Perfection and Visual Antithesis in Renaissance Artwriting and Aesthetics

Introduction

In this chapter I consider what idealisation, beauty and perfection in art was thought to amount in artwriting and aesthetics of Vesalius’s own time. Vesalius’s extensive representation of the body visually suggests that his search for the *historia absoluti hominis* may have involved consideration of art theoretical and aesthetic treatises. Even if Vesalius himself did not read any artwriting of his time, his draftsman would undoubtedly have been influenced by the contemporary understanding of the beauty and perfection of the human form in art. A consideration of Renaissance notions of beauty and the ideal human form helps to shed light on the idealisation of the Vesalian illustrations.

Firstly I examine the theory of the representation of human proportion in the Renaissance. I consider the relationship of the *Canon* of Polycleitus to the theory of human proportionality in the Renaissance; the way that artists copied from nature and from art and the lack of a distinction between nature and art; and I examine the way that ancient art and aesthetics served as a model for Renaissance art.

I then consider idealisation and proportion in the artwriting of Leon Battista Alberti (1404-1472). Apart from being generally important for an understanding of the principles of Italian Renaissance art, Alberti’s writing has a particular relevance to Vesalius’s idealised and teleological representation of the human form and to the relationship between art and nature. For Alberti there is no tension or contradiction between representing Nature accurately and representing a perfect and beautiful ideal. I consider proportionality and the ideal human form in Alberti’s artwriting and his teleological aesthetic principle *concinnitas*. Firstly, I examine human proportionality in his *De
I consider Alberti’s system for representing proportionality in the human form and how it relates to and differs from the Canon and Vesalius’s illustrations; Alberti’s *tabulae dimensionum hominis*; his account of the ‘perfect beauty distributed by Nature’ and his ‘task of recording the dimensions of man’; his description of the artist’s ability to perfect Nature and of art’s end as the imitation of Nature; his belief that there is no tension between representing Nature accurately and representing a perfect and beautiful ideal; and his account of the idea of beauty and his method for attaining it. Furthermore, I also examine his aesthetic principle *concinnitas* and its relation to the Polycleitan Canon. *Concinnitas* is, for Alberti, the absolute and perfect law of Nature, and its representation in art can be thought of as the representation of Nature in art, and of the beauty and perfection towards which natural particulars strove.

However, as I have argued in the previous chapter, the idealised style of Vesalius’s illustrations cannot solely be explained by reference to an austere aesthetic governed by harmonious mathematical relations of parts to each other and to the whole such as that dictated by the Polycleitan Canon or *concinnitas*. The inflated muscles, variety of pose and use of *contrapposto* characteristic of a High Renaissance style means something more is required. As we have seen Vesalius and his draftsman employ both the *contrapposto* poses typical of the art of the Hellenistic baroque and the High Renaissance. Similarly his muscle and skeleton figures express variety of poses and movement as was endorsed in Renaissance artwriting. Indeed, they realise what Heinrich Wölfflin recognised as the High Renaissance style and called ‘invention of composition by contrasts’. We might interpret the strong use of *contrapposto* in the Vesalian illustrations as an expression of the *artificial* in his illustrations. In Renaissance artwriting and theory *contrapposto* was construed as a pictorial expression, and indeed offspring, of antithesis in rhetoric. In this chapter I build upon claims made by David Summers, and suggest that the expression of antithesis in art (as a stylistic principle and

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389 The date for the composition of this work is unknown and debated. Cecil Grayson suggests that it was most likely produced between *De Pictura* and *De re Aedificatoria*. For a discussion of this see Cecil Grayson’s ‘Introduction’ to Alberti, *On Painting and On Sculpture*, 5; 18–26.  
390 Wölfflin, *Classic Art*, 258.  
compositional device) augments concinnitas (as an aesthetic principle, but also as a principle of nature and mind). Concinnitas as Alberti says ‘flourishes in Nature’ and is the ‘spouse of the soul and of reason’ 392 By contrast the expression of antithesis in painting is only achieved through art, and is an expression of the artificial.

I shall suggest ways in which Vesalius’s use of contrapposto as the expression of antithesis in visual art emphasises the artificial aspect of his illustrations through style and subject matter. Firstly, the dead and partially dissected cadaver is depicted as standing and animated and the muscles are represented as in movement and in tension. This pairing results in the animated dead, which gains meaning through antithesis. It takes the illustrations beyond that which would be found in nature, and beyond the representation of the laws of nature in art. The presentation of the dissected body as art (as antique sculptural fragments), can also be construed as the representation of pictorial antithesis. The body is presented both as natural and as artificial, as an accurate representation of human anatomy but also as prints modelled upon sculptural fragments.

**Human Proportion and Art and Nature in the Renaissance**

In some respects certainty coloured the cultural climate of the Renaissance. Then, more than ever, complete and certain knowledge of nature seemed within reach. Humanity lay at the centre of the universe and the rationality and laws found throughout nature, imbued within it by God, were continuously being discovered, rediscovered and understood. Technical discoveries, such as the advent of perspective and newly discovered pigments, gave art a new ability to represent nature accurately and convey certain knowledge about it. Alberti’s first written formulation of the rules for perspectival representation offered artists a systematic means for pictorial control and exactitude and a guaranteed method for accurately representing the appearance of nature. Art, like the natural world, could be mastered and understood through the investigation of rules. Perspectival representation provided a link between the rules and laws of nature and those of art. Just as the postulates of Euclidian

geometry described the space of the natural world, so too did they describe that of the pictorial. With perspective in painting art and nature became subject to the same mathematical rules of spatial organisation. Perspective in painting offered just one facet of naturalism in Renaissance art and one facet of the transgression of the ancient opposition between art and nature. Theory concerning the representation of human proportionality offered another.

Throughout the middle ages the theory and representation of human proportions in art remained thoroughly Pythagorean. Pythagoras, the founder of theoretical geometry, believed that the truth about the structure of the universe was to be found in ratios and proportions. This seemed to be particularly verified by observations about musical consonances and their relations to the strings of musical instruments. As Rudolf Wittkower observes: ‘The discovery of the close interrelation of sound, space (length of the string), and numbers must have left Pythagoras and his associates bewildered and fascinated, for they seemed to hold the key which opened the door to unexplored regions of universal harmony’. \(^{393}\) Plato, in his *Timaeus*, is very much concerned with Pythagorean proportionality. Plato’s *Timaeus* was influential in late-medieval thought, offering an important account of the creation of the universe and all that was contained within it. One class of proportion derived from the Pythagorean-Platonic tradition was particularly favoured in the middle ages, while another was to be taken up by artists in the Renaissance. Wittkower notes how: ‘The medieval artist tends to project a pre-established geometrical norm into his imagery, while the Renaissance artist tends to extract a metric norm from the natural phenomena that surrounds him’. \(^{394}\) This is not without exception, however, on the whole the Renaissance artists and theorists favoured arithmetical proportions expressed in fractions.

In this section I shall consider the theory of human proportionality in the Renaissance and its relation to the *Canon* of Polycleitus. As we have seen, Vesalius himself read about the *Canon* of Polycleitus in the works of Galen, and perhaps elsewhere. Other artists and theorists in the Renaissance, near contemporaries of Vesalius and his draftsman, were deeply concerned with the

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394 Ibid., 116.
representation of the human form and the proportionality involved in this. Some of their theory is adopted directly from the Polycleitan Canon while other parts are novel. The proportionality found in Renaissance treatises on art and representation form another potential avenue of influence between Polycleitan theory and the Vesalian illustrations. It also provides an account of the understanding of human proportions in art that is contemporaneous with the Fabrica and therefore provides further insight into the artistic context of Vesalius and his draftsman.

Artists of the quattrocento, the century before Vesalius, passionately measured and sketched antique sculptural fragments and architectural ruins as they were being unearthed in Rome. The status of art was transformed over this century, as it became thought of not only as a craft but as a discipline that involved a deep understanding of antiquity and of the Seven Liberal Arts that formed the basis of the university curriculum. During the quattrocento the intellectual status of art was elevated from art colla mano to art col cervello. This new intellectual status of art solidified further throughout the sixteenth century, the High Renaissance, and the canons of proportion and rules of beauty aided in this process. Phyllis Bober writes that it ‘was Vasari and others like him who expanded upon the tradition of Early and High Renaissance predecessors by turning to systematized ideas of rules and canons by which to set criteria for discriminating valid taste in matters artistic’. Bober points out that for the artists and theorists of the Quattrocento there was no tension between art and nature, no debate as to whether artists should, or, indeed, did, look to the art of classical past or directly to nature. ‘ancient art was nature rationalized and articulated, its creators having mined the raw ore of nature, transmuted and refined it.’ Furthermore, she adds: ‘It is not difficult to show how ancient art served as nature’s surrogate or to pinpoint the historical moment when truth to visual reality dictated transformation of medieval workshop methods to include – as a matter of

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395 These included grammar, rhetoric and logic (a trivium), and arithmetic, geometry, music and astronomy (a quadrivium).
396 This distinction is discussed in Bruce Cole, The Renaissance Artist at Work: From Pisano to Titian (New York: Harper & Row, 1983).
397 Bober, Renaissance Artists & Antique Sculpture, 32.
398 Ibid., 34.
As I have been arguing, the ancient distinction between art and nature is transgressed by Vesalius and his draftsman, through their copying of both nature and art in their presentation of knowledge about the natural world. Vesalius’s illustrations are based not only on ideas and observations but also on antique sculptural fragments – on both art and nature. This goes some way in accounting for their idealisation and naturalism. The Early Renaissance applied the concept of refined or enhanced nature (natura naturata) to antique art. This concept I suggest, also may help to illuminate both the idealism and naturalism evident in the Vesalian illustrations.

**Idealisation and Proportion in Leon Battista Alberti’s Artwriting**

A significant contribution to the ‘systematized ideas of rules and canons by which to set criteria for discriminating valid taste in matters artistic’ referred to by Bober and quoted above, was made by the Renaissance art theorist (amongst other vocations) Leon Battista Alberti (1404-1472). In his *De Statua* we find systematic rules of proportional representation of the human body; in his *De Pictura* (1435) the first written account of perspectival representation; and in his *De Re Aedificatoria* (1452) what is the first theoretical attempt to deal with aesthetic judgement as aesthetic judgement. Alberti’s own accounts of both the proportional representation of the human form in sculpture and in painting form part of the same tradition of human proportionality in representational art as the *Canon* of Polycleitus, however, Alberti’s is also significantly original. Furthermore, his account of beauty is very Polycleitan in character. As I have mentioned, Alberti’s principles of art making and aesthetics are foundational for Italian Renaissance art generally, and therefore cannot fail to be important in understanding the proportionality employed by Vesalius and his draftsman and consequently for that which is evident in the Vesalian illustrations. Also, his tabulation of an ideal form, his understanding of art and nature and his teleological aesthetic mean that his artwriting is particularly relevant to Vesalius’s illustrations.

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399 Ibid.
In his work we find evidence of the relationship between proportionality, artistic imitation of Nature, and the ideal. For Alberti there is no tension or contradiction between representing Nature accurately and representing a perfect and beautiful ideal. Absolute, perfect and beautiful forms lie, while not fully realised in any individual case, within the forms of Nature herself. This, I hope, will help to shed light on the idealised nature of the Vesalian illustrations and their apparent naturalism. Alberti’s work offers a link between Polycleitus and Vesalius as well as an account of the ideal that is derived directly from artwriting that is temporally as well as geographically close to Vesalius and the publication of his work. Firstly, I shall consider proportionality and the ideal human form in Alberti and then his thoroughly teleological aesthetic principle concinnitas. These are, as we will see, fundamentally interrelated.

The theoretical instinct of Alberti is very much a reflection of his time. The cultural climate of the quattrocento is literally engrained into the marquetry walls of Frederico da Montefeltro’s Studiolo in the Ducal Palace in Urbino. It is a study which pays homage to the Seven Liberal Arts. The Uomini illustri (‘famous men’) portraits that adorn the walls are united by the ubiquitous sense of measure that constituted their intellectual values and respective disciplines. This is particularly evident in the words inscribed below each portrait. For example, below Euclid it is written: ‘To Euclid because he comprehended the space of the earth ... Frederico gave this for the most precise and exact invention’.\(^{400}\) Alberti’s is a culture that revered measure and certainty, and felt more than ever that certainty about the world was within its grasp, and was to be achieved through the understanding of the laws of nature and human reason’s ability to grasp them.

In both De Statua and De Pictura Alberti connects the theory of anatomy with that of proportionality. Both works offer an account of human proportionality and measurement in the representational arts, however, the systems recommended do differ in important respects. Even though it seems likely that De Statua was written after De Pictura it is with the former that I shall begin due to its more immediate application to human proportionality. The primary

concern of De Statua lies with the measurement of people and statues (nature and art) in static or dynamic positions. In the case of the static figure Alberti uses the exempla and normae to measure height, width and depth. Unlike the fractional system advocated in the Canon (and recommended by Vitruvius), Alberti’s system uses the normae or ruler as a measure which is derived from the height of the person to be represented, and can vary accordingly. (Because the Canon advocates proportionality amongst its own parts it too can vary according to the height being represented). This measure (the normae) gets divided into six parts called pede or ‘feet’ and further into six-hundred smaller parts. Alberti designed a special instrument called the finitorium for the representation of dynamic bodies.

At the end of the work Alberti tabulates ‘ideal’ dimensions in his Tabulae dimensionum hominis. He also provides a picture of this (see fig. 48). Alberti’s table provides measurements in pede (feet), gradus (degrees), and minuta (minutes). The exempla is the height of the figure, and is six feet. That is, each foot is 1/6 of the height. Each foot is divided into ten degrees, and each degree into ten minutes. This means that there are sixty degrees and one-hundred minutes in the whole length of the figure. Using Alberti’s method one can compare Vesalius’s illustrations against it, against the Doryphoros (as I did in chapter four) and other Renaissance artworks and illustrations. Vesalius’s first muscle figure (fig. 6) matches Alberti’s ratios in the dimensions concerning height. He only departs from them in the dimensions measuring bulk of muscle. For example, the height of Vesalius’s figure is 25cm and the distance from the navel to the ground is 5cm giving a ratio of 15/25 which matches Alberti’s ratio of 3.6/6. The measurements from the ground to the fork of the throat; ground to the bottom of the knee cap; ground to the top of the knee cap; and ground to the base of the buttocks all accord very closely with Alberti’s measurements. These are presented in the table (see fig. 49) and show that in each case there is less than 2% deviation. However, the measurements differ where muscle bulk is concerned. For example, the widest part of the calf is 2cms in Vesalius’s figure, deviating 37% from Alberti’s recommendation. The widest part of the thigh deviates from Alberti’s recommendation by 20%, and the maximum width between sides above the hips deviates by 26%. This shows that while the basic proportionality of the
figure (heights and lengths) is virtually identical to Alberti’s recommendations, it deviates significantly where bulk of muscle is concerned.

Comparing Alberti’s ideal dimensions to both Vesalius’s first muscle figure and to the Doryphoros we see that the Doryphoros also closely resembles Alberti’s proportions concerning height (from ground to navel, ground to fork of throat, ground to the bottom of the knee, ground to the top of the knee, and ground to the base of the buttocks). Considering these measurements, Vesalius’s figure is a closer match to Alberti’s table than it is to the Doryphoros or than the Doryphoros is to Alberti’s dimensions. Like Vesalius’s figure, the Doryphoros differs from Alberti’s ideal dimensions where it comes to muscle bulk, however, not nearly as significantly. Where the Vesalian thigh measurement differs by 20% the Doryphoros differs by only 5%. These figures can be seen represented in the table (see fig. 49).

Grayson notes that Alberti’s tabulation of the ideal male figure may seem puzzling:

Why does a work hitherto founded on and aimed at the measurement of a given individual pass in its final conclusions to the proportions extracted, after the manner of Zeuxis, from the measurement of many bodies with a view to seeking some ideal of beauty in human form? The underlying problem is that of the relationship between the particular and the general ... and the object of the artist, in imitating nature, to represent the beautiful. 401

For Alberti, as for other Renaissance thinkers, there is no tension between the particular and the ideal, for study of particular individuals in nature will reveal the underlying type, or ideal form. This ideal set of measurement provided by Alberti at the end of De Statua functions just as Polycleitus’s Canon did, as an ideal type or formula which can be artistically altered or manipulated. Grayson writes:

The important fact is that the mean proportions of Alberti’s tables represent an aesthetic idea of the human form as a basic guide for the sculptor, extracted from actual examples, and not dictated by philosophical or religious principles. Like the Greek system, his is soundly based on anthropometry, not understood

as a rigid formula, but as a basic pattern which may be varied according to any particular case.  

While artistic and aesthetic rules could appear as anathema to originality, artistic freedom or variation from artistic rules is clearly intended by Alberti. As Kemp has noted, of De Pictura, but it is equally relevant here, ‘an imaginative exploration of his principles ... is entirely in tune with the intentions of Alberti’s treatise’.  

As we have seen Vesalius uses the term ‘homo absolutus’ or ‘perfect man’ in his discussion of the body which is best for dissection. This ‘homo absolutus’ is indeed what we find represented in the Fabrica, and it is this perfection or idealisation that is our concern. He also uses the debated term ‘quam temperatissimum’ to refer both to the kind of body that is best for dissection and also to refer to the statue of Polycleitus. Alberti’s terms, in his discussion of the ideal human form in De Statua, are slightly different. The passage at issue states:

\[Hoc\ opusculum\ cupio\ meis\ pictoribus\ atque\ sculptoribus\ fore\ familiare,\ qui\ si\ nos\ audierint\ congratulabuntur;\ cum\ et\ nos,\ quo\ res\ exemplis\ clarior\ habetur,\ quove\ plurimum\ nostra\ prodesset\ opera,\ hunc\ nobis\ suscepimus\ laborem\ adnotandarum\ dimensionum\ praesertim\ in\ homine.\ Ergo\ non\ unius\ istius\ aut\ illius\ corporis\ tantum,\ sed\ quoad\ licuit,\ eximiam\ a\ natura\ pluribus\ corporibus,\ quasi\ ratis\ portionibus\ dono\ distributam,\ pulchritudinem\ adnotare\ et\ mandare\ litteris\ prosecuti\ sumus,\ illum\ imitati\ qui\ apud\ Crotoniates,\ facturus\ simulacrum\ Deae,\ pluribus\ a\ virginibus\ praestantioribus\ insignes\ elegantes\que\ omnes\ formae\ pulchritudines\ delegit,\ suum\que\ in\ opus\ transitulit.\ Sic\ nos\ plurima,\ quae\ apud\ peritos\ pulcherrima\ haberentur,\ corpora\ delegimus,\ et\ a\ quibusque\ suas\ desumpsimus\ dimensiones,\ quas\ postea\ cum\ alteras\ alteris\ comparassemus,\ spreritis\ extremorum\ excessibus,\ si\ qua\ excederent\ aut\ excederentur,\ eas\ excepsimus\ mediocritates,\ quas\ plurium\ exemplarum\ consensus\ comprobasset.\ Metiti\ igitur\ membrorum\ longitudines,\ latitudines,\ crassitudines\ primarias\ atque\ insignes,\ sic\ invenimus.\ Nam\ fuerunt\ quidem\ membrorum\ longitudines\ sic.\]

I follow Grayson’s translation:

\[Hoc\ opusculum\ cupio\ meis\ pictoribus\ atque\ sculptoribus\ fore\ familiare,\ qui\ si\ nos\ audierint\ congratulabuntur;\ cum\ et\ nos,\ quo\ res\ exemplis\ clarior\ habetur,\ quove\ plurimum\ nostra\ prodesset\ opera,\ hunc\ nobis\ suscepimus\ laborem\ adnotandarum\ dimensionum\ praesertim\ in\ homine.\ Ergo\ non\ unius\ istius\ aut\ illius\ corporis\ tantum,\ sed\ quoad\ licuit,\ eximiam\ a\ natura\ pluribus\ corporibus,\ quasi\ ratis\ portionibus\ dono\ distributam,\ pulchritudinem\ adnotare\ et\ mandare\ litteris\ prosecuti\ sumus,\ illum\ imitati\ qui\ apud\ Crotoniates,\ facturus\ simulacrum\ Deae,\ pluribus\ a\ virginibus\ praestantioribus\ insignes\ elegantes\que\ omnes\ formae\ pulchritudines\ delegit,\ suum\que\ in\ opus\ transitulit.\ Sic\ nos\ plurima,\ quae\ apud\ peritos\ pulcherrima\ haberentur,\ corpora\ delegimus,\ et\ a\ quibusque\ suas\ desumpsimus\ dimensiones,\ quas\ postea\ cum\ alteras\ alteris\ comparassemus,\ spreritis\ extremorum\ excessibus,\ si\ qua\ excederent\ aut\ excederentur,\ eas\ excepsimus\ mediocritates,\ quas\ plurium\ exemplarum\ consensus\ comprobasset.\ Metiti\ igitur\ membrorum\ longitudines,\ latitudines,\ crassitudines\ primarias\ atque\ insignes,\ sic\ invenimus.\ Nam\ fuerunt\ quidem\ membrorum\ longitudines\ sic.\]

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402 Ibid.
Furthermore, so that the subject may be clarified by examples, and my work most useful to many people, I took on the task of recording the *dimensiones* of man. I proceeded accordingly to measure and record in writing, not simply the beauty found in this or that body, but, as far as possible, that perfect beauty distributed by Nature, as it were in fixed proportions among many bodies; and in doing this I imitated the artist at Croton who when making the likeness of a goddess, chose all remarkable and elegant beauties of form from several of the most handsome maidens and translated them into his work. So we too chose many bodies, considered to be the most beautiful by those who know, and took from each and all their *dimensiones*, which we then compared one with another, and leaving out of account the extremes on both sides, we took the mean figures validated by the majority of *exempeda*. By measuring the principle and most important lengths, widths and thicknesses of limbs, we found as follows. The lengths were: ....

In this passage Alberti speaks of the *laborem adnotandarum dimensionum praesertim in homine* or the ‘task of recording the dimensions of man’ and of ‘the perfect beauty distributed by nature’. Here, rather than using the term *absolutus* as he does in his discussion of *concinnitas* in *De Re Aedificatoria* and as Vesalius did in referring to the *homo absolutus* (and, as we have seen Ficino did) Alberti uses the term ‘eximiam...pulchritudinem’ or ‘perfect beauty’ that is distributed by nature among many bodies. His recommendation is that like the artists at Croton, artists should choose many bodies which are considered by experts of taste (‘those who know’) to be beautiful, measure there dimensions, leave out the extremes, and then take the mean dimensions of the remaining measurements. We find in Alberti the identification of the mean with beauty, and a form of mathematical averaging of dimensions allows for the discovery of this. Importantly, this process is very much empirical. Alberti notes these dimensions are to be derived from a sample of actual bodies found in Nature, for the most beautiful form is ‘distributed by Nature ... among many bodies’, which is why a mathematical process of averaging dimensions from a number of real, particular examples will reveal the underlying typical and perfect form.

In chapter three I discussed ancient accounts of the perfecting of nature’s ends through the arts of medicine, husbandry and athletics. There is a sense in which, for Alberti, the artist, through this process of averaging, is able to make

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405 Ibid., 133–135.
an image that is more perfect than any actual token examples found in nature. This is evident in his discussion of the origins of art that appears at the beginning of *De Statua*. Alberti says that ‘every art and discipline contains by Nature certain principles and procedures, and whoever applies himself to recognising and learning them may perfectly accomplish whatever he sets out to do’.

Alberti identifies the end or objective of sculpture as the attainment of likeness – either of a type of creature, a human for example, or of a particular individual. Alberti, begins to speculate as to the nature or essence of both a type of thing, and of a given individual, but unfortunately cuts this short.

For Alberti the ultimate end of art itself lies in the imitation of Nature. This is evident in *De Statua* and *De Pictura* alike. *De Pictura* was written in Florence in 1435. It is in this treatise that, for the first time, the rules of fixed-point perspective in painting were written down. Alberti applies a mathematical theory of vision to the end of representing the way that the world appears to a human eye on a plane surface. The result is a theory that allows all objects, ground and space represented in a given image to be spatially unified according to a perspectival grid, so that all elements of a given picture stand proportionally to each other and to the whole, according to the Euclidian mathematics of vision and the general appearances of objects in the world.

Again, in *De Pictura*, we see that there is no tension or contradiction for Alberti between representing Nature accurately and representing a perfect and beautiful ideal that surpasses token examples found in nature. As we have seen, his discussion in *De Statua* provides us with the empirical and mathematical method for which this is to be obtained. In *De Pictura* he discusses how the artist must not simply transcribe Nature accurately, but select and conflate the most beautiful parts from many particular examples. In section 55 of Grayson’s translation he writes:

> But, considering all these parts, he should be attentive not only to the likeness of things but also and especially to beauty, for in painting beauty is as pleasing as it is necessary. The early painter Demetrius failed to obtain the highest praise

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406 Ibid., 121.
407 See paragraph 4 of ‘On Sculpture’ in Ibid., 123.
because he was more devoted to representing the likeness of things than beauty. Therefore, excellent parts should all be selected from the most beautiful bodies, and every effort should be made to perceive, understand and express beauty. Although this is the most difficult thing of all, because the merits of beauty are not all to be found in one place, but are dispersed here and there in many, every endeavour should be made to investigate and understand it thoroughly.\(^{408}\)

However, in section 56 he adds:

we must avoid the habit of those who strive for distinction in painting by the light of their own intelligence without having before their eyes or in their mind any form of beauty taken from Nature to follow. The idea [my emphasis] of beauty, which the most expert have difficulty in discerning, eludes the ignorant. Zeuxis, the most eminent, learned and skilled painter of all, when about to paint a panel to be publically dedicated in the temple of Lucina at Croton, did not set about his works trusting rashly in his own talent like all painters do now; but, because he believed that all the things he desired to achieve beauty not only could not be found by his own intuition, but were not to be discovered even in nature in one body alone, he chose from all the youth of the city five outstandingly beautiful girls, so that he might represent in his painting whatever feature of feminine beauty was most praiseworthy in each of them … So, let us always take from Nature whatever we are about to paint, and let us always choose those things that are most beautiful and worthy’.\(^{409}\)

In these passages Alberti’s recommendation is that the artist must imitate and draw from Nature directly, and also surpass the beauty found in particular natural examples. Alberti uses the phrase pulchritudinis idea or ‘idea of beauty’. Again, this idea of beauty, is seems, is to be found in and distributed throughout natural examples, however not fully realised in any. Grayson writes that: ‘Alberti seems to see this ‘idea of beauty’ as a transcendence of particular reality, a superior goal the painter must aim for’.\(^{410}\) Realism in painting, alone, is not enough. Grayson adds: ‘There would seem to be no problem here for Alberti of a gap between real and ideal. You learned the latter from study of exemplars of the former; and the object would be to arrive at a representation, not of this or that particular man, but of the perfect image of a given kind of

\(^{408}\) Ibid., 99.
\(^{409}\) Ibid., 99–101.
\(^{410}\) Cecil Grayson, ‘Introduction’ to Ibid., 15.
man in a particular position or emotion, - an exemplary likeness more convincing and more beautiful than reality itself'.

So far I have considered human proportionality, the relationship between the ideal and the particular, and between imitating nature and representing an ideal of beauty that surpasses anything found in nature in Alberti’s *De Statua* and *De Pictura*. However, it is in his book on Architecture *De Re Aedificatoria* that we find the earliest theoretical attempt to deal with aesthetic judgement as aesthetic judgement. The concept introduced by Alberti is that of *concinnitas*. This highly rational aesthetic appears to be precisely apt to measure the form of painting and sculpture set out by Alberti in the texts we have been considering. It also appears to be consistent with the idea of beauty found in the literary sources for the Polycleitan *Canon*. As we have seen in these sources it is said that beauty comes about through many numbers and is the product of many numbers; the mean of a given type of form (for example, human, horse, cow, lion) is directly associated with the beautiful; it is said that image-makers are in best position for discovering this; it is associated with the commensurability of parts to each other and to the whole; and related to a system of proportion and harmony. *Concinnitas* also has these features. I am arguing for a link between the Polycleitan *Canon* and the Vesalian illustrations. Given that Alberti’s concept *concinnitas* appears to elaborate exactly on the highly rational aesthetic set out by Polycleitus I suggest that an understanding of it helps to elucidate the visual character of the Vesalian illustrations and in particular their idealisation.

*Concinnitas*, I suggest, can be understood as a measure that governs judgements of taste and as an objective aesthetic principle. Alberti writes that: ‘beauty is a form of sympathy and consonance of the parts of a body, according to a definite number (*numerus*), delimation (*finitio*), and position (*collocatio*), as dictated by *concinnitas*, the absolute and fundamental rule in Nature’. In Latin he says ‘*concinnitas hoc et absoluta primariaque ratio*
For Alberti, *concinnitas* dictates and measures the relation of elements in a given body such that nothing can be added or subtracted (*numerus*), enlarged or decreased (*finitio*), or positioned differently (*collocatio*); *concinnitas* guarantees that the form is ‘right’ and ‘perfect’. It dictates the structural and measureable aspects of a body’s form and ensures that its parts harmoniously relate to each other and to the whole, illuminating the ends and perfection towards which it was thought that nature strove.

*Concinnitas* can be understood as a teleological concept and as an ideal of the judged object’s perfection; a concept which governs and partially determines a judgement of taste. It is, for Alberti, the fundamental law in Nature. He writes: ‘Atqui est quidem concinitatis munus et paratio partes, quae aloinqu inter se natura distinctae sunt perfecta quadam ratione constituere, ita ut mutuo ad speciem correspondeant’.415 This is translated by Rykwert, Leach and Tavernor as ‘everything that Nature produces is regulated by the law of *concinnitas*, and her chief aim is that whatever she produces should be absolutely perfect’.416

The beautiful and the ideal ends in nature are, for Alberti, synonymous. Indeed, earlier in book four, in identifying a perfect form, he writes: ‘We should follow Socrates’s advice, that something that can only be altered for the worse can be held to be perfect’.417 The notion that perfection in art is signalled by the way in which no element can be altered was fundamental to Renaissance art. *Concinnitas* dictates that each element in an artwork, as in the organic bodies of nature, must stand in harmonious and proportional relations with each other and to the whole. As Heinrich Wölfflin observes: ‘This kind of interconnection is called organic, for its secrets lie in the very fact that art works like nature, that the image of the whole is repeated in the parts’.418

The concept *concinnitas* occurs in Alberti’s book on architecture, and it appears in the context of the problem of unifying the various parts of which building are composed into a unified and organic whole. Alberti hopes that

415 Ibid.
417 Ibid., 96.
'observing what produces beauty by its very nature'\textsuperscript{419} will aid this problem in the art of architecture. Just as Vesalius and Galen use architectural metaphors in their descriptions of the human body, Alberti uses corporal metaphors in his description of architecture (as Vitruvius had done before him).\textsuperscript{420} For example in book three, he says that features of roofs include: ‘the bones, muscles, infill panelling, skin and crust ... spaces are left between the beams, then cross-beams are added, and from these span the lathing and anything else similar. Each of these can quite acceptably be considered ligaments’.\textsuperscript{421} And, later he writes:

The physicians have noticed that Nature was so thorough in forming the bodies of animals, that she left no bone separate or disjointed from the rest. Likewise, we should link the bones and bind them fast with muscles and ligaments, so that there frame and structure is complete and rigid enough to ensure that its fabric will still stand on its own, even if all else is removed.\textsuperscript{422}

Given that concinnitas is for Alberti the fundamental law of Nature it is unsurprising that he uses bodily metaphors throughout De Re Aedificatoria. It is the bodies of Nature that the bodies of art must imitate.

Concinnitas is for Alberti a principle that runs through all of Nature – including human nature. He writes that ‘Neither in the whole body nor in its parts does concinnitas flourish as much as it does in Nature herself; thus I might call it the spouse of the soul and of reason’; that ‘When you make judgements of beauty, you do not follow mere fancy, but the workings of a reasoning faculty that is inborn in the mind’; and notes that the ‘form and the figure’ of a building is that which the mind responds to when it recognises the ‘natural excellence and perfection that excites the mind and is immediately recognised by it’.\textsuperscript{423} Judgements of beauty are for Alberti rational judgements, about an object’s (visible) spatial or (auditory) temporal form, which pleases the mind.

\textsuperscript{419} Alberti, On the Art of Building in Ten Books, 301.
\textsuperscript{420} As J.J. Pollitt notes: ‘Vitruvius points out that a well-planned temple must have both a fixed module of measurement and also a system of symmetria which is modelled on that of the human body. He then describes the ideal proportions of the human body in detail’ in Pollitt, The Ancient View of Greek Art, 19.
\textsuperscript{421} Alberti, On the Art of Building in Ten Books, 79.
\textsuperscript{422} Ibid., 86.
\textsuperscript{423} Ibid., 301–303.
We see that *concinnitas* appears to be very much a teleological concept and the principle itself which underpinned the mathematics and rationality that was observed to run through Nature organising and unifying it. This rational core of Nature constituted beauty. A judgement of beauty for Alberti, it seems, lies in the fittingness of an objects form to an idea of its final cause or perfection. From Alberti’s thinking as it is expressed in *De Statua* and *De Pictura* we know that the ideal form of any given type is known through the averaging of a number of examples found in Nature, which are considered to be good of their kind by experts or critics of taste.

As I noted earlier, beauty as it is conceived in the Polycleitan *Canon* is an attribute belonging to the object judged and not the judging subject. Similarly, *concinnitas* is very much a property that belongs to the object judged. As we have seen Alberti states that it concerns the ‘form and figure’ of an object. Similarly, just as proportionality lies at the heart of the Polycleitan system, it is a key feature of perspective in painting, of the system of representation recommended in *De Statua*, and also central to Alberti’s account of beauty. The term *finitio* designates proportionality. He defines it as: ‘*correspondentia quaedam linearum inter se, quibus quantitates dimetiantur*’. 424 *Finitio* as an element of *concinnitas* ensures the proportionality of the length, breadth and depth of an object. Importantly, Alberti’s account of human proportions and of perfection in Nature and art begins to furnish an understanding of how these were understood in artistic circles in the Renaissance. In his thinking there is no gap between realism and idealism and no tension or contradiction between representing Nature accurately and representing a perfect and beautiful ideal.

*Concinnitas* is for Alberti the rational and intellectual core that lies at the heart of Nature and is an idea that can be recognised by reason. As we have seen it is the absolute and fundamental law of Nature, which dictates that the products of nature will be perfect. That is, that that the parts of any natural body will correspond to each other and to the whole. *Concinnitas* runs throughout the natural world and human nature, yet it is not the case that absolute perfection is found in particulars. Natural objects strive towards perfection (that is, a state in which nothing about it can be altered without harming the whole), yet this is

never fully attained. Art also aims towards the type of perfection that concinnitas demands. As we have seen, for Alberti, the artist should select the best parts from a selection of natural particulars.

Concinnitas is the rational, intellectual and beautiful core of Nature and that which determines beauty in art. Yet, as I have argued, Vesalius’s illustration with their variety of poses, inflated musculature and contrapposto share a style analogous to Michelangelo and the Hellenistic baroque. While Alberti would not have advocated the extent of stylistic embellishment found in Vesalius, he was not opposed to it. In Alberti ornament (ornamentum, ornatus), and variety (varietà) are two concepts that embellish the rational aesthetic core and intellectual frame of art. In the next section I shall consider the relationship between beauty and adornment in Alberti, as this provides the basis for an account of the style of Vesalius’s illustrations derived from Renaissance artwriting.

‘Composition by Contrast’ Antithesis in Visual Art

Eighteenth-century aesthetics (in particular Kantian aesthetics) came to emphasise that aspect of art which departed from rules and formula. While Renaissance art and aesthetics focused on the rational and rule following aspects of art, certain stylistic principles and devices can be found in Renaissance artwriting that address the ways in which it was appropriate for the art of painting to augment its rules through the artist’s use of ingenium. In Alberti’s artwriting ornatus and ingenium (or ingegno) represented the artificial aspect of art, while concinnitas represented the aesthetic perfection found in the rules of nature and the mind. The former imparts the creative human aspect to art. Quattrocento art, like classical art, embodied the most subtle and austere departure from rules, while works from both the Hellenistic period and sixteenth-century Mannerism took such departures further. An account of antithesis in art can be found in the artwriting of Alberti. Considered in conjunction with concinnitas, contrapposto (as a stylistic device) refines my account of the idealised style of Vesalius’s anatomical illustrations.

For Alberti’s use of the term ingenium see, for example, section 56 of De Pictura in Alberti, On Painting and On Sculpture.
Following Alberti, we might interpret the strong use of *contrapposto* in the Vesalian illustrations as an expression of the *art* (or artificial) in his illustrations. In Renaissance artwriting and theory *contrapposto* was construed as a pictorial expression, and indeed offspring, of antithesis in rhetoric. In his paper ‘Contrapposto: Style and Meaning in Renaissance Art’ David Summers discusses the way that *contrapposto* and *chiaroscuro* in painting emerged out of the great tradition of rhetoric and the concept of antithesis (as a form of embellishment).\(^426\) He notes that ‘antithesis occupied a unique and venerable place in the history of rhetoric and, more than being simply a figure of speech, was a structural device’.\(^427\) This was transferable to painting.

The expression of antithesis in art (as a stylistic principle and compositional device) stands in contrast to *concinnitas* (as an aesthetic principle, but also as a principle of Nature and mind). As we have seen, Alberti says that *Concinnitas* ‘flourishes in Nature’ and is the ‘spouse of the soul and of reason’. It is the ‘absolute and perfect law of Nature’. By contrast the expression of antithesis in painting is only achieved through art, and is an expression of the artificial. Vesalius’s use of *contrapposto* as the visual expression of antithesis in visual art emphasises the artificial aspect of art through style. This is mirrored, I suggest, in various features of Vesalius’s standing skeleton and muscle figures. Firstly, the dead and partially dissected cadaver is depicted as standing and animated and the muscles are represented as in movement and in tension. This pairing results in the animated dead, which gains meaning through antithesis. Secondly, in these illustrations Vesalius is concerned with making the internal and invisible external and visible, through the *art* of medicine, and through the use of his own hands. This making of the internal and invisible external and visible through art can, I suggest, be understood as an expression of antithesis in art, and therefore of art in art.

**Alberti on Contrapposto**

For Alberti *contrapposto* in painting was permissible insofar as it did not exceed the limits of what was physically possible. In his *De Pictura* he discusses


\(^{427}\) Ibid., 347.
the representation of movement in painting, and lists rules stating what is permissible within the bounds of decorum in art. Alberti writes:

There are those who express too animated movements, making the chest and the small of the back visible at once in the same figure, an impossible and inappropriate thing; they think themselves deserving of praise because they hear that those images seem alive that violently move each member; and for this reason they make figures that seem to be fencers and actors, with none of the dignity of painting, whence not only are they without grace and sweetness, but even more they show the *ingegno* of the artist to be too fervent and furious.428

For Alberti, those who carry *contrapposto* too far, in cases where both the front and the back of the figures are depicted, are both ‘contrary to Nature’ and ‘contrary to art’.429 Where Nature could not make a figure show both its front and back at the same time this was possible (but not decorous) in art. Excessive *contrapposto* represented for Alberti excessive display of the artificial aspect of art at the expense of the natural, and at the expense of the expression of *concinnitas*.

In his account of this feature of Alberti’s thinking Summers offers, as a point of direct contrast, a positive endorsement of ‘conspicuous *contrapposto*, or more generally conspicuous display of artificial construction’ found in G. A. Gilio’s description of a work by M. Pulidoro Saraceni. He writes:

Truly the *ingegno* of the man is great, and all the more so when sometimes with charming and beautiful inventions he does that which nature cannot do by herself. In this regard, I understand that a painter was taken to Francis, King of France, in which an armed man was painted in such a way as to show his whole back; and the prudent and ingenious artist wishing also to show the front, and not being able to, charmingly painted a mirror in his hand, in which was shown his face, with the chest and all the rest, with such charm that the generous King paid many hundreds of *scudi* for it’.430

This painting took *contrapposto*, the artificial aspect of art, beyond Alberti’s limits of decorum. With the aid of representing the artificial device of the

Subtle antithesis in art, or a pairing of opposites, is found throughout classical and quattrocento art. The contrapposto stance of the Doryphoros is itself an example, as is Leonardo da Vinci’s invention of chiaroscuro (modelling though light and dark). David Summers notes that ‘From Alberti onwards, contrapposto was a general constructive principle – perhaps the major component of varietà – with many important applications, and from Leonardo onwards it was the foundation of a pictorial eloquence that encompassed chiaroscuro and figure serpentine as well as juxtapositions of colours, of beautiful and ugly, young and old, near and far, and so forth'. In the Renaissance, the juxtaposition of such opposites in a painting had connotations of embellishment and of the artificial aspect in art. For Alberti such juxtapositions were necessary for varietà but had to be used carefully and in moderation. By contrast, the art of the Hellenistic baroque and the High Renaissance (including Michelangelo) took antithesis and contrast further, adding more of the artificial aspect to the rational, natural, and intellectual core of art. Raphael’s oeuvre contains numerous examples. Take for example his Entombment, 1507 (see fig. 50). This work is full of figure serpentine, the face of an old man is situated next to that of a young woman, one figure leans forward while the other leans backward, and dramatic chiaroscuro is employed.

As the High Renaissance gave way to Mannerism antithesis in art was taken continually further. Departures from the rules of art and of Nature (or the rules of Nature in art) came to be associated with artistic freedom. This resulted in the magnificently surreal forms found in Mannerist art. Both the front and the back of the figure closest to the foreground in Jacopo Pontormo’s Descent from the Cross, 1525-1528 can be seen even without the aid of a pictorial mirror (see fig. 51). This is taken even further by his pupil Agnolo Bronzino in the figure of cupid in his Venus, Cupid, Folly and Time, 1546 (see fig. 52).

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431 Ibid., 354.
While Vesalius never goes this far in his representation of antithesis, I would like to suggest ways in which Vesalius’s use of *contrapposto* as the expression of antithesis in visual art emphasises the artificial aspect of art through both subject and style. Firstly, the dead and partially dissected cadavers in the muscle figure series are depicted as standing and animated and the muscles are represented as in movement and in tension. This pairing results in the animated dead, which gains meaning through antithesis. It takes the illustrations beyond that which would be found in nature, and beyond the representation of the laws of nature in art. The presentation of the dissected body as *art* also can also be construed as a representation of pictorial antithesis. The body is presented both as natural and as artificial, as an accurate representation of human anatomy but also as a print modelled upon sculptural fragments.

In his own art, the art of medicine, Vesalius was concerned to make the internal aspects of anatomy external and visible through dissection. Similarly, his illustrations also represent the internal and invisible aspects of anatomy as external and visible. This making of the internal and invisible external and visible through art can, I suggest, be understood as an expression of antithesis in art, and therefore of art in art. Just as Pulidoro’s painting with the mirror used this device to make visible what would otherwise remain invisible, so too did Vesalius, through dissection, and the use of his hands, make the internal and invisible aspects of anatomy external and visible. He then made invisible anatomy even more visible (to a wider audience) through his representation of it in illustrations.

As I noted in chapter three, this aspect of art is found in the relationship between art and nature described in the Hippocratic Corpus, where the art of medicine is described as forcing or compelling nature against its internal ends. In *On the Art* medicine is described as forcing nature to make what is internal and invisible, external and visible. In Vesalius’s own art, the art of medicine, he too compelled nature against its ends – making the internal and invisible aspects of anatomy external and visible.

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My suggestion is that there is a mirroring between the way that Vesalius’s own art (the art of medicine and the practice of dissection) compels nature against its own ends by making the internal and invisible external and visible and the stylistic expression of antithesis in his illustrations. Both are expressions of the artificial. The Vesalian illustrations represent the ideal forms and laws of nature, embodying mathematical rules of proportional relations and harmonious relationships of parts to each other and the whole (indeed, that prescribed by the Canon of Polycleitus and dictated by concinnitas the absolute and perfect law of Nature). Yet they also celebrate their artificiality in a number of respects. The use of contrapposto; the variety of poses found in the muscle figures; and indeed the presentation of the dissected human body as antique sculptural fragments all signify the expression of antithesis in visual art as an expression of style. These can be understood as formal means for emphasising the artificial aspect of art and augmenting the beauty and the laws of nature in art.
Chapter Nine: The Influence of Vesalius’s Illustrations; The Visual as a Model for Art

Introduction

So far I have enquired into the role that visual material played in determining the style of Vesalius’s anatomical illustrations. I have used his references to both the *Canon* of Polycleitus and the *historia absoluti hominis* as a starting point into investigating the aesthetics of his illustrations, and have argued that antique and Renaissance art and aesthetic theory helped to inform the style of the Vesalian illustrations. The Vesalian illustrations embody the harmonious and mean proportionality representative of that prescribed by the Polycleitan *Canon* and Alberti’s concept *concinnitas*. This, I have argued, is compatible with the consciousness-based teleology and account of art and nature that is found in the *Fabrica’s* text, and derived from Plato and Galen. However, in the manner typical of the High Renaissance, Vesalius’s illustrations also embellish this austere aesthetic, through the representation of *contrapposto*, movement, variety of pose and inflated musculature following examples from Hellenistic art and the work of Renaissance artists such as Michelangelo.

My interest has been with the role that artworks (and their theory) can play in determining the style of scientific illustrations. I have intended to focus on a confined aspect of the broader issue concerning the role of images in early modern science. In this chapter I shall investigate a selection of anatomical illustrations that followed in the wake of the publication of the *Fabrica*. The illustrations in this text changed the way that the body was visualised in anatomical illustration. They employed the skill, theory and methods that had properly belonged to ‘fine art’, and put them to use in a scientific context. Their greater naturalism allowed them to convey clear knowledge about the world visually, and their idealised style allowed them to generalise and therefore function diagrammatically. They also expressed the author’s beliefs about nature, its operations, and humanity’s ability to have knowledge of it.

Vesalius’s illustrations exerted a powerful influence over anatomical illustration in the West. Indeed, almost two-hundred years after the *Fabrica*
was first published Bernhard Siegfried Albinus published a 1725 edition of Vesalius’s *Opus omnia* in the Netherlands. At first glance, archive and rare book collections reveal what appears to be a long series of plagiarism of the Vesalian illustrations. In this chapter I attempt to differentiate between the forms of copying that occurred, and endeavour to remove the charges of plagiarism that have been made against the cases that I consider. I examine a small selection of illustrations that appeared in the two-hundred years after the *Fabrica* was first published. I suggest that the nature of this influence might be re-evaluated through re-description as a *movement* such as those that occur in the history of art. This has the positive effect of lifting the charges of plagiarism. As was the case earlier in the thesis, my intention here too is to map relationships between images and to consider the way that visual material serves as a model for other visual material. Rather than plagiarising the Vesalian illustrations, subsequent anatomists found representational freedom within the pictorial template set up by Vesalius. Art historical movements can be thought to work according to a similar principle.

Firstly I shall identify the sense in which I employ the term *movement*. I then briefly point to the issue of plagiarism and charges that have been levelled. This is followed by an outline of the key features of the Vesalian anatomical model. The main body of this chapter involves an examination of illustrations found in the works of the anatomists Thomas Geminus (1510-1562), Juan Valverde de Hamusco (1525-1588), Caspar Bauhin (1560-1624), Giulio Casserio (1561-1616), Adriaan van der Spiegel (1578-1625) and John Browne (1642-1702). In each of these cases we see the use and adaptation of the Vesalian illustrations to differing degrees and effect. The relationship between Casserio and van der Spiegel offers in itself a case study in the use and adaptation of anatomical illustrations in this period. As in the case in art historical movements, boundaries are flexible and open to suggestion concerning where one movement might end and another might begin. Their governing principles and their parameters remain moot. I suggest that the anatomical illustrations of Govard Bidloo (1649-1713), and his representation of the cadaver as dead, can be understood as signifying the origination of a new anatomical model, style of anatomical representation and movement in the representation of anatomy in scientific texts. Where Vesalius’s intentionally disguises the reality of the subject matter, Bidloo makes this explicit.
Art Historical Movements

An art historical ‘movement’ is a category imposed upon a body of works, and its unifying principles can vary. For example, works in a given movement might have a common theoretical agenda (like Dada), or they may be based more upon a common style (like Rococo). Often works in a movement might have both a common theory and style, as theory often entails a set of implications for style, and vice versa (Impressionism or Cubism are examples). Categorising artworks in this way can be conceived as problematic, not least in that it marginalises art’s originality. Furthermore, as Michael Baxandall has pointed out, there are problems involved with applying the term influence uncritically in an attempt to account for stylistic similarity. My aim is not to establish claims about influence or artistic intention, avoiding the numerous complexities the surround these issues. I employ a simple definition of a movement - as the relationship between elements of subject matter and style between a given set of artworks.

Take, for example, Claude Monet’s *Impression, soleil levant* (1873). This work set up an artistic template for visual representation within which the rest of Impressionism (or, indeed, any work we might call ‘Impressionist’) participates. Initially Impressionism was intensely theoretical. One reason Monet and other early Impressionist wanted to register their subjective impressions of the world was, amongst other things, a reaction to the art of the *Salon*. Impressionism embodied a radical shift in thinking about the most apt way that painting could represent our experience of the world, and the characteristic methods, subjects and style followed from the theory.

Endless originality is possible within any given artistic formula, and conversely, considering the variation that occurs within a formula can shed light upon the original model. While the notion of ‘movements’ in the history of art is a blunt instrument for generalising about particulars, it is also a useful tool for organisation and understanding artworks and stylistic schemas that obtain between groups of works. Vesalius’s illustrations and those that he influenced can usefully be viewed in such terms. There are also instances where an innovation is so significant that it is questionable whether we can still consider

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433 Baxandall, *Patterns of Intention*. 
the illustration as falling within the Vesalian template. These I refer to as radical innovations.

**Charges of Plagiarism**

Modern historians have viewed some of the copies and adaptations of the Vesalian illustrations as instances of plagiarism. For example, in his famous biography of Vesalius C.D. O’Malley refers to Thomas Geminus’s ‘plagiarism’ and ‘borrowing’ of Vesalius’s illustrations. J.B. de C.M. Saunders and C. D. O’Malley wrote that ‘there was much justification for Vesalius’s irritation since [Juan] Valverde’s illustrations were for the most part deliberately plagiarized from the *Fabrica*. More recently Thomas Laqueur refers to ‘Vesalius’s immensely influential and widely plagiarized works’. The title of a recent work on John Browne refers to him as both ‘anatomist and plagiarist’. Browne’s illustrations were also condemned by his contemporaries. For example, the English anatomist and surgeon William Cowper criticized Browne’s work as plagiarism. Yet, Cowper himself copied Govard Bidloo’s illustrations presenting them in an even larger form than the originals.

Vesalius discussed the copying of the illustrated fugitive sheets that comprise his *Tabulae anatomicae sex*, in his letter to Johannes Oporinus (1507-1558), professor of Greek Literature at Basel, and printer of the *Fabrica*. In this letter, which appears as a kind of preface to the *Fabrica*, Vesalius notes the way that booksellers and publishers took little notice of the imperial documents, then known as ‘privileges’, which forbade the printing of illustrations without consent. He states that ‘this is abundantly demonstrated in the case of my *Anatomical Tables*, first published three years ago in Venice and since then

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434 O’Malley, Andreas Vesalius of Brussels, 1514-1564, 128.
438 Ibid., 4.
pirated in many other places in deplorably bad editions’. The existence of privileges, which were intended to guard against unlawful use of the early printed book, show that it is not itself anachronistic to apply the notion of plagiarism to sixteenth-century anatomical illustrations. Vesalius was understandably irritated by the numerous copying of his work. Yet this does not mean that the best way to understand all of the instances of copying is in the terms of plagiarism.

The Vesalian Anatomical Model

I shall only briefly here mention features of the Vesalian anatomical illustrations that have been discussed at length in earlier chapters. These are those features characteristic of his illustrations, and that mark the parameters of my construal of his visual anatomical model.

1. His skeleton and muscle figures in toto as well as his torso figures embody a proportional representation of the human form that expresses a harmonious relation of parts to each other and to the whole. This proportionality involves the averaging of a number of particular examples, and therefore expresses a mean or average human form. This form is also, in the terms of antique and Renaissance thought, considered both beautiful and ideal.

2. These same skeleton, muscle and torso figures employ a variety of poses, express movement, and employ contrapposto poses characteristic of both Hellenistic and High Renaissance art.

3. His skeleton and muscle figures in toto are represented as standing and animated. Rather than being represented as dead (and as they might have appeared on a dissecting table), these Vesalian cadavers are set in animated poses, and are placed within a landscape.

4. His figures are set in poses characteristic of art, and his torso figures are presented as antique sculptural fragments.

5. Some of the series of illustrations in the Fabrica relate to each other in a way that has been referred to as ‘continuous revelation’. Together they

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represent the successive depths of the anatomy. (This occurs in the
representation of muscles, organs and the brain).
6. The figures in the muscle figure series appear to tear off their own
muscles.

The Case of Thomas Geminus

In 1545, only two years after the publication of the *Fabrica*, Thomas Geminus published his *Compendiosa totius anatomie delineatio, aere exarata*. This work is celebrated for the fact that it contains the first copperplate engravings to be made and printed in England. However, it is perhaps better known for its copying of both images and text from Vesalius’s *Fabrica* and his *Epitome*. The 1545, Latin edition of Geminus’s *Compendiosa* was essentially an adaptation of the text found in Vesalius’s *Epitome*.442 The illustrations in it included forty copperplates copied from the *Fabrica*, as well as the Adam and Eve figures that appear in the *Epitome*. I.M.L Donaldson suggests that the lack of correspondence between text and image might arise from the fact that it was originally intended only to contain images.443 An English edition was published in 1553. The preface to this tells us that it was translated from the Latin by Nicholas Udall, but, as Geoffrey Keynes has pointed out, the text in the English edition is ‘similar to that used by Thomas Vicary in his *Anatomie of the bodie of man*, 1548, this having been translated from an earlier manuscript by Henri de Mondeville (d. 1320)’.444 The English edition is therefore an amalgam of a late medieval French text, and the Vesalian illustrations. As was pointed out in 1964, there are differences between the plates found in first edition copies of the *Compendiosa*.445 Donaldson has shown how Geminus was able to achieve this during the publication of the first edition without having to re-engage the images.446

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441 Thomas Geminus, *Compendiosa Totius Anatomie Delineatio, Aere Exarata* (Londini: In officina Ioanni Herfordie, 1545).
445 See, Donaldson, “Two States of Some Plates in the Compendiosa of Thomas Geminus (1545),” 89.
446 Ibid., 89–104.
As Charles O’Malley noted, in his Introduction to a facsimile of the first English edition of Geminus’s text from 1553, this was not the first time that Vesalius’s illustrations had been copied. Vesalius’s *Tabulae anatomicae sex*, published in 1538, often had been. As we have seen, Vesalius discussed the use of his images by others in his letter to Johannes Oporinus which appears at the beginning of the *Fabrica*. Later, in 1546, Vesalius discussed an English case of plagiarism of his work. In his *China Root Epistle* he writes that ‘the figures of my *Epitome* have been copied very poorly and without skill in drawing’. It seems that Vesalius is referring here to Geminus. He also suggests that he would rather lend people his woodcuts, than have them be copied badly. On the title page of Geminus’s *Compendiosa* it states ‘An Epitome of his own books on the body by Andreas Vesalius of Brussels’. Clearly it is not a lack of acknowledgement that troubled Vesalius, but, rather, the alteration of his carefully constructed images.

Turning to Geminus’s copperplates themselves, despite Vesalius’s criticisms, they are in fact beautifully executed. Geminus’s role in this process is unclear. He says in the preface that he engraved and printed the copperplates himself. But, it has been suggested that he may mean that he supervised the printing rather than doing it himself. The Adam and Eve figures, copied from the *Epitome*, are slightly altered. Adam holds an apple in his hand, rather than a skull, and the skull is moved to the ground and a serpent is added. The idea that these idealised figures are in fact Adam and Eve is made explicit by Geminus by the inclusion of the apple and serpent, whereas this was not done so by Vesalius. Many of the copies have been shifted around, and those that are on separate pages in the *Fabrica* have sometimes been grouped together onto a single page. Geminus uses all three of the Vesalian skeleton figures, but they appear in a different order. They are virtually identical to the Vesalian originals, although Geminus eliminates the Vesalian backgrounds, as well as the writing that appears on the tomb in the Vesalian side view. Similarly, in all fourteen of the Vesalian muscle figures that he copies, he eliminates the

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449 Geminus, *Compendiosa Totius Anatomie Delineatio, Aere Exarata*.
450 Donaldson, “Two States of Some Plates in the Compendiosa of Thomas Geminus (1545),” 103.
backgrounds. Yet they appear in the correct order, so as not to disrupt the Vesalian innovation of continuous revelation of the muscles. However, his copies of the Vesalian brain illustrations do not appear in the same order, despite the fact that in Vesalius’s work they also form a series of continuous revelation.

One difference that occurs in the muscle figure series is that Geminus adds bricks to the wall in the seventh figure. This is henceforth a surprisingly common addition. It is also effective, as it is hard to tell in the Vesalian original that the wall is in fact a wall rather than simply a post (see fig. 12). Out of all the anatomical illustrations that I consider here Geminus’s are the ones that copy Vesalius’s the most closely. While there are hints of originality, such as the inclusion of the apple and serpent, these are rare. The use of the copperplate engraving technique and the skill in their execution is certainly something to be valued in its own right, especially given that these illustrations are early examples of copperplate engraving for book illustration.

The Case of Juan Valverde de Hamusco

The Spanish anatomist Juan Valverde de Hamusco published his Anatomia del Corpo Humano in 1560. His illustrations perfectly exemplify the freedom to be found within the Vesalian model. In his Examen of Gabriele Falloppio, Vesalius had written that Valverde was a plagiarist, and that he had never performed an anatomical dissection. However, Valverde’s discoveries concerning the movement of the eye, amongst others, prove his skill as an anatomist, and the illustrations in his work include some of the most innovative that occur within the Vesalian model. His most famous illustration depicts a muscle figure which holds his own skin in one hand, and the dagger with which he has removed it in the other (see fig. 53). Valverde’s illustrations are highly original. While they take place firmly within the Vesalian model, they also contribute to it. Valverde’s illustrative innovations were themselves copied by many subsequent anatomists.

451 Juan Valverde de Hamusco, Anatomia Del Corpo Humano (Rome: A. Salamanca; A. Iafrevy, 1560). The work of Valverde’s that I refer to is an Italian translation, not the Spanish original. Both date from 1560.
Despite the fact that Valverde writes that he only used copies of the Vesalian illustrations in his *Anatomia*, there are in fact fifteen illustrations that are completely original. The illustrations in this work are known to have been designed by the Spanish sculptor and painter Gaspar Becerra, a pupil of Michelangelo and a friend of Giorgio Vasari. This is interesting as Valverde’s muscle figure with pelt is often likened to the supposed self-portrait of Michelangelo that appears in the *Last Judgement* in the Sistine Chapel. Valverde’s plates were then engraved by Nicolas Beatricet, whose monograph N.B. appears on the prints. The proto-baroque frontispiece of this work is itself a tribute to Vesalius. The two skeletons that flank the medallion shield with title are very Vesalian in form, and at the bottom of the image appears a miniature dissection scene that is analogous to that which appears on Vesalius’s title page. In both cases the anatomist stands by a cadaver on a dissecting table and is surrounded by an eager crowd. However a different title page adorns the 1568 edition of his *Anatomia* published in Antwerp. Here figures that are very similar to the Vesalian Adam and Eve figures from the *Epitome* flank the title of the work. It was this version of the title page that would later be copied by Helkiah Crooke in his *Mikrokosmographia: A Description of the Body of Man*, 1631.

Valverde’s posterior skeleton figure is the reverse of the Vesalian original, probably due to the reversal that occurs when an image is copied, engraved and then printed. While the Vesalian skeleton rests his right arm on a spade Valverde’s skeleton rests his left arm on a cane. While they share the same *contrapposto* stance, the hip bones are more rounded in Valverde’s, the tailbone is more evident and the expressions on the faces are different.

Valverde’s muscle figure with pelt is the eighth plate in the *Anatomia*, and replaces the first of the Vesalian muscle figures (compare figs. 6 and 53). As I mentioned above, the dagger that he holds in his left hand suggests that he

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has removed the skin himself. In the Vesalian muscle figure series there is the general impression that the figures are taking off the layers of muscle themselves. This is done far more dramatically in Valverde, whose figure with pelt makes this impression explicit. Like the Vesalian original, Valverde’s muscle figure embodies proportional relationships of the parts to each other and to the whole. This harmonious proportionality is embellished by a dramatic contrapposto stance. Like the Vesalian original the contrapposto in the Valverde illustration represents the ‘Hellenistic swagger’, where the resting leg is set to the side of the weight-bearing leg rather than behind it. In fact, this is even more exaggerated in Valverde’s illustrations as the free leg is set up upon a rock, creating more of a bodily bend.

Plate Twenty-One in Valverde’s Anatomia is also an original (see fig. 54). It consists of four small images, in three of which, figures hold back the skin of their stomach to reveal the viscera. What is striking about this set of images is that individuals, with different features and of different ages, are depicted. This is in stark contrast to the idealised types that are depicted in Vesalius’s illustrations. Plate Twenty-Five is also not found in Vesalius (see fig. 55). This full anterior view of a female figure is accompanied by details of the uterus and fetuses. The female body appears only four times in the Fabrica. It is the subject of the dissection in the title page; the uterus is represented in isolation; the urinary system is represented on a female torso figure; and the uterus and bladder on another torso figure. Valverde’s full anterior view of a pregnant woman accompanied by details of the uterus and fetus is a radical innovation. However, its standing animated form still marks it as very Vesalian.

**Caspar Bauhin and the Representation of Female Anatomy**

The anatomist and botanist Caspar Bauhin published his anatomical text *Vivae imagines partum corporis humani* in 1620. The original edition is fairly small measuring 17cm wide and 23cm high. Unlike the Fabrica the illustrations are not integrated throughout the text but are contained separately in the second half of the work. This text is interesting in that it contains examples of copying

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455 For a discussion of this see chapter seven.

456 Caspar Bauhin and Caspar Bauhin, *Vivae Imagines Partium Corporis Humani* (Frankfort: Opera sumptibusque Johan. Theodori de Bry, 1620).
from both Vesalius and Valverde’s illustrations. It also contains a number of original illustrations that clearly occur within the Vesalian template and some that exhibit more radical innovations including the illustration of the female skeleton and of infant anatomy. The frontispiece to Bauhin’s *Vivae imagines* is, like Valverde’s, a tribute to Vesalius (see fig. 56). On the left hand side of the title appears a reversed copy of the first Vesalian muscle figure and on the right appears a modified analogue of Valverde’s pregnant female nude. A portrait of Bauhin, at the top centre of the image, is flanked by two Vesalianesque skeleton figures, and at the bottom of the page appears a copy of the pig, tied down for vivisection, which appears at the end of the *Fabrica*.

Bauhin’s work includes modified copies of both Vesalius and Valverde’s illustrations. For example, *Table Three* is a reversed copy of the left-hand vein figure in Valverde’s *Anatomia* while table five is a non-reversed adaptation of Valverde’s muscle figure with pelt and dagger (see fig. 57). It is useful to juxtapose Valverde’s and Bauhin’s muscle figure with pelt illustrations (see figs. 53 and 57). The stance is identical, and unusually the copy is not reversed.  

The *contrapposto* stance is maintained, and again the leg is set both to the side of the body and up from the ground. The figure holds the dagger extended in his left hand and looks towards the pelt held in his right hand. Bauhin’s figure is somewhat more bulky and the length between the hip and knee is disproportionate compared with that between the hip and shoulders. The proportions of Valverde’s figure correspond directly to those of the first figure in the Vesalian muscle figure series while the proportions of the Bauhin illustration do not. By measuring the length from the shoulder to the hip and then the hip to the foot on the corresponding sides reveals that, in the case of both Vesalius and Valverde, the ratio between these two measurements is virtually 1:2 with the leg measurement being almost exactly double that of the torso. However in the case of the Bauhin analogue the ratio is 3:7, where the torso is a whole extra 1/7 longer proportionally than its earlier counterparts.

Bauhin’s publication contains a series of three skeleton figures that are intriguing adaptations of the Vesalian model. The first is an adaptation of the posterior Vesalian skeleton. This figure leans on a scythe while the Vesalian

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457 Perhaps it was copied from another copy.
original does not. Bauhin’s side figure is significantly different from the Vesalian original. In fact, it appears to be copied from Felix Platter’s *De humani corporis structura et usu libri III*, 1583. Platter was professor of anatomy at the University of Basel and was Bauhin’s senior colleague. The Bauhin side figure holds an hourglass while the Vesalian original contemplates a skull placed on top of a tomb. Bauhin’s third posterior skeleton weeps onto a scythe while the Vesalian original simply turns and weeps.

Platter was the first anatomist to provide an account of the complete female skeleton and his representation of it is the earliest in western history. This was initially pointed out by Michael Stolberg. Before the Renaissance any references to the difference between male and female skeletons were virtually non-existent. Jacopo Berengario da Carpi was one of the first to notice any differences. In particular, he observed that the female pelvis was more capacious than that of males. His successful private practice meant that he had access to a larger number of bodies of deceased clients which he could use for private dissection. His understanding of female anatomy was significantly advanced compared with his contemporaries. Vesalius himself noticed differences in the skeletal structure of woman compared to men but did not represent them visually.

Platter’s depiction of the particularities of the female skeleton marks it as different from the Vesalian skeleton figures. The main difference lies in the structure of the pelvis, or, more specifically, the width of the iliac bones. This depiction of the female skeleton marks a significant innovation in anatomical representation. However, this innovation in anatomical illustration was not immediately influential. Michael Stolberg notes:

> Actual illustrations of the female skeleton did not become a standard feature of anatomical textbooks in the wake of Platter’s and Bauhin’s publications. Illustrations were expensive, and the specific features of the female skeleton

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461 A discussion of this can be found at pp. 128-132 of the original edition. His discussions of further skeletal difference can be found in Richardson and Carman’s translations at 61, 62, 134, 309, 364. See, Vesalius, *On the Fabric of the Human Body*, 1998.
were not easy to depict. But in written form their findings were almost immediately taken up and repeated by many other authors. Some anatomists devoted a whole chapter to the topic. Indeed, Platter’s and Bauhin’s influence can be traced into more popular, vernacular publications. In 1616 Helkiah Crooke published illustrations of a female clavicle and a female chest bone – with their specific female characteristics – in his *Mikrokosmographia*; he explicitly cited Bauhin and Platter among his major sources.  

While both Platter and Bauhin’s writing on female anatomy was greatly influential, visual representation of the female skeleton did not become commonplace until much later.  

The Vesalian convention for the representation of the human skeleton *in toto* as male continued to dominate anatomical illustration well into the eighteenth century. Indeed, the Vesalian anatomical model continued to influence anatomical illustrations of the human skeletons irrespective of the representation of sexual differences.

**Giulio Casserio and Adriaan van der Spiegel**

In this section I focus mainly on the anatomical illustration of Adriaan van der Spiegel (Adrianus Spiegelius) and their relationship to the Vesalian model. However, the relationship between Giulio Casserio (Julius Casserius) and van der Spiegel is one that is difficult to prize apart. It is not just for this reason that I consider them together. The relationship between their works itself serves as an example of the use and exchange of anatomical images in early modern medical atlases and textbooks. Casserio worked at the University of Padua in the 1580s and 1590s, giving private lectures and filling in for Fabricius, with whom he famously quarreled. It has been reported that Fabricius did not like it when the students gave Casserio a silver chandelier, as a gift of appreciation.

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464 Casserio’s birth date is disputed. For example K.B. Roberts and J.D.W. Tomlinson locate is at 1552, while Charles Singer locates it at 1561. See, Roberts and Tomlinson, *The Fabric of the Body*, 338; Singer, *A Short History of Anatomy from the Greeks to Harvey*, 209.
for his teaching.\textsuperscript{465} He was especially popular for his teaching in the setting of private dissections. The same report states that Fabricius applied ‘to the academic authorities to enforce the old (1586) statutory rule that private lectures were forbidden’.\textsuperscript{466} The rivalry, however, ran both ways. In 1601 Casserio published his \textit{De vocis auditusque organis historia anatomia}. While this work echoes in form and content Fabricius’s \textit{De visione vocis auditus}, 1600, Casserio does not acknowledge this. As has been noted:

\begin{quote}
The handling of the material in both treatises is much the same, each book being organized into three sections: Anatomy, Physiology and Philosophy. Casserio, although not mentioning Fabricius, scrupulously reports the discoveries made by previous authors.\textsuperscript{467}
\end{quote}

Casserio tragically died of fever in 1616. Fabricius lived for three years after this retaining the Chair of Anatomy at Padua. After his death the chair was taken up by Adriaan van der Spiegel.

Casserio published two major works in his lifetime. In 1601 he published his \textit{De vocis} and eight years later \textit{Pentaestheion, hoc est, de quinque sensibus liber, organorum fabricam}, in 1609. He also published the less well known \textit{Nova anatomia continens accuratam organorum sensilium, tam humanorum, quam animalium brutorum} in 1607 and again in 1622. This contains a comparative study of the sensory organs. Casserio also worked on both the text and illustrations for a comprehensive anatomical atlas. Unfinished at the time of his death, the material for this atlas was given to van der Spiegel. The latter intended to use it in combination with his own work, but died prematurely in 1625. Van der Spiegel’s great work \textit{De formato foetu liber singularis} (1626) was published posthumously. This text is illustrated with Casserio’s images. In 1627, Daniel (Jan) Rindfleisch (Bucretius) edited van der Spiegel’s \textit{De humani corporis fabrica libri decem} which is also illustrated with Casserio’s images.\textsuperscript{468} I examine this text below. In 1627 Rindfleisch also published Casserio’s

\textsuperscript{466} Ibid.
\textsuperscript{467} Ibid., 169.
\textsuperscript{468} Adriaan van der Spiegel et al., \textit{De Humani Corporis Fabrica Libri Decem: Tabulis XCIIX Aeri Incisis Elegantissimis, Nec Ante Hac Visis Exornati} (Venetiis: Apud Euangelistam Deuchinum, 1627).
illustrations, with some of his own annotation as *Tabulae anatomicae*. As this case demonstrates the origins and authorship of many anatomical illustrations in the sixteenth and seventeenth century is not straightforward.

Unlike the Vesalian case where the design of the woodcuts is disputed, the illustrations that appear in van der Spiegel’s *De Fabrica* and in Casserio’s *Tabulae anatomicae* are known to have been drawn by Odoardo Fialetti a student of Tintoretto. These were then copied into copperplate engravings as Vesalius’s were into woodcuts, and then printed. Van der Spiegel, like Vesalius, was born in Brussels but spent much of his life working in Padua where he was professor of anatomy and surgery. Also, like Vesalius, he spent time dissecting human bodies and steadily came to reject aspects of Galenic medicine. The title page (and indeed the title) of his *De Fabrica* pays tribute to Vesalius’s *Fabrica*. The name of the work on the title page is flanked on one side by a copy of the first Vesalian muscle figure, and, on the other, by a copy of the anterior Vesalian skeleton figure which here holds a gravedigger’s spade under its bony arm. Again, we see the title page functioning as a direct acknowledgement of the central importance of the Vesalian illustrations.

The illustrations in van der Spiegel’s text are all placed at the back rather than integrated throughout the text. Some of the images are direct copies of those found in Vesalius’s *Fabrica*, including the anterior and the posterior skeleton figures. However, most of the illustrations in this text that were originally by Casserio, while still falling within the Vesalian model, are highly original. *Table III Lib IV, Table IV Lib IV, Table V Lib IV, Table VI Lib IV, and Table VII Lib IV* (see, for an example, fig. 58) form a mini series of five illustrations that reveal the posterior muscles of the back. This series of illustrations adopts the Vesalian convention of continuously revealing the layers of muscles at different depths. Like the Vesalian muscle figure series these too are set in a Renaissance landscape, clearly falling within this aspect of the Vesalian model. They are also standing and animated. As is the case with the Vesalian muscle figure series

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470 For a discussion of this see chapter two.
the series at issue changes the positioning of the arms to best display the muscles.

Just as Valverde had with his muscle figure with dagger and pelt, this series of illustrations seems to further exaggerate the notion that the figures are peeling off their own muscles. In both the third and fourth images of the series the increasingly skeletal figures peel off muscles from their upper back and neck region. They also hold the muscles in such a way that displays them diagrammatically, and in the first and second images of the series the muscles spread out away from the body without the aid of a pictorial hand. We find this feature in some of the Vesalian muscle figures. Most often Vesalius allows the muscles to droop towards the ground pictorially representing the effects of gravity. However, in the first, seventh and eighth Vesalian muscle figure illustrations we see muscles that are spread out diagrammatically, and do not fall towards the ground (see figs. 6, 12 and 13). In the van der Spiegel mini-series the first three illustrations represent the bottom half of the body as naked but complete with all of the muscles and skin. The last two illustrations, by contrast depict only the skeleton of the bottom half. In all five images the positioning of the bottom half of the figures is subtly manipulated. In each case one leg takes the weight and the other is positioned upon a rock. This subtle manipulation of the bottom half allows for the best representation of the muscles on display in the top half of the figures. This is also a technique used by Vesalius in his muscle figure series. Each figure stands in such a way that best demonstrates the muscles being represented.

Van der Spiegel also includes a series of twelve full body muscle figures taken from Casserio comprising nine anterior views and three posterior views. All figures are male, animated, and set within a Renaissance landscape. However, they depart considerably from the Vesalian model in a number of respects. Firstly, the Vesalian innovation of continuous revelation is adopted; however, the van der Spiegel/Casserio series reveals not only muscles but also different organs depicting physiological systems alongside muscles and bones. Vesalius’ flap figure mannequin in his Epitome serves a similar function. In Table VI Lib VII of van der Spiegel’s text, which forms part of this series of twelve, a young man holds back his skin to reveal parts of the viscera that lies beneath. This resembles the three figures in Table I Lib III of Valverde’s Anatomia (fig. 54). As
I discussed earlier, in this illustration Valverde depicts three clearly identifiable individuals who hold back their skin to reveal different layers of the viscera. No set of figures that are distinguishable individuals can be found in Vesalius’s *Fabrica*. Importantly, like Valverde, and unlike Vesalius, the figures depicted in this series of van der Spiegel’s are clearly identifiable individuals rather than one depersonalized and idealised typical human form. To my knowledge it is not known whether the depiction of these figures is based on actual individuals used in public or private dissections.

Some of the illustrations in van der Spiegel’s work were originally published in Casserio’s *Nova Anatomia*. The three hands, for example, set out on page twenty-two of *Nova Anatomia* baring the title ‘*tabulae II organ tactus*’ appear as Table XXV Lib IV in van der Spiegel’s work. Casserio’s *Nova Anatomia* is fairly small. The second, 1622, edition measures only 31cm high by 20cm wide. The illustrations from this comparative anatomical study include representations of human anatomy alongside that of various animals. Van der Spiegel uses Casserio’s illustrations of the dissection of a neck, which depict muscles exposed at different depths. He also and adds to them. For example, the two representations that appear as *Table II Lib IV* are additions.

In 1627 van der Spiegel’s *De formatio foetu* was published posthumously. It contained nine of Casserio’s embryological plates illustrating pregnancy. Out of the nine, four depict an animated pregnant woman standing in a landscape representing the dissection of the uterus occurring at different levels of depth. Other plates depict the placenta and the internal anatomy of a baby girl. These representations constitute a significant innovation in anatomical representation. The standing, animated character of the dissected woman is Vesalian, yet the representation of female anatomy, both adult and infant, surpasses all previous representations of this subject. Martin Kemp and Marina Wallace note the way that, in one illustration: ‘the female abdomen is shown open like the petals of a flower, complete with stem and leaves, set in a watery landscape, revealing its inner organs arranged as seeds and stamens’. These illustrations by Casserio that appear in van der Spiegel’s work were very

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influential in their own right. Just as Vesalius’s illustrations were both copied and adapted so too were these appearing in numerous anatomical works throughout the seventeenth and eighteenth centuries. For example the work of the English anatomist John Browne reproduces these illustrations with only very minor acknowledgement. ⁴⁷⁴

The Case of John Browne

Moving forward about sixty years, and to England, we find the publication of John Browne’s A complete treatise of the muscles as they appear in the human body and arise in dissection with diverse anatomical observations not yet discovered – illustrated by nearly forty copper plates accurately delineated and engraven, 1681. ⁴⁷⁵ Browne’s historical reputation has been marred due to his extensive use of others’ work. He has been labeled a plagiarist and perhaps for this reason has received less attention than he might have in secondary literature. The copying of anatomical illustrations was common practice in the sixteenth and seventeenth centuries. So, why has Browne’s reputation suffered so much more than others? Browne published on a wide range of subjects, however, the work that has afforded him his reputation is his Treatise of the Muscles. This work is a hybrid including not only Casserio’s illustrations but also text taken from William Molin’s work Myotomea or the Anatomical Administration of all the Muscles of the Human Body, 1648. ⁴⁷⁶

Of the illustrations in Browne’s text the secondary literature has been scathing. A recent article notes: ‘In keeping with the alterations, Browne had made in the text a proportion of the book, the clothing [on the illustrated figures] was changed to seventeenth-century style, and the poses and backgrounds were modified in an attempt to claim them as his own’. ⁴⁷⁷ Browne was also criticised by his contemporaries. William Cowper, for example, criticised Browne’s

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⁴⁷⁴ At the beginning of this text Browne lists seventeen authors, including Casserio, who are ‘concerned in this musculardiscourse’. This is the only form of acknowledgement that Casserio gets and it is not for the use of his illustrations.

⁴⁷⁵ John Browne, A Complete Treatise of the Muscles as They Appear in Human Body, and Arise in Dissection: With Diverse Anatomical Observations Not yet Discovered. Illustrated by Near Forty Copper-plates, Accurately Delineated and Engraven (Savoy: Newcombe, 1681).


⁴⁷⁷ Ibid., 4.
Yet, as I mentioned earlier Cowper famously copied Govard Bidloo’s illustrations. There is no doubt that Browne directly copied Casserio’s illustrations, but he also adapted many of them. The standing animated cadavers illustrated by Casserio and used by van der Spiegel, I have suggested, are creative and unique illustrations that participate in the Vesalian template for representing the body. Browne’s copies and adaptations (while inferior to Casserio’s), I suggest, can be viewed in a similar light. Here too, we find standing animated cadavers, partially dissected, and set within a landscape. The figures in Browne’s text have been significantly altered in terms of their style. Compare, for example, Table XV Lib IV (fig. 63) from Casserio’s work with figure six in Browne’s text (fig. 59). The serious Renaissance capped figure has been transformed into a seventeenth-century nobleman. This adaptation is fairly successful. Less successful, however, is the figure in Table XIII (fig. 60). Here the smiling face of the figure displaying his own back muscles is almost completely discontinuous with the rest of his body. The part copying and part adapting process in cases such as this one is poorly done, and the effect is bizarre.

Govard Bidloo: A New Anatomical Model?

During the seventeenth century in the Dutch Republic a mechanical explanation of nature became the dominant one, replacing the teleological understanding of nature. I have suggested that the consciousness-based teleology found in the text of the Fabrica is consistent with the idealised style found in its illustrations. I suggest that the anatomical model represented by Bidloo reflects elements of the new mechanical philosophy and its emphasis on the role of minute corpuscles in epistemology.

In this section I shall outline elements of the cultural climate of the Dutch Republic that offer a means for understanding artistic change; examine the rise of mechanical philosophy within the Dutch Republic; and consider the anatomical illustrations in Bidloo’s Anatomia humani corporis, 1685. I suggest that the new understanding of art and nature that emerged out of the Dutch

\[478\] Ibid.
Republic in the seventeenth century offer a means for understanding the new anatomical model set up by Bidloo’s illustrations.

Revolts emerge out of widespread discontent, and the Dutch revolt that began in 1572 is no exception. Prior to this time the Low Countries had been under the rule of the Spanish Crown. The Dutch Revolt was a war for independence and the main point of tension was religious. Catholic Spain disliked the growth of Protestantism in the Low Countries. The King of Spain, Phillip II, sent troops into the Low Countries in a violent attempt to suppress the Protestant communities that had sprung up during the first half of the sixteenth century. Tensions resulted in a revolt which continued until 9 April, 1609, when a Twelve Year’s Truce was made with Spain.\(^\text{479}\) War continued after the peaceful twelve years, and it was not until 1648 that peace was achieved. The Northern Provinces emerged a newly independent state. The Republic soon came to house a Golden Age that was to last over seventy years.\(^\text{480}\)

The most important ideology underpinning the Dutch Revolt was religion. Jonathan Israel notes that ‘the ideological framework prevailing in the Holland and Zeeland towns, from the very outset, in 1572, [was] based on rejection of Catholicism and insistence on Protestant worship’.\(^\text{481}\) It was the Reformed Church that emerged from the Revolt as the dominant one, and was subsequently given a privileged position. Given that the war with Spain was so strongly underpinned by religious ideology, it seems plausible to assume that the seventeenth-century Dutch may have associated Protestantism with their emerging cultural identity. In Wiebe Bergma’s words ‘Reformation and revolution cannot be thought of as entirely separate entities in the sixteenth-century Netherlands.’\(^\text{482}\) The Dutch also hoped to distinguish themselves from Spain politically and economically. The Dutch Republic was renowned for its


religious diversity and tolerance. Consequently, it became a safe haven for political refugees. Intellectuals and artists from all of Europe congregated there. The absence of Crown rule or that of a single political party created a climate of intellectual, religious and economic freedom.

The invention of the microscope made a significant impact on the understanding and investigation of anatomy. The compound microscope had evolved from the invention of the telescope. It soon evolved into a system of convex lenses rather than the combined concave and convex system of the early telescope. The medical use of the microscope owes much to the discoveries of Antony van Leeuwenhoek (1632-1723) and to those of Robert Hooke (1635-1703). The former invented the first microscope capable of visualizing single cells. As K. Saladin notes ‘Leeuwenhoek opened the door to an entirely new understanding of human structure and the causes of disease’. Leeuwenhoek vigorously investigated nature through his microscope, and while initially his discoveries were celebrated by the scientific community, by the end of the seventeenth century it came to be believed that the microscope had little potential in the acquisition of knowledge. The Englishman Robert Hooke elaborated significantly on the compound microscope that had been invented by Galileo. Hooke’s *Micrographia*, 1665 contains both verbal and visual descriptions of his discoveries. While the use of the microscope in the seventeenth century had been popular amongst botanists and zoologists its use by physicians was rarer. However, several prominent seventeenth-century anatomists, all students of Johannes van Horne, used the microscope in their anatomical and physiological investigations. These include Frederik Ruysch, Jan Swammerdam and Nicolaus Steno.

In 1594, the same year that Fabricius ab Aquapendente’s anatomy theatre was founded in Padua, the anatomical theatre at Leiden University was constructed.

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483 Ibid., 78.
under the supervision of Petrus Paaw (1564-1617). As was the case in Padua, public dissections took place during the winter months. During summer students and the public could investigate the medical artifacts on display within it. The University of Leiden was a centre for anatomical invention and investigation. Along with anatomical investigation with the microscope, the practice of filling the veins and organs of both animals and humans with hot wax occurred. While Bidloo was somewhat against this practice Frederik Ruysch was one of its most famous practitioners. Ruysch’s innovations in embalming and preserving significantly contributed to the study of anatomy and it has been argued by Julie V. Hansen that they ‘created a new aesthetic of anatomy that melded the acts of demonstration and display with the stylistic and emblematic meanings of vanitas art’. Ruysch preserved a large collection of various body parts. Vesalius has disguised the morbid nature of the subject matter of his Fabrica illustrations by presenting them as antique sculptural fragments. Similarly, in order to ‘disguise the brutality of death and dismemberment, he [Ruysch] embellished the compartmentalized cadavers with flowers or garments’. Ruysch’s specimens are relevant as they provide a point of contrast to Bidloo’s representation of the cadaver as dead.

The seventeenth century saw the development of non-teleological explanations of art and nature. In his Le Monde, 1630, and then in his Principia René Descartes famously developed a theory of physics capable of supplanting that of Aristotle’s with an elaborate interpretation of nature. The Cartesian philosophy of nature was widely adopted by the 1660s. Cartesian physics states that matter is the basis of all that exists and it is characterised by extensionality and movement. The Cartesian universe is full of moving matter. Different kinds in the world were explained by the shapes, positions and relative velocity of matter. As Jonathan Bennett explains, for Descartes ‘qualitative differences ... arise from differences of micro-structure’. Due to

his conception of matter as extensionality the methods of geometry could be employed in the acquisition of knowledge about natural things.\textsuperscript{492}

The Cartesian mechanistic view conceived of all of nature, including humanity, as analogous to the workings of clock. Rather than viewing nature as working according to ends and purposes he viewed it as functioning according to mechanical processes. Both the artificial and the natural are fundamentally analogous in this way. For Plato art and nature were both explained in terms of a consciousness-based teleology. By way of contrast art and nature on Descartes’s view are explained in terms of mechanism. Descartes explicitly rejected teleological explanations. He writes: ‘When dealing with natural things any explanation from the purposes which God or nature may have in view when creating them ... we should not be so arrogant as to suppose that we can share in God’s plans’.\textsuperscript{493} Descartes conceived of God as the efficient cause.

Of artificial and natural bodies Descartes wrote:

I do not recognize any difference between artificial and natural bodies except that the operations of artifacts are for the most part performed by mechanisms which are large enough to be capable of being manufactured by human beings. The effects produced in nature, by contrast, almost always depend on structures which are so minute that they completely elude our sense. Moreover, mechanics is a division or special case of physics, and all the explanations belonging to the former also belong to the latter; so it is no less natural for a clock constructed with this or that set of wheels to tell the time than it is for a tree which grew from this or that seed to produce the appropriate fruit. Men who are experienced in dealing with machinery can take a particular machine whose function they know and, by looking at some of its parts, easily form a conjecture about the design of the other parts, which they cannot see. In the same way I have attempted to consider the observable effects and parts of

\textsuperscript{492} Descartes wrote: ‘The only principles which I accept or require in physics are those of geometry and pure mathematics; these principles explain all natural phenomenon, and enable us to provide quite certain demonstrations regarding them’ in René Descartes, \textit{Principles of Philosophy}, part 2, section 64, in René Descartes, \textit{Descartes: Selected Philosophical Writings}, trans. John Cottingham (Cambridge: Cambridge University Press, 1988).

\textsuperscript{493} Ibid., 202.
natural bodies and track down the imperceptible causes and particles which produces them.\textsuperscript{494}

Again, we see the artificial providing a means for understanding the workings of nature, and art making visible (or, at least providing knowledge of) the invisible aspects of nature. However, in the Cartesian case the internal and micro-structural aspects of things are available for investigation.

Govard Bidloo’s anatomical illustrations in his \textit{Anatomia humani corporis}, 1685 are in many ways continuous with the Vesalian tradition. Yet, the departures from the Vesalian model and the representational innovations for anatomical illustration are so significant that his illustrations can be seen as setting up a new anatomical model and bringing to a close that which Vesalius’s \textit{Fabrica} first established. Bidloo’s text takes naturalism and empirical observation in anatomical illustration further than anyone before. Departures from the Vesalian model are evident in the anatomical illustrations that I have conceived of as falling within the model, while subtly exerting pictorial freedom from it. For example, Valverde’s muscle figure with pelt and dagger, Bauhin’s female skeleton, Casserio’s representation of particular individuals rather than idealised types and Browne’s seventeenth-century adaptations of Casserio’s originals. Bidloo builds on these already established innovations. However, his illustrations set up a new model for anatomical illustration.

Bidloo was born in 1649 in Amsterdam during the Golden age of the Dutch Republic. He became Professor of Anatomy at The Hague in 1685, and in 1696 was appointed Professor at Leiden. Bidloo is most well-known for the anatomical illustrations in his \textit{Anatomia humani corporis} (1685). The sheer size of this book is significant, measuring roughly 64cm high by 41cm wide. The illustrations themselves were drawn by Gérard de Lairesse (1640-1711). The cadavers depicted in Bidloo’s anatomical atlas are in most cases represented as dead. Rather than representing standing, animated cadavers within a landscape (as had been the convention since Vesalius), Bidloo’s corpses are often represented as they might have appeared on the dissecting table. Sheets of linen are draped over the figures. This emphasises the parts that are being represented, but also preserves the dignity of the subject.

\footnote{\textsuperscript{494} Ibid., 288–289.}
Representing the cadavers as dead is a feature of Bidloo’s illustrations that significantly departs from the Vesalian model. It also contributes to their realism insofar as what is represented matches up more closely to the reality of the subject matter. On the whole the figures are not standing. However, exceptions include two standing adult, male, skeletons which both appear to have climbed out of their graves. The anterior view holds an hourglass, while the posterior view holds the linen which his body would have been wrapped in. These two exceptions do clearly fall within the Vesalian model. There are also two standing representations of the infant skeleton. None of the figures on which the muscles and organs are represented are animated. Bidloo’s concern for representing the cadaver as dead is evident in the debate between him and Ruysch concerning the relative merits of anatomical preparations compared with anatomical representations on paper. Dániel Margósey reports that Bidloo ‘found it problematic that Ruyschian preparations looked alive. Cadavers were dead and no art could bring them back to life’. While Vesalius modeled his illustrations on ancient and Renaissance art to disguise the reality of the subject Bidloo, by contrast, makes this reality explicit through his representation of the cadaver as dead and through his representation of the instruments of anatomical dissection.

Table 27 (see fig. 61) and Table 30 of Bidloo’s text represent the dissected back of a woman at different depths. In both cases ropes are used to keep the body upright and string is used to tie the hands. The use of nails, string, and rope is common in Bidloo’s illustrations. In the representation of the woman’s back muscles, ropes and string is used to support her, and in the illustrations of the flexor tendons and muscles, we see the pins and nails depicted. These hold aspects of the anatomy in place so as to offer the best view of it. These dissection tools further enhance the realism of the illustrations as they convey the reality of the dissecting room. In Plate 52 a fly is represented as having landed on the decaying corpse. Rina Knoeff notes that ‘a creeping fly across

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the dissected abdomen, illustrates the putrefaction of the corpse and thereby the repulsive reality of the dissection room’. 496

We might also understand this fly as serving a *tromp l’oeil* effect. Flies appeared in the margins of medieval manuscripts and books of hours and can be found in paintings from about the fifteenth century onwards. The inclusion of a fly, appearing to have landed on the work, became a common device in the paintings of Bidloo’s contemporaries. The meaning and use of the fly in the history of painting is debated. Aside from its successful *tromp l’oeil* effect they are thought to function sometimes as religious symbols and as symbols connoting decay and mortality. Both the *tromp l’oeil* function and the symbolic interpretation are relevant to Bidloo’s use of the fly.

The creeping flies, nails, ropes and pins that appear throughout the illustrations in Bidloo’s *Anatomia* consign them not to the idealised realm of Platonic forms which the Vesalian illustrations occupy. Aristotle brought Plato’s forms down into the empirical realm and it is here that we can situate Bidloo’s illustrations. They realise the reality of dissection while the Vesalian illustrations intentionally disguise it.

**Conclusion**

In this chapter I have considered the way that Vesalius’s anatomical illustrations functioned as a model for subsequent anatomical illustrations. Rather than construing these later illustrations as instances of plagiarism I have suggested that we consider the relationship between these illustrations as analogous to an art historical movement. My intention has been to highlight the sense in which these illustrations function within the Vesalian model, and the ways in which they depart from it.

I have suggested that Bidloo’s illustrations might be taken to signify the end of the Vesalian model insofar as they highlight the reality of the subject matter through his representation of the cadaver as dead. While Bidloo makes explicit the reality of the subject, Vesalius disguises it through his presentation of his

cadavers as standing and animated, in poses derived from sculpture, and through the presentation of his torso figures as antique sculptural fragments. Art is used by Vesalius to convey knowledge about nature. But the art in the illustrations plays its own fundamental role, and is central to an understanding of their style.
Conclusion of the Thesis

Any examination of the style of Vesalius’s *Fabrica* illustrations must be rooted in both science and art. While they are contained within an anatomical treatise, and function as scientific illustrations within this context, the illustrations are artworks in their own right. These prints made from woodcuts that depict the anatomical form are carefully constructed, beautiful representations, designed and executed with aesthetic ends in mind. While approaching the question concerning the idealised style of the *Fabrica* illustrations from an art historical point of view, I have tried not to lose sight of the natural philosophical underpinning which is so closely tied to the aesthetic. In the Renaissance, artists, philosophers and indeed physicians all partook in the investigation of the natural world, a world which contained within it laws that simply needed to be discovered. As Walter Pater said of the Renaissance: ‘artists and philosophers ... do not live in isolation, but breathe a common air, and catch light and heat from each other’s thoughts’. The *Fabrica* is a manifestation of this light and heat shared between art and science in this period.

A claim that lies at the heart of this thesis is that the *Fabrica* illustrations played a decisive role in undermining the ancient distinction between art and nature through the role that both art and aesthetics played in determining their idealised style. The relationship between art and nature that has provided the conceptual setting for this thesis is, I have argued, central to an understanding of the Vesalian style. The relationship between art and nature fundamentally changed in the sixteenth century, as art came to play a role in gaining knowledge about nature. Greater naturalism achieved through pictorial invention made room for images to accurately depict features of the world. However, in order to function diagrammatically and to generalise about the world, Vesalius’s illustrations needed to abstract away from the representation of particulars. The idealised style of Vesalius’s illustrations allowed them to function as diagrams that stand in for the human type, representing a Platonic

form distributed throughout natural particulars, while at the same time not being fully contained within any.

A broad sweep of the history of ideas is required of a consideration of the Vesalian style. Vesalius’s references to the *Canon* of Polycleitus and to the *historia absoluti hominis* suggest that this ancient aesthetic and method for the proportional representation of the human form is immediately applicable to the type of body that he thought best for use in a public anatomical demonstration. By extension it seems that for the same reason a mean, average and typical human form would similarly be most suitable for the didactic illustrations found within the *Fabrica*. The *Fabrica* illustrations are also beautiful and idealised and the *Canon* of Polycleitus itself suggests one reason why this is so. For, the task of representing a mean or typical human form and that of representing a beautiful and ideal one is one and the same. The belief that beauty is distributed throughout natural particulars, and that it can be discovered through a mathematical process of averaging was taken up and elaborated on by *quattrocento* artists and theorists. Alberti’s tabulation of the ideal form and his account of *concinnitas* I suggested offer a Renaissance account of beauty and the proportional representation of the human form analogous to the *Canon* of Polycleitus.

I have considered the epistemology evident in Plato’s *Timaeus*, Ficino’s commentary and interpretation of the *Timaeus*, and in Galen’s *On the Usefulness of the Parts*. The account of art, nature, form and beauty as well as the consciousness-based teleology evident in these texts, I have argued, is mirrored in both the text and the illustrations found within Vesalius’s *Fabrica*. The epistemology found within Plato’s *Timaeus* (and Ficino’s interpretation of it) and that evident in Galen’s *On the Usefulness of the Parts* offered a picture of nature and of the body that is entirely in keeping with the Polycleitan *Canon* and with the mean, proportional and ideal form that we find described verbally and represented visually on the pages of the *Fabrica*.

However, as I have suggested, the body represented visually in the *Fabrica* embodies the method and aesthetic of the *Canon* yet significantly augments this in the manner of both the Hellenistic precedents upon which I have suggested some of the illustrations are modelled, as well as in the manner of High Renaissance art, that is art of the period to which the *Fabrica* belongs.
This augmentation of the austere classical aesthetic is achieved by Vesalius through his use of *contrapposto*, variety of poses and representation of musculature and movement. Theoretically it can be understood through the Renaissance understanding of antithesis in art.

This thesis had been concerned with relationships between artworks and how visual material might function as a model for other visual material. Relationships that obtain between different artworks (whether these are ones of influence, similarity, or difference) is what provides art with a history. While artworks invariably bear the stamp of their time and culture they also retain traces of the artistic tradition out of which they emerge. Amongst everything else, artists look to artworks in order to find solutions to the problems involved in pictorial representation.
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3. Vesalius’s representation from the anterior aspect of the human skeleton *in toto*

4. Vesalius’s representation from the side of the human skeleton *in toto*

5. Vesalius’s representation from the posterior aspect of the human skeleton \textit{in toto}

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6. The first plate of the muscles

7. The second plate of the muscles

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Spear Bearer (Doryphoros), Roman marble copy after the original bronze figure, ca. 450-440 B.C., Marble, h. 6’ 6”. Museo Archeologico Nazionale, Naples. Reproduced from Artstor, library.artstor.org (accessed June 4, 2013).
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Roman copy of a work by Myron, *Discobolos (Discus Thrower)*, bronze original c. 450 BCE; marble copy probably 2nd century CE. Marble, h. 155 cm. Museo nazionale romano. Reproduced from Artstor, library.artstor.org (accessed June 4, 2013).
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### 49. Table of proportions

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<th>Doryphoros</th>
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Table of proportions
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Valverde's muscle figure with dagger and pelt. Reproduced from Juan Valverde de Hamusco, *Anatomia Del Corpo Humano* (Rome: A. Salamanca; A. lafrery, 1560), 64.
54. Valverde’s figures demonstrating viscera

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57. Caspar Bauhin, Muscle figure with dagger and pelt
Adriaan van de Spiegel’s muscle figure, Table VI Lib IV. Reproduced from Adriaan van de Spiegel et al., De Humani Corporis Fabrica Libri Decem: Tabulis XCIIX Aeri Incisis Elegantissimis, Nec Ante Hac Visis Exornati (Venetiis: Apud Euangelistam Deuchinum, 1627).
60. John Browne, Figure representing the muscles in the back

John Browne, Figure representing the muscles in the back. Reproduced from John Browne, *A Complete Treatise of the Muscles as They Appear in Human Body, and Arise in Dissection: With Diverse Anatomical Observations Not yet Discovered. Illustrated by Near Forty Copper-plates, Accurately Delineated and Engraven* (Savoy: Newcombe, 1681).
61. Govard Bidloo, Table 27. Representation of the dissected back of a woman

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Adriaan van de Spiegel’s muscle figure, Table XV, Lib IV.

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