Well-Tempered Building: Michelangelo's full-scale template drawings at San Lorenzo

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ABSTRACT

This work questions the present migration toward prescriptive building procedures through a micro-historical reading of Michelangelo's use of architectural template drawings. Examining the artist's ten surviving paper templates (called "modani") from the façade of San Lorenzo (1516-1520), the Medici Chapel (1519-1525), and the Laurentian Library (1524-1527), Michelangelo's template-making practices are mined for possible ways to reorient current thinking toward a dynamic worksite that embraces, rather than shuns, in-progress alterations.

Taking the common word origin of 'template' and 'temper' as a starting clue, the relationship between Michelangelo's template drawings and the building site are theorized as a process of tempering, a 15th and 16th century term investigated through key sources such as Ficino's writings on health (De vita), the commentaries on Vitruvius by Barbaro and Cesariano, and Biringuccio's treatise on metallurgy (De la pirotechnia). From this, key connections emerge between Michelangelo's template-making and contemporaneous practices of tempering, where dynamic, in-situ material adjustments achieve great effect through tiny alterations. Whether in the health of the body, music, or material techniques, tempering offers a method of in-progress commensuration between axiomatic proportions and those of material, sensibly present harmonies.

The tempering power of templates is investigated in three parts that follow the transmutation of Michelangelo's templates between paper, tin, and stone. The investigation begins with paper and, following a close examination of the extant drawings, discredits the common conclusion that Michelangelo's templates were drawn free-hand. Rather, it is shown that the extant templates are actually a small fragment of a once robust collection of parent and offspring templates related through tracing. Next, parallel practices in bell-casting and column profiling are discussed in terms of template materials, particularly tin, and how small adjustments may be leveraged to great narrative and conceptual effect in the emerging work. The final part examines the San Lorenzo building site through assembling the body of architecture, where templates are seen as surrogate building stones in the conception and adjustment of the in-progress work.

The dissertation concludes with an assertion that Michelangelo's use of templates as instruments for micro-interventions amidst an unstable building site serves as a marvelous exemplar for tempering as a method for materializing the poetic image through disciplined practice.
Delirium for yours
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CONCLUSIONS: WELL-TEMPERED BUILDING

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The recent proliferation of digital fabrication technologies has inspired as many dreams within the discipline of architecture as it has ruptured traditional modes of practice. New research in materials and techniques has awakened the desires of architects wishing to offer a direct hand in the material realization of their projects, suggesting the possibility of a new 'digital' master-builder. However, as promising as some of these trends appear in re-introducing the craft of making to the materialization of architecture, the prescriptive linearity between ideation and building stubbornly persists. Although the computer has enabled a closer hand in actual fabrication, what was dubbed some years ago as "file-to-factory," the promise of a dynamic construction site, perhaps a "factory-to-file", remains elusive. The profession remains committed to the formal separation of 'design' and 'build' with as much force as claims surface to the contrary. Even with the advent of digital design and construction, the possibility of alterations or changes once fabrication begins are as closed as ever, continuing a trend toward increasingly prescriptive construction procedures well-founded in the Modern period. What seems to be novel is not the possibility of a greater 'hand' in materialization procedures; rather it is the incredible instrumental power of software to more reliably predict construction through databases and precision fabrication. In fact, the implementation of highly differentiated, algorithmic constructions, now increasing in popularity, highlights this fallacy: the more architects take control of fabrication, integrating it into their design work, the less the construction site itself remains as a possible stage for invention once construction or fabrication begins. The possibility of the temporality of construction to act as a physical site for the architect's imagination remains as remote as ever.

The present work implicitly questions the migration toward the total prescription or formalization of building procedures, thus making room for the recovery of the architect's imagination within the dynamic procedures of the drawing board and the construction site. It views edification as both a constructed building as well as a temporal practice that, taken together, lead to a realization of the poetic image through the disciplined imagination. We have yet to encounter a methodology in contemporary construction that fully empowers what for

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centuries was one of the most provocative aspects of the architect's imagination: evaluating, judging, and projecting while the work is in progress. With the development of software that offers dynamic updates, virtual model-building, and real-time construction simulations, promises endure. Yet, the profession still struggles with how to handle unforeseen conditions, discoveries during construction, and better ideas that arise once building begins. In short, the dynamism offered to the architect's imagination by the physical, emerging body of architecture - the primordial block-stacking or forming of clay - has been completely dismantled in favor of a near total intolerance of non-prescriptive building practices.

Admittedly, it is easy to sentimentalize the recovery of older ways of building. The Romantic ideal of the master-builder, where the architect directs the totality of building, from design to construction, has no doubt gained new attention. Recent trends and technological innovations have revived this desire within the profession to re-engage with the dynamic worksite and to take control of the fabrication process. However, it is easy to overlook that the master-builder, in the medieval tradition, generally inherited a building project that predated him by decades or centuries and that he would not live to see completed. Indeed, while 19th century notions of the Gothic master-builder endure, a 13th century sermon from a Dominican preacher tells a different story, where:

Master-masons, with a rod and gloves in their hands, say to others 'cut it for me in this way' and labour not themselves, yet take higher pay.  

or, in a similar statement from the 14th century:

In those great buildings, there is commonly one chief master who commands only by word of mouth, who seldom or never lays his hand to the job and yet takes higher pay than the rest.

These sermon fragments alone affirm that the contemporary rebirth of Pugin's or Ruskin's craftsman-architect deserves a skeptical eye. Rather than a streamlining of workflow, as in the role of new, 'information master-builder', his or her predecessor in the middle ages probably encountered a building site fraught with entrenched hierarchies, indeterminacies, and interruptions. The architect's 'workflow', then, relied on direct encounters with craftsmen, constant design adjustments, and uncertain deliberation following the conditions on the perpetually unfolding building site. The prescriptive methods embedded in complex models of digital workflow, for example, while admirably concerned with both the product and the production, nevertheless miss the larger target - a medieval master-builder was building the design as much as he was designing the building.

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2 Saint 1983: 42; Coulton 2004: 174
3 Saint 1983: 42.
With the rise of the professional architect in 15th century Italian regions, the master-builder paradigm began its long march toward the complete separation between an on-site builder and an off-site architect. However, during this time the practice of architecture enjoyed an especially innovative period in which architects struggled with the imaginative space between the building site and the drawing board - roughly between the publication of the architectural treatises by L.B. Alberti and Vincenzo Scamozzi. Alberti, often held up by scholars as the first to theorize this formal separation, nevertheless demonstrated a extremely active record of acquiring first-hand experience in building and materials. As well, documentation from projects such as the Tempio Malatestiano in Rimini suggests that, although working remotely in Rome, he traveled to the building site regularly and deliberated closely with builders regarding evolving and discovered conditions, through models, drawings, letters, and personal site visits. Filarete, whose treatise is a marvelous narrative of architectural materialization, forcefully advocated that the architect, in spite of his status as a purveyor of theory (or disegno) should continue to work directly in material using his own hands. And finally, Scamozzi, by his time encountering a largely professionalized discipline, still adhered strongly to the imaginative potential of drawing, direct knowledge of materials, and on-site modeling. The separation of the architect from the building site did not necessarily lead to a lack of concern for the temporality of the building process and its potential to direct and enlighten the imagination.

Having this in mind, what emerges is a desire within the context of present practices to re-introduce the imaginative and poetic potential of a worksite in motion, where drawing, building, and even re-building are embraced as a dynamic conversation between craftsmen, architects, and clients. In so doing, we recognize the deep potential of past practices to offer a technological and cultural framework by which to reflect upon our own condition. Hoping to move beyond the deluge of recent publications on materials, techniques, and digital fabrication, the present work seeks to correct certain shortcomings in the theory by grounding itself in a close examination of historical practices. Although we share a beginning desire to understand the shifting relationship of the architect to current building practices, our method of inquiry veers sharply from current conversations based primarily in technological concerns. Rather, the approach herein is two-fold: first, looking back to the innovative practices of the cinquecento, we have searched among the period artifacts - drawings, models, and extant buildings - for ways in which architects developed novel approaches within the emerging professionalism of the discipline. Second, probing deeper into written literature, we have wondered about intersections between such practices and the prevailing attitudes embedded in philosophy, poetry, and theoretical treatises.

Within these two streams of inquiry, the curious practice of template-making, a building activity with ancient roots, comes to light as a possible micro-history by which disciplinary
innovations may be revealed and studied. Known in the cinquecento as *modani* or *sagome*, templates quickly evolved from a medieval, guild-based practice, based in secrets and closely-held traditions, to a position in the 16th century at the forefront of innovations in architectural expression. Among the many drawing practices that architects assumed upon their migration from the building site, the creation of templates appears to have played a pivotal, if understated, role in the materialization of buildings between the drawing board and the worksite. Templates allowed architects to maintain their influence over the smallest building details: those places in the building that offered, in the minds of many Renaissance architects, the greatest potential for flaw or perfection. Drawn full-size, or 1:1, these were flat, two-dimensional profile drawings of building cornices, architraves, and column bases, subsequently cut with scissors along their profile and passed to the stone masons on the building site. Once there, the templates could be traced directly onto a rigid support medium, such as wood or metal, after which they would act as 1:1 tracing devices for carving stone ornaments. As instruments between the building site and the drawing board, they demonstrated the imaginative potential of drawing (*disegno*) to dwell simultaneously between the imagination of the architect and the hand of the craftsman. Their capacity to embody an idea, to enliven a material object with the life and joy of the architect himself, was unmatched among other products of 16th century *disegno*, such as models, drawings, and sketches. They were, one may surmise, the very earliest detail drawings emanating from the drawing board of an off-site architect.

Architects' *modani* from the cinquecento differed greatly from the modern day notion of the template. Used in a variety of ways, contemporary architects' generally encounter templates through the lens of digital modeling, drawing, or fabrication - an information-based version of the flat (wood, metal, or plastic) templates that proliferated architect's offices for most of the 20th century. Like these now, mostly defunct versions, digital templates offer an amalgam of technical decisions that gain efficacy through their transmissibility between projects. They are materializations of formal, universal ideas, able to be utilized as open-ended operations having generic applicability. The *modano* of the 16th century, however, rarely if ever moved beyond the specific worksite in which it was employed, having little value outside of the particular case. More often than not, they were ‘used up’ in the building process, which is one of the reasons we possess so few today. The difference between modern and cinquecento templates may be understood in similar way as the difference between templates and jigs in a craftsman's workshop today: jigs are specific solutions to circumstantial fabrication problems, outliving their immediate use only in cases where they are re-adapted or re-imagined; conversely, templates are intended to synthesize a wide range of possible technicalities, translating a complex and wide range of knowledge into a simple and narrow usage. Modern templates outlive their use within the particular case. Both jigs and templates conform to the general idea of 'pattern', although a jig
acts as a pattern of prudent thinking while modern templates operate as formalized patterns of thought, structure, or action.

A study of the etymology of the word 'template' opens up a plethora of associations and possible interpretations. Among the many obvious relations, ultimately submitting to the origin in *tempus*, or time, 'template' invokes common likenesses with the words 'temper', 'temperature', and 'temperance'. Rather than understand the relationship of template and temper as a validation of a hypothesis, however, where templates 'temper' a building, we take it as a starting clue from which to expand hidden associations. Interestingly enough, tempering offers a method for conceptualizing the dynamic worksite, where the architect accords invisible desires with visible, materially based practices. As will be seen, tempering emerges as a powerful metaphor for edification because of its potential for commensuration between hidden, axiomatic proportions and those of material, sensibly present harmonies. Tempering presents the invisible through manifest clues, as in the harmonizing of two strings to a practiced ear, or the skilled reading of a site 'temperatura' through the animals who dwell on it, and it offers a method for materializing the poetic image through disciplined practice. Through the association with the body 'tempers', or humors, the practice of tempering invites enticing relationships with the health of the body and one's character, or 'temperament', and the unfolding of the figural character of a building. What holds most of these potential uses together is the Aristotelian insinuation of the 'golden mean', where moderation between extremes is the most desirable, yet difficult, state of being. The maintaining of the proper temper thus relates immediately to practices situated within a temporal scheme of small yet exact adjustments and alterations unfolding within the stage of action.

The best preserved and most robust collection of 16th century template drawings are from the hand of Michelangelo and relate to his three architectural projects at San Lorenzo in Florence - the never completed façade, the Medici Chapel, and the Laurentian Library. Beginning with these artifacts, the question of tempering is investigated through his practices between his drawing board and the San Lorenzo building site. Michelangelo employed his drawing templates as dynamic tools for a building site in movement, where the physicality of the building site acted as an extension of the drawing board and a stage for imaginative building. Through the use of templates, he dictated the temperament of each building project within the crafting of specific details, and he used the materiality of the flat template drawing to mirror his propensity toward on-site deliberation, experimentation, and adjustments. In their making, he utilized paper-like procedures such as tracing, flipping, and sliding, as well as model-like activities, such as in-situ placements. Moreover, they were often re-used as support for workshop tallies, employment rosters, and even poetry. Michelangelo's use of templates as instruments for micro-interventions

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amidst an unstable and changing building site serves as a marvelous exemplar for the hidden potential of the vicissitudes of the construction site in the architect's imagination today.

Understood in the context of small, micro-adjustments, rather than large change-orders, tempering suggests a method for working within the current, risk-averse building culture. The practice of tempering, as will be seen, demonstrates that the smallest of changes may often be leveraged to great conceptual and experiential benefit, thus offering a method for prudent practice that recognizes the poetic potential of a certain level of on-site uncertainty. Within the conditions of current practice, however, it requires a backpedaling against certain trends: first, the discarding of the dream of total prescription, where buildings are assembled like airplanes and ships within a comparatively formalized and controlled environment; second, it requires the commitment by the architect for a deep and active engagement on the building site as the work unfolds, a responsibility that has been largely distilled out of the profession through litigation; third, a commitment by the architect to first-hand knowledge of materials and techniques; and finally, an understanding of architecture as a demonstration of culture through building and a connection with history. Broadly speaking, in contrast to mega-projects taking place continents away, a study of tempering-as-building highlights the pertinence for an ethically-based practice where the architect remains grounded in locally accessible building sites and traditions of construction while developing a keen sense of environmental phenomena and material culture.

Alexandria, Virginia
December 2013
INTRODUCTION
MICHELANGELO'S TEMPLATE DRAWINGS AT SAN LORENZO

I would still rather have been Phidias than the best of carpenters
Cicero

IN DIO CHRYSOSTOM'S imaginary defense of Phidias's statue of Zeus, the master sculptor makes the audacious suggestion that his work exceeds even that of Homer himself. Claiming that poetry is "an extravagant thing" based on its freedom to exaggerate through the fluidity of words, Phidias stresses that the sculptor is faced with a more difficult task, "the reason being, no doubt, that [he] must work with a rock-like and hard material." Phidias announces himself to his critics by stating:

...as to the product of my workmanship, nobody, not even an insane person, would liken it to any mortal man whatsoever, if it be carefully examined from the point of view of a god's beauty or stature; since, if I shall not be found to be a better and more temperate artificer than Homer, whom you thought godlike in his skill, I am willing to pay any fines you wish! 2

Although Homer's imagination was unsurpassed, Phidias is a greater "artificer (poietes)" because of his ability to render the imagination in rock-hard material - a more difficult endeavor requiring labor, constancy, and great skill. To do so, he relies on his 'temperance', thereby avoiding the excessive embellishments of the worded poet. In this 'tempering' of the work, the sculptor surpasses what Phidias considers the more capricious or superfluous images created by the facility of the spoken word alone.

Dio's introduction of the "temperate artificer (sophronesteros poietes)" merits deeper exploration. Phidias, the legendary sculptor-architect of 5th century Greece, presents himself as an embodiment of the tempered poet, one who may awaken the spirit through works skillfully wrought in lifeless, resistant materials. 3 This presentation cannot help but conjure a similar image, delivered nearly two millennia later by Le Corbusier, who invoked Phidias in his Vers une architecture as the mythic ancestor of the modern architect. Phidias, he declared, understood that architecture was not an invitation to free form, rather it was the realm of the plastic artist, whose work was acutely ordered yet free from formal restraints at the same time. For the Greek builders stone was equal to the tautness of polished steel for the moderns, where "fractions of a

1 “tamen ego me Phidiam esse malem, quam vel optimum fabrum tignarium", Cicero, Brutus (Hendrickson 1939: 256).
3 This work by Dio Chrysostom (1st century CE) presents an imaginary speech by Phidias within sight of his Olympian statue of Zeus. This exposition is one of the earliest and most complete expositions on the merits of the sculptor's art.
millimeter come into play (*la fraction de millimètre intervient*).\(^4\) For Le Corbusier the ability to render material in this manner was metaphysical, almost spiritual, and it could be seen readily in Phidias’ greatest work - the Parthenon.\(^5\) Among the magnificent play of volumes in light, the emotion stirred when experiencing the Parthenon relied heavily on the most poignant realm of the plastic artist; that is, in fashioning the building’s "*modénature*".\(^6\)

Taken to its next logical step, one may ask whether the "*modénature*" invoked by Le Corbusier might hold clues in the examination the ‘temperate artificer’, as both derive from the same mythic figure - Phidias. Properly speaking, *modénature* referred to the discipline of deriving profiles for architectonic elements such as cornices, friezes, and column bases.\(^7\) The term actually originated, not in Phidias, but in the rubric of architectural treatises that flourished during the late 16th and 17th centuries.\(^8\) It had an established and normative use up until the late 19th century, when the ornamentation of buildings lost its fundamental relationship to edification. Le Corbusier revived the term in an effort to connect the role of the architect to sculpt or edify a building through a precise projection of the building's spiritual character.\(^9\) Phidias was the model architect for Le Corbusier since, as sculptor, he could engender the minutest architectural details with an ardent manifestation of the building's inner spirit.\(^10\) Such a view was well-captured in the Romantic imagination with Sir Lawrence Alma-Tadema’s 1868 rendition of Phidias, who stands on the scaffold espousing his work to his friends on the Parthenon frieze (figure 1.1). This connection between the inner spirit of the sculptor and the well-tempered architecture relies on its *modénature*, since, in the practice of sculpting the profiles, reliefs, and edges, the sculptor exercised his greatest potential as a plastic artist. These were the joints between columns and floors, floors and walls, and walls and sky. If Phidias were a more temperate artificer than

\(^7\) Baldinucci in his *Vocabolario toscano dell’arte del disegno* (1681) defines the term as: "*Modanatura f.*. Termine degli Architetti, che generalmente comprende la foggia e’l componimento per lo piu’ de’membri minori, come cornici, base, cimase, e simili altre" (Baldinucci 1681: 99)  
\(^8\) An early appearance of the word *modanatura* appears with Vasari's use of it in the 1550 edition of *Le Vite*.  
\(^9\) Le Corbusier apparently borrowed the term from Auguste Choisy, who, in his *Histoire de l’architecture* (1899), defined *modénature* simply as, "the abstract art of accentuating masses (*l’art abstrait d’accentuer les masses*)" (Goodman 2007: 22). By this view, *modénature* was a relic of historicism that relied on the application of a coded formal language, and thus it may be discarded in the making of a new architecture. Shortly after Le Corbusier, however, August Perret (1874-1954) invoked the term to discuss the use of *modénature* to express the structure of a building, particularly within the context of early 20th century proliferation of ferro-cement construction. In this way, the use of articulated building profiles and relief acted as a kind of non-arbitrary ornament that emphasized tectonic forces and structural hierarchies. Perret’s advocating for a unity between structure and building profiles approached the classical use of *modanatura*, where the practice of deriving building profiles was not added or extraneous. Rather, the derivation of *modanatura*, in the pre-modern sense, ensured the proper integration of the building with its cultural and physical environment, e.g. the finishing of a wall with a cornice to protect it from rain as well as meet the sky and announce its proportional and cultural propriety. For a summary of French usage in the 19th century, see Goodman 2007: xii.  
\(^10\) It has been argued that Michelangelo represented himself as Phidias on the relief sculpture, *The Battle of the Lapiths and the Centaurs* (Barolsky 1994: 66-67). Summers finds remarkable similarity between Dio’s conversation’s with Phidias and Michelangelo’s *paragone* letter to Benedetto Varchi (Summers 1988: 273ff); letter is in Carteggio, MLXXXII (Barocchi and Ristori 1967: IV, 265) Le Corbusier also compared Michelangelo to Phidias (Goodman 2007: 205).
Homer, he probably demonstrated his tempering on the Parthenon most precisely in the fashioning of the modénature.

**modanatura and the architect's modani**

In 15th and 16th century Italy, a building's modénature (in Italian, modanatura) was realized by the architect through the making of modani - flat, profile-models cut into the shape of a future profile edge out of paper. Conceived as templates but fashioned on the drawing board, these full-scale (1:1) drawings were sent to craftsmen on the worksite who would trace the profile edge of the paper template onto a more substantial medium, such as wood or thin metal. From there, the rigid version would be utilized by the stone masons as a tracing template on a squared block of stone. As drawings of profiles, or profili, they would have been crucial instruments for what Vasari defined as the "the beginning and the end of the art (il principio e la fine di quell'arte)" of architecture, thus indicating their fundamental status in the discipline as well as their inclusion in a project from its initial stages to the finishing touches. Their position as profiles and their origin on the drawing board together qualified them as a unique type of disegno, the 15th and 16th century rubric of realizing an artist or architect's idea through drawings and models.

*Modani* differed from other types of models, or modelli, precisely by their relationship to the realization of modanatura. By drawing full-scale, the architect could achieve a nearly fluid translation between the idea and the executed stone details, almost as if he were sculpting it himself. The *modani* were descendents of a well-established medieval practice of transferring full-scale details from the architect's drawing board (or tracing surface) to the hands of the actual stone carvers. In the translation between the flat drawing and the full-bodied stone, template drawings held great potential to demonstrate the judgment and invention of the architect, since it was between the paper and the stone that the architect could freely conceive proportions, assembly, and other phenomena, such as shadows. Their materiality as flat objects permitted a fertile realm between the various practices of the workshop, and they served as productive extensions of the architect's imagination, often becoming support for workshop tallies, new drawings, and, as we shall see, even poetry. It was in the cutting of these paper profiles that the architect would put the chisel to the stone, setting into motion the temporal processes of material modifications.

Given the practicality of their scope -- from the embodiment of an idea to its actual execution at 1:1 scale, *modani* were specifically attached to the imagining and making of building

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11 Vasari, Vite (Milanesi 1906: I,170), the three types of lines specific to architecture were: "profili, dintorni, o lineamenti". In Italian principio may mean both a 'beginning' as well as 'of great importance'. cf. Cooper 1990: 494
details. Because the entire character of a building could often be expressed only in a few key details, *modani* assumed a special role in the architect's practice. Since the greater part of his architectural work was being executed by others, this tuning of the parts must have taken place through the *modani*, the only type of representation that was both generative, as a device for the imagination, and productive, as a construction tool. It is well documented that the making of *modani* was a common practice among architects from Brunelleschi to Scamozzi and beyond. These seemingly unremarkable remnants of daily practice are an unexplored field of research that may illuminate new ground in how an architect works between the material and the immaterial. A cinquecento architect's wood model, for example, was rarely a production of the architect himself, especially if the model depicted a large, complex building assembly. Rather, teams of carpenters and other craftsmen were employed for the actual, often highly skilled, work of the model. When building records connect a model to a certain architect, they were usually solidifying the authorship of the model as an architect's _disegno_ and not usually as a product of his actual hands. Conversely, template drawings were well documented to have been made by architects themselves; indeed using their own hands. Thus, they were a peculiar mode of _disegno_ that embodied the architect's authority as the origin of an immaterial idea as well as in directing executed work.

*Modani* were often attached to building contracts as insurance against faulty or unacceptable work, and they were sent by the architect as methods of persuasion to potential patrons. The most practiced architect in this regard was certainly Palladio. Numerous building contracts between patrons and stone carvers (*tagliapietre*) attest to the binding agency of his templates, what in the Veneto were called "sagome". In a 1568 agreement involving work at San Giorgio Maggiore, for example, profiled stone cutting executed by Andrea dalla Vecchia and Giovanni Giacomo de Grigis were to strictly follow, "the sagome and measures given to us by Mes. Andrea Palladio". Likewise, documents describe a stone carver named Bartolo who was...
contracted to produce part of the building’s *modanatura*, “according to the *sagome* given to them by the hand of Mr. Andrea Palladio.”¹⁷ The added emphasis on Palladio’s hand underscores the authority of his *sagome*: not only were they ordered by the architect, but they were personally executed by Palladio himself. The reach of Palladio’s *sagome* onto the building site, both as binding agents and agents of building, demonstrate the potential of these artifacts to open up questions related to the on-site carvers and masons as well.

As Palladio’s *sagome* suggest, template drawings in the cinquecento were case-specific solutions designed to synthesize a wide range of practical, narrative, and formal criteria. They might have been properly called *exempla*, where they were both concrete building solutions as well as a paradigmatic models. In this way, the template demonstrated the invisible, poetic, or divine image through the mirror of a practical building solution. The architectural precedent for the *exemplum* resides in Vitruvius’ story of Callimachus, who, when passing the funerary monument of a young maiden, discovered an arrangement with acanthus leaves and a basket filled with objects of the former maiden’s delight. Weighted by a roof tile, the sprouting leaves were forced around the sides of the basket, offering to Callimachus a novel and spectacular *exemplum* from which to fix the proportions of the Corinthian order.¹⁸ The re-imagining of a found *exemplum* provided the basis for the architect to make his own full-scale models, becoming *exempla* in their own right; acting as tools for emulation by the stone carvers. Indeed, excavations from the Temple of Epidaurus have revealed, buried in the foundations, such a full-scale model of the Corinthian column capital, most likely carved by the architect and used by the masons to fashion multiples of them.¹⁹ As in Palladio’s *sagome*, these models often carried a special authority as contractual objects, serving as direct demonstrations of the architect’s imagination. Such was the case in Veronese’s 16th century portrait of Vincenzo Scamozzi, who wielded a full-scale architectural *exemplum* of a Corinthian capital with the upward pointing compass - two symbols of architectural knowledge encompassing idea and realization (figure 1.2).

At its root, an *exemplum* was something that was to be emulated through both formal and temporal action, but it was not only a physical model. In craftsmen’s workshops, *exempla* appeared as patterns, both material and immaterial, from which an artisan may work. Robert Grosseteste, for instance, noted that, “Form (*forma*) is thus the name given to the pattern

¹⁷ “secondo le sagome datte a loro per mano di M. Andrea Palladio” (Zorzi 1967: 67, doc. 28), translation by author.
¹⁸ Vitruvius, *De architectura*, IV.i.9-10 (Granger 1931: 208-209). The relevant passage reads: “Pleased with the style and novelty of the grouping, he made columns for the Corinthians on this model (*ad id exemplar*) and fixed the proportions”. See Rykwert’s investigation into this myth in Rykwert 1996: 317-319; see also Payne 2010: 356-366.
(exemplar) from which an artist works, in order, by imitation, to shape a work in its likeness.\textsuperscript{20} Such a pattern may be material, as in a wooden mould, or it might exist as an immaterial mould in the artisan's mind that guides his hands in giving physical shape to the material.\textsuperscript{21} In the Christian tradition, the lives of saints were also known as exempla, providing a basis in which moral teachings could translate from the saints' lives into the lives of everyday people. Boccaccio's 14th century De mulieribus claris (On Famous Women), for instance, was a collection of exempla, where the lives of historical and mythical figures offered models for emulation.\textsuperscript{22} Theologically speaking, these stories recalled how an exceptional life had to confront the material, circumstantial reality of daily life, and how he or she dealt with it would become an exemplum for certain moral teachings. Vasari's own Lives of notable artists, first published in 1550, announced a similar approach, where the exemplary life of an artist paralleled the work of art as exemplum.\textsuperscript{23} In the physical body of architecture, exempla such as Scamozzi's column capital were full-scale, in the world, and experienced. Like the stories of saints and artists, these models were immersed in the circumstances of daily affairs, offering a shared directive from which to apprehend, deliberate, and imagine.

In 14th century Florence, the proliferate use of architectural exempla offer important precedents for the architect's use of modani. The relationship of the exemplum to full size models may be found in several documents from Santa Maria del Fiore. On the 29th of May, 1355, for instance, the capomaestro Francesco Talenti was asked to make "an exemplar of wood (asempro de legniame)", a model that must have been full size considering its enormous cost.\textsuperscript{24} As well, an exemplum might refer to a full size wall drawing, as when the building works committee commanded the plastering of a wall facing Via dei Servi, adjacent to the Cathedral, in preparation for an "asempro" of a column and a capital to be painted "in full-size (in vera grandezza)".\textsuperscript{25} This painting was part of a competition to decide on the best column design among those proposed by various capomaestri. And finally, piece-work stone carvings at the Loggia delle Signoria were sometimes copied "ad illud exemplar", a process of repeating cornice stones following either existing examples already on the building, or new ones provided by a

\textsuperscript{20} "Dictur ataque forma exemplar, ad quod respicit artifex, ut ad eius imitationem et similitudinem forment suum artificium...", Robert Grosseteste, De una forma omnium, Latin and English translation Tatarkiewicz 1970: 231. Also, the silver seal is the 'forma' of a wax seal; a mould the 'forma' of a bronze statue.
\textsuperscript{21} A helpful overview of medieval concepts of exempla as related to the craftsman's workshop is in Scheller 1995:13-14. This is reminiscent to the Neo-platonic understanding of how an architect conceives of a building, recounted in Ficino (Commentary, fifth speech, V; Jayne 1944: 172) and Plotinus (Ennead 1.6), where the architect begins with an immaterial idea, and, guided by this image, fashions a house.
\textsuperscript{22} Scheller 1995: 16.
\textsuperscript{23} The blurring of the line between the work of art and the artist, and its emulation as exempla, would find its formalization in the Accademia del Disegno, founded in 1563 by Vasari and others under the patronage of Duke Cosimo I (Barzman Guasti 1887: 81. From the same document, we learn that the model cost twenty florini. By comparison, Brunelleschi's full-scale wood ring model for the Duomo, ca. 1420, cost only five (Saalman 1980: 36-38), Giuliano da Sangallo's magnificent model for the Strozzi palace cost about 115 lira, or about 18 florins, in 1490 (Goldthwaite 1973: 191). It seems that Talenti's asempro was worth more than half a years' salary for an architect: 128 lira, or about 36 florins, was his yearly salary in 1350 (conversion from Goldthwaite 1980: 429-430).
\textsuperscript{25} Guasti 1887: 116; See also Mustari 1975: 189; Lepik 1994: 32, 183.
master stone carver. One may detect such a usage in an exemplar detected in a detail of Piero di Cosimo's *Costruzione di un Palazzo* of 1520, where a now-familiar Corinthian column capital rests next to a group of working masons, quite likely as a model for copying (figure 1.3).

Florentine exempla from the 14th century serve as precedents for later, 15th and 16th century architect's modani. Not only do they guide construction or serve as models for deliberation, the emulation of case specific examples introduces a temporal space of interpretation. For an architect, making exempla engages a complex process of projecting future material bodies using drawing or models that rely on full-size embodiment. As will be seen in the practices of template-making, the materiality of the template facilitated the productive realm for the imagination since it could act as both a model and a drawing. As a drawing, it provided support for character-making within the complexion the profilo; in model-making, the template could be traced, used to cast a shadow, or placed in-situ. As a device to simultaneously guide the realization of modanatura, it thus served as a prudent extension of the architect's embodied intention.

Michelangelo and tempering templates

As exempla for imagining and constructing modanatura, modani provide a technological framework from which to discover the potential of the case-specific imagination in assembling architecture through the detail. In the 16th century no architect embodied the inventive potential of modanatura as well as Michelangelo Buonarroti (1475-1564). His implementation of the ancient architectural vocabulary in exemplary ways was no doubt as original and fresh in his own time as it appears to us today. Even before Michelangelo's death, Giorgio Vasari commented on the "novelty and variety in the creation of such beautiful cornices, capitals and bases, doors, tabernacles, and tombs." The complex of San Lorenzo in Florence, on which he dedicated over twenty years of his life, displays a wealth of insight into the contribution of modanatura in the

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26 On following examples already on the existing building, see Frey 1885: 295, doc. 46; on following the example of a master carver, see Frey 1885: 296, doc. 47. On the use of exempla and in reference to 14th century Florentine practices in sculpture, see Mustari 1975: 195-202.


realization of architecture. Michelangelo’s inventive implementation of architectural profiles appears to have had a relationship with his unusual practices in template-making, which will be discussed. He seems to have grasped the full potential of these flat paper models to act as instruments of architectural invention, creating a fluid translation between drawing, building, and idea.

A small but illuminating set of modani that still survive testify to his involvement in the fashioning of modanatura for his projects at San Lorenzo. They include eight full-scale, cut template drawings, one large folio containing tracings or workshop records of templates, and one uncut, full-scale profile drawing. Examined together, these drawings recount a relatively untold micro-history of Michelangelo’s well-known propensity toward an intimate involvement of the building site, and they provide a poignant case from which to study the practices related to the realization of architecture through the character of details. They offer valuable clues into Michelangelo’s relationship with the building site and, more broadly, the possibility of drawing practices to moderate between the architect and the hand of the stone cutters. Taking the common word origin of ‘template’ and ‘temper’ as a starting clue, as well as the possible lexical associations with moda (fashion, character, modal) and modano, Michelangelo’s modani for San Lorenzo are used to investigate the constructive potential of the architect’s imagination to act on the building joint in the same way as Phidias— as a mode of tempering.

In peering deeper into possible connections, a vivid picture emerges when intersecting 16th century conceptions of temperance, or temperanza, with Michelangelo’s template-making practices. Raphael left the most prominent portrayal of the cinquecento virtue in his rendering of the four cardinal virtues in the Stanza di Segnatura at the Vatican (figure 1.4). Here, Temperanza is depicted along with one of her most common attributes, the bridle and bit, as an

29 Using De Tolnay’s nomenclature from his definitive Corpus dei disegni di Michelangelo (1976-1980), abbreviated hereafter as Corpus, this set encompasses numbers: 203 (figures A.1/A.2), 204 (figures A.3/A.4), 525 (figures A.6/A.7), 534 (figures A.9/A.10), 535 (figures A.10/A.11), 536 (figures A.12/A.13), 537 (figures A.15/A.16), 538 (figures A.18/A.19), 539 (figures A.21/A.22), and 540 (figures A.24/A.25). The complete set of Michelangelo’s extant modani may be found in Appendix A; a bibliography in Appendix B.

30 The lexical relationships of template/temper and modano/moda are investigated at length in subsequent sections. An obvious bridge between these two families of words may be found in the Latin moderare, a word that was often used in conjunction with temperare as demonstrated by Cicero in Tusculan Disputations, 3.8, “Veri etiam simile illud est, qui sit temperans quem Graeci σοφροσύνη appellant eamque virtutem quam soleo equidem tum temperantiam, tum moderationem appellare, non numquam etiam modestiam...”. See a discussion on the relation of these word families to sophrosyne in North 1966: 262-263 and Spitzer 1963: 81.

31 Temperanza (as the Greek sophrosyne) was included among the four cardinal virtues first developed by Plato in the Republic and in his dialogue Protagoras (North 1966: 150-176). The gathering of Temperance along with Justice, Fortitude, and Prudence would pass through Cicero and St. Augustine, eventually becoming one of the foundations of Thomist theology (North 1966: 259-265).
offering to Prudence, seated to her right.\(^{32}\) A symbol of self-mastery, the bridle invoked an association between the unbridled horse with the unrestrained passions of man, thus calling on the virtuous individual to become the ‘master’ of the ‘beast within’. It appears prominently again in Cesare Ripa’s late 16th century rendering of *Temperanza* (figure 1.5). The metaphor of the horse was an important foundation for *Temperanza*, and it points directly to her origin in the early Greek renderings of *sophrosyne* (σωφρόσυνη).\(^{33}\) In Greek myth the bridle became a powerful image of passionate moderation, where, like a well-trained horse, one’s moral constitution came into alignment with the natural dispositions of one’s talent and fortune.\(^{34}\) When Phidias boasted as being a more temperate artificer than Homer, Dio relied on the Greek term *sophrosyne*, a connection with the deeply moral attitude toward material restraint and the exteriorization of the poetic image.\(^{35}\) Not incidentally, returning to the cinquecento, *Temperanza* played a key role in Cesare Fiaschi’s 1563 treatise on horses, the *Trattato del modo dell’imbrigliare, maneggiare, & ferrare cavalli*, where she served as the frontispiece (figure 1.6).\(^{36}\) Founded in the ancient relationship between the loosely bridled horse and the moral command of the *cavaliere* over his appetites, Fiaschi’s treatise builds a bridge toward broader notions of cinquecento temperance as well. One of the most important discussions of 16th century temperance, for example, revolved around music, a topic of great interest to Fiaschi. He provides multiple illustration of the various movements and gallops of horses, relying on the *cavaliere* to imagine and make "buon Musico" (figure 1.7).\(^{37}\)

Music acted as a common concretization for practices of tempering, magnifying embedded associations between time and the tuning of the soul through proportion and measure. At the turn of the 15th century, for example, Pico della Mirandola wrote that "God is said to have composed the entire world with music and harmonic temperament".\(^{38}\) It was a notion that certainly echoed Dante, who imagined the movements of the heavenly wheel as tempered through the harmonizing of singing voices:

\(^{32}\) Aristotle referred to temperance (sophrosyne) as “preserving prudence” in *Nicomachean Ethics*, VI.v.6 (Rackham 1926: 339)

\(^{33}\) Although directly related, sophrosyne and temperare are not synonymous terms. The Latin temperare owes a similar debt to another Greek term, *krasis* - a reference to the practice of mixing or combining. The etymology of temperare is confronted at greater length in Part III.

\(^{34}\) Villari 2001: 2-10

\(^{35}\) Cohoon 1939: 66. The Greek sophrosyne translates literally as “soundness of mind”, being a compound of the root - *phrên* (mind) and *sous* (healthy, safe, sound), from North 1966: 3, n. 10. It shares a root with Aristotle’s *phronesis*, the chief intellectual virtue as espoused in the *Nicomachean Ethics*, Book VI and often translated as “prudence”. Aristotle plays on this root when he defines sophrosyne as “preserving prudence”, *Nicomachean Ethics*, VI.v.6 (Rackham 2003: 338-339).

\(^{36}\) Fiaschi 1563: frontispiece

\(^{37}\) Fiaschi 1563: 59v. The full passage reads: “Essorto io ancora in ciò li Cavalieri d’imitar piu, che si possa il buen Musico, che piutosto si vuol mostrare biszzaro, che sonare instruméto scordato, ó falso, o non interamento buono, ne ance Musica se non ottima / perfetta, / questo aviene per farsi udırraro, & eccellente; non tanto per il saper suo; ma etiandio per la bontà dell’instrumento, & Musica, liche a tutti di questo essercitio di cavaleria sarà per essemmpio, acciò che così essi procedino, & attendano piu, che potranno ad havere a fare con buoni cavalli.”

\(^{38}\) “Si dice Dio con musico e armonico temperamento avere composto tutto il mondo,” Pico della Mirandola, *Commento sopra una canzone d’amore di Girolamo Benivieni*, IX (Biblioteca Italiana 2004).
thus I saw that glorious wheel in motion
matching voice to voice in harmony

\textit{così vid’ io la gloriosa rota}
muoversi e render voce a voce \textit{in tempra}^{39}

Connecting tempering to the practices of singing and composing, Dante and Pico point toward a
deeper connection of \textit{Temperanza} with its root \textit{tempus}, or time, and an assessment of measure
as a fundamentally temporal, rather than spatial, procedure. It was certainly in this vein that
Dante’s teacher, Brunetto Latini, wrote in his 13th century \textit{Tesoretto}:

\begin{table}[h]
\centering
\begin{tabular}{l}
\textit{Here Stands Temperance} \\
\textit{Whom folk at times} \\
\textit{Call Measure} \\
\end{tabular}
\end{table}

\textit{Qui sta Temperanza} \\
\textit{Cui la genta talora} \\
\textit{Suole chiamar misura}^{40}

So it is that measure becomes an invisible accounting of one’s actions in the temporal space of
human relations. This connection appears overtly appears in Ripa’s 1615 rendering of
\textit{Temperanza}, who shows her left hand holding a verge escapement, known as a \textit{foliot}, the pre-
cursor to the balance wheel in the regulation of the ticking, mechanical clock (figure 1.5).^{41} And
the clock appears once again prominently in an earlier, cinquecento rendering of temperance by
the Dutch painter Jan Swart van Groningen, where she holds an hourglass in her left hand and a
bridle and bit in her right (figure 1.8).

In revealing the particular practices involved in tempering one’s soul, the most
illuminating source was certainly Marsilio Ficino. Through his writings on bodily health in the
\textit{Three Books on Life (De triplici vita)}, the agency of materials and corporal practices were
manifest in the tuning of the soul to the heavenly construct. The balance of the four humors, or
temperatures, became the basis for health, mood, and character; the knowledge of which relied on the
relationship between earthy materials and esoteric knowledge of celestial movements and
influences. Temperance for Ficino was the harmonious state of the body (\textit{corpus}), spirit (\textit{spiritus}),
and soul (\textit{anima}) as a reflection of the World Soul, or \textit{anima mundi}, where the play of celestial
bodies provided the key to one’s character, daily mood, and sickness. Understanding these
movements was the role of the physician so that one could align one’s own body mixtures and

\begin{itemize}
\item \cite{Dante:ParadisoX:139-146} (Robert and Jean Hollander 2007)
\item The making of mechanical clocks in certain instances fell within the rubric of the architect, as undertaken by
Brunelleschi, for example (Manetti 1992: 64-65; Payne 2010: 1; Prager 1968: 203-216). Along with building (\textit{aedificato})
and mechanics (\textit{mechinatio}), Vitruvius mentions time-keeping (\textit{gnomonice}) as one of the three principle parts of
architecture (\textit{De architectura, I.iii}; and advises architects to familiarize themselves with the workings and mechanics of the
water-clock in Book IX.viii.2. The mechanical clock would, in fact, become a key component of in the iconology of
Temperance and is reinforced by several 15th and 16th century renderings where Temperance wears a mechanical clock
on her head. (White 1969: 198-199; see esp. figures 6-10).
\end{itemize}
routines (diet, sleep, air) with those of the heavens, thus leading to a well-tempered *spiritus*. As he wrote in *De vita*:

> Nothing in the world is more tempered than the heavens; virtually nothing under the heavens, more tempered than the human body; nothing in this body more tempered than the spirit (*spiritus*). Through tempered things the spirit is conformed to celestial things.  

Materials, then, could be both tempered (as in gold, the most tempered material), or they could have tempering power over the body, as in the ingestion of properly tempered wine. To manipulate the bodily temper, then, Ficino relied on manifest practices such as mixing, adjusting, and balancing, where tiny, highly differentiated procedures had the potential for great effect. To patients that are unable to digest heavy cuts of meat, for example, Ficino recommends cooking with "wine -- not white but red which is astringent and somewhat bitter, tempering the wine with water of iron or of mastic". After ingestion, the patient should gently have the stomach rubbed with hands dipped in the fragrant wine, cooked as well with "camomile, myrtle, and roses." If done properly, the body receives its temper from the tempered mixtures thus ingested, rubbed, and smelled.

Ficino's principle of leveraged effect through highly differentiated adjustments helps propell the present study on tempering and its transference into architecture. What will arise in multiple instances is the discovery that slight alterations at the level of the detail were often utilized by Michelangelo to achieve great narrative consequence. Just as in the human body, the materiality of the template enabled the micro-adjusting of profiles within the temporal space of substances and their combining. By extension, the influence of a tempered template may also contribute to tempering the body of architecture. Measured in both space and time, the stretching and assembling of the architecture relied on the template's capacity to act as a constructive tool in addition to the compass and rule, the normative tools of the architect. Following Michelangelo's proclamation that one must have "compasses in the eyes (*seste negli occhi*)", architecture thus emerged through temporal as well as formal constructions. In his *modani*, this meant that the profile drawings would become 'alive' - active agents in the sculpting of the architectural experience through the detail. The various drawing tools, the paper, and the cutting tools all worked in a mirror image of the stone cutting activity itself, allowing Michelangelo to

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42 *Nihil in mundo temperatius est quam coelum, nihil sub coelo ferme temperatius est quam corpus humanum, nihil in hoc corpore temperatius est quam spiritus. Per res igitur temperatas vita permanens in spiritu recreatur. Spiritus per temperata coelestibus conformatur,* Ficino, *De vita* (Kaske and Clark 2002: 206-207). A similar passage may be found in Ficino's commentary on Plato's Symposium (Fifth speech, VI), "Harum vero fundamentum est elementorum quattor temperata complexio, ut corpus nostrum caelo, cuius est temperata substantia..." (Jayne 1944: 71), cf. (Summers 1981: 394) for a discussion of Lomazzo's Italian translation of this same passage, found in Panofsky 1968: 138-139.

43 On gold as the most tempered substance of all in Ficino, see *De vita* (Kaske and Clark 2002: 194-195; 230-231). On wine and its tempering effect on the body see *De vita* (Kaske and Clark 2002: 188-189).


45 The term *seste negli occhi* (compasses in the eyes) is often sourced to Vasari, who quotes Michelangelo's insistence that, "bisognava avere le seste negli occhi e non in mano, perché le mani operano, e l'occhio giudica: che tale modo tenne ancora nell'architettura", *Vite* (Milanesi 1906: VII, 270).
fluidly move between the hand and the intellect without necessarily cutting the stone himself. As will be discussed, Michelangelo's famous regard for the removal of material in the creative potential of the divine concetto takes on new relevance, since the cutting of paper may be understood as a parallel practice to the cutting of stone.

It follows, then, that templates have the ability to temper in part because they have a materiality all their own, just as does the building stone itself. They could be fully immersed in the temporal procedures on the building site even while working remotely. Understood in this way, Michelangelo's modani were not only formal tools for transferring profile shapes onto stone, they were also active, tuning devices that relied on the immeasurable component of longing or unfulfilled desire present in the living body. It was precisely in their active processes of making, in fact, that they translated character or living proportions onto stone. For this it helps to recall that, to a greater degree than his predecessor Alberti (De statua) and contemporary Dürer (Vier Bücher von Menschlicher Proportion), Michelangelo relied heavily on the measures of the gestured body in conceiving his work; where proportion was both qualitative and quantitative. Just as human proportion could not be realized without an eye to the vitality of the kinetic body, the template-making involved the temporal intersection of the compassed eye and the skilled hand. Perhaps the most clear exposition on this appeared in the writing of Lomazzo, who, reflecting on Michelangelo's practices in his Trattato dell'arte de la pittura of 1584, wrote:

Michelangelo, that greatest of sculptors, painters and architects used to say that all the reasons -- of geometry, or arithmetic, or proofs of perspective -- were no use to men without the training of the eye in knowing how to see and in making the hand to do. And this he said, adding that, however much the eye may be trained in these reasons, it is only in its seeing -- never mind angles or lines or distances -- that one may render properly and make the hand show everything he wishes...

Soleva Michel Angelo quel grandissimo Scultore pittore & Architetto dire che non valevano ne gli huomini tutte le ragioni ne di Geometria, ne d'Aritmetica, ne essempli di prospettiva, senza l'occhio cioè senza l'essercitatione dell' occhio in saper veder & far fare alla mano. E't quello egli diceva, aggiungendovi che tanto l'occhio si può essercitare in queste ragione, che solamente co'1 suo vedere senza più angoli ne linee o distanze si può render atto, à far che la mano dimostri in figura tutto quello che vuole...47

In a later treatise, the Idea del Tempio della Pittura, published in 1590, Lomazzo underlined the temporal basis of qualitative beauty, relying on Ficinian metaphysics to support his understanding of human proportion. Stating that beauty relies, "as much on the beauty of the soul as on the temperanza of the body", Lomazzo reminds us of the role of temperance in the presencing of the

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46 Michelangelo was openly critical of Dürer's Vier Bücher, published in 1528 in both German and Latin, in which the Florentine referred to the Dürer's drawn figures as "stiff as stakes" without any regard to "human acts and gestures (atti e gesti umani). See Condivi, Michelangelo (Maraini 1928: 90-91) and Summers 1981: 380-381.

divine image within the material, sublunary body. 48 Michelangelo’s templates, concerned as such with the realization of qualitative proportion in architecture, may be hence understood as tempering devices. Conceived as profile drawings, templates acted as configuration instruments for the building detail; thus revealing its essential character.

The intersection of 16th century notions of Temperanza and Michelangelo’s modani acts as a backbone for the findings and interpretations offered herein. Anchored by the well-documented associations between Michelangelo, Ficino and Neo-platonism, and vernacular poetry, the artist’s modani are understood as special types of as architectural exempla that edify the building through a vivifying approach to its modanatura. 49

Prior scholarship on Michelangelo’s modani: new assessments

Michelangelo’s nine extant modani encompass a period roughly between 1523 to 1533. Of his various projects at San Lorenzo, these modani are principally concerned with the Medici Chapel, or Sagrestia Nuova, and the Laurentian Library. The never-completed San Lorenzo façade, his first major architectural commission in 1516, was cancelled in March 1520, a matter that remains shrouded in some mystery even today. 50 Although no modani remain from this project, related façade drawings and models will be referenced, especially when discussing how Michelangelo imagined the joining of profiled stone blocks into larger assemblies (Part III). It also should be noted that a fourth project at the complex of San Lorenzo, the Tribune of Relics and Interior Façade of the main church (Tribuna delle Reliquie e Controfacciata), concerned the artist during the period of 1530-1532. 51 Although few drawings exist from this project, it shall be occasionally referenced. 52

In looking back into the plethora of contemporary scholarship on Michelangelo, especially until the early 1990’s, it will be seen that the San Lorenzo modani have been examined largely at face value, particularly when compared with the depth of examination lavished on his figural

48 “tanto per la bellezza dell’animo, quanto per la temperanza del corpo,” Lomazzo, Idea del Tempio della Pittura (Panofsky 1968: 142-143). Translation by author. Large sections of Lomazzo’s Idea are copied nearly verbatim from the Italian translation of Ficino's Commentary on Plato's Symposium.
49 For a recent work that discusses Michelangelo’s debt to Ficino, see Hub 2005: 103-130 and Summers 1981: 14-17; for an analysis of Michelangelo’s poetry through the influence of Ficino and Neo-platonic thought, see Hub 2008: 93-140. The many intersections between these two figures will be explored throughout the dissertation as a backdrop against which Michelangelo understood the translation between materials and ideas (or concetti). The two traditional starting points for discussing the artist’s relationship to Neo-platonic thought are the poem, “Non ha l’ottimo artista alcun concetto”, touched upon in Part I and Francisco de Hollanda’s De la pintura antiqua of 1563 (Hollanda 1921: 60-61).
50 For a review of the circumstances surrounding the façade cancellation, see Finkle 2005: 145-151.
51 The history of this project is well summarized by Mussolin 2007: 183-226.
52 The San Lorenzo projects were not Michelangelo’s first foray into architecture. The small façade on the exterior of the Chapel of Leo X has been attributed to him, completed in 1514. Even earlier, he submitted a design for the gallery below the cathedral dome at Santa Maria del Fiore in 1507. He began the gradual shift in his career from painting and sculpture, finally passing the final twenty years of his life as the architect of the building works at St. Peters.
Indeed, when placed next to some of his more expressive architectural drawings at San Lorenzo, such as the anthropomorphic profile studies (figure 1.9) or the Medici tomb sketch (figure 1.10), the *modani* exhibit an apparent austerity that invites a simple reading of them. The few that remain from the 16th century are probably due to a combination of being consumed in use as well as discarded at the conclusion of their specific intention as tools for construction. In Michelangelo's case, the primary concern of these documents, up until recently, has been two-fold: one, as documents of building histories, relating the profiles to as-built conditions; and two, as documents containing other notes, such as employment rosters, workshop tallies, and poetic fragments. Different from previous approaches, the present work offers a micro-history of his *modani* related specifically to their intentionality as tools for imagining and facilitating construction.

Early scholars established the historiography of the templates, much of which has proven remarkably consistent over the course of repeated scrutiny. Placing them in the context of the building histories, the drawings were dated and discussed in terms of their relationship to Michelangelo's autograph. Generally speaking, the most important work in this regard was performed by Henry Thode, Karl Frey, Paola Barocchi, and Charles De Tolnay. In 1964 Paolo Portoghesi's important work, *Michelangiolo architetto*, for the first time brought together a comprehensive assessment of Michelangelo's architectural oeuvre, publishing many of the extant *modani* along with excellent building surveys of the Medici Chapel and the Laurentian Library. By the time De Tolnay published his monumental *Corpus* in 1980, scholarship was generally settled with regard to most of the templates' historiography, although there were a few exceptions. More recent historians have expanded beyond these findings, focusing increasingly on how to interpret them within a rising awareness of Michelangelo's working methods.

Tracy Cooper is the first to systematically draw our attention to the substance of *modani* beyond their mere instrumentality; proposing that they might be included under the products of Vasarian *disegno*. As such, she points out, in addition to being practical devices for communication, the *modani* were also theoretical demonstrations. Their inclusion in the 16th century treatises of Ammannati and Alessi signaled an evolution of the practice of template drawing. No longer were templates confined to discussion among craftsmen only; by the cinquecento they were an integral aspect of the discussion of antique building and propriety in ornamentation. Antonio da Sangallo il Giovane, who relied greatly on full size drawing, leveraged

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53 A current bibliography on each *modano* is supplied at the end of this dissertation in Appendix B
54 The *modani* preserved by Ammannati are perhaps the exception here. Cooper contends that his templates were intended to accompany a proposed architectural treatise (Cooper 1994: 498). This has been disputed by Kiene in a recent monograph on Ammannati (Kiene 1995: 217-218).
55 Thode 1908-1913; Frey 1909-1911; Barocchi 1964; De Tolnay 1975-1980
56 Portoghesi 1964
57 Tolnay 1975-1980. These exceptions will be discussed when examining the individual drawings.
his wide-spread practice of template drawing to help forward the use of canonized geometrical constructions to generate his full-size template drawings.\textsuperscript{58}

William Wallace offered an informative reconstruction of template use at San Lorenzo, with much important work done in illuminating connections between Michelangelo and the assistants actually executing the stone work.\textsuperscript{59} For the first time Wallace systematically sorted through the mountains of documentation surrounding the day-by-day construction site at San Lorenzo, constructing a much more complex picture than had been previously assumed. Scouring letters, bank records, and other ricordi, this work opened the door to the world of personal relationships within the quotidian circumstances of construction. In grounding Michelangelo in the daily frustrations with which all architects may relate, Wallace provided a significant counterbalance to the myth of the divine Michelangelo, perpetuated ever since Ludovico Ariosto referred to his contemporary as "il divino".\textsuperscript{60} His meticulous archival research provides significant support in our examination of the San Lorenzo building site.

In many ways, Wallace’s work, published in 1994, ushered in a subtle shift among recent scholarship, with increasing emphasis now being placed on the implications of a close study of Michelangelo’s working methods. Since the early 2000’s, a small group of scholars supported by the institutions such as the Casa Buonarroti and the Kunsthistorisches Institut in Florenz has published several edited volumes and exhibition catalogues that include detailed discussions about most of the extant modani.\textsuperscript{61} Among these scholars, Joannides Paul was the first to suggest that the cutting of the templates constituted a creative act within itself.\textsuperscript{62} Following this, Cammy Brothers acknowledged the in-process nature of Michelangelo's template drawings, stating that, in their making, Michelangelo, "essentially transforms a technique invented for construction and execution into a design instrument."\textsuperscript{63} Mauro Mussolin wrote that his use of architectural models, modani included, "represented an ideal instrument for the artistic process and an indispensible means for controlling and defining the characteristic of the work," and he reminds us that Michelangelo already had an established reputation as working in full-size figural models, using wax, clay, and cordage.\textsuperscript{64} The modani, then, could be situated within the

\textsuperscript{58} Cooper 1994: 497-500. Cooper does not mention Alessi’s Libro, although I suspect this probably reflects some of the same intentionality in the inclusion of templates embedded in Ammannati’s project. A selection of Antonio da Sangallo’s drawings are collected in Frommel 1994, vols. 1-2.


\textsuperscript{60} Ariosto, Orlando furioso (1532)

\textsuperscript{61} Exhibition catalogues and edited volumes supported by the Casa Buonarroti since 2000 that contain research on the modani are: Androsov and Baldini 2000; Ciulich and Ragionieri 2001; Elam 2006; Ruschi 2007; Mussolin: 2009, Ciulich and Ragionieri 2010; Ruschi 2011; An edited volume supported by the Kunsthistorisches Institut in Florenz (Maurer and Nova 2011) summarizes the most recent scholarship on Michelangelo’s architectural practices.

\textsuperscript{62} Catalogue entry to Corpus 203 and 204 (Paul 2000: 13). See also Payne 2009: 386.

\textsuperscript{63} “Questa practica instintiva essenzialmente trasforma una tecnica inventata per la costruzione e l’esecuzione in uno strumento progettuale.” (Brothers 2008: 187), translation by author. She reiterates this point in Brothers 2008: 165.

normative practices already established, expanding the materials for architectural models to include paper and sheets of tin. Christoph Thoenes wrote quite forcefully in this sense, asserting that the full size drawings of Michelangelo were continuations of the process of ideation, a demonstration that at no point in Michelangelo’s process did the creative process stop and execution begin.\(^{65}\) Other scholars working within a similar vein are Silvia Cattiti, who has focused on the Laurentian Library, and Golo Maurer.\(^{66}\)

What emerges from this brief review of the literature is that interpretations of the *modani* have evolved, in the eyes of recent scholars, from simple documents of building facts to demonstrations of creative thinking. Current scholarship has generally accepted the early suggestions by Cooper and has sought a deeper understanding into Michelangelo’s processes of realization through drawing. Taking this trend as a point of departure, the present work builds on current scholarship by offering a new interpretations as to how they participated in the architect’s imagination. Recognizing, as have others, that they evidence a blurred line between ideation and realization, we search for specific clues within the drawing factures that serve as building blocks for plausibly reconstructing a narrative of this in-between space. What seems evident from surveying current scholarship is that a gap has emerged between prevailing conclusions that *modani* were more dynamic than previously thought and the limits of traditional historiography to offer meaningful interpretations of them within the conditions of architectural practice.

The sharpest demonstration of this gap involves the known condition that most of Michelangelo’s templates do not exhibit any signs of proportioning or construction lines. Unlike the contemporaneous templates by Ammanati and Antonio da Sangallo, who make ample use of the compass, dry point (or stylus), and rule, most of Michelangelo’s template drawings are curiously lacking evidence of having been constructed with the geometrical tools of the architect. Scholars who have addressed this condition have generally concluded that the profiles must have been drawn free-hand. Curiously, although scholarship in the last ten years has opened up to the possibility of a more nuanced reading of the *modani*, the myth of the genius, freehand profile drawing stubbornly persists. This sentiment was summarized by James Ackerman, who, in 1961, claimed that the master, “avoided the ruler and compass until the design was finally determined...From the start he dealt with qualities rather than quantities.”\(^{67}\) The assumption of a strict bifurcation between quality and quantity when examining Michelangelo’s architectural drawings continues to undermine current scholarship, a tendency that the present work seeks to counterbalance. In accounting for the deviations between the cut line and the drawn lines on

\(^{65}\) “...e la continuità del lavoro ideativo: non esiste alcun punto dove la tensione creative si rilassi nella elaborazione delle forme, anche dopo che queste apparivano ormai stabilite”, Thoenes 2009: 28.


\(^{67}\) Ackerman 1961: 47.
several template drawings, for example, Brothers describes them as in-between sketches, performed freehand, noting that the profiles as executed do not match those drawn. She observes that, unlike other architects, notably Antonio da Sangallo, Michelangelo’s templates lack the traces of having been constructed with a compass or rule, thus indicating "their unsuitability for actual use by masons". By this interpretation, then, *modani* began as intuitive sketches, like painting or sculpture, and afterward they were subject to some kind of formalization procedure that prepared them for the actual construction site.

Rather than demonstrating a linearity from quality to quantity, however, Michelangelo’s *modani* stand as possible examples of the dynamic and unstable dialectic that vibrates between measured, material constructions and immaterial conceptions. In this way, measured, geometric constructions are not necessarily in opposition to figural procedures that rely, perhaps, on the *giudizio dell’occhio*. This has been well understood in relation to a few of his proportion studies of the human body, where number is not opposed to the animated figure; but rather they supplement and support each other. This is shown in a sheet from the Royal Library where a figure in *contrapposto* is carefully measured and quantifiably proportioned - a rare example by the artist where the temporality of the figure in motion is also conceived with spatial measures (figure 1.11). Recalling the earlier mention of *tempus* as both temporal and spatial, drawings such as these reveal the potential of *temperanza* in architectural assemblies as well, where temporal qualities may be manifest in the measured, material quantities of construction.

Building on the momentum of recent scholarship, these new interpretations offer a more penetrating look into the specific narrative of how he worked between the invisible *concetto* and the material body of architecture, between conception and realization; figuration and construction. Taking the excellent historiography performed by scholars on *modani* as a point of departure, the present study builds on this work by offering new discoveries based on Charles Sanders Peirce’s late 19th century theory of abductive reasoning. For Peirce, when employing abduction, one first searches for surprising or unaccounted clues, and then one constructs a narrative based on imagined events or conditions that may best account for them. Neither deductive or inductive logic, this alternative mode of ‘projecting’ opens the mind for the unexpected and unexplained - what has been called a ‘science of intuition’. Seeking to penetrate what first appear as inert documents, especially when compared to the whole of Michelangelo’s seductive oeuvre, abduction eschews the apparent austerity of the *modani* and views them, rather, as hermetic documents inviting interpretation. In general, for example, scholars have viewed his *modani* as

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68 Brothers, 2008: 165; similar conclusions are found in Brothers 2006: 187.
69 This drawing is discussed at length in Summers 1981: 380 and Brothers 2008: 4.
70 The pragmatic philosopher Charles Sanders Peirce (1839-1914) famously introduced a third mode of logical thought beyond induction and deduction, called ‘abduction’. This alternative mode of thinking, Peirce argued, was the only way we arrive at new knowledge. Some have even called this a ‘science of intuition’. Abduction works only by acute observation -- in searching for clues. He writes succinctly of this in Peirce 1955: 150-156.
having been drawn free-hand, deducing as proof that only one out of the remaining nine contain any evidence of compass and rule. This supports, of course, the well-known narrative forwarded since Vasari of Michelangelo’s singular genius, a view that has been generally scattered by scholarship although stubbornly persists within the margins of prevailing interpretation. Abductive reasoning, however, searches within known practices (both of Michelangelo and his contemporaries) for ways in which disparate or overlooked clues on the *modani* may be elucidated. In this way, for instance, a close examination of the multiple marks and pricks present on the *modani* lead to a complex assessment whereby Michelangelo abstained from compass and rule but employed other modes of construction, particularly tracing, in his template-making practices. If Michelangelo tracing his own templates is taken as a matter of course, for example, a wealth of possibilities, previously non-associated, become apparent. Thus, Michelangelo’s *modani* are not only documents of historical facts containing clues for piecing together building histories, they are also sources for clues in elucidating his practices.

As instruments for ideation and realization, *modani* narrate a temporal realm between the drawing board and the worksite. Like most modern architects’ practices, Michelangelo’s activities of drawing and the building were not primarily located within the same site, meaning the temporality between drawing and building was also mirrored in the movement between worksites. As such, his drawing board resided about a fifteen minute walk from the San Lorenzo worksite in a modest workshop on Via Mozza (modern day Via San Zanobi). The short walk between the two worksites will emerge as a meaningful point of departure in recounting the story of Michelangelo’s templates. Since drawing and building were not directly adjacent to each other, the distance between them opens up a fascinating space for Michelangelo’s imagination where conceiving and constructing were simultaneously intertwined and separated. As will be seen, the *lavoro di quadro* (architectural stone work) was entirely executed by the hands of other masters working outside of Via Mozza and directly on the building site at San Lorenzo.71 Although Michelangelo frequently relied on models and assistants to complete his statuary work, sometimes even at a distance, the *lavoro di quadro* at San Lorenzo began with the shared understanding the other assistants would undertake the actual carving.72 Rather than seeing the

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71 Vasari referred to the architectural stone work as “quando si lavorano per la fabbrica, tutto quello dove si adopera la squadra e le seste e che ha cantoni, si chiama lavoro di quadro. E questo cognome deriva dalle facce e dagli spigoli che son quadri, perché ogni ordine di comici, o cosa che sia diritta ovvero risaltata ed abbia cantonate, è opera che ha il nome di quadro...”, (Milanesi 1906: I, 127-128), see also a recent discussion of the term in Elam 2006: 45-50. When the San Lorenzo façade project was initially awarded, it was to be shared by Michelangelo and the Florentine architect Baccio d’Angelo, with the understanding that Michelangelo would take on the sculpture program and execution while Baccio would assume the responsibility for the architecture. This split between sculpture and architecture was remedied rather quickly with Michelangelo assuming the design and execution of the entire project. For a summary on the various competitors for the façade, from Leo X’s early solicitations in 1516 to Michelangelo’s contract of 1518, Finkle 2005: 100-129.

72 The extent of Michelangelo’s actual hand in carving has been shown to be complex and varied. His ‘hand’ could signify anything from the final touches (“l’ultima mano”) to the making of a model from which assistants would follow in stone in its entirety. On the *ultima mano* in Michelangelo, see Elam 1998: 475-497. Ambiguity continued even among the *lavoro di quadro*. In a late contract for work on the tomb of Julius II, it was stipulated that certain ornaments above the final cornice would be reserved for Michelangelo’s own hand, while others would be permitted to be executed by his contracted
absence of Michelangelo's direct hand as 'allowable', as most patrons viewed it with his sculpture, the architectural stone work began under a different precondition. Unlike a work of sculpture, where the hand and the intellect aspire to be in direct dialogue, if not always as such, edification takes this proximate distance as a starting point, where the architect is both near and far at the same time. For Michelangelo, new ways of working would have to emerge that took advantage of the gap between eye and hand. The physical posture between Michelangelo and the lavoro di quadro was thus an invitation for a prudent intervention - one that seized the proper moment to accelerate or elongate the translation from the idea to the material. It is actually the tension hidden in this fissure, spatially amplified in the presence of the separated worksites, that lies at the root of the architect's imagination.

For the twenty six or so years of employment in Florence, this workshop acted as an extension of the San Lorenzo fabbrica (building works), serving as a site for his drawing board, several assistants, and mountains of marble. While the employment of assistants was certainly a normal practice for Michelangelo, his role as the conductor of an entire fabbrica no doubt required the adoption of new practices. Or, put another way, the practice of architecture necessitated the amplification of certain modes of working in which he was already familiar. Working trips to the Carrara marble quarries, for example, were nothing new to him, having already extensively searched for marble for the Tomb of Julius II. With the commencing of the San Lorenzo façade, however, Michelangelo's relationship with the quarrying of marble and its transportation reached new intensities. Between 1516 and 1519, during the height of the quarrying for the façade, Michelangelo visited the quarries surrounding Carrara nineteen times, sometimes spending several months directing and evaluating the proper building material (figure 1.12). Also for the

73 For evidence where patrons permitted Michelangelo to work through his assistants, several examples stand out. In one, during the design of the San Lorenzo façade, Leo X permitted many of the sculptures on the façade to be sculpted by others following Michelangelo's models and under his direct supervision as long as the principle figures were made by Michelangelo himself. See Carteggio OLXIV (Barocchi and Ristori 1979: I, 207). "...le figure principali sieno di mano vostra [Michelangelo], e delle altre, che voi le alloghiate a quelli tali che stimerete sieno per satisfare: intendendo che voi facciate loro li modelli." In another example, more architectural although not technically lavoro di quadro, the Laurentian staircase was executed entirely by Ammannati following the small clay model sent by Michelangelo from Rome near the end of his life. Short of having Michelangelo present in Florence to guide the construction, these was the most favorable terms by which Duke Cosimo could coax Michelangelo's 'hand' back to the Laurentian construction site, some 30 years after he had left. On the episode of the stair model and the pivotal role played by Vasari, see Wittkower 1934: 171-174 and, more recently, Gronegger 2007: 118-123. The key letter from Michelangelo to Vasari describing the model is found Carteggio MCCXV (Barocchi and Ristori 1979: V, 47). For other examples of Michelangelo working through others, see O'Grody 1999: 76.

74 Michelangelo employed up to thirteen assistants for the Sistine chapel while five helped him cast the bronze statue of Julius II in Bologna. By mid-1525, at the height of construction at the San Lorenzo fabbrica, he recorded more than one hundred assistants on his weekly employment tally (Wallace 1994: 4).

75 For a representative list of minute concerns, see Ricordi CXXIII (Ciulich and Barocchi 1970: 128-131). Michelangelo directly oversaw the fabrication of workbenches (cassette), worktools (schabegli), measuring tools (regoli), and
first time with the San Lorenzo façade, Michelangelo undertook a sustained and complex collaboration with a distant patron, something he had experienced in previous projects, although not to such an extent. Several wooden models as well as dozens of drawings and letters were exchanged between the Rome and Florence, and Michelangelo made key journeys to Rome to meet with the Pope to deliberate over the design. The orchestration of the fabbrica among multiple sites, as well as pleasing a distant patron in the Vatican, meant that the reach of his hand would have to extend far beyond the workshop walls.

While much of his architectural drawing during this time appears to have taken place at Via Mozza, Michelangelo’s noted wall drawings in the apse of the Medici Chapel prove that the drawing worksite probably changed as rapidly as the master changed his location, a tantalizing demonstration of on-site drawing discussed at length in Part III (figure 1.13). Also, although he employed an on-site capomaestro to oversee the daily coordination of personnel, Michelangelo commonly took it upon himself to manage even the smallest of building activities. In one instance, for example, dissatisfied with the poor quality of measuring tools on the building site, the master himself purchased several high quality iron tools at his own expense, even though it was customary for the scarpellini to purchase and maintain their own tools. Complaining of the stone cutters’ "defective squares (squadre cattive)", Michelangelo ordered two large iron rules and promptly remedied the situation. It is clear that no aspect of the worksite escaped his attention.

If abductive reasoning drives the interpretation of certain clues on the modani, the three sites of edification, San Lorenzo, Via Mozza, and the space between, provide a fitting allegorical structure from which to tell the story of those clues. Beginning in Part I, the temporality of the template as a device for imagining future building profiles is examined at length. Here, the physicality of the paper and its ability to be cut, flipped, and traced are shown to lie at the root of Michelangelo’s invention of the building character through the profile. The figuration of the architecture is explored through studies in characterization through shadow and 16th century conceptions of physiognomy. Part II begins at Via Mozza and traces the progression of the paper templates as they are sent to San Lorenzo and translated onto thin tin sheets, making them suitable for the rigors of construction. The space in-between is considered within the dynamic sawhorses (capre). From these notes it may also be seen that Michelangelo assumed an active role in overseeing the quality of the stone carver’s tools: one may also find the purchase of a marking gage ("un grafietto per segnare certi frontespiti"), iron rules, and a large, four kilogram hammer (martello).

76 The Rome Pietà was commissioned by a French cardinal but during his and Michelangelo’s early residence in Rome. The first designs and execution of the Tomb of Julius II, as well as the Sistine ceiling, took place not far from the watchful eye of the Pope himself. The facade for Pope Leo X’s chapel in Castel Sant’Angelo also took place during Michelangelo’s residence in Rome. Probably the most significant early project located some distance from his patron was the casting of the bronze statue for Julius II, which took place in Bologna.

77 “...il scarpellini mi dicono avevano 2 misure e le squadre cattive,” Carteggio DCLXXIII (Barocchi and Ristori 1979: III, 115). See also a related entry, “A di venti 9 di luglio 1524 rende’ al Piloto dieci grossoni che ave’ pagati a un fabro che sta nella via de’ Servi, per due regoli di ferro d’un braccio e mezo l’uno m’avea fatti per li scharpellini di San Lorenzo,” Ricordi CXXIII (Ciurchi and Barocchi 1970: 131).
movements of the templates while being carried between the worksites. Once on site, transference of temper between the profile line and the full-bodied stone is illuminated through studies on parallel practices such as bell-making and constructing the column swelling, or entasis, two activities that required the transfer between profiled templates and material bodies. This part concludes with the transference of the template onto the stone and its subsequent carving into the profile. The final analysis of the modani occurs in Part III, where their presence specifically at the San Lorenzo worksite is considered within their role in assembling the building parts. Here, emotion and the practices of tempering - mixing, adjusting and joining - are fully manifest in relation to Michelangelo's poetic and edification practices, with the templates finally acting as surrogate building stones within the dynamic and temporally conceived construction site.

The three-part progression from Via Mozza to San Lorenzo structures the dissertation paralleling Ficino's tripartite progression from body (corpus) to spirit (spiritus) to soul (anima). Residing in the heart and associated with the quickness of blood, the spiritus was a vapor-like, angelic substance halfway between the invisible and the visible. Having substance, it possessed extension, and yet, having no visible, material presence, it had no body. For Ficino the spiritus was the vehicle by which temperance mitigated between body and soul, tenuously balancing the body's four tempers within a state of perpetual longing for their tempered, celestial ancestors. As invisible yet present, spiritus resonated with similar entities, particularly music. In an analogous way to the in-between space of Via Mozza and San Lorenzo, templates operated between the progression from the invisible, or what Michelangelo might have called his concetto, to the visible, or the materialization of the architecture through the cutting and assembling of building parts. As we follow the back and forth vibrations between idea to building and drawing to carving, Ficino's metaphysical structure will be frequently called upon to provide key connections between templates and tempering (figure 1.14).

By this analogy, San Lorenzo's modanatura would have provided a site for the convergence of spirit and embellishment of motive character through Michelangelo's modani. Indeed, returning to Le Corbusier, Phidias' profiles on the Parthenon are discussed in precisely these terms. In proclaiming the imperative of architectural profiles as a definitive moment in the character of the building, he writes in 1926 that:

It is when the traits of the face take on their distinctive qualities through the profile that...give[s] us the architectural emotion.

_c'est lorsque les traits du visage prennent leur qualité par le profil qui...nous donner l'émotion architecturale_
This includes, he states, not only architectural moldings but the profile of entire wall assemblies. This statement recalls a similar passage from *Vers une architecture*, published three years earlier. When asking the question "Where does the emotion come from?", he answers in a curiously Ficinian fashion; stating, "From a unity of idea extending from a unity of materials to a unity of *modénature*". In other words, the invisible and the visible are unified in the manifestation of the building profiles. With this, he offers his most definitive statement, a Modern manifesto, perhaps, for the urgency of architectural profiles in the conceiving and realization of the architectural *spiritus*:

*modénature* is the touchstone of the architect....*modénature* is a pure creation of the spirit.

*La modénature est la pierre de touche de l'architecte...La modénature est une pure création de l'esprit.*

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79 Le Corbusier 1923: 164. Translation by author.
Figure 1.1  Phidias Showing the Frieze of the Parthenon to his Friends, Sir Lawrence Alma-Tadema (1868). Birmingham Museum and Art Gallery.
Figure 1.2  

Figure 1.3  
Figure 1.4 Three Cardinal Virtues (Fortitude, Prudence, Temperance), fresco, Raphael (1511). Stanza della Segnatura, Palazzi Pontifici, Vatican

Figure 1.5 Personification of Temperanza, Cesare Ripa (1615). Excerpted from Cesare Ripa, Nova iconologia di Cesare Ripa pervgino. Padova: Per P. P. Tozzi nella stampa del Pasquati (1615).
Figure 1.6 Frontispiece (Temperanza), Cesare Fiaschi (1563). Excerpted from Cesare Fiaschi, Trattato del modo dell’imbrigliare, maneggiare, & ferrare cavalli (1563). Courtesy Biblioteca Nazionale Centrale di Florence (BNCF).
Figure 1.7  Musica & disegno del sudetto maneggio, Cesare Fiaschi (1563).
Excerpted from Cesare Fiaschi, Trattato del modo dell’imbrigliare, maneggiare, & ferrare cavalli (1563). Courtesy Biblioteca Nazionale Centrale di Florence (BNCF).
Figure 1.8   Temperanza, Jan Swart van Groningen (16th century). Trustees of the British Museum, inv. 1872-1012.3314.

Figure 1.9   Profile studies for the Ducal tombs in the Medici Chapel (“el cielo / la tierra”), Michelangelo. Excerpted from Charles De Tolnay, Corpus dei disegni di Michelangelo, no. 201r (1976-1980). Casa Buonarroti, 10A.
Figure 1.10  Studies for tomb of the Magnifici in the Medici Chapel, Michelangelo. Excerpted from Charles De Tolnay, *Corpus dei disegni di Michelangelo*, no. 180r (1976-1980). Trustees of the British Museum, inv. 1859-5-14-822r.

Figure 1.11  Proportion study of male body, Michelangelo. Excerpted from Charles De Tolnay, *Corpus dei disegni di Michelangelo*, no. 61r (1976-1980). Royal Library, Windsor, inv. 12765r.

Figure 1.14  *Cathena Auris Platonica*, Crispijn de Passe the Elder (ca. 1575). Trustees of the British Museum, inv. 1862-0712.328.
The first picture was merely a line, drawing round the shadow of a man cast by the sun upon a wall

Leonardo

...your art must be as if it were a grandchild of God

Dante

Drawing at Via Mozza

When Michelangelo signed the contract for the construction of the facade of San Lorenzo on the 19th of January, 1518, Pope Leo X stipulated that, in addition to a generous salary, the artist would be allocated a workshop, "without any cost to himself...where he could execute the works of marble and do whatever else is needed for the said facade". Up to the time of the San Lorenzo projects, he had executed all of his works, including the David, the bronze statue of Julius II, and the Sistine Chapel ceiling, in hastily arranged, temporary workshops. Having returned to his native Florence to undertake the façade, however, Michelangelo made it a priority to build a permanent place of work. Once provisions for the endeavor were obtained in the contract, Michelangelo acted quickly. Within six months, on July 15, 1518, a one acre site was acquired at the end of Via Mozza (present day Via San Zanobi). This property seems to have been ultimately unsuitable as he promptly began looking elsewhere for another site. By the early fall 1518, discussion emerged around a new site near the Arno in front of the church of Ognissanti, an especially attractive one given its proximity to arriving marble. However, even this site would prove untenable, and in November Michelangelo finally settled on a much smaller

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2. “L’arte vostra quella, quanto puote / Seque, come il maestro fa il discente / Si che vostr’arte a Dio quasi è nipote” Dante, Inferno XI.103. Translation by author.

3. “..sanza alcuna sua spesa...nella quale possa fare lavorare li marmi et altre cose per conto di detta faccia”. The 1518 contract may be found in Milanesi 1875: 672. Translation by author.

4. Michelangelo primarily worked in two workshops prior to Via Mozza, neither of which he considered permanent (Wallace 1991: 64). The first was funded by the Opera del Duomo in Florence for the proposed work on twelve life-size apostles for the Cathedral in 1503 (Milanesi 1875: 626); the second was a workshop in Rome behind the now demolished church of Santa Caterina delle Cavallerotte created to serve the work on the Tomb of Julius II and was probably employed through the work performed on the ceiling of the Sistine chapel, see Carteggio MI (Barocchi and Ristori 1967: IV, 150). Vasari mentions this workshop (Milanesi VII, 163). For more on his early workshops, see Hirst 1991: 760-761.


6. This initial site was located just inside the city walls near the old Church of Santa Catarina delle Ruote (no longer extant), and he purchased it for 274 1/4 gold florins. It is not clear why he did not build his workshop on the Santa Catarina site. However, it remained in his possession until 1555 until it was sold to the Ospidale di Bonifazio Lupi for 320 gold florins, making it the only property that Michelangelo would ever sell. On the history of this property and transcriptions of pertinent documents see Hatfield 2002: 75-78, 467-468; as well as relevant letters in Carteggio CCLXXXIX (Barocchi and Ristori 1967: II, 14), Carteggio CCXCVI (Barocchi and Ristori 1967: II, 22), and Carteggio CCCVII (Barocchi and Ristori 1967: II, 36).
property back on Via Mozza, quite close to his original July acquisition. Here, halfway between the church of Santa Bernaba and the monastery of Santa Caterina d'Alessandria, he found "a marvelous and useful site (un sito mirabile e utile)" that traversed several acres of vineyards and fruit tree groves. Although the contract specified that the workshop shall be "neighboring (propinquus)" the church of San Lorenzo, the Via Mozza site was not exactly as such, requiring a fifteen minute walk between the workshop and fabbrica of San Lorenzo (figure 2.1).

Michelangelo referred to his workshop simply as "la mia stanza", my room. Whether this reflects an overall attitude toward the modest understatement of the workshop, it is worth noting that the small, mason's shed attached to the San Lorenzo fabbrica was also referred to as a "stanza". Perhaps the use of "stanza" in his case suggested a disassociation with the normal artisan's workshop, or bottega, a place that would have been maintained by commissioned artisans like his former teacher Dominico Ghirlandaio or the Florentine painter Andrea del Sarto. Later in life, the artist would write to his nephew Leonardo, stating that, "I never was a painter or sculptor like those who kept a workshop". Having worked for several Popes, he reminded his nephew that if a Florentine citizen wants to have an altar piece painted, he ought to find a painter (dipintore) to do it. The notion of a "stanza" as opposed to a bottega perhaps reiterates this self-image: like the small mason's shed, the Via Mozza workshop was in servitude to another purpose, one that exceeded conventional artisanal productions of furniture decorations or portraiture.

In spite of its demure term, this "stanza" oversaw the largest active building site in Florence since the completion of the Strozzi palace in the late 15th century. Beside the ongoing fabbrica operated by the Opera del Duomo, San Lorenzo / Via Mozza was a magnet for assistants and material from throughout Tuscany. The grand scope of the façade enterprise no
doubt fueled the furious erection of the Via Mozza workshop. Surviving quarry sketches, for example, made by Michelangelo attesting to the anticipated audacity of the project -- the first solid marble façade to be constructed since antiquity (figure 2.2). Between the lavoro di quadro and the ambitious figural program, the project required the auxiliary space to accommodate scores of blocks while allowing for the working of twenty statues at a time. Within a period of less than six months, Michelangelo oversaw the emergence of a fully functioning workshop, from digging the drinking wells to roofing the walls (figure 2.3). Having a roofed, interior dimension of about fourteen meters square, the total height of the workshop was around four meters and contained a small, walled vegetable garden in the rear. After a mere two months of excavations for the foundations, through the height of winter, Michelangelo recorded payments to carpenters for the doors and windows and to wall finishers for finishing the interior walls.

By spring of 1519, major design decisions on the San Lorenzo façade had been settled upon, the Pope’s contract was signed, and a large, wooden model had been constructed (figure 2.4). While work continued on constructing the Via Mozza workshop, marble was already arriving by the cartload, and Michelangelo and his assistants had commenced roughing-out several sculptures. In May discussions began for the expansion of the San Lorenzo fabbrica to include a design for the reconstruction of the Sagrestia Nuova, or Medici Chapel. With Michelangelo positioned at his drawing board in the spring of 1519, the story of the tempering templates commences. Immersed in bone-white marble, the aspiration of his desiring chisel and the smells example, was commonly purchased from Duomo site and carried to San Lorenzo, see Ricordi XLII (Ciulich and Barocchi 1970: 48). And it was through the cooperation of the Opera that many of the quarries near Seravezza and Pietrasanta were reopened and improved, not only to ensure the uninterrupted supply of marble to San Lorenzo, but to facilitate the continued construction of Santa Maria del Fiore as well (Wallace 1991: 24-25).


17 “…Ò a ordine qua una bella stanza, dov'io potrò rizare venti figure per volta”, Carteggio CCLXXII (Barocchi and Ristori 1967: II, 129)

18 Michelangelo kept an extensive record of expenses incurred during the workshop construction, found beginning in Ricordi, XLII (Ciulich and Barocchi 1970: 45-51) and including references in Ricordi XLVI, XLVII, LVII, LV, LVI, LXII, LXIII, LXV, and LXVI. The foundations were initiated shortly after the purchase of the Via Mozza property in December 1518. It appears there were two portions - a garden, possibly covered by exterior portion; and an interior workshop. Throughout January and February 1519, the interior portion was quickly constructed, and by late Feb/March the garden wall foundations were underway. In February the walls received their plastering and the doors and windows were installed. Construction of finish wood elements like soffits and ceilings continued into the May, along with the garden wall construction, as reflected by brick purchases in late March. After mid-May 1518, it appears the workshop was in working order.

19 Hatfield 2002: 80

20 December 11, 1518, Michelangelo records digging the foundations, 28 1/2 x 3 braccia, one braccio deep for the garden (orto) at 2 soldi per braccio, cost 8 lira 11 soldi, a sketch of which is found in Archivio Buonarroti, XIX n. 8, recto, from Ricordi, XLVI, (Ciulich and Barocchi 1970: 55); less than two months later on February 15 and 17, 1519, Michelangelo records payments for 18 braccia of lower doors (porta subiatta), the façade, a truss, 3 window casements, a beam, 65 braccia of fabric window covering (chardinaletti), 8 loads of wood, 30 braccia of sills for 4 windows at 4 soldi per braccia, and 44 stone hooks, from Ricordi LXI (Ciulich and Barocchi 1970: 66).
and sounds of hardened tools must have fueled the compasses in the eye at work on the drawing board. Paper, at hand and expedient, provided the most poignant support for such desires.  

Within his "stanza", Michelangelo would be principally concerned with receiving statuary blocks, carving sculptures, fashioning figural models (mostly from clay), and making drawings. The paper modani examined herein are all likely to have originated from the artist's drawing board in the Via Mozza workshop. The reasoning behind this assessment will become more apparent during the larger analysis, but it will suffice at this point to note a few basic conditions. First, most of the template drawings exhibit marks that are connected with known activities occurring at Via Mozza. For example, the workshop was the general location where Michelangelo documented daily expenditures, employment records, and other ricordi; and, indeed, four templates, figures A.10, A.24, A.21, A.15, all display some kind of employment roster or workshop tally. Further support for this derives from the observation that three additional modani display poetic verse fragments, leading one to surmise that, in all likelihood, Michelangelo cut these paper templates but never sent them to San Lorenzo, thereby freeing them for other uses that might have occupied his immediate attention near the drawing board. The probability that the paper templates underwent multiple variations, as will be seen, reinforces the connection between the paper fragments and their support for workshop-based marks, sketches, and notes.

The normative practice of modani in cinquecento Florence

Before examining Michelangelo's specific drawing practices, it would help to situate his work among characteristic template-making practices of the 16th century. Documents record the use of modani in Florence back to the 14th century, with the probable use of template technology in place for centuries under different terminology. From this, enough evidence exists among various letters, building records, and the few surviving template drawings themselves to construct a fairly clear picture of Italian practices. From Michelangelo's contemporaries there is a well-preserved set of three cut template drawings for San Giovannino by Bartolomeo Ammanati, most

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21 For an overview of the 16th century Italian paper trade, see Bambach 2000: 105-120.
22 Figures are Corpus 535r, Corpus 540r, Corpus 539r, and Corpus 537r, respectively. It is apparent that many Ricordi of "spese" or daily expenditures are written from the point of view of Michelangelo having recorded them while in the workshop. Examples include, "...chosis fece nella stanza di via Moza dov'io lavoro", Ricordi LXXXVI (Ciulich and Barocchi 1970: 90); and, "...a di venti da di settenbre [1519] richominciò maestro Domenicho, decto Topolino, a llavorare mecho in via Mozza", Ricordi, LXXXVI, (Ciulich and Barocchi 1970: 89).
23 The earliest reference to the use of modani per se that I have been able find is from the Opera della Santa Maria del Fiore, dated January 5, 1350: ..."Seducim bracchia stipidorum, ad modinum eis dandum per Fransischum Talenti principalem magistrum dicti operis..." (Guasti 1875: 66, doc 68). The key factor is in the use of 'n' in place of 'l' (as in modano rather than modelo), and all of their variants; discussed in Part II. Evidence of template use dates back to at least the 1st century CE, where Heron of Alexandria mentions the use of an "anagrapheus" that clearly describes a template used to aid in the carving of an Attic column base. Interestingly enough, the Greek use of "grapheus" carries some of the same ambiguity present in 16th century modani, where it could serve as both a drawing and a construction implement (Coulton 1976: 302-304).
likely destined for inclusion in an unfinished treatise on matters of building and surveying (figures 2.5, 2.6, and 2.7). Among the hundreds of drawings surviving from Antonio da Sangallo il Giovane, a magnificent six foot un-cut template drawing exists for the monumental order of the interior of San Pietro in Rome (figure 2.8) and at least six more full-scale detail drawings preserved in the Uffizi. Additionally, although none survive, documents record the existence of *modani* in Florence with Baccio d'Angolo and Giorgio Vasari. Elsewhere in Italy, Andrea Palladio maintained a vigorous practice of making template drawings, or *sagome*, as they were known in the Veneto, and he mentions their use on several occasions in *I quattro libri dell’architettura*. And the Milanese Galeazzo Alessi, in his 1565 treatise work, *Libro dei Mistri*, includes several *modani* as part of his collection of drawings on the Sacro Monte di Varallo.

Palladio’s follower, Vicenzo Scamozzi, doubtless provided the most metaphysical commentary on the template drawings (figure 2.10), declaring in his 1615 treatise *L’Idea della architettura universale* that: “the *sacome* are the mark and sign of the work itself, from which results the perfection or imperfection of the whole.”

While template-making has been a periodic focus of scholars on the gothic builders of northern Europe, no such scholarly approach appears in the consideration of Italian template-making practices. Evidence suggests that a much different practice of template-making emerged during the late-medieval period in the regions south of the Alps, and a generalization based on ‘gothic’ builders does not account for the tradition of *modani* as template making within the Italian regions. Generally speaking, emphasis on northern practices remained grounded in the teachings and secrets of Euclid, while the practices of the southern counterparts echoed the traditions of antique building intertwined with the Vitruvian emphasis on number and module. Villard de Honnecourt, who called the masons’ templates ‘*molles*’, recorded a number of practical procedures for generating templates in his *Sketchbook*, but there is little evidence to support that

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24 Ammannati’s template drawings are included in a volume of drawings in the Uffizi entitled, *La città ideale* (Uffizi 3462A-3464A), personally examined by the author on May 28, 2012. On Ammannati and his unfinished treatise, see Fossi 1970; on Ammannati’s *modani* see Kiene 217: 1995 and Cooper 1990: 498, who includes an extensive bibliography.

25 Several of Sangallo’s full-size drawings were personally examined by the author May 31, 2012, including: Uffizi 7976A, 6770A, 1149A, 718A, and 303A.

26 On *modani* of Baccio d’Angolo, see a 1522 contract with Sandro del Gira on the Da Galligano palace for making the ornaments “secondo il modano” of Baccio d’Angolo, referenced in Goldthwaite 1980: 377, n.6, original found in Archivio Salviati, Pisa: ser. IV, 14, fol 2v. (Building accounts for the Da Galligano palace); on Vasari, see a letter to Duke Cosimo of 1563, “...ho fatto a tutti loro [ai maestri di legname] un modano grande come il cartone grande che portai cosi’ a vedere Vostra Eccellenza” (Milanesi 1906: VIII, 371).

27 See Palladio, *I quattro libri*, i, ch. xiii (Tavernor and Schofield 1997: 18); On Palladio’s *sagome* at San Giorgio Maggiore, see Zorzi 1967: 61-67; for other Venetian examples in addition to Palladio, see Burns 1991: 207, n. 126.


29 “*le sacome sono il marco e sigillo dell’opera stessa, dalle quali ne risulta la perfezione, o imperfezione dell’atto***, Scamozzi, *L’idea della architettura universale*, Scamozzi, *L’idea della architettura universale*, Parte Seconda, 139. Translation by author. In the same paragraph Scamozzi notes the equivalence of *sacome* with the Roman use of *modano*.


31 This two part distinction is suggested by Rykwert, although he does not directly associate it with geographic regions (Rykwert 1984: 26). Such a connection between the Vitruvian tradition in the middle ages in southern climes as opposed to the north was suggested by Pevsner (Pevsner 1942: 558).
these templates had theoretical underpinnings beyond the mason's knowledge of geometry.\textsuperscript{32} Honnecourt's masons were likely to conceive of the template as an implement of construction and as a harbinger of certain trade traditions or secrets (figure 2.11).

Indicative of the divergent approaches to template-drawing, one may contrast two contemporary books of drawings, the first from the German Lorenzo Lechler and the other compiled by the Florentine architect Giuliano da Sangallo, both of which contain full-scale drawings of stone details. Lechler's \textit{Unterweisung} (1516) is an assembly of techniques for his son (or apprentice) Moritz, and it contains detailed instructions of how to employ geometry to "[obtain] correct proportions from beginning to end with many structures if you have their groundplan and dimensions."\textsuperscript{33} Included are several full size drawings demonstrating generalized template making procedures, all of which are intended to instruct his 'son' on the secret rules of proportioning details irrespective of the particular building (figure 2.12). Sangallo's \textit{Codex Barberini} (ca. 1487), on the other hand, disconnects the full-scale detail drawing from the direct materiality of the mason's template, converting the drawing into an object of speculation and exemplary knowledge rather than practical application (figure 2.13).\textsuperscript{34} Examining the \textit{Codex}, one discovers several full-scale profiles for ancient buildings, including the Pantheon (fol. 27r), Portico di Ottavia (fol. 36r), the Tempio Rotondo a Tivoli (fol. 42v), often juxtaposed among various points of view and building elements.\textsuperscript{35} Although never proposed as templates \textit{per se}, Sangallo's drawings are obviously closely related to the drawing of \textit{modani}. The representation of such details in their actual size introduces a mode of relating to past building details in an analogous way as the imagination projects future details through the making of template drawings, i.e. they both require constructive thinking.\textsuperscript{36} Additionally, both engage the body directly, allowing one to inhabit the architecture beyond the simple recording or projecting of measures. The divergence between Sangallo's and Lechler's approach to detail drawing illustrates what would become one of the principle characteristics of \textit{modani} as opposed to gothic templates: as \textit{exempla} rather than proportioning secrets, \textit{modani} were available for a range of speculative associations beyond those embedded in geometrical relationships. The use of a familiar double torus profile from the column base of the Pantheon, for example, might be described through measures but was associated more readily with the recovery of ancient grandeur or with the character narrative of the Corinthian order.

\textsuperscript{32} See Villard de Honnecourt, \textit{MS Fr 19093 Bibliothèque nationale de France}, fol. 63. (Hahn 2009); Shelby 1971: 144-148.


\textsuperscript{34} See facsimile of Sangallo's \textit{Codex Barberini} in Huelsen 1984. See Brothers dissertation (harvard)

\textsuperscript{35} Giuliano was reportedly very protective of his sketchbooks, this one and the \textit{Taccuino Senese}. The highly limited access suggests that a practical application in construction was quite unlikely. Speculation on the intent of Sangallo in the \textit{Codex Barberini} may be found in Brothers 1999: 14-23.

\textsuperscript{36} Brothers diss: ruins, the simultaneous digging down and building up.
Regional differences in template-making were certainly apparent, and the culture of itinerant masons that distinguished the medieval cathedral building campaigns does not seem to have penetrated deep into Italy. The pivotal gathering of master masons in Regensburg in 1459 drew representatives from nineteen masons' lodges, all of whom traveled from within the Holy Roman Empire. And Italian architects up until the late 16th century continued to draw sharp distinctions between northern practices and local building conditions. The widespread movement of craftsmen and technology characterized by the organized network of masons' lodges does not appear in northern Italy, leading to a heightened sense of regional differences among trade practices and terminology. Even in Milan, the most 'gothic' of Italian cities, documents surrounding the 14th century cathedral building exhibit open tensions between local building practice and imported influence from French and German masters. The examination is clouded by divergent terminologies in referring to the various activities that we today associate with the word 'architect'. This confusion persists, for example, among those today who profess a return to the 'medieval master builder', a term which obscures the wide range of building practices taking place across various regions in northern and southern Europe.

One characteristic of Italian practices is the apparent willingness to promote painters and sculptors into positions of leadership on architectural building sites. In Florence the culture of the master-builder, emerging from a system of masonic apprenticeships as in the north, seems to be the exception rather than the rule. It is in this vein that Giotto, having no technical building experience, was elevated to the status of 'magister et gubernator' for the fabbrica of the Opera del Duomo in Florence in 1334; and Brunelleschi, a goldsmith and sculptor by training whose leadership the local masons' guild forcefully resisted, was promoted to capomaestro in spite of

38 Nineteen master masons and twenty-six journeymen converged on Regensburg to discuss matters of lodge organization and to formalize the requirement that non-masons shall not be taught the 'secrets' of design nor shall anyone teach the secrets for money. See Harvey 1950: 21-22.
39 Filarete criticizes the influx of French and German influence over the antique, Filarete Trattato di Architettura, fol 100v (Finoli and Grassi 1972: 382-383) and Spencer 1966: xxx-xxxv; Manetti claims that under Brunelleschi architecture regained "le loro proporzioni musicali" lost under the influence of Goths and Lombards (Manetti 1992: 54); and Cesariano, in his rendering of the facade of the Milan Cathedral in his translation of Vitruvius, refers to its proportions as being, "secundum Germanicam symmetriam" (Cesariano 1520: Liber Primus, XIV). Vasari spewed heavy criticism on the barbarian architecture that he called the "maniera tedesca" (Milanesi 1903: I, 137-138). On the term 'Gothic', see Frankl 2000: 263-264.
40 Ackerman explains how local builders, frustrated with long-standing structural problems at the end of the 14th century, invited northern master masons to Milan to aid in their resolution, even as most of their advice was rejected (Ackerman 1949: 84-111).
41 See Pevsner 1942: 549-562, Kostof 1977: 77-93, and Harvey : 210-220.
42 Such a notion is as much a result of 19th century Romanticism as much as it is based on what actually occurred on the medieval buildings site.
43 During the 14th century construction of the Duomo in Florence, the modeling and conceiving of architectural ornaments often originated in painters rather than craftsmen carving stone. More often than not, stone carvers would follow exempla put forth by painters who were trained in disegno. See extensive archival research on this topic in Mustari 1978: 181-236.
being jailed by the masonic guild leaders. Around the same period, we find sculptors, such as Ghiberti and Michelozzo; and painters such as Francesco di Giorgio asked to lead major building projects. The practice continued in Rome with Peruzzi on various building projects and Raphael, who was named as the architect of St. Peters upon the death of Bramante in 1514. It is probably from this custom that Michelangelo proceeded rather fluidly into architectural projects, even though his previous training in the building trades was dubious. Although passing his youth among the stone masons of Settignano, his formative training in the workshop of Domenico Ghirlandaio and the Medici Garden was no doubt in painting and sculpture rather than in the mason's art.

Following in this tradition, Alberti asserts the origin of architectural details in the work of the painter, writing in Della pittura that:

The architect, if I am not mistaken, takes from the painter architraves, bases, capitals, columns, façades and other similar things...

Prese l'architetto, se io non erro, pure dal pittore gli architravi, le base, i capitelli, le colonne, frontispici e simili tutte altre cose...

Painters and sculptors, it seems, were the most qualified to execute matters of edification as well, particularly when it comes to generating stone profiles. From this it appears that an important separation emerged in Italian template-making practices between the production of template drawing and the making of the actual rigid template used on the construction site. Unlike their northern counterparts, for whom template-drawing and making were tightly bound, it seems that Italian architects in the 15th and 16th century generally produced paper template drawings and left the production of the rigid templates to the work of the mason or the carpenter. In their strict technical context, in fact, the words 'modano' and 'sagoma' refer to the rigid template in use by the stone mason, usually made of wood or metal, and not to the paper drawing itself. Practically speaking, however, architects referring to their 'modani' or 'sagome' were often referring to their paper drawings, making it difficult in most cases to pinpoint whether they referred

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44 On Giotto, see Pevsner 1942: 557 and Guasti 1887: 43; on Brunelleschi's imprisonment by the Arte dei Maestri di Pietre, see Ettlinger 1977: 108. See also Burns 1995: 111.
45 Ghiberti was part of a long line of painters and sculptors chosen to lead the Duomo's masons, among them the painter Giotto (1334) and sculptors Andrea Pisano (1340) and Francesco Talenti (1351), see Ettlinger 1977: 106 and Burns 1991: 192.
46 One notable exception was Palladio, who was apprenticed as a stone mason. In 16th century Italy it was rare for an architect to receive his formative training in the building trades (Burns 1991: 192).
47 Michelangelo continued late into his life insisting that he was not an architect even while in the midst of work on St. Peter's. During his formative training in the workshop of Dominico Ghirlandaio, one of Florence's most prolific botteghe for painting and sculpture, Michelangelo appears to have taken an unusual interest in the technical procedures of the craft (Milanesi VII, 140), an aptitude that helped him erect an excellent scaffolding underneath the Sistine ceiling to the chagrin of his rival Bramante, as told by Vasari (Milanesi VII, 173-174).
49 Alberti declared that painting was one of the two most vital prerequisites in the practice of architecture; the other being mathematics, in De re aedificatoria, IX, 10 (Rykwert, Leach & Tavernor: 1988: 317). This stands in stark contrast to Vitruvius' robust program for the education of an architect laid out in Book I of De architectura, I.i.4-15 (Granger 1931: 9-25).
50 Mussolin 2006: 95, Cooper 1990: 497.
to the drawing or the mason's template. Building documents, for example, often record the purchase of paper for *modani* just as commonly as they do for the purchase of wood or tin. The word 'modano' might have referred to a paper drawing, a wood or metal template, or the profile or outline itself, a topic that will be discussed at length in Part II.

In the final review, Italian template drawing appears to differ drastically from its French and German counterparts, whereby north of the Alps the template belonged to the mason himself and often travelled beyond the project at hand.\(^{51}\) Practiced in this way throughout northern Europe, the template was conceived as an extension of a certain cosmic order as practiced by a mason who had mastered its Euclidean secrets.\(^{52}\) In the Italian tradition, however, templates rarely survived beyond the project for which they were made, and the idea of applying the same template between different projects would have seemed a violation of *decoration*. When Brunelleschi was said to have closely guarded the secret details of his buildings until needed by the masons, for example, it was probably not in the same sense as the so-called 'secret' of the northern European masons. Rather than symbolizing a process of divine initiation into the secrets of geometry and the cooperative building lodge, Brunelleschi, somewhat differently, apparently concealed his building templates in order to exert greater control over the building process as it occurred.\(^{53}\) As Brunelleschi demonstrated, or perhaps exemplified, by the mid 15th century templates assumed a deeper rhetorical role in the building process, formally connecting the authorship of the architect with the production of the building. In the personalized marking of stones by a medieval master mason, the signification was in the confirmation of one's work with God's work. For 15th and 16th century Italian architects, however, the presentation of template drawings to the building patron or the craftsmen initiated a deep authorial connection between the architect and the character of the architecture.\(^{54}\) It is in this context that we recall L.B. Alberti,

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\(^{51}\) Some similarities with Italian practices appear in documents for the building of the Escorial, particularly in the separation between profile drawings prepared by architects on paper and their counterparts for use by masons on a rigid substrate, see an excellent overview of drawings used for construction at the Escorial in Wilkinson 1991: 266-268.

\(^{52}\) Frankl claims in a seminal article, *The Secret of the Medieval Masons*, that such a secret resided primarily in how to "take the elevation from the ground plan" through techniques such as quadrature - a geometrical 'building-up' from a given building footprint. Similarly, Matthias Roriczer explains his *Büchlein von der Fialen Gerechtigkeit* (1486) that templates, or "Massbretter", were also derived from the ground plan, knowledge of which must have come from possessing the secret knowledge of geometry (Frankl 1945: 46-50). Rykwert discusses the complicated question surrounding what constituted the masons' secret and how printed material such as Roriczer's *Büchlein* should be evidence that such a 'secret' could not be transmitted strictly through graphic means (Rykwert 1984: 17-22).

\(^{53}\) On Manetti's discussion of Brunelleschi's model making procedures, see Manetti 1992: 123-124, where he discloses that Brunelleschi preferred to make models "senza ornamenti o modi di capitelli o d’architravi, fregi e cornici" so that "chi facevane l’modello non intendessi ogni suo segreto." Brunelleschi’s 'secreto' is commonly understood in modern scholarship as a matter of protecting his inventions among a culture of professional jealousy (Cooper 1990: 497). Additionally, or perhaps alternatively, it is possible that Brunelleschi wished to extend greater control over construction as it unfolded. In this way, making models without ornaments leaves the project 'open' for alterations and changes. This is summed up with the contention by Manetti that Brunelleschi preferred to proceed little by little on a project during the construction process, "... sperando cosa per cosa, quand’ elle succedevano nell’opera propria, farle bene ed a punto" (Manetti 1992: 124).

\(^{54}\) A couple examples: in a contract for the construction of the Innocenti in Florence, a stone carver is required to follow details for the architrave, cornice, and oculi of the loggia, "chome sarà il modello e la forma darà loro Filippo di ser Brunellescho" (Goldthwaite 1980: 376, n. 47); in Filarete, *Trattato di Architettura*, fol 62v, "...mostrati i modi e gli disegni e dato a ‘intendere in prima quello volevo fare, e cosi’ fatti i modelli degli ornamenti dell’edificio volevo prima fare..." (Finoli and Grassi 1972: 241). Filarete's Palatino MSS renders 'modelli' as 'modini' (Finoli and Grassi 1972: 241).
who, in a letter to his patron Lodovico Gonzaga, included several paper templates for the
ornaments of his current projects in Mantua. In closing the letter he states, "And the modani of
San Sebastiano, San Laurentino, and the logia are made, I believe they will not displease you."55

Michelangelo’s practice of making modani was certainly something that the local stone
carvers would have expected and been accustomed to discussing. Yet, while Michelangelo
seems to have participated in a customary Florentine practice, there is no doubt that his own
version of it was anything but conventional. In contrast to his contemporaries, Michelangelo
adopted several unusual practices outside of the normative practices of the architect, many of
which probably evolved from his work as a painter and sculptor. Perhaps the most important
point of departure from conventional practice appears in how much Michelangelo conceived of
the templates as more than just devices for communicating or for preserving knowledge. It
seems that he viewed the template drawings as fully participating in the fluidity of the imagination;
moving seamlessly between idea and execution. The templates were pregnant with potential in
their manifestation of the concetto. And, enabled by their rigid flatness, the templates were fully
exploited as three dimensional objects - available for manipulation through flipping, translation,
cutting, and re-cutting. Their capacity to transmit the profilo actually relied more on their physical
materiality than in their simple rendering of a profile line. They could be moved between the
workshop and the building site with ease, facilitating in-situ testing, and they were constantly
available for modification and re-sizing right up to the point when the stone carver actually began
working. Michelangelo's template drawings acted as a fulcrum between design and execution,
facilitating a constant flow between the drawing board at Via Mozza and the on-site masons at
San Lorenzo.

Tools for figuration: templates as tracing devices

To help broaden the inquiry, one may ask what, in particular, empowers a template as a
device for conceiving and producing architecture in the first place? In the case of modani, they
were especially apt at translating the architect's profile directly on the stone through the practice
of tracing. By cutting paper and creating a profiled edge, the architect could rely on tracing
practices to ensure a faithful transference of the profile both formally, as in the shape of the
profile, as well as in a narrative trace emanating directly from the hand of Michelangelo. The
connection between templates and tracing is, in fact, quite old, and it appears to have been

55 "...E modoni de Sancto Sebastiano, Sancto Laurentio, la logia, sono facti, credo non vi dispiaceranno", letter dated 27
February 1460 (Braghirolli 1869: 8). Translation by author. Support for the contention that Alberti was referring to paper
templates as opposed to on-site / rigid templates or the stone carvings themselves derives from the date of the letter in
relation to the building histories. Records show that the foundations of San Sebastiano were dug one month after the
dating of the letter, in March 1460, suggesting that the Alberti was sending the modani to his patron for his approval
before construction began. A general building history of San Sebastiano is found in Tavernor 1998: 127-147.
widely ruptured only recently, with the broadening of template use for abstract, digital applications - more closely related to the general idea of a 'pattern'. It is well-known that for centuries, perhaps millennia, templates have acted as important technological devices whose essential offering was the fidelity of the traced line as it passed between changes in materials, location, and time. Remarkably, a template could be carried across mountains or left dormant for centuries, and it remained a reliable embodiment of the latent desire to build something. With such an efficacy, it is no wonder that templates became one of the principle instruments in the language of edification.

Their most common application in architecture was certainly as guides for stone tracings. Although depictions of templates at the moment of tracing are rare, an illumination from a 15th century manuscript of the Old Testament offers one such rendition, where the mason carefully traces a template resting on top of a partially squared block (figure 2.17). When depicting master masons at work, medieval illuminations generally show the craftsmen drawing directly on the stone (figure 2.18), at a drawing board (figure 2.19), or with a template lying next to him (figure 2.20). It seems plausible, however, that Villard de Honnecourt’s somewhat cryptic illustration may be interpreted as a template resting on a stone block, ready to be traced (figure 2.21). Although stone was probably the most common destination for a mason's or architect's template, one of the a distinctive qualities of a template was its capability to be traced on practically any material. In this manner, one discovers a late 14th century template tracing on parchment where a rigid template was laid onto the page and carefully traced, first in charcoal, and then inked after the template was removed (figure 2.22). In a related technique, a 16th century full-size drawing for a fireplace bracket by Giovannfancesco da Sangallo displays evidence of pouncing, whereby a previous full size drawing would have been pricked along its profile and subjected to fine, black chalk, enabling a transfer - a remarkable method well-established with large-scale fresco cartoons (figure 2.23).

What is more, it is well-known that Michelangelo himself performed tracings of his own modani. In a large extant folio, Corpus 534 (figures A.7-A.8), the artist exhibited strong evidence for tracing the paper templates before sending them to the construction site. Adjacent to one of the most prominent profiles on the recto, he wrote, "la copia della cornice de' modani delle porte

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56 The OED recognizes the earliest non-building related use of templates chiefly in the study of biological patterns, such as, "The protoplasmic complex may be regarded as built up of a series of associated templates which serve as patterns to determine change in the various directions necessary for the maintenance of vital processes and of growth", from the Proceedings of the Royal Society of London 1904: 73, 542, emphasis added.

57 Scholars remain perplexed by this drawing. The most convincing explanation appears to be that of Bucher, who reads it as a "negative template" cut from a wooden board (Bucher 1979: 125-126). This is cited as such in the most recent facsimile publication of Villard’s sketchbook (Barnes 2009: 149). See also Frankl 1962: 344, n.20A. The text below has been roughly translated by Barnes as, "How to bevel the lowest springer of an arch, piece by piece, without a template". M.R. James 1925: 1-17, and Compass and Rule; Gerbino and Johnston 2009: 22

58 These observations are taken from Cooper 1994: 499-500. On pouncing techniques in the Renaissance, see Bambach 1999: 28.
della libreria date a Cechone", roughly translated as, "the copy of the cornice templates of the doors of the library given to Cechone".\(^{60}\) The prevailing interpretation of this sheet is that it recorded a moment before the paper templates departed Michelangelo’s drawing board for the construction site - a workshop tracing that served as a practical record of templates sent to the San Lorenzo masons.\(^{61}\) The use of the word "copia" no doubt raises some interesting questions about the tracing process and what exactly was given to Cechone, his on-site mason, a topic discussed at greater length in Part II. For now, what strikes us is that Michelangelo apparently traced his own templates as a matter of course, a clue that opens up surprising possibilities in examining the remaining modani.

Having a confirmed sheet of tracings, the potential to look for similar visual evidence in the other modani gains viability. One wonders if tracing may help account for the general lack of compass and rule on the templates, for example, or if it may suggest a plausible narrative for the multiple drawing materials present along many of the profile edges, a well-observed but generally unexplained condition. In this way, templates that had already been cut could remain near the drawing board in Via Mozza and become available as drawing templates in the assembly, modification, and re-conception of future profiles. It seems plausible that tracing was implemented beyond the mere recording of profiles for the workshop in Corpus 534, thus becoming the basis for a generative process of producing new profiles as well. This leads to the finding that, instead of viewing the modani as simply a mediator between the architect and the stone mason, they also mediated within the imagination of Michelangelo himself in the demanding search for the well-tempered profile.

By this narrative, a parent template would have provided the initial measures with the use of black chalk, a straight edge, and a pair of dividers. This parent would be subsequently cut along the profile edge, signaling its availability to act as a drawing template for the next iteration. Along the way, the cut profile line might undergo any number of adjustments in black or red chalk, ink, or even further cuts. This process might be repeated and combined with other templates, creating new profile edges as assemblages among various other iterations. Such a practice would naturally account for the observation that few of the remaining modani exhibit any evidence of having been constructed with a compass and rule. Since the profile edge would be the result of tracing rather than an on-sheet geometric or mathematical procedure, the template drawings suddenly offer surprising interpretations.

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\(^{60}\) Transcription from Tolnay 1976-1980: IV.59; translation by author.

\(^{61}\) This drawing was recently published in Catiti 2011: 62 and Catiti 2007b: 128. See Appendix for bibliography on each of Michelangelo’s modani.
Thus conceived, the profile lines would be subject to the assumption that, at some level, they must have been a product of construction and not just sketches, or primi pensieri, as Vasari referred to them. Following this reasoning, the template profiles were bound to more than just the judgment of a practiced hand - they also had to relate to a larger building project located some distance from the drawing board. While perhaps largely freed from "reason and rule (ragione e regola)", as Vasari suggests, the apparent lack of compass and rule does not necessarily define them as free-hand sketches, nor does it exclude the possibility of other modes of constructing. More specifically, the use of tracing templates, especially those generated by the architect himself, may be considered a synthesizing procedure of figuration, whereby practices such as repetition, in-situ experimentation, and juxtaposition may lead to refined and unexpected results. Although it does not directly rely on instruments of geometry or mathematics, such as the compass and rule, manipulative tracing (as opposed to tracing as rote copying) nevertheless generates a sequential narrative of guide marks, ticks, and smears. When tracing, one may freely shift, rotate, or flip the template, trace only part of it, or combine it with other sketches or tracings. However, while perhaps more free to engage one's inner eye, the use of the template dictates that the drawing shall nevertheless remain bound to a lineage of measured, tooled lines; meaning that, if a parent were produced with a compass and straightedge, the tracing retains its geometrical conclusion even as it lacks a direct geometrical construction. In this way the templates participate in a process of figuration whereby the eye's judgment is tested through rapid and repetitive shifts of the template across the tracing sheet. The traced templates ensure that the ornaments remain tempered - guided by certain in-situ conditions, such as the temporality of construction, adjacent stone profiles, and the character of part and whole, yet free from fixed constraints or proportioning.

This distinction between figural and analytical transfer techniques may be seen in the context of cartoon making for wall painting, where the process of squaring emerged in the early quattrocento as one of the most common forms of transferring between preparation drawings and the actual wall paintings. Here, a preparatory drawing was made at some smaller size that was translated onto the wall by the analogous use of reticulation between the squaring of the drawing and the squaring of the plaster - one of our earliest examples being Masaccio's Detail of a Virgin from The Trinity in 1427 (figure 2.24). Other techniques emerged around the same time that employed large sheets of glued paper and a variety of means to directly transfer a 1:1 drawing onto the wet plaster. During the 16th century the use of transfer techniques became a question

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62 Vasari, Vite (Milanesi 1903: I, 174).
64 For a succinct summary of 16th and 17th century attitudes toward tracing and copying see Bambach 1999: 127-137. In the case of Michelangelo, tracing templates was an imaginative action, where the template was employed as a means of assembly, stretching, and mirroring.
65 ibid., 128-133.
of speculative debate centered on the role of the \textit{giudizio dell'occhio} and the relationship between the mind's eye and the skilled hand. Giovanni Battista Armenini in his treatise, \textit{De' veri precetti della pittura} (1586), forcefully argued for the use of the grid ("grata") for its ability to minimize errors and enable alterations of "defective marks (\textit{segni cattivi})" during the transfer process.\textsuperscript{66} Citing the skilled and frequent use of squaring by Raphael and Giulio Romano, he points out that one may not always rely on judgment alone ("col giudicio solo") and may benefit greatly from such devices. On the other hand, Anton Francesco Doni, Michelangelo's energetic advocate, wrote in 1549 that grids (\textit{reti}) and other modes of squaring are for those of weakened mind (\textit{ingegno}), ",...because it makes the practice of the hand lazy and very much deceives or retards the true judgment of the eye".\textsuperscript{67}

Against the writings of certain theorists, we find actual practices of Michelangelo, who seems to have eschewed the common practice of squaring for the enlargement of his preparatory drawings, preferring to produce cartoons in their actual size from the very start. Although sparse evidence remains, existing sketches and cartoon fragments do not exhibit evidence of the squaring technique.\textsuperscript{68} Given his professed rebuff of rational proportioning in figure drawing, it is likely that he rejected the squaring technique as infringing upon the natural work of the \textit{giudizio dell'occhio} and as a method which arrests the vivacity of the figure during the translation process between paper and fresco. To this, Michelangelo probably owes much to his teacher, Dominico Ghirlandaio, who was praised by Vasari for his consummate ability to work "by eye (\textit{a occhio})" and without rulers, compasses, or other measuring devices.\textsuperscript{69} Perhaps following his exemplary Michelangelo, Vasari seems otherwise silent on the role of translation devices in painting and fresco, mentioning the \textit{rete} only in the context of perspective drawing.\textsuperscript{70}

Michelangelo's apparent objection to rationalized enlargement and transfer techniques highlights how a series of alternative, highly refined 15th and 16th century practices developed


\textsuperscript{67} "...perche la fa pigra la pratica della mano, & molto inganna, o ritarda il vero giudicio dell'occhio", Anton Francesco Doni, \textit{Disegno: Partito in piu' ragionamenti, ne quali si tratta della scoltura et pittura} (1549) fol. 9r. Translation by author. Anton was of the Doni family that commissioned Michelangelo's 'Doni tondo' of 1506. The full passage reads: "E un modo facile, con certe reti, & altri modi di linee intersecate, con varie forme di sesti, di quadri, i quali modi non solo s'usano nelle cose di piano nella Scoltura, ma anchora d'ogni forte di rilievo....A me pare una via cotesta molto nociva all'una, & all'altra arte...Perche la fa pigra la pratica della mano, & molto inganna, o ritarda il vero giudicio dell'occhio...Non è maraviglia, che tutti que gli che l'usano, hanno debili ingegni; perche non s'accorgono de gl'errori, ne i quali incorrono: considerato che i difetti nelle cose picciole son tanto minimi, che l'occhio non gli puo discernere; & la pratica della mano no se ne puo liberare." Original reference from Bambach 1999: 131.

\textsuperscript{68} On Michelangelo's fresco preparatory sketches and cartoon fragments, see Bambach 1999: 133, 420, n. 28, plates XII-XIV; and Hirst 1988: 8, 42-58. See also Bambach 1983: 661-665. Given the lack of squaring, it remains a mystery as to how Michelangelo actually enlarged his drawings for fresco work. One drawing in the British Museum (1859-4-14-818 recto, \textit{Corpus} 240r) shows a light grid over one of his drawings as part of a didactic procedure, although scholars generally agree that this was not an autograph (Hirst 1999: 8, n. 10).

\textsuperscript{69} Regarding Ghirlandaio's ability to draw the ruins of Rome using only his eye, Vasari writes that, "era si giusto nel disegno, che la faceva a occhio, senza regolo o sese o misure; e, misurandole dappoi fatte che l'aveva, erano giustissime, come se e' le avessse misurate..."; Vasari, \textit{Vite} (Milanesi 1903: III, 271-272), originally referenced in Bambach 1999: 132.

\textsuperscript{70} Vasari, \textit{Vite} (Milanesi 1903: I, 175-177)
within the framework of cartoon making that facilitated a greater degree of invention in the transfer process. Spolvero, the use of fine dust sprinkled through closely pricked points along a contour line, and calco, whereby the verso of the sheet would be smeared with charcoal or chalk and subsequently traced on the recto with a stylus, allowed for the inventive inhabitation of the transfer process beyond that of a likeness or facsimile. Carmen Bambach describes an example of such a procedure in transferring a cartoon onto the ceiling of the Sistine Chapel in the *Separation of Light from Darkness*, where Michelangelo made productive use of the rapid shifting of the cartoon paper across the wet intonaco. Here, rather than the cartoon acting as an infallible template for the emerging figure, it is employed or removed as needed in the service of God's gesture in relation to the remaining area for the composition (figures 2.25 and 2.26). Although the cartoon would have obviously been prepared in advance, the final execution depended on the temporality of the eye and hand, both guiding and being guided by the paper sheet. Unlike the freezing of the figure through reticulation, transfer techniques such as these facilitated a large degree of controlled slippage between the template and the receiving medium.

In fresco painting, squaring was most often employed in enlarging smaller drawings into wall-sized figures. Transferring through spolvero or calco, however, required a drawing that was already of the same magnitude as that which was to be frescoed. The quickness of the sliding pattern or template relies on the giudizio dell'occhio, even though an intermediate tool is present. Acting as a veil by visibly concealing the work below, these transfer techniques activated the mind's eye by having to imagine the invisible outlines underneath the sheet of paper.

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71 Bambach 1999: 297
72 Raphael demonstrates that transfer techniques such as spolvero where often used in conjunction with that of squaring (Bambach 1999, 296). Our interest here is not in the artificial bifurcation of analytical and figurative techniques; rather it is in illuminating the relationship between various types of devices and the judgment of the eye.
73 This procedure is described in Bambach 1999: 262-263.
74 Alberti notes the difficulty of copying sculpture due to one's constant changing of the point of view. The veil allows for such a flattening, where sculpture may be copied like painting, by presenting “the same thing in the process of seeing”. Alberti, On Painting, Book II, 26.
75 Squaring became closely associated within the speculative discipline of perspectiva artificialis, and it appears in discussions of representing spatial depth in early treatises on painting by Alberti (1436) and Piero della Francesca, and in architecture by Filarete (1490), Francesco di Giorgio (1487), Serlio (1530). Filarete’s treatise appears to be the first to associate perspective drawing with architecture (Pérez-Gómez and Pelletier 1997: 28). Alberti advocated for the use of formal instruments for rationalizing the field of view, describing a device known as a reticulated "velum" or "velo" (veil), which mediated between the draftsman and the object being copied. Scholars generally agree that Alberti was speaking of a thin cloth stretched across a frame with threads defining a squared plane through which the artist peers, something akin to the instrument engraved by Dürer in 1525 for his treatise, *Die Underweisung der Messung*. Lomazzo describes Alberti’s invention as similar to that of Dürer’s, and he recounts its construction as composed of a reticulated net of threads on a frame in *Trattato dell’arte della pittura, scultura, et architettura* (1583) VI.xiv,320. Alberti claims to have invented this device, and it is confirmed by Vasari, *Vite* (Milanesi 1903: II, 540-541). On Alberti’s velo see Gadol 1969: 75; Bambach 1999: 128. Leonardo da Vinci advocated for a similar device for drawing live nude models, called a “rette” or “telaro”. Leonardo, Paris MS (fol. 104r), ca. 1490, original found in Bambach 1999: 128, who cites Jean Paul Richter, *Commentary*, Oxford (1977), vol. I, pg. 333. Pérez-Gómez and Pelletier point out the importance of the armillary sphere in Leonardo’s sketch of the veil as evidence that these devices were primarily for speculative use in the unveiling of hidden, cosmic relationships through geometry (Pérez-Gómez and Pelletier 1997: 31).
- engaging the hand in a complex process of intellection through revealing and concealing. And as direct extensions of the hand, they require no transitional process of rationalization or enlargement. Alberti recognizes the potential problem in small drawings, advocating for the making of large drawings whenever possible:

I prefer you to practice by drawing things large, so as to represent the size of that which you draw, because in small drawings large weaknesses are easily hidden; in the large the smallest weakness is easily seen.

Voglio te esserciti disegnando cose grandi, quasi pari al ripresentare la grandezza di quello che tu disegni, però che nei piccioli disegni facile s’asconde ogni gran vizio, nei grandi molto i bene minimi vizi si veggono.  

In painting, the weaknesses of a small drawing are manifest in the lack of appropriate narrative (or istoria, discussed in Part III), since telling a story often depends on the rendering of life’s smallest minutiae. Michelangelo, imagining architectural space as a temporal unfolding of the experience of the animate body, relied heavily on the full size detail drawing as a way of tempering the istoria because, like painting, the smallest details may often have the greatest importance. 

His use of 1:1 modani as tracing devices, following in the tradition of cartoon making, enabled an embellishment of figural, gestural qualities by means of two attributes: one, unlike a gridded drawing constructed with compass and/or rule, a modano was locomotive, able to be slid and flipped, and easily modified; and two, like a fresco cartoon, it was already full size, possessing direct access to the architectural istoria. 

Conversely, when examining Michelangelo’s non-full size architectural drawings, it may be seen that he employed the compass and rule as part of his normative practices. In a drawing made for the facade of San Lorenzo, perhaps as a template for the model maker, the use of ruled edges with both ink and the stylus, along with compassed ticks and circles, indicates that we ought not stray too far into the assumption that the master altogether avoided rational proportioning instruments (figure 2.27). This key line of inquiry begins with the difference between the qualitative techniques employed in the modani, as temporal devices having direct access to the istoria, and his other architectural drawings made to scale. A coherent narrative will gradually emerge as we closely examine each of the modani, but it will suffice to say at this point that the ardent use of compass and rule for full size details, as in the case of Antonio da Sangallo il Giovane, allowed for the adherence of the profile line to quantitative proportions often realized as mathematical ratios, something that garnished little interest from Michelangelo. 

Architectural details, as Alberti has already suggested, are where the character of the work found its fullest fruition, which is why this task was borrowed from painters trained in disegno. Michelangelo’s interest in architectural proportion resided in the human body in movement, and the rendering of

76 Alberti, Della pittura, Book 3 (Grayson 1975: 57). Translation by author.
77 See Part III, where the relationship between small and large / part and whole becomes central to the discussion of tempering in the recounting of the architectural historia.
78 Thoenes 2009: 30.
the body's fleshy proportions in stone must have been implemented through parallel kinetic practices such as moving and flipping templates. Like Polykleitos' sculptures in *contrapposto* (figure 2.28), simultaneously suggesting movement and repose, the dynamic tracing, flipping, and cutting of templates conjures images of flying marble chips amidst the detachment of cold, chiseled stone.

**On Michelangelo tracing his own templates: the case for *Corpus* 203 and 204**

If Michelangelo's templates are understood as tempering devices, then they would be more than just simple instruments for asserting off-site direction within the stone carvers' work and the activity of the building site. Rather, like the drawing transfers just discussed, the *modani* would have been utilized by the architect himself as an integral device for the imagination to further articulate the future building proposal. This finding hinges on a number of important clues; beginning, as it were, with a pair of templates, *Corpus* 203 and 204 (figures A.1/A.2 and A.3/A.4).

These practically identical templates were drawn during the work on the so-called 'second' building campaign at the Medici Chapel, dated to circa 1533 just before Michelangelo left Florence for Rome. *Corpus* 203 and 204 are associated with the double tomb of the *magnifici*, an elaborate all-marble construction for the brothers Lorenzo and Giuliano de' Medici. Sketched by Michelangelo, but never realized, the tomb fell victim to the permanent departure of Michelangelo in 1534 (figure 1.10). These two templates are often published together because of their nearly matching size and shape of the profile edge, and recent scholarship has shown that they were probably transported or stored together at one time. In spite of a few important deviations, discussed shortly, they are a near match when overlaid on top of each other (figure 2.29). Surprisingly, however, scholars have been unable to provide a satisfactory narrative surrounding them -- why do we have two nearly exact templates? And if they are so close, why do they not match exactly? This curious fact has remained unaddressed ever since they were first published by Aurelio Gotti in 1875.

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79 *Corpus* 203 and 204 (Casa Buonarroti 61A and 59A, respectively); both template drawings are in the care of the Casa Buonarroti in Florence and were viewed personally by the author on June 7, 2012. See Appendix for bibliography.

80 Work was suspended at San Lorenzo between 1527 and the early 1530s during the absence of Medici rule in Florence. Although Michelangelo supported the Republic during repeated efforts to reinstate Medici rule, the Medici Pope Clement VII granted amnesty for the artist on the condition that he complete the work on the chapel. His resuming of work after the reinstatement of Medici rule marks the beginning of the second building campaign. Condovi in his biography writes that during this time Michelangelo was "driven more by fear than love", passing the majority of this time alone in the Via Mozza workshop (Condovi 2006: 116). Several of the figures, including the double tomb of the *Magnifici*, St. Cosmos, and St. Damian were carried out by skilled assistants utilizing Michelangelo's sketches. For the state of the Medici chapel in the fall of 1534, see Wallace, pg. 128-134. Some scholars have suggested that *Corpus* 203 and 204 were made as part of the master's effort to turn all of the work over to his assistants right before leaving (Ruschi 2007:84).

81 Facing increased political alienation resulting from his support of the Florentine Republic, Michelangelo would lock the doors to the Via Mozza workshop for good in September 1534. Work on the Medici chapel was largely in disarray, although the marble *lavoro di quadro* was on the whole intact. The principle sculptures were complete, although they remained at Via Mozza until their installation in 1545. On the general building history of the Medici Chapel (New Sacristy), see Beck et al.: 1994.

82 Mussolin has shown how the were once folded together (Mussolin 2012: 300-301).
Drawn on paper, the watermark on 203v (figure A.2) indicates that the paper is of Florentine origin, perhaps from one of the then-active paper making workshops near the Badia Fiorentina and the Piazza San Firenze, a short walk from the workshop on Via Mozza.  It also shows that the paper was cut from a large folio known as a "foglio reale", giving it an original size of approximately 610mm x 440mm. The buying of "fogli reali" was a common activity at Via Mozza, something that Michelangelo frequently recorded in the workshop expenses.  Aside from the cut profile edge, the most prominent characteristic of 204r (figure A.3) is the neatly drafted note in Michelangelo’s hand on the recto which reads, "the modano of the columns of the double sepulture of the sacristy", indicating its intended use for the columns of the un-built Medici tombs.  The practice of indexing the template to its corresponding detail on the building site appears to be a common one and may be seen in Ammanati’s template (figure 2.5), for example, where he indicates on the recto that this modano is for "the cornice that goes above the pilasters at San Giovannino de Medici".  Additionally, on Antonio da Sangallo’s nearly two meter high, surviving template drawing for St. Peters (figure 2.8), he writes modestly on the verso, "modano of the great base St. Peters."

Upon close inspection of Corpus 204, the contention of many scholars that Michelangelo eschewed compass and rule on this sheet is confirmed.  There are no prick marks indicating a compass use nor are there signs of ruled lines in ink, pencil, or stylus.  The close match between 204 and 203, coupled with the lack of apparent construction residue, indicate that these two templates are quite possibly related through direct tracing.  In exploring how this could be possible, a hypothetical narrative of tracings, flippings, and cuttings is reconstructed in the following manner (see figure A.5 for a graphic depiction):

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84 Common paper sizes (mm) as specified by the ordinance of the Società degli Speziali in Bologna were: Imperiale (500 x 730), Reale (440 x 610), Mezzano (350 x 500), and Rezzuto or Commune (310 x 440). Outlines of the paper formats were incised into a publically visible marble slab that served as a legal contract in the commercialization of the Bologna paper trade during the 14th and 15th centuries, and, due to the importance of the Bolognese paper trade, the sizes act as a reliable indicator of common paper sizes throughout northern Italy. The statutes of the Società indicate that paper must conform to the stone outline, "ad mensuram ordinatam... secundum quod contineat in marmore po[s]ito in muro atiguo Palati Publici". First published in Briquet 1923: I, 2-4; see Mussolin 2012: 294-295, Bambach 1999: 34-39, Bambach 2000: 111-112.

85 See Ricordi CXXIII (Ciulich and Barocchi 1970: 128), Ricordi CXXIV (Ciulich and Barocchi 1970: 134).

86 "el modano delle colonne della sepultura doppia di sagresti", translation by author.

87 "La Cornice ch[e] va sopra i pilastri di San giovannino de medic", transcription by Cooper 1994: 498; translation by author.

88 "modano della basa gra[n]de / di s.to pietro de pilastri", transcription by Cooper 1994: 499; translation by author.
1) Beginning with the recto of 203, one may observe several lines in black pencil (lapis nero) which have been clearly marked using a straight edge and a rule (figure A.1). Two horizontal proportioning lines may be easily observed as well as one vertical line, partially cut, near the profile edge. In addition, a line in black pencil hugs the straight edge of the bottom portion of the profile. It seems that Michelangelo begins with a clean folio, lays down an armature of proportioning lines using a rule, and then proceeds to construct the profile edge facing left. The observation that he apparently initiated the construction of this profile on this sheet means that it shall be known as the 'parent' (as opposed to subsequent drawings called 'offspring', as described below). Rendered mostly in free-hand, the profile edge faces left; relating precisely, however, to the proportioning lines drawn with the aid of a rule. Some of the residue of the proportioned, free hand profile line remain in the top portion of the cut edge drawn in black pencil, the same material used for the ruled construction lines (figure 2.30). Corpus 203 is finally cut using scissors (forbici) along the profile line drawn in black pencil. The pattern of overcuts suggests that the profile was probably cut beginning from the top edge.

2) Next, Corpus 203 is flipped over, perhaps immediately (Corpus 203v - figure A.2); at which point Michelangelo continues to alter the profile edge through sketched lines just to the inside of the cut line. Here, on the verso of 203, one may clearly see the continued work in black pencil in the upper portion and near the double torus (figure 2.31).

3) Keeping its current orientation (verso), the 203 is placed, with the profile facing right, onto a new sheet. In preparation for being traced, the right-facing orientation facilitates a tracing by Michelangelo's right hand.

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89 Throughout the Corpus, De Tolnay refers to this type of line as lapis nero. In the early 16th century, tools for making grey or black lines broadly fell within three types: charcoal, chalk, and metal point. Following De Tolnay's lead, a lapis nero would have indicated a hard, metal-based stone. On Michelangelo's drawing tools for architecture see Elam 2006: 53-55.

90 The forbici in their direct connection to modani are further discussed below.

91 Unfortunately I was not able to photograph closely the recto of either 203 or 204, due to the conservation procedures enacted by the Casa Buonarroti. In both cases, a piece of green acid-free paper has been attached to the verso in order to render the outside dimensions of the drawing as a rectangle. This allows for a more consistent conservation method but obviously reflects the attitude of historians and preservationists toward the more interesting aspects of the modano being explored in this dissertation.

92 There is some ambiguity on the part of Michelangelo's favored hand, although most scholars generally agree that his drawings evidence the predominance of right-handedness (Chapman 2005: 304 n. 106). Mussolin implies that Michelangelo's right handedness accounts for the predominance of his left-facing profiles (Mussolin 2012: 303). Raffaello di Montelupo, an apprentice of Michelangelo, helped throw this into question when he wrote, "...I draw better with the left hand, and once when I found myself drawing the "Arco di Trasi al Colosseo," Michelangelo and Sebastiano del Piombo passed by and stopped to watch me. It should be prefaced that both of them, though naturally left-handed, did everything with their right hand, except actions requiring force. So they stayed a long time to watch me with great wonder, because, as far as is known, the two of them never made anything with their left [hand]" (Milanesi 1906: IV, 552), translated and quoted in Bambach 2003: 45. Contemporary representations of Michelangelo have depicted him using his right hand, such as Sigismondo Fant's 1527 drawing in the Triompho di Fortuna (Ragionieri 2008: 105), or Raphael's rendering of Michelangelo in the School of Athens writing with his right hand (Ragionieri 2008: 12). Perhaps most convincingly, Michelangelo sketches himself during the painting of the Sistine ceiling with the paint brush in his right hand, in Corpus 174v.
4) Michelangelo traces the right-facing profile edge of the parent template 203 in black pencil onto the sheet below, creating a new profile edge that appears on the 'offspring' template, observable in 204 verso (figure A.4). At this point he removes 203 from on top of 204 and starts modifying the edge of 204, reproducing some of the *pentimenti* present in the upper portion of 203 verso (figure A.2). Evidence of the tracing in black pencil may still be observed along the cut edge of 204 verso (figure A.4), especially in the deposits of black chalk around the double torus.

5) The offspring (204) is now cut, verso side up, to precisely the same profile as is delineated by the *pentimenti* in the parent template (203). This overlay may be seen clearly in figure 2.29. Several lines of the tracing process may also be observed on the profile edge. The remaining evidence of the tracing on 203 verso, however, has been cut away due to the process of trimming the profile edge. As can be devised from the overlay image (figure 2.29), the offspring (204) has material removed with respect to its parent (203). When the scissors cut the edge, it left some marks of the tracing intact, and others were cut away.

6) After cutting, the offspring (204) is flipped back over with the profile facing left, now evident in figure A.3. Michelangelo neatly notes its final destination for the carpenters and the carvers. The two folding lines across the middle of the template, if contemporaneous, are perhaps evidence of its storage, movement around the workshop, or even to the site at San Lorenzo.\(^{93}\)

Why flip 204 back after it has been cut? This template drawing may represent one of the only remaining drawings ready for tracing by the carpenters onto tin sheets. The neatness of the lettered index may also signal, as some scholars have suggested, Michelangelo's intention to leave remaining work to his assistants as he prepared to leave for Rome.\(^{94}\) As will be discussed later, it seems that Michelangelo made some distinction between those *modani* that he kept near his drawing board and those that he sent off to the construction site. It is very probable, in this case, that 204 was made for the purpose of sending to the carpenters, also at the Via Mozza workshop, who had the task of transferring it onto a more rigid substrate. By providing a clear labeling, the line of authority from the master's hand to that of the stone carvers (*scarpellini*) could be insured. In this way, the carpenter tracing the template drawing would clearly know to whom this *modano* should be given.

Additionally, it seems likely that Michelangelo flipped 204 back over for the simple fact that he favored the left-facing profile. In an informal survey of Michelangelo's profile drawings published in the four volume *Corpus*, around ninety percent of his sketched profiles are drawn

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\(^{93}\) Mussolin 2012: 300-301

\(^{94}\) Ruschi 2007: 84
facing the left edge of the sheet. On several of his profile copies after the Codex Coner, a topic discussed at length in Part III, he deliberately reversed what were originally drawn as right-facing profiles. The impulse to draw profiles facing left seems to take precedence over establishing a formal relationship among adjacent profiles, as on one sheet, Corpus 528v (figure 2.32), where he shows multiple profiles drawn in different orientations depending on the orientation of the sheet. It would seem likely, given this evidence, that Michelangelo might have imagined the final version of this template to face left as well. Body posture may help explain why Michelangelo flipped the template over in the first place (as in step two, above), since, differently than sketching free-hand, a right-facing template edge is much easier to trace with the right hand.

The process displayed in setting up the initial parent drawing (203) merits further exposition. The profile edge, as has been stated, is largely drawn free-hand, a practice that may be observed quite clearly in the template drawings of Ammanati as well. In the context of an architectural drawing, traditionally constructed with compass and rule, the use of the free-hand to render the profile edge approaches what Vasari called "schizzi" or "primi pensieri"; those which, "we call a first sort of drawing that is made for finding the manner of the poses and the initial composition of the work". Indeed, as discussed earlier, this is how current scholarship generally views Michelangelo's template drawings, as schizzi. However, the free-hand delineation of the profile relies on a network of measured proportioning lines, ensuring that the profile will fit within the larger architectural assembly previously measured by Michelangelo or one of his assistants. In this way, the 'hanging' of free-hand lines on a scaffold of given proportioning lines allows for a large degree of figural invention, much of which may fall outside of geometrically determined proportions. The poignancy of the tempering potential of templates depends to large degree on this subtlety. Something more guided than primi pensieri, they were also less determined than mechanically executed drawing constructions. They could partake of both the directness of the sketch as well as the assuredness of fitting into a larger whole with overall proportions given.

Thus, in closely examining the parent/offspring relationship of 203/204, one may conclude that this is not merely a simple effort by Michelangelo to guide his assistants in absentia, as some have argued. Rather, the maneuvering of paper templates follows a concerted attempt by the artist to arrive at a properly tuned profile edge that satisfies the giudizio dell'occhio. The incremental flipping, tracing, and cutting indicates that Michelangelo cared a great deal about

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95 De Tolnay 1975-1980: I-IV. Some prominent examples of left-facing profiles may be observed in: Corpus 201r, 202r, 250v, 275v, 463v, 528r, 528v, 530r (with ruled lines), 531v, 532r, 532v, 533r, and 614v. Mussolin offers a reconstruction of the original correspondence between Corpus 201v and 202r based partly on the predominance of Michelangelo's left-facing profiles (Mussolin 2012: 301-303).
96 Brothers 2008: 64. See esp. Michelangelo's copy on Corpus 518r that illustrates a reversal of profiles from Volpaia's original.
97 "...chiamiamo noi una prima sorte di disegni che si fanno per trovar il modo delle attitudini, ed il primo componimento dell'opera", Vasari, Vite, (Milanesi 1903: I, 174), translation by author. Baldinucci in his 1681 Vocabolario del disegno used the term 'primo pensiero' as an alternative to the word 'schizzo' (sketch), see Hirst 1988: 32.
making very small adjustments along the profile edge. Indeed, he seemed a master at introducing very small changes to his drawings with great narrative effect.98 In a famous sheet to which we shall return, for example, Michelangelo sketched a series of profiles for the Medici tomb (figure 1.9). The drawing furthest to the right experiences a remarkable transformation from a profile study into a human caricature simply by faintly altering the profile edge and adding a few marks along the stone relief (to render an ‘eye’). One may argue that a similar procedure is at work in the pushing and pulling of templates, whereby minute exaggerations or diminutions may be leveraged to great qualitative potential.99

Compared with the contemporaneous template making of Ammanati or Antonio da Sangallo, Michelangelo in 203/204 engages a comparatively arduous process involving multiple revisions, cuts, and profile lines - all for seemingly minor modifications. The reciprocity between small changes and great effect will emerge as a recurring theme in the study of tempering practices. In one of Ripa’s many renderings of Temperanza, she is imagined grasping a bow and arrow, a posture where very small sleights of the hand have critical effects on the outcome of meeting the target. As he recounts, she stands poised to send away an arrow "with a certain measure (con certa misura)," yet, at the same time, "with swiftness (con velocità)" she finds the exact target without pulling the bow too forcefully or too little ("...& non tirando la corda, ò tirandola troppo, ò non vale, o si spezza").100

In making small changes to result in great effect, as in 203/204, the connection between beautiful works and the tiny adjustments necessary to achieve them assumes a moral dimension which may be understood through the consummate notion of difficoltà, a condition often associated with practices of tempering (figure 2.33). This is especially true in the Aristotelian tradition, where temperance is the "observation of the mean in relation to pleasures and pain", and, like a target, "success is possible in one way only".101 Indeed, the association of the bow and arrow with temperance may have originated in Aristotle, who wrote that "if the good

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98 See Hirst for a description of such a procedure in the studies leading up to the cartoon for the Battle of Cascina, where he describes a process of small adjustments in posture that lead to radical changes in the figural narrative (Hirst 199: 44).
99 See Brothers, who analyzes “stretching, compression, scale shift, and displacement” in terms of developing the design of the San Lorenzo façade (Brothers 2008: 122).
100 The full passage reads, “...Si potrebbe ancora fare in una mano un Arco di tirar Freccie, per mostrare la mezanità fatta, e generata dalla temperatura nelle attioni perché, tirato con certa misura, manda fuora le Saette, con velocità; e non tirando la corda, o tirandola troppo, o non vale, o si spezza,” Ripa, Iconologia (Ripa 1615: 108).
101 "...virtue is a mean state in the sense that it is able to hit the mean. If error is multiform...whereas success is possible in one way only (which is why it is easy to fail and difficult to succeed—easy to miss the target and difficult to hit it); so this is another reason why excess and deficiency are a mark of vice, and observance of the mean a mark of virtue”, Aristotle, Nicomachean Ethics, II.vi.14-15 (Rackham 2003: 93). The definition of Temperance (sophrosyne) in Aristotle occurs Nicomachean Ethics III.x.1 and VI.v.5. Michelangelo captured this sentiment in a famous letter written to the Florentine Bendetto Varchi, where he defended the art of sculpture over painting based primarily on its greater difficulty, and superior requisite judgment (“...maggiore g[ iudicio e difficoltà”), found in Carteggio, MLXXII (Barocci and Ristori 1967: II, 265); see also Summers 1981: 184.
craftsmen look to the mean as they work, and if virtue, like nature, is more accurate and better than any form of art (techne), it will follow that virtue has the quality of hitting the mean."\footnote{102}

The slight alterations endeavored by Michelangelo in his templates recall an association with another bowed instrument, namely the *trapano ad archetto*, or sculptor's drill (figure 2.34). An ancient tool for carving marble, the *trapano* relied on bowed tension to power a rotating drilling point with great exactitude and speed.\footnote{103} The connection between Ripa's bow, the *trapano*, and Aristotle's association of temperance with difficulty suggests a unifying correlation in ideas of tension.

**Cutting paper as the "forza di levare"**

If tracing templates is a normative practice for Michelangelo, an entire world opens up for the interpretation of these previously hermetic documents. For the tracing narrative thus described to have validity, however, one ought to be able to find further supporting evidence in his other template drawings. For this we shall turn to a template drawing, *Corpus* 539 (figures A.21/A.22) intended for the *lavoro di quadro* of the Medici Chapel.\footnote{104} First, however, a word on its attribution: prevailing scholarship places this template for use on the portal between the reading room and the vestibule of the Laurentian Library. This assertion has been based mainly on its formal similarity to several of Michelangelo's other templates which are accurately attributed to it; in this case, to the templates traced on *Corpus* 534 by Michelangelo for his assistant Ceccone for the Library portal (figures A.8/A.9).\footnote{105} However, a re-analysis concludes that such an attribution is problematic, as can be seen in a simple scaled overlay (figure 2.35) of 539 onto 534. While the profile shapes may appear similar, their overall size is much different. The magnitude of 539 is much smaller, suggesting a more delicate order, and one that would not fit the monumental profiles of the Library portal. A more probable location for this drawing is for one of the upper storey windows in the Medici Chapel. The window survey drawings provided by Portoghesi and Zevi brings us much closer to a relative match between the template and the in-situ construction.\footnote{106} For our purposes, *Corpus* 539 will be referenced to the Medici Chapel rather than to the prevailing reference by scholars to the Laurentian Library.

\footnote{102 Aristotle, *Nicomachaen Ethics*, II.vi.9 (Rackham 2003: 93).} 
\footnote{103 On the connection between Michelangelo and the sculptor's drill, see Lavin 1993: 29-39 and Seymour 1974: 7. Varchi mentions Michelangelo's employment the *trapano* in his *Orazione funerale* (Varchi 1564: 15) as an example of his "diligenza".} 
\footnote{104 *Corpus* 539 (Archivio Buonarroti, XIII, fol. 127) is in the care of the Casa Buonarroti in Florence and was examined by the author on June 9, 2012.} 
\footnote{105 See bibliography on *modani* in the Appendix. Scholars have generally followed the attribution of De Tolnay in the *Corpus* (De Tolnay 1976-1980: IV, 61), who cites the relation to 534.} 
\footnote{106 Portoghesi and Zevi 1964: 175-185}
Returning to the question, on the recto of 539 (figure A.21) there is a workshop tally made by Michelangelo for an unknown purpose, and to the upper left of the sheet is a poetic fragment, identified by Frey as the first part of "Sento d' un foco un freddo aspetto acceso". On the verso (figure A.22) another workshop tally may be identified along with some fragmentary recording of expenses near the bottom left in Michelangelo's handwriting. The orientation of the poetry fragments, ricordi, and other written marks strongly suggest these were added after the template drawing had been cut. Since, as we will see, other template drawings exhibit the addition of such marks after their cut, the likelihood that these particular templates moved beyond the Via Mozza drawing board seems remote. Rather, as residue from the tempering process - possibly involving several generations of tracing and re-cutting - the potential of these remnants to intersect with seemingly disconnected jottings seems high. Residing near the drawing board, the template drawings acted as natural support for the active imagination racing between non-rational connections and dream-like associations. Not unlike the hundreds of sheets in Michelangelo's oeuvre which freely juxtapose word and image, these 'incidental' marks imply tantalizing links between the imagination and the world of practice (figure 2.36). In examining Corpus 539 for evidence of tracing, it is best to begin on the verso (figure A.22); see figure A.23 for a graphic demonstration.

1) A now lost parent template to 539 is placed on a sheet of foglio reale with the profile facing left. The parent template is then traced onto the folio below in black pencil; evidence of which may still be seen along the cut profile edge of 539v (figure 2.37). The lost parent template to 539 is removed, revealing a sheet with an uncut, traced profile edge; after which Michelangelo goes over the profile in black pencil, making further adjustments and trimmings. Signs of black pencil pentimenti are evident near the middle cyma where it joins with the corsa, and they may also be seen just below the upper cyma (figure 2.38).

2) Upon reaching a satisfactory state of the profile, Michelangelo cuts the template drawing along one of the profile lines, leaving the residue still evident in figures 2.37 and 2.38, with some of the original, traced profile falling away. This template, as seen in 539v (figure A.22), is now available to be traced again or to be used as support for poetry or other ricordi.

3) The template remains near the drawing board in Via Mozza, and either immediately or sometime in the future, it becomes a template for a new drawing. Before being employed as a

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107 Frey 1897: CIX, 127 & 413. Poetic fragments on the modani are examined in Part III.
109 Leonard Barkan engages this very question in the recent publication, Michelangelo: A life on paper, Princeton University Press (2011). See esp. final chapter (Barken 2011: 287-304) for interesting conclusions regarding the dream-like coherency of many of these drawings, following Freud's Psychology of Everyday Life.
110 See Appendix for a taxonomy of profiles.
drawing template, Michelangelo flips it over, revealing the profile edge facing to the right, as in 539r (figure A.21). Now, with the recto side facing up, 539 is traced onto a new folio, producing a new offspring (also lost). Strong evidence of this tracing may be clearly seen in the residue of black pencil deposited along the entire profile edge (figures 2.39 and 2.40). Among all of Michelangelo's extent modani, the black pencil evident along the profile edge exhibited in these two images provides the most conclusive evidence that Michelangelo traced his own templates.

4) The new offspring produced in this tracing is possibly lost because it was sent to the San Lorenzo site for transference onto sheets of tin, as was Michelangelo's custom in the Via Mozza workshop (the tin transfers are discussed at length in the next Part). Meanwhile, 539 remains available and at hand to support other purposes, as may be seen in the addition of workshop tallies on the recto and verso, a poetry fragment on the recto, and cost records on the verso. It might also have been used again for other tracings.

   The use of different templates for assembling new profiles may have been one of the main reasons that Michelangelo retained so many of the in-process template drawings near his drawing board. In addition to the sheer economy of re-using paper, one could also imagine that the templates might have been employed as part of a fragmentary assembly of cavetti, cymae, or ovoli. It is significant that when Michelangelo made copies of the ornaments and profiles of the Codex Coner, he omitted the accompanying measures carefully rendered by Volpaia, an matter discussed at length in Part II. Instead, the fragments of various profiles were emphasized through their potentially qualitative aspects, rendered in the sculptor's soft red chalk instead of the ink used in the Codex. Freed from their reliance on the Virtuvian canon, the profiles were available to be stretched and re-assembled, as evidenced in a sheet of column base studies (figure 2.41) for the Laurentian Library. Here, a similar plinth/torus combination is juxtaposed with variations on a fillet / cavetto and a fillet / cyma, increasing in complexity from right to left. One could easily imagine how fragments of template drawings laying around the drawing board may have inspired similar treatments in tracing full-size profile drawings. Like the profile studies, the templates would allow for a similar stretching and assembly without having to resort to more standard proportioning methods, i.e. compass and rule, in the laying out of drawings meant for construction.

   To help confirm this proposition, an un-cut template remains, Corpus 535, that rather clearly exhibits the process at work (figures A.10 and A.11). On the verso (figure A.11) we

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111 Brothers 2008: 50-52
112 Corpus 535 (Archivio Buonarroti, I, 57, fol. 144v) is in the care of the Casa Buonarroti in Florence and was examined by the author on June 9, 2012. Vitale Zanchhatin, in a 2011 publication on Corpus 535, calls the drawing "a preliminary drawing for a template for the mouldings..." (Zanchhatin 2011: 156). He also offers a more definitive attribution of the
observe how the tracing procedure may have been used as a means of quickly assembling and working through multiple alternatives. Here, in a 1:1 scale profile study for the lower cornice of the Medici Chapel, the red chalk line of the upper cavetto records the vestiges of having been traced from a parent template. The open corner between the upper fillet and the cavetto indicates a hurried tracing, and the double line along the curve could easily result from a slipped template or the pliability of the paper edge against the drawing tool (figure 2.42). Such drawing factures are also present in the confirmed tracings of Corpus 534 (figure A.10), especially on the stair tread profile on the recto (Profile C). Perhaps also the gocciolatoio (dripstone) on 535 was the result of tracing as well, from the same parent template or a different one, as is evidenced by the stark contrast between the tooled vertical line of the fascia and the free hand vertical line designating the wall plane (figure 2.43). The possible use of multiple templates, sliding and flipping along the paper surface, accords well with how Michelangelo seemed to have imagined his profiles as a free assembly of malleable and stretchable components.

Once traced, the tempering procedure assumes a new dimension through cutting or severing. As in a work of marble sculpture, cutting paper simultaneously mutilates and creates. A key concept in revealing the relationship between the inner eye and the hand, Michelangelo’s stated propensity toward the imaginative potential of subtraction further illuminates his inclination toward the cutting and whittling of paper. This is the basis, after all, for the greater difficulty of sculpture over painting, since the force of taking away, the “forza di levare”, requires more refined judgment than the adding of colors in painting, the “via di porre”. In terms of the Neo-platonic writings of Ficino and Plotinus, the whittling down of stone is seen as a mirror of the soul’s ascension from the body. Michelangelo reveals this in a madrigal written for his beloved poet Vittoria Colonna:

Just as, by taking away, lady, one puts into hard and alpine stone a figure that's alive and that grows larger wherever the stone decreases, so too are any good deeds of the soul that still trembles concealed by the excess mass of its own flesh, which forms a husk that's coarse and crude and hard.

drawing as likely belonging to a study for the New Sacristy, as previous scholars had predominantly considered this profiled as related to the Laurentian Library. See Appendix.


114 The association between sculpting stone and the removing of moral excess is an oft repeated Neo-platonic metaphor that largely follows its early appearance in Plotinus, Ennead, 1.6.IX. This notion finds early recognition in Aristotle’s distinction between potentiality and actuality in Metaphysics, IX.6, as suggested in Panofsky 1968: 188, n. 43 and Carabell 1997: 91, n. 40; also discussed in Aristotle, De anima, 417a. Benedetto Varchi relied on Aristotle when discussing the related poem, “Non ha l’ottimo artista alcun concetto”, discussed below (Varchi 1549: 33 and Summers 1981: 209-210). Another early source on the ‘forza di levare’ may be found in Cicero, De divinatione, Book 2. Vasari defines sculpture along similar grounds in the introduction to his 1568 edition of the Vite, as “...un’arte che, levando il superfluo dalla materia sugetta, la riduce a quella forma di corpo che nella idea dello artefice è disegnata” (Milanesi 1906: I, 148), although Alberti held a somewhat wider view of sculpture in De statua, contending that some sculptors work by adding, such as those who work in wax or clay, and others who work in stone by subtraction, Alberti, De statua (Grayson 1972: 121). See discussion on this in O’Grody 1999: 65.
You alone can still take them out from within my other shell, for I haven't the will or strength within myself.

Si come per levar, donna, si pone in pietra alpestra e dura una viva figura, che là più cresce u' più la pietra scema; tal alcun'opre buone, per l'alma che pur trema, cela il superchio della propria carne co' l'inculta sua cruda e dura scorza. Tu pur dalle mie streme part' puo' sol levarme, ch'in me non è di me voler né forza."  

As the stone conceals a beautiful figure, the hegemony of the body's appetites conceals the goodness buried within the soul. Both the stone and the soul seem equally impenetrable in the removing of superfluous material. The relationship between the removal of hard stone and the emergence of the concetto is probably one of the artist's most known and discussed topics. For this, it is useful to recall a fragment of Michelangelo's well-known sonnet where the interdependency of mano and intelletto is empowered in the release the sculptor's inner vision, or concetto, from the circumscription of the stone:

Not even the best of artists has any conception that a single block of marble does not contain within its excess, and that is only attained by the hand that obeys the intellect.

The pain I flee from and the joy I hope for are similarly hidden in you, lovely lady, lofty and divine; but to my mortal harm, my art gives results the reverse of what I wish

Non ha l'ottimo artista alcun concetto c'un marmo solo in se' non circonscriva col suo superchio, e solo a quallo arriva la man che ubbidisce all'intelletto.

Il mal ch'io fuggo, e 'l ben ch'io mi prometto, in te, donna leggiadra, altera e diva tal si nasconde; e perch'io più non viva, contraria ho l'arte al disiato effetto.  

Just as a beautiful body resides within an otherwise brute stone block, the concetto resides inside the soul of the artist, and the hand obeys the intellect in an analogous practice of taking away that which is superfluous. The marble block waits passively as an active agent in Michelangelo's imagination - for the intervention of what Ficino called the spiritus, the in-between force of Love

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115 Written circa 1538-1544; translation and transcription from Saslow 1991: no. 152, 305. This is one of a series of poems addressed to the Roman aristocrat Vittoria Colonna, who acted for Michelangelo "as Beatrice was to Dante or Laura to Petrarch" (Saslow 1991: 18).
116 See analysis of this and related poems in Cambon 1985: 75ff.
118 On the moral and philosophical implications of removal, or levare, in Michelangelo's poetry, see Cambon 1985: 81ff.
that translates between body and soul. Michelangelo heightens this translation in the above sonnet through the irony of irreversibility: just as the concetto is revealed through the irreversible removal of stone, the artist's arduous work produces the reverse of that which he intends. Rather than discovering great joy in knowing his lovely lady (or concetto), it only renders him great pain in the reminder of unfulfilled Love (or, a marble figure less beautiful than imagined).

Like the removal of stone, the exact mixing of water and wine by Temperanza is sequenced and cannot be reversed or unmixed (figure 2.45). One of the main consequences of tempered works, according to Ripa, is in their demonstration of "a perfect concetto (un concetto di molta perfettione)", manifest in the exact situation between corporal extremes. Such an "idea (idea)" is born from the "tuned intellect (acconto intelletto)" in harmony with the pleasures and displeasures of taste and touch. As will be demonstrated at length in Part II, this irreversibility is manifest in a evolutionary series of small adjustments, or tunings, where the material body slowly emerges in accord with the invisible desire as revealed in the concetto. For Michelangelo this took shape in a rather precise technical procedure of carving the stone. Unlike his contemporaries who typically carved the upright figure from all four sides, Michelangelo assailed the stone block from one side only, allowing him to leave material in place in anticipation for future adjustments as the figure came to life. Confirmed in observations from his so-called 'unfinished' works, the artist developed a particular approach where the progressive carving allowed him to continually adjust and tune the lineaments while he worked (figure 2.46). While each piece of fractured stone could not be put back, the work remained viable within the temporal context of the evolving concetto. What is more, Michelangelo's frontal method seems fitting for the analogous practice of cutting paper modani, as both require a frontal working posture while simultaneously envisioning the emergent depth.

119 For Ficino the spiritus dwells in the heart where it moves between the senses and the brain by means of "a vapor of blood - pure, subtle, hot and clear (vapor quidam sanguinis purus, sugtilis, calidus et lucidus)", Ficino De vita, 2.1 (Kaske and Clark 2002: 111). This is elaborated upon in Part II.

120 The notion that Michelangelo remained perennially unsatisfied with the material translation of the concetto is one of his most enduring narratives. Early biographers laid the groundwork for this: Vasari wrote that Michelangelo, "usava dire, che, se s'avessi avuto a contentare di quel che faceva, n'arebbe mandate poche, anzi nessuna, fuora...", Vite (Milanesi 1906: VII, 243); similar to Condivi, who recounted that the artist "...è anco di potentissima virtó immaginativa, onde è nato primieramente e chi egli poco si sia contentato delle sue cose...", Vita (Maraini 1928: 102). From this, scholars have speculated on matters of the non-finito (as expressed in the unfinished Slaves) and the purposeful destruction of his drawings throughout his life, a connection that Vasari makes in the Vite (Milanesi 1906: VII, 269-270). For recent discussions of this, see Chapman 2002: 26-28 and Carabell 1997: 94-96.

121 Cellini writes about the importance of using proper tools to avoid removing material too quickly while carving, and he censures the practices of filling and patching. Michelangelo's working methods are cited as exemplary in this regard. While removing stone may be 'reversed' or repaired, it is clear that meticulous steps were taken by sculptors to avoid having to do it. He writes in the Trattato della scultura (1565), "...hanno avuto di poi (conosciuto i grandi errori) a rappezzare le lor figure, e non tanto i pezzi, che non hanno potuto rimediare a di grandi errori, si come si vede in molte figure d' uomini, quali non hanno usato la detta ubbidienza e pazienza" (Milanesi 1857: 199). Vasari also censures the practice of patching (rattoppamento), stating that such an activity falls under the work of cobbiers (ciabattini), not rare masters; Vasari, Vite (Milanesi 1906: I, 155).

122 Ripa, Iconologia (Ripa 1615: 508)

123 Both Vasari, Vite (Milanesi 1906: VII, 272-273) and Cellini, Trattato della scultura, VI (Milanesi 1857: 197-198) describe this method as well of the difficulty of imagining multiple points of view while carving.

124 A recent discussion of this may be found in Carabell 1997: 96-97.

125 An oft repeated story of Michelangelo 'saving' what was considered a ruined block for the Accademia David.
The complexity of the cutting process is clearly at work in the next example, Corpus 537 (figures A.15 and A.16). This template drawing was probably intended for the splayed windows of the upper story of the Medici Chapel. Like Corpus 539, this drawing has been predominantly attributed to the Laurentian Library based on the profiles found in Corpus 534 (figures A.8 and A.9) even if further analysis appears to refute such an attribution. Once again, a simple overlay of 537 onto 534 confirms the disparity in magnitude between the two profiles, suggesting that 537 belongs to a more delicate order (figure 2.47).

Aside from the question of attribution, Corpus 537 raises for the first time the possibility of a template having been cut multiple times, even in addition to the tracing. Should this prove viable, it becomes more convincing that Michelangelo used the scissors almost like the chisel on the block of stone, as a "forza di levare", where multiple, irrevocable micro-cuttings slowly lead to the well-tempered profile. A possible narrative may be reconstructed below (see figure A.17 for a graphic demonstration):

1) The making of 537 begins on the recto, where the initial profile is generated by a now-lost parent template traced in black pencil, as has been Michelangelo's normative practice up to this point (figure A.15). Residue of the black pencil can still be observed in two small points along the profile (figure 2.48).

2) Before it was cut, though, this template received a heavy reworking of the profile line. We observe for the first time Michelangelo's use of red chalk (lapis rosso) in the reworking of the profile edge (figures 2.48 and 2.49). As one of Michelangelo's favored drawing materials for figure drawing, this opens up tantalizing questions into the embodiment of the profile line. Additionally, red chalk was the traditional tool employed by sculptors and masons when tracing directly onto the stone itself. The vertical ruled line in red chalk to the left of the sheet is possibly a register line for another template, or it indicates a possible cut line which was never followed (best seen on figure A.15). The other profile sketch in red chalk in the middle of the

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126 Corpus 537 (Casa Buonarroti, 60A) is in the care of the Casa Buonarroti in Florence and was examined by the author on June 9, 2012. Corpus 537 (Casa Buonarroti 60A) is in the care of the Casa Buonarroti and was examined by the author on June 9, 2012.

127 Scholarship has not been settled on this attribution, even if it has been nominally accepted after the Corpus definitively tied 537 to the Library portal profiles recorded on 534. In dating 537, the Corpus cites Thode as placing the initial attribution to the Laurentian Library (Thode 1913: III, n. 83), and confirmed later by Barocchi and Hartt who both noted the affinity with the tracings in Corpus 534 (Barocchi 1962: I, 116 and Hartt 1971: 198). Thode's attribution, however, was always tentative, writing that it is, "Vermuthlich für die Libreria, aber nicht näher zu bestimmen." Guglielmo De Angelis d'Ossat (d'Ossat 1967: 308), believed that 537 was for the Medici Chapel, although in Cooper, in her exhaustive analysis of the bibliography (Cooper 1994: 497), ultimately submits to the prevailing interpretation that 537 was intended for the Laurentian Library. 537 was published as recently as 2009, reiterating the Library attribution (Thoenes 2009: 28).

128 Zanchattin 2011: 161
template drawing probably took place at this time, as it appears to be some variation on the bead moulding just below the horizontal soffit.

3) Surprisingly, another drawing material, penned ink, is introduced to the profile edge. Appearing along various sections of the profile, there is now evidence of three drawing materials: black chalk, red chalk, and ink (figures 2.48 and 2.49). If not already, one is forced to conclude at this point that the choice of drawing tools is non-arbitrary, suggesting a deliberate sequence which begins with the hard, traced line in black pencil, intercedes with the quick, figural hand in soft ground of lapis rosso, and finishes with the hard-edged ink pen. This combination of red chalk and penned ink appears again in other template drawings, in a dialogue between the intuitive search for the profile (lapis rosso) and the definitive line which emerges (ink).129

4) Corpus 537 receives its first cut with the recto side up and the profile faced left, with the scissors generally following the inked line. Then, as we observed with 203, Michelangelo immediately flips the drawing over (or picks it up at a later date) and draws a new profile line on the verso in ink (figure A.16). This ink line may be observed as more or less hugging the profile edge as seen from the verso. The obvious question emerges: how is it possible that both sides of the template exhibit evidence of having been cut from that side (i.e. of exhibiting inked edges)?130 Generally, the cut edge leaves some residue of the drawing material used to articulate the profile line, but in the case of 537, one may see such residue on both sides, leading to the probable conclusion that it must have received multiple cuttings, one from the recto and another from the verso. A clear example of this may be seen in comparing the treatment of the gocciolatoio (dripstone). On 537v (figure 2.50) an inked line may be observed, inset just slightly from the profile cut. On 537r (figure A.15), no such ink line may be observed, suggesting that the template was first cut from the recto side, flipped, and re-cut from the verso side, following a modified inked line. Such a procedure would have removed evidence of the ink profile from the recto. A similar relationship between recto and verso may be seen above the gocciolatoio near the cyma and bead molding as well, where ink residue on the verso does not correspond with a ink line on the recto, and vice-versa.

5) To summarize the sequencing of Corpus 537: first it is traced from a now lost parent template, facing left. That profile is adjusted using red chalk and ink, after which the paper is cut roughly along the inked line. It is then flipped, where on the verso a new profile line is inked. From the verso side, the template receives another cut, leaving it in its current profile configuration.

130 Personal observation confirmed that the ink did not merely bleed through to the other side.
As can be seen, the interplay between the parent template, multiple drawing tools, and the scissors is incredibly complex and impossible to reconstruct with absolute certainty. Still, in accounting for all the clues available on the recto and verso, the notion that Michelangelo engaged in multiple cuttings of his templates appears to now be quite likely. Such a discovery adds a powerful narrative to Michelangelo's notion of the "forza di levare", since the practice may now be clearly linked to architecture vis-à-vis the practice of slowly cutting and re-cutting templates. The paper, while certainly having less at stake than chiseling a marble block, nevertheless presents an analogous resistance in the sense that whatever is severed cannot be re-affixed without a material vestige such as glue. It thus offers a similar potential of divine emergence within the violent cutting away - an analogical performance of difficoltà. Since Michelangelo would not be cutting the stone himself, he does so by extension through the parallel practice of cutting the stone mason's guiding template.

Although the analogy between Michelangelo's drawing techniques and the stone chisel is frequently invoked by scholars, the association between the paper cutting tool, the forbici, and the stone cutting tools has been little explored. As tools for taking away, both the scissors and the stone chisel offer the double-sided certitude of the cleaved edge, heightening the association with tempering as a difficult procedure requiring highly consequential, yet slight, changes of hand. In figure 49 one may immediately observe the angled, serrated profile that occurs during the scissor cut of an interior curve, but it is Benvenuto Cellini who definitively confirms this association. Writing to Benedetto Varchi in an exchange of letters in 1546, Cellini comments extensively on Michelangelo's use of models, including his use of paper modani, "precisely cut along their profiles with scissors (tagliate in su' profili apunto con le forbici)" (figure 2.51). The sharpness of the forbici, able to cut apunto, or with exactitude, evokes Vasari's discussion of the tempering of stone cutting tools discussed in his introduction to architecture in the 1568 edition of the Lives. Recalling the lost secrets of carving the ultra-hard porphyry, Vasari tells of a secret temper-bath distilled from an unknown herb, whereby red-hot tools may be quenched and receive the "hardest possible temper (una tempera durissima)". From this discovery, the sculptor Francesco del Tadda would go on to carve marvelous works, even to the astonishment of Michelangelo, who thought such precise work in porphyry to be impossible. The association between the tempered tool and the tempered edge still resides in modern Italian, where the rendering of a

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131 A notable exception is Joannides Paul, who observed that the cutting with forbici constituted a "prosecuzione del processo creativo", (Paul 2000: 13); and Hirst makes a strong connection between the chisel and black chalk in several of his analyses, esp. in the Oxford study for the sculpture of Day in the New Sacristy in the Ashmolean Museum (Hirst 1988: 63). On recent scholarship discussing this, see Marani 2011: 102-136.


133 Vasari, Vite (Milanesi 1906: I, 109ff), where he also recounts Alberti's novel use of goat's blood in the tempering of carving tools to carve into the porphyry threshold at Santa Maria Novella.

134 The lack of properly tempered cutting tools would not allow for the precise rendering of edges and corners, Vasari, Vite (Milanesi 1906: I, 111).
sharp pencil point takes place with a *temperamatite*. One may also, with the help of a *temperino*, or a sharp pen-knife, make precise cuts in paper. Like their counterparts for cutting stone, *forbici* would have probably been tempered during their making, allowing for them to hold a hard-ground edge capable of the exact shearing of paper. The tempered edge thus enabled the architect to cut with great exactitude, a great advantage when following a line or in departing from it during inventive discovery. Such a meticulous shearing of the profile line with a tempered tool helps sharpen the association between exactitude and tempering, something already present in Michelangelo's sculptural practices.

**The rapidity of the tempered edge**

After examining *Corpus* 537 it becomes clear that the tracing procedure is more complex than initially thought. During the course of the analysis, we have discovered the use of multiple drawing tools, cuttings, and tracings in a singular effort to temper the profile edge. Along the way, the drawing may be pulled for making a sketch, recording costs, or even poetry. Still, while the multiplicity of operations appears dynamic and fluid, we have not yet been able to understand how quickly this might have unfolded in time. As the next template demonstrates, the velocity of the traced line may be a product of rapid tracing and repositioning, performed within a matter of seconds. Michelangelo's cutting, flipping, and whittling of the template edge accords well with the artist's predilection toward the rapid and almost furious removal of stone.

Michelangelo was known even during his lifetime to astonish observers by how he assailed the marble block. Yet, at the same time, the hammerings were performed with great exactitude, causing many to marvel at his heroic skill. The French traveler Blaise de Vigenére vividly recalled seeing the sculptor in action, instilling an image of heroic frenzy amidst the stillness of brute matter:

> I have seen Michelangelo, although more than sixty years old and no longer among the most robust, knock off more chips of a very hard marble in a quarter of an hour than three young stone carvers could have done in three or four, an almost incredible thing to one who has not seen it; and I thought the whole work would fall to pieces because he moved with such impetuosity and fury, knocking to the floor large chunks three or four fingers thick with a single blow so precisely aimed that if he had gone even minimally further than necessary, he risked loosing it all, because it could not then be repaired or re-formed, as with images of clay or stucco.

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135 The relationship between the tempered tool and the tempered edge explored at greater length in Part II in the context of the *lima*, the sculptor's file used to temper the edge of tin templates.

136 J. Paul reports on Michelangelo's propensity toward cutting and re-assembling - another productive use of *forbici*. This may be seen in a drawing in the British Museum for a study for *Christ Expelling the Money Changers* (1860-6-16-2/3), where he assembles five fragmentary sheets during the making of the composition (Paul 2000: 13).

Captured in an illustration published by Sigismondo Fanti in 1527, Michelangelo’s fury is given form in the working of the figure of Dawn for the tomb of Lorenzo de’ Medici (figure 2.52). While perhaps not the purpose of Fanti’s woodcut, the association with the tempering hammer of Hephaestus is certainly not coincidental (figure 2.53).

Swiftness assuaged by measure certainly lies at the origin of Ingegno, who finds his target not only through the precise aiming of the arrow but also through the winged rapidity of a timely release (figure 2.33). The amplification of virtuosity through the juxtaposition of velocity and the meticulous hand appears in the temporality of Temperanza, who meets her target not only in space but also at the proper time. Like Ingegno, this takes place through the aforementioned bow and arrow, pulled at the proper moment that has been, “...generated from the temperatura of one’s actions”. By initiating a new modano using a pre-proportioned template, Michelangelo is able to rapidly consider alternatives -- repositioning, sliding, and pushing the template around the sheet. He also transmits a bit of his own temperament, where the swiftness of the scissored template may be seen as the extension of the sculptor’s vehement chisel.

Unlike the other template drawings henceforth discussed, Corpus 536 exhibits a large amount of template area relative to the small profile cut made along the corner (figures A.12 and A.13). A poetry fragment is drafted by Michelangelo on the recto, discussed at length in Part III, datable to 1532 (figure A.12). Beyond this simple observation, one of its most prominent characteristics appears on the verso (figure A.13), where large areas of smudged ink appear over the profile work. Here, at first glance, one sees a fury of ink, cut paper, and multiple profile sketches. To help unpack this complex template, let us first identify two full scale profiles on the verso (A + B), as labeled on figure A.13. See also figure A.14 for a graphic demonstration if this discussion.

1) The first profile (A) is underneath the ink smudge and clearly exhibits signs of originating from a tracing of a parent template, now lost. This is evident in the black chalk line underneath the ink

\[\text{138} \text{ Fanti’s book contains astrological games related to one’s birth constellation. In accordance with his own birth calendar, Michelangelo is included in the sphere of Jupiter, as his birth fell under the house of Jove, Vasari, Vite (Milanesi 1906: VII, 137). The significance of Michelangelo’s birth horoscope is discussed in Riggs 1995: 99-121 and Britton 2003: 653-675. From Sigismondo Fanti, Trionfo di Fortuna (1527), XXXVIII; original reference found in Lavin 1993: 44. On this image in relation to Michelangelo, see also Ragionieri 2008: 104 and Barken 2011: 116-117. The association between Michelangelo in this image and Hephaestus is recently discussed in Cole 2011: 22-23.}\]

\[\text{139} \text{ “...generata dalle temperatura nell’attioni...perche tirato con certa misura, manda fuori le saette con velocitá”, Ripa, Iconologia (Ripa 1615: 508).} \]

\[\text{140} \text{ Corpus 536 (Archivio Buonarroti XIII, fol. 157) is in the care of the Casa Buonarroti and was examined by the author on June 9, 2012. It has been attributed to Laurentian Library for one of the cornice details of the door that passes from the ricetto to the reading room, and it has been dated to circa 1530, although it does not appear as a clear or approximate match with any in-situ construction. See Appendix for bibliography information.} \]

\[\text{141} \text{ The poetry fragment on the recto was identified by Frey in his Dichtungen (Frey 1897: CXXXI, 226) as belonging to, “Che sie doppo molt’anni di chosteri”.}\]
profile in the upper cavetto, drawn as if being guided by a template (figure 2.54). Michelangelo then traces over most of profile (A) in brown ink, allowing it to dry and adding several rapid lines imagining the profile in elevation.

2) Then, using a different parent template, he offsets a new line in ink to the left, profile (B), which plays off of (A) but adds considerable complexity to the profile.

3) Quickly offsetting again, Michelangelo then draws a new profile, profile (C). For this he uses either the same parent template as was used to generate profile (A) or, more probably, a different parent template close at hand. In the rapidity of the work, the ink constituting profile (B) does not yet dry, and it is smudged by the removal of the parent template. Several clues in the smudged area attest to this conclusion by the logic of abduction: most of the smudges originate from the free-hand line of profile (B), meaning that in order for something to induce the smearing, the object must have started its smudging beginning to the left of the profile cut, that is, at profile (C); the smear appears ‘tooled’, in that the smudges run in relatively the same direction, covering a wider area than may be accounted for by positing a simple hand smudge. Michelangelo was right handed, so he probably would have grabbed the parent template on the non-inked edge (the right) and may have likely dragged it across a freshly inked profile.

4) On the actual profile cut, several possibilities emerge: a few of the smudges appear to originate off the current sheet, suggesting that the cut line deviated somewhat from the inked line (B), a common practice we have already encountered. Or, given Michelangelo's propensity toward reassembly, it is probable that either the original parent template used for (A) or a different parent template altogether was used to trace the third profile (C). It is possible that after the cut this template was used to trace a new one, but the edge is too deteriorated to show any signs of the tracing.

The quickness of the pen, scissors, and template would certainly mirror Michelangelo's fury when attacking a block of marble, eager to free the concetto. Like a chisel on the stone, Michelangelo's drawing tools descend upon the paper with rapid, but measured, fluidity. Corpus 536 demonstrates that for Michelangelo the materiality of the paper templates are well-equipped to respond to the quickness of the imagination. Like the template drawings on the stone, the paper is employed as a medium in itself, where its qualities of flatness, texture, and motility are

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142 Scholars have noticed the swiftness of the strokes of ink and made parallels with the drawings Michelangelo made during the fortification of Florence, during which he was under great duress in conducting the rapid reinforcement of his native city against the returning Medici; see Marani 1984: 76 n. 46. This suggestion has since been republished in several modern catalogue entries of 536, bolstering its plausibility among scholars; see Marongiu 2002: 51, cat. no. 18; and Ragionieri (Ciulich and Ragionieri 2010: 72 cat. no. 24). While the rapidity of the line work is duly noted, nothing other than a similarity in formal style ties 536 definitively to the fortification drawings. Note also that 536 has been incorrectly mirrored in Ragionieri's catalogue entry.
fully exploited to their potential in service of the *concetto*. The rapidity exhibited in many of the templates' production, does not necessarily equate with the myth of the perfect line, however, executed without effort, under the guidance of unbridled intuition.\footnote{Renaissance authors held as an ideal the quality of *sprezzatura*, or the difficult done with ease, see Summers 1981: 205-230.} Rather, as has been observed, Michelangelo engaged in a conscious and arduous dialogue with the templates and drawing tools in the search for the well-tempered profile.

While the medium of paper *modani* certainly lent itself to the rapid, furious hand, it conversely facilitated a longevity that also supported the tempering procedure. A template drawing may have remained near the drawing board for months before being picked up again, or it may have travelled to San Lorenzo and back as part of Michelangelo's propensity toward in-situ, full-scale modeling.\footnote{Several *modani* exhibit evidence of having been folded. While it is impossible to know if the folds are contemporaneous with Michelangelo's drawing, the thought that the folds were residue of being transported between Via Mozza and San Lorenzo is intriguing (Mussolin 2012: 300-301).} They also, as we've seen in *Corpus* 534, facilitated a future revisiting through a tracing of the templates as workshop records. As translation devices, the *modani* originate in the peculiarity of architecture as a projective activity, still preserved today in the modern Italian distinction between *disegnare* and *progettare*.\footnote{The proper activity of an architect in Italian is *progettazione*, encompassing a wider range of meaning beyond the immediate generative activity of a formal or conceptual idea (or what we more commonly call 'design', from *disegno*). It also includes a consideration of the idea in concurrence with its material realization.}

**The fullness of the cut-off**

Such a distinction becomes important in considering the residual artifacts of the template making process. Rather than inert by-products, they have a latent potential to reveal images all their own. Just as the marble cuttings from the *lavoro di quadro* were transmuted into the recipient mortar bed, the removal of paper during the cutting procedure created Janus-like artifacts that looked backward and forward at the same time.\footnote{Marble chips were ground into aggregate for stucco in the vault of the Medici Chapel. Michelangelo records several instances of marble chips being carted from the Via Mozza workshop to San Lorenzo in: *Ricordi*, CXVII (Ciulich and Barocchi 1970: 121ff), cf. Wallace 1994: 91. This material may have been used to fix 'errors' as well, as in Palladio XXX (Burns, Palladio's Vicenza 207).} In helping to recount the story of Michelangelo's template drawings, we are fortunate to have several examples of that which was removed or 'cut-away' by the scissors during the trimming of the *modani*. In examining the cut-off, the fact that these drawings are projective devices, and not mere exercises in profiling, becomes more clear.
Conventionally, in nearly every publication that has mentioned them, these drawings are called the 'negative' templates. However, as a modern nomenclature, the use of positive / negative distills much of the imaginative potential of these types of drawings, and it blurs any possible interpretation of their value beyond that which is 'negative' and therefore discarded. A more suitable terminology would follow that of Vannoccio Biringuccio, in whose 16th century treatise on metallurgy the vocabulary of templates and moulds may serve as an example. Without the apparent bias present in modern usage, the two sides of a die were known by Biringuccio as the *modello* or *architipo* (what we would call the positive today) and *le forme* (the corresponding moulds, or the negative). Correspondingly, the *modello* was described as being "pieno", or full, while the *forme* were referred to as the "vuoto", or empty, side of the casting die. While no doubt adopting a strict workshop usage born out of the casting process, as opposed to the act of carving, the term 'forma' could also signify a pattern or exemplar in general, as in Robert Grosseteste's description discussed in the Introduction from *De unica forma omnium*. Such was the sense when the French master-mason, William of Sens, appointed to work in 1179 at the Canterbury Cathedral, made orders for wooden templates, calling them "formas" - another reminder of the embedded associations between *forma* and the notion of template.

Understanding the so-called negative templates drawings as "forms", as *exempla* in their own right, is a good way to introduce them and to grasp their possible contribution to the tempering process. *Corpus* 538 is a fascinating remnant (figures A.18 and A.19). This *forma* for one of the steps at the Laurentian Library was probably produced in the Spring of 1533, just as work was progressing on the rest of the portal between the reading room and the vestibule. Its association with the step can be clearly seen in figure 2.55, where it is matched with the now lost *modano* traced on *Corpus* 534 (figure A.8, Profile C) and discussed at length in Part II. On the recto, added after the cutting occurred, Michelangelo crafted a now famous sonnet to his Roman lover Tommaso de' Cavalieri, "Non so, se s' è la desiata luce". In analyzing this template, a surprising question emerges: were they also productive, as *forme*, for other drawings in a similar way as the 'full' sides?

147 See, for example, Wallace 1994: 173; Barocchi in (Barocchi 1964: 85, n. 335) calls *Corpus* 538 a "foglio negletto" and *Corpus* 540 a "profilo negativo" (Barocchi 1994: 90, n. 340).
148 *La Pirotechnia* was published in Venice in 1540 and is taken up extensively in the next part. Vannoccio Biringuccio (1480-1539), whose father was an architect, was likely personally acquainted with Michelangelo, since he served with the Florentine Republic as superintendent to the artillery during Michelangelo's supervision of the fortifications.
149 Biringuccio, *Pirotechnia* (Carugo 1977: fol. 92r, 94r, 148v)
150 See Introduction. "Dicitur atque forma exemplar, ad quod respicit artifex, ut ad eius imitationem et similitudinem forment suum artificium...", Robert Grosseteste, *De unica forma omnium*, Latin and English translation Tatarkiewicz 1970: 231. Also, the silver seal is the *forma* of a wax seal; a mould the *forma* of a bronze statue.
151 "...Formas quoque ad lapides formandos his qui convenenter sculptoribus tradidit...", from Shelby 1971: 141.
152 *Corpus* 538 (Archivio Buonarroti XIII, fol. 134) is in the care of the Casa Buonarroti and was examined by the author on June 11, 2012. See Appendix for bibliography.
153 This date is based on its association with *Corpus* 534, De Tolnay 1976-1980: IV: 60-61.
154 Frey 1897: LXXV, 79
In recounting the following narrative for 538, it will help to assume that the now lost companion, its so-called positive, shall be known for our purposes as the 'Step'. The following narrative is graphically demonstrated in figure A.20:

1) A parent template to the Step, also lost, is placed onto a sheet facing left, and it is traced in *lapis nero*. Evidence of this tracing can still be seen in the verso of 538 (figure A.19), along with another adjacent tracing of what appears to be the lip of a stair tread, in *lapis nero*, possibly from the same parent template (figure 2.56). Near the top right, there are multiple tracings along the same general profile edge using the same *lapis nero*. Any further sign of tracing is no longer available due to the 19th century conservation processes still in place on this drawing.\(^{155}\)

2) After multiple tracings of the profile edge, Michelangelo introduces the scissors. The Step is cut quite rapidly as is evidenced by the multiple overcuts in the interior corners visible on the recto (figure 2.57). The rapid shearing of 538 is quite clear in the tearing away near the apex of the stair nosing, a natural reaction to the hanging remnant of paper at that point obstructing further cutting of the profile.

3) One of the fragments that remains of the cut, 538, lingers in the workshop and eventually, perhaps immediately, receives the sonnet to Cavalieri. As a *forma*, it is still available for tracing, and it is used as such, as is evidenced on 538 recto (figure 2.57), which has clear traces of black pencil hugging the edge, in the very same manner as we've already seen on 539 (figure 2.37).\(^{156}\) As has been seen already in *Corpus* 201, 536, 537, and 539, the understanding of this template as a tracing for another one is the only way to account for having black pencil on both sides.

The possibility that Michelangelo also traced the so-called negative adds considerable complexity to the narrative thus far recounted. In this same context, a second cut-away, *Corpus* 540, should also be mentioned (figure A.24 and A.25).\(^{157}\) Corresponding to marble volute brackets for the Medici Tombs, this remnant prominently displays on the recto a record of days worked by the assistants on the San Lorenzo worksite on April 15, 1524.\(^{158}\) In addition to the text, the cut line shows signs of multiple profiles, all in red chalk (*lapis rosso*). The contrast

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\(^{155}\) Drawings and letters from the "Archivio Buonarroti" are generally part of a bound volume. The gluing of 538 into the pages of the binding have concealed any further speculation on the verso.

\(^{156}\) The author acknowledges the presence of certain pencil lines on 538 that are likely the vestige of a past conservation effort, especially those along the stepped edge of the recto. In may be surmised that the template was removed from the volume at one point for photographs or exhibition, and it was lightly traced, so as to record its placement for being returned. Still, there are traces of pencil on the edges not included in the conservator's tracing, as shown in the above figure.

\(^{157}\) *Corpus* 540 (Archivio Buonarroti I, 59, fol. 151) is in the care of the Casa Buonarroti and was examined by the author on June 11, 2012. See Appendix for bibliography.

\(^{158}\) Attributed by De Tolnay (De Tolnay 1976-1980: IV, 61) to the Library vestibule. Wallace's attribution to the Medici Tomb brackets, however, is more likely (Wallace 1994: 89). See Walice 1992: 131 for a graphic reconstruction.
between cut edges and torn edges suggests a rapidity of the forbici not yet observed. As the cut proceeded along the interior curve of the volute, the hanging paper would have obstructed the movement of the scissors, requiring a quick tearing of the hanging paper. Additionally, the heavy use of red chalk with no sign of other drawing tools suggests that the corresponding template may have been used as an in-situ model, performed quickly and without a parent template. Although it was expected, based on what was observed in 538, this template drawing shows no evidence of having been traced.

While probably not of primary concern to Michelangelo, the understanding of these paper artifacts as 'throw-away' seems excessive. It appears that he kept them at hand for sometimes virtuous purposes, even as support for poetry. But why trace a fragment of the cut-away, when presumably the template drawing proper is still near the drawing board? If we accept the idea of multiple cuttings - the possibility for a productive cut-away becomes clearer. While cutting modani multiple times, the initial cut-away survives as a memory of the initial cut - a productive record that may be revisited. Michelangelo may have returned to this profile long after its companion (the Step) left the workshop. Or, he may have re-visited the first profile edge after multiple cuttings had effectively mutilated the so-called positive. In this way, the two sides of the profile become the two faces of Prudenza: the forma, looking backward, as a memory of the initial cut; and the modano itself, looking forward, available for continued cuts or whittlings (figures 2.58 and 2.59).

As prudent devices, they actually belong in the realm of projective thinking (as in progrettare), since looking backward is also a way of looking forward. Both 540 and 538 show that there was some concern for the state of the cut-off, and the tearing of the hanging paper appears to be kept at a minimum. As well, keeping workshop records is something that Michelangelo took very seriously, perhaps with much frequency, as has been already pointed out in Corpus 534 (figures A.8 and A.9). The understanding of a prudent, double-sided profile may, in fact, be fundamental to the notion of the tempering template. Just as the two sides of the paper are brought into tune, where the paper has two sides and may be flipped and re-flipped, the profile acquires two sides which are both productive.

If retaining both pieces of the cut profile was a prudent act for facilitating the imagination, it recalls the flipping and mirroring practices introduced in the initial discussion of the tracing procedure with Corpus 203/204. Although Michelangelo favored the sketching of profiles facing left, the parent/offspring relationship in the template tracings follow no such convention. Unlike in 203/204, for example, where the parent template was traced facing to the right, the lost parent

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159 See Part II for a discussion of Michelangelo's inclination toward in-situ, full size models.
templates for Corpus 539 and 537 were both traced with their profile facing left.\textsuperscript{160} It appears, like the relationship between the two sides of a profile cut, that the mirroring of the parent templates were used to open up new possibilities to the imagination.

The apparent ambiguity between right and left reflects a practice borrowed from the artist's figure drawing, where the cunning employment of mirroring, flipping, and tracing expanded possible compositional and narrative associations. In Michelangelo's famous rendering of Tityus, the suffering Titan is transformed into a double-faced figure through a miraculous flipping of recto and verso (figure 2.60).\textsuperscript{161} Before gifting the carefully rendered Tityus to his adored Cavalieri, Michelangelo held the drawing up to the light and rapidly transformed the recumbent figure into a study for the resurrection of Christ on the verso of the sheet (figure 2.61). The mirroring of Tityus into an improvised Christ figure is a brilliant demonstration of practice at work in narrative space: by a simple flip, the tormented lover is set free through his submission to divine Love.\textsuperscript{162} Yet, at the same time, the distant Cavalieri remains a poignant reminder of unfulfilled, corporal desire.\textsuperscript{163} In between, the thickness of the paper keeps the two figures simultaneously back to back and worlds apart.

**Tempering the profilo I: paper**

Michelangelo's use of paper as support for the imagination deserves closer scrutiny. On a drawing from the height of work on the Medici Chapel in 1524, for example, Michelangelo left an imperative from the drawing board in Via Mozza for one of his assistants, Antonio Mini; famously urging his pupil to, "draw Antonio, draw Antonio, draw and don't waste time!".\textsuperscript{164} Next to his writing the teacher left space for the student to copy various inked studies of a Virgin and Child (Corpus 240r - figure 2.62). On the verso of the same sheet, among other ricordi in Michelangelo's hand, one finds payments to his assistants for carting sand to the San Lorenzo site, several payouts for model-making nails, and 40 quartini for two balls of string. Additionally, there are notes on expenses for three pounds of iron wire, various materials for making figure

\textsuperscript{160} The traced profiles face left in Corpus 534 as well as in 536 which shows the smearing of the template, possibly because of the left facing; Corpus 535 was also traced from a parent template facing to the left. Corpus 525, discussed in Part III, possibly had no parent, but if it did, then it was traced with the parent facing left.

\textsuperscript{161} The flipping of recto/verso in this drawing was discussed by Hirst 1988: 113 and followed more recently by Brothers 2008: 26.

\textsuperscript{162} Tityus was sent to Hades for attempting to rape Leto. His punishment was the eternal attack by vultures on his ever regenerating liver. Lucretius would re-imagine the Tityus figure as a symbol of the "prototypical anguished lover", in De rerum natura. Original reference from Kenney 1970: 44-47.

\textsuperscript{163} Michelangelo met Cavalieri during his sojourn to Rome in 1532. A letter written by Cavalieri to Michelangelo in Florence dated New Years Day 1533 acknowledged the receipt of the drawing, Carteggio, CM (Barocchi and Ristori 1967: IV, 3).

\textsuperscript{164} "disegnia antonio disegnia antonio/disegnia e no[n] p[er]der[e] te[m]po... "; Ricordi, CXLIX (Ciulich and Barocchi 1970: 157), found on Corpus 240.
models, and money for marble sawyers on the building site. While the nudging of Mini gives us a tantalizing glimpse into Michelangelo's great haste, not to mention his impatience with slothful assistants, the slow, careful documentation of mundane payments proves to be equally illuminating. Each of the marks offers a temporal site for the imagination to unfold, where minute and large gestures combine in unexpected ways.

Although scholarship generally accepts the non-arbitrary reuse of paper for Michelangelo's figural drawings, a common belief behind his reuse of paper for templates has rested on the assumption that paper was a costly and relatively scarce resource. However, a rather quick analysis of Michelangelo's records during the especially active period in the spring of 1524 tells a different story. On April 4, 1524, the workshop expended two quartini, "for two sheets of regal-sized paper for making modenature". Slightly later, on the 14th of April, 1524, another purchase of "dua fogli reali" was recorded, this time for eight denari (eight denari is the equivalent of two quartini). From these examples and others between 1518 and 1524, the price of one sheet of regal-sized paper (approx. 615 mm x 445 mm) may be surmised to cost one quartino, or four denari. A skilled day rate for a scarpellino was recorded by Michelangelo at 20 soldi per day (240 denari), meaning that our four denari sheet of paper is a relatively inexpensive commodity, near the cost of a sheet of high quality paper today.

It seems clear that his dutiful reuse of paper was more than a result of Michelangelo's well-documented thrifty practices. Rather, the juxtaposition of word and image indicates that the paper was primarily a physical and temporal site for the imagination. Practices such as flipping the Tityus sheet, retaining two sides of a cut profile, or scratching poetic verse on template fragments, rely on the supple, semi-transparent qualities of paper - a remarkably similar depiction by Ficino of the materiality of the spiritus. In his Commentary on the Symposium of Plato, for example, Ficino describes the spiritus as that which joins ("copulantur") the soul and body, "which is a certain very thin and clear vapor". Paper, then, might be said to be invested with spiritus; thus conceived as a kind of subtle body that mediates between the manifest lines of

165 See Ricordi, CXLIX (Ciulich and Barocchi 1970: 157-158) for a full transcription.
166 Cooper, for example, describes Michelangelo's re-use of paper for his modani as "thrifty" (Cooper 1994: 497).
167 "per dua fogli reali per far modonature...", Ricordi, CXXIV (Ciulich and Barocchi 1970: 134).
168 Ricordi, CXIII (Ciulich and Barocchi 1970: 128). In 16th century Florence, 1 lira = 20 soldi = 240 denari = 60 quatrini.
169 For the size of 'fogli reali', I am following the Bologna convention described in the notes above. For other references to paper purchase see also, Ricordi, XLII, LXXII, as well as other notes in Ricordi, CXXIII (Ciulich and Barocchi 1970).
170 Four denari would be 1.6% of a highly skilled day labor rate (at 20 soldi, or 240 denari). Say a current day labor rate costs $240 ($30 x 8 hrs): 1.6% would be $3.84, a reasonable cost for an 18x24 sheet of high quality artists' paper. In another comparison, the price of a pound of meat in the early 16th century in Florence was around 30 denari (Goldthwaite 1980: 443). This would mean that a pound of meat would be close to the cost of 7 to 8 sheets of regal sized paper.
171 Michelangelo was known to live like a pauper even though he was quite a wealthy man, a myth perpetuated by Vasari when he wrote, "...sebbene era ricon, viveva da povero..." in Vite (Milanesi 1906: 275-276). Rab Hatfield specifically addresses the complexity and contradictions of this myth in his book, The Wealth of Michelangelo (Hatfield 2002).
172 "...qui vapor quidem est tenuissimus et perlucidus", Ficino, Commentary, sixth speech, VI (Jayne 1944: 83, 189)
drawing materials or cut paper and the occult disposition of the soul ("anima").

Being imbued with spiritus, paper provides a material support for fantasies of the anima, what Ficino called phantasia, since the imaginative faculties of the soul rely on the spirit to "receive the powers of the soul and transfer them into the body." In thinking of the analogy between paper and stone discussed earlier, the association of the spiritus with paper recalls Michelangelo’s preoccupation with Carrara marble, and the suppleness of its white, transparent body.

The notion of the spiritus as a messenger between body and soul, or material and idea, could be paralleled with Michelangelo’s movement between building sites and in the particular nature of the templates as devices for architectural projection. Produced at his drawing board, they were imagined as being carved by others and installed in the light and shadow of San Lorenzo, far outside of his immediate field of view. Vasari commented on the special aspects of architects’ disegno in his 1568 edition of the Lives. Although disegno was the father of all the arts, architecture, painting, and sculpture, each discipline had its own particular relationship with the rubric of drawing. For the cinquecento architect, drawing, guided through models, was "the beginning and end of that art (il principio e la fine di quell’arte)." Beyond what the architect drew with lines, the built work was produced by the hands of masons and carvers; not the architect, following the schema Alberti had formalized almost a century earlier. Drawings by architects thus had a dual role - as products of disegno, they were objects of speculation and deliberation; yet, at the same time, they were projections of future constructions to be completed by others.

Although rarely cited as such, modani were well-adapted messengers between these tasks, as captured by in a 1563 letter written by Vasari to Duke Cosimo I, when he wrote that, "I made for the master carpenters a large modano as the large cartoon that I could take to show his Excellency". The full size paper modano was not only a pivotal device in helping the patron imagine the character of the future building, it was also a direct instrument of realization on the

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173 The notion of the spiritus as a subtle body owes its earliest thinking to Augustine, who describes a state of perception that is less than mind (mens) but more than the immediate power of sensation. The spiritus was an image-making faculty that presenced in the mind that which was unseen (the past, future, dreams, and those things concealed from sight because of distance). It is also likened with Aristotle's sensus communis. Referenced from Summers 1987: 114ff. For an introduction to the notion of subtle bodies, see Mead's somewhat outdated but still useful The Doctrine of the Subtle Body in Western Tradition (1919).

174 "... animae vires accipit et transfundit in corpus", Ficino, Commentary, sixth speech, VI (Jayne 1944: 83, 189). On another example of the spirit between body and soul, "spiritum medium inter corpus et animam", see Ficino, De vita III.xi.30 (Kaske and Clark 2002: 290-291).

175 The full passage reads, "...Quegli, poi, che hanno le prime linee intorno intorno sono chiamati profili, dintorni, o lineamenti. E tutti questi o profili o altrimenti che vogliam chiamarli servono così all’architettura e scultura come alla pittura, ma all’architettura massimamente; perciò che i disegni di quella non sono composti se non di linee, il che non è altro quanto all’architetto, ch’il principio e la fine di quell’arte, perché il restante, mediante i modelli di legname tratti dalle dette linee, non è altro che opera di scarpellini e muratori", Vasari, Vite (Milanesi 1906: I, 169-170).

176 Alberti’s schema is discussed at length in the Conclusion.

177 Vasari included architectural drawings in his collection of exemplary disegni, Il libro de' disegni. See Collobi 1973: 3-120.

178 "Ho fatto a tutti loro [ai maestri di legname] un modano grande come il cartone grande che portai così a vedere Vostra Eccellenza...", Vasari, Vite (Milanesi 1906: VIII, 371).
construction site, as a tool for projection. And their importance in dictating future character of the building is well demonstrated by the role given to them by Vasari in discussing the building with the Medici patron. The materiality of the paper template thus communicated invisible intent through visible, corporal means, presenting the architect’s projection as well as transmitting that desire to the construction site.

The flatness of paper facilitated the journey between the visible and invisible through the remarkable potential of the profile to assume an outward projection of inner character. Vasari explains that architecture, like painting and sculpture, fundamentally depends on the virtuosity of the profilo.\(^{179}\) These first and fundamental lines of disegno ("profili, dintorni, o lineamenti"), he writes, are the basis for excellence and perfection by all that follows, be it relief in painting, or form in sculpture. It is from the practiced demonstration of these first lines that the artist may hope to reap the fruits of disegno; that is, in expressing the "concetto dell’anima" and producing a "giudizio universale" from dispersive matters.\(^{180}\) It was specifically Michelangelo’s inventive use of architectural profili that led Vasari to declare that the master had performed a great service to all those who follow, "having broken the knots and chains" of common ways of working based on Vitruvius and ancient precedent.\(^{181}\) The notion that the outline or profile may be a fertile source of invention, or that it somehow captures the basis or fundamental character of the work, certainly harkens to Alberti’s notion of “circumscription (circonscrizione)” as one of the three parts of painting in Della pittura.\(^{182}\) These lines, defined as “the turning of the outline (l’attorniare dell’orlo)”, are the basis for the other two parts, composizione, or the relationship of bodies among each other, and the coloring of surfaces in light and relief ("colori e qualità delle superficie"). No fault in the other two parts may be overcome without the presence of a “buona circonscrizione”, equivalent in Alberti’s mind to “uno buono disegno”.\(^{183}\)

In making outlines, the material factures of the drawing tools were tightly bound to the intentionality of the concetto. Alberti warned that circonscrizioni ought to be almost invisible,

\(^{179}\) Daniele Barbaro, in his translation and commentary on Vitruvius (1567), was unique among the Vitruvian commentators when he included the "profilo" among the three Vitruvian drawing types, or "ideae". What in Vitruvius are "ichnographia, orthographia, scenographia" (De architectura I.i.2), Barbaro translates as "la pianta, lo in piè, il profilo" (Barbaro 1567: 29-30). On the possible significance of this translation for the architect's imagination, see Frascari 1990: 43-44.

\(^{180}\) “E perché da questa cognizione nasce un certo concetto e giudizio che si forma nella mente quella tal cosa, che poi espressa con le mani si chiama disegno...”, Vasari, Vite (Milanesi 1906: I, 169).

\(^{181}\) The full passage reads, "...perché nella novità di si belle cornici, capitegli e base, porte, tabernacoli e sepolture, fece assai diverso da quello che di misura, ordine e regola facevano gli uomini secondo il comune uso e secondo Vitruvio e le antichità, per non volere a quello agiugnere....Onde gli artefici gli hanno infinito e perpetuo obbligo, avendo egli rotti i lacci e le catene delle cose, che per via d’una strada comune egli di continuo operavano", Vasari, Vite (Milanesi 1906: VII, 193). For more on the contemporary reception of Michelangelo's unusual use of profiles, see Elam 2005: 46-82. For a recent discussion of the profile in Michelangelo's architectural language, see Elam 2012: 85-99.

\(^{182}\) Alberti’s three parts of painting in Della pittura (Bartoli translation): circonscrizione, componimento, and ricevimento de’ lumi (Alberti 1804: 45).

\(^{183}\) Alberti 1804: 43-46. A recent overview of Vasari and Alberti’s writings on the outline may be found in Jacobs 1988: 139-150.
seemingly rendered without thickness, so as to allow for the seamless breaking of light across the edge of a body.\textsuperscript{184} Alberti wrote in \textit{Della pittura}:

> When you represent in your work shadows which you can only discern with difficulty, and of which you cannot distinguish the edges, so that you apprehend them confusedly, you must not make them sharp or definite lest your work should have a wooden effect.\textsuperscript{185}

Indeed, Leonardo would criticize painters who proceeded from the outline first, arguing instead for lines that were ‘smoky’, or \textit{sfumato}, as a way of rendering such outlines without harsh and unnatural boundaries.\textsuperscript{186} Employing soft drawing tools, such as chalk or charcoal, allowed for rendering light and shadow without having to clearly define the profile edge. This squared with Lomazzo, who was critical of drawing with a sharp pen. In his \textit{Trattato dell’arte della pittura, scoltura et architettura}, he argued that the \textit{concetto} most effectively emerges from ghosted lines in soft drawing materials, and that the physical body of the drawing must materialize from within the framework (\textit{armature}) of the mind’s vision, or ”\textit{vista interna}”.\textsuperscript{187} One of Michelangelo’s preferred drawing materials in this regard was certainly red chalk, called \textit{lapis rosso} or \textit{sanguigne}, associated with the blood-infused \textit{spiritus} and the favored tool of stone carvers and masons.\textsuperscript{188} Several of his \textit{modani}, Corpus 540, 537, and 535 (figures A.24, A.16, and A.11 respectively) exhibit red chalk and suggest a similar teasing of the profile line with softer, spirit-like materials.

In Neo-platonic terms, the multiple manifestations of the profile line in different drawing materials reflect the increasing stability of the \textit{concetto} as it reaches toward the sublunary realm from near the divine intellect. Ficino, in observing that a ray of lighting will melt a piece of metal but leave its leather covering unharmed, reasons that the hardness of a material has a direct relationship with its capacity to receive divine influence. He posits that hard materials, such as metal and stone, resist heavenly rays more than softer materials, although once so inclined the harder materials are more likely to retain such influence.\textsuperscript{189} In another example, Ficino notes that a sword striking a piece of wood wrapped in felt will likely cut the wood without damaging the wool, proving that forceful impacts may often pass through soft materials while permanently affecting those materials with the most resistance to it.\textsuperscript{190}

\begin{footnotesize}
\begin{enumerate}
\item \textsuperscript{184} “\textit{Ed in questo disegno penso che principalmente si abbia a procurare, ch’egli si faccia con linee sottilissime, e che al tutto non si discernino dall’occhio...}”, Alberti, \textit{Della pittura} (Alberti 1804: 46).
\item \textsuperscript{185} Alberti 2004: 91. Original reference in Kaufmann 1975: 271
\item \textsuperscript{187} Lomazzo 1584: 317; Rykwert 1996: 92.
\item \textsuperscript{188} \textit{Lapis rosso} was also known as \textit{lapis aematitis}, or blood-stone, from the Greek “\textit{hematite}”, blood. In French red chalk is known as “\textit{sanguine}” (Cennini 1954: 25, n. 1). On red chalk as a preferred material for masons and carvers, see Zanchettin 2011: 161 and Zanchettin 2012: 110.
\item \textsuperscript{189} Ficino, \textit{De vita} (Kaske and Clark 2002: 323); Copenhagen 1984: 529.
\item \textsuperscript{190} Ibid.
\end{enumerate}
\end{footnotesize}
By this reasoning, lines that originate in softer materials impart profiles less resistant to subtlety and more open to celestial influence as transmitted through the *spiritus*. Once implemented, however, ‘soft’ profiles less easily preserve their heavenly consequence, and the addition of ‘hard’ drawing materials work toward a tuning or tempering of the line, as it is the material qualities or character that determines their relation to divine forces. Like the slow removal of stone, examined earlier in the analogous removal of small bits of paper, the gradual building up of drawing materials could also be seen as a form of tempering. In this way, the progression from chalk to ink may be conceived as a Neo-platonic journey between the material and the divine, where the most resistant material is also the most likely to retain the celestial influence.

After receiving an inked line, Michelangelo’s *modani* were then subject to the scissors. The introduction of the *forbici* suggests that it might be thought of as just another drawing tool, even higher up on the Neo-platonic ascension than ink. The sheared edge of the paper produced a profile line having an even thinner line than ink, thus becoming nearly invisible, as was advocated by Alberti in the rendering of *circonscrizioni*. Possessing quality without line width, the flat paper edge introduced an outline without the artificiality of a thickened edge. Having now the beginnings of three-dimensionality through the slight thickness of paper, the full-scale, profiled template drawings could be carried around the workshop or taken to the building site, becoming immersed in the temporality of the *istoria*. And, being bodies in their own right, they could even cast a shadow - the thinnest profile line of all.

**The character of the outline: shadow, physiognomy, temperament**

The ability of cut paper to cast a shadow itself meant that the architect could presence the profile in an analogous way to imagining the shadow cast by the future stone edge. Indeed this very possibly could have occurred given Michelangelo’s proven use of full size, in-situ models, a matter touched upon in depth in Part III. Shadow casting presenced the Neo-platonic condition of the profile, arriving closer to soul where it would have bodily extension but without material - a key point in understanding the tempering procedure. The relation of the shadow to the profile or outline recalls the story of the origin of painting, a theme taken up by Vasari and also mentioned by Alberti in *Della pittura*. Various ancient sources describe the first drawing as an act of shadow tracing, where the sun (in some versions, a candle) casts a shadow of a departing beloved onto a wall, rendering an outline for Butates, his lover, to trace. Perhaps

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192 Sources generally point to Pliny, *Natural History*, XXXV, 15, or Quintilian, *De institutione oratoriae*, X.ii.7. Alberti cites Quintilian, who recounts the use of sunlight rather than a candle as the light source, in *Della pittura*, although Vasari relies
never to return, the lover’s outline sufficed as a surrogate body through the physical capturing of his soul. Vasari provided one of the more interesting renderings of this story, where a young architect, perhaps himself, is depicted tracing his own shadow rather than that of his lover (figure 2.63).193 In giving thickness to previously invisible circonscrizioni, the shadow outline on the wall assumed a material presence, leading the captured soul closer to corporality. A raked light image of Vasari’s fresco underscores this contention, where the young man’s shadow was literally cut into the surface of the wet plaster with a stylus during the fresco preparation (figure 2.64).

Through the imagination, then, one could reconstruct the character of the body from the presence of the shadow alone. When Dante roams Purgatory, for example, he encounters the souls’ shadows, not their physical bodies. In one scene, as Dante and Virgil walk with their backs to the sun, Dante is startled to learn that his companion has no shadow, at which point Virgil explains that he, like the others, is a diaphanous body whose “body which casts a shadow” has long been buried.194 Although they are shadows, Dante vividly imagines the souls as if they were physical bodies, just as Butates was able to keep present her lover’s shadow from the material outline of his long departed body. Ritual, as well, could relied upon and sanctified the deeply held connection between shadow and soul. In traditional foundation rituals across several cultures, an innocent passerby might be ‘sacrificed’ by having the builder secretly measure the bystander’s shadow and bury it into the wall. In other versions, the builder simply places the foundation stone on top of the unsuspecting person’s cast shadow. Either way the result is the same: within a short period of time afterward, the man must die, having now lost his soul in the immuring of the building.195 Like the tracing of Butates’ lover or Dante’s encounters in Purgatory, the shadow was the soul, and its measure could actually stand-in for the living body. In all three cases, the flattened, two-dimensional shadow, void of materiality but having measure, offers a remarkable window into the tightly held bond between character and outline.

The shadow-as-soul was a direct distillation of one’s inner character, or temperament.196 Ficino, following Galen, recognized that the outward character of the body was a direct reflection of the inward temperament of the soul, describing Jovial people of temperate complexion as "eloquent, sharp, and versatile (eloquentes, acuti, versatiles)" who generally possess "oblong faces and hands which are not fat".197 Physiognomy, the ancient study of the relationship...
between health, character, and the external body, provided a clear link between the two, and 16th century treatises such as Gauricus' *De sculptura* (1504) and Giovanbatista della Porta's *De humana physiognomonia* (figure 2.65) build on the largely Peripatetic tradition of relating the soul to the "form" of the body. 198 Thus, when architects began studying the relationship of the facial profile to the character of the architecture, such as in Francesco di Giorgio in the late 15th century (figure 2.66), the notion that the *forma* or 'mould' of the body could be projected into external character was already well-established. 199 What seems innovative, in this regard, is in the 'molding' of body character using flattened, two-dimensional profiles, a phenomenon that was certainly related to the presencing of the soul through shadow casting.

The distillation of the inner character into the facial profile shows the potential of *modanatura* to embody the character of the architecture through minute shifts. Since the temper of the body was related to the particular qualities evident in the shadow profile, the act of tempering - micro-adjustments in materials to reveal character - was an essential skill for the architect. Michelangelo is well-known for his witty physiognomic concordances with architectonic profiles, an observation briefly discussed earlier in a sheet for the Medici Tomb (figure 1.9). In this sheet he demonstrates, using the red chalk of the *spiritus*, that the separation between architectural and anthropomorphic outlines is remarkable thin, and small changes to the profile may lead to rapid shifts in the narrative. In this case, the 'speaking' profile might have had something to do with the text above, where the Tomb sculptures, Day and Night, are given a voice that speaks directly to the interred Duke, writing "El Di e la Notta parlano, e dicono..." (figure 2.67). 200 The instability of profile between speech and silence is a reminder that character had to be understood as a temporal condition through the active body in movement, thus recalling a passage from the pseudo-Aristotelian *Physiognomonica* where inner character included, "movements, gestures of the body, color, [and] characteristic facial expression[s]". 201

In demonstrating the relationship between shadow, the *modani*, and character, one may briefly turn to a specific example of a profile on *Corpus* 525v (figure A.7), a cut *modano* for the Laurentian library. Examined in greater detail in Part III, what concerns us at this point is a specific profile on the verso: the heavy ink wash of a double torus attic column base placed over top of a series of free-hand, red chalk profiles below (figure 2.68). Although Michelangelo

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198 The pseudo-Aristotelian *Physiognomonica*, written in the 3rd or 4th century BCE, was the first systematic discussion of the subject and remained current up to the renewed interest in the discipline in the 16th century (Evans 1969: 7-17). Gauricus defines physiognomy as, "...a certain manner of observation by which we recognize from the signs of the body the qualities of the soul (...certa quaedam observatio, Qua ex iis que corpori insunt signis, animorum etiam qualitates denotamus)", in Gaurico, *De Sculptura* (Cutolo 1999: 171), translation by Summers 1999: 81. On the Aristotelian basis for physiognomy, see esp. *Analytica Priora*, 2.27.70b.

199 The term 'character' as it relates to the architectural orders enters into common parlance through the 18th century writings of Robert Morris and Charles Boffrand. Francesco di Giorgio's studies of the face and cornice are the first to relate the human facial profile to architectural members (Rykwert 1996: 54-60).


regularly employed wash, its use in architectural drawings was generally limited to the subtle rendering of relief (figure 2.69) or the teasing out of layers (figure 2.70), and it was rarely laid down with such weight. One is left wondering if there is something else at work here. In comparing this profile to another study sheet for the Library base moldings and columns (Corpus 528v - figure 2.32), one finds a parallel instance of poché within the profile drawing. Here, after rapidly working through several alternatives, Michelangelo paused at one particular profile on the left side of the sheet to add poché marks in ink (figure 2.71). A closer examination of this sketch reveals that it is a near match with the heavy ink washed profile on Corpus 525v (one may see the entire profile prominently in figure A.7).

Both profiles, then, have been rendered in poché, a curious and somewhat rare condition in Michelangelo's architectural drawings. In turning to the treatises and sketchbooks, one finds the emphasizing of the profile through a variety of methods, none of which offer a concordance with how Michelangelo worked here. Typically, darkening is employed to emphasize relief through shadow, as in Gherardo Spini (figure 2.72), Filarete (figure 2.73), or Giuliano da Sangallo (figure 2.13). Or, in other cases, darkening amounts to a kind of figure-ground, as in Alberti (figure 2.74), Serlio (figure 2.75), or Cesariano (figure 2.76), who actually employs both techniques. And even on a rare occasion, one finds Antonio da Sangallo's use of darkening to create a shadow relief (figure 2.8). Michelangelo, however, while sometimes employing ink wash for shadows (figure 2.77), specifically rendered this profile otherwise. Acting as an anatomical 'cutting-into', what he records is literally the complete absence of light, or the shadow inside the stone, a true *skiagraphia* that reveals the relationship between the soul and the body of the detail. The shadow, then, becomes the face in Francesco di Giorno's uncanny profile drawings.

Michelangelo's darkening of the profile was related to illuminating the interior body and, ultimately, to imagining a three-dimensional, extruded molding through a two-dimensional profile. This 'embodiment' of the profile recalls a related episode given by Pliny from the aforementioned story of Butates, where her father was able to fashion a fired clay body double from only the simple lineaments of the body outline - the origin of sculpture perhaps. Templates, as embodied profiles, acted as devices for imagining the future architecture both temporally and spatially. One wonders, then, given the current evidence that Michelangelo commonly traced his own templates, if the darkened ink wash suggests a related narrative: perhaps he was not drawing the stone at all but was in fact tracing a template. In this way, the poché is not only an imagining of the stone

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202 Frascari 1999: 44, Stoichita 1997: 28, and Kunze 1999: 66-67. Barbaro's understanding of Vitruvius' "scaenographia" as "skiagraphia", or shadow painting (from Plato discussion on the cave, Republic, 602d), further bolsters the architectural relation between profile and shadow, since he translated "scaenographia" into Italian as "profilo" (Babaro 1567: 29-30). On a related note, Aristotle uses the edge of the shadow to prove the existence of a line in the physical realm - like the thin edge of the modano or Alberti's *discrimin* discussed earlier, ideas enter the world through a spirit-like medium that has extension without breadth, Aristotle, *De anima* 419b (Hett 1936: 111-113).
interior, as spent light, it is the imagined shadow of the template itself cast on the page during an act of tracing. By this narrative, after first making a series of rapid profile sketches on Corpus 528v (figure 2.32), he then chose one and signified its future life as a template through the use of darkened poché. From this, a series of 1:1 profile drawings would have been made, and, indeed, a comparison with the in-situ construction leads one to conclude that this inked profile is, in fact, drawn full-scale.203 By decisively covering the free-hand, red chalk studies below with a tracing from a constructed, physical template, Michelangelo emphasizes the clarity of his desire (or concetto) in a way that recalls Ficino's theory of material resistances, where materials of higher resistance are more apt to retain celestial influence.

This recalls, once again, that character, a product of temperament, could be honed only through minute, careful, and ultimately inventive alterations to the body outline, a process we have also observed across most of the other paper modani. The precise relation of mouldings with their respective profiles could only be discovered through a tempering procedure, where character and materials are placed in a dynamic dialogue reliant on the eye and hand. Templates, as near body doubles of stone profiles, offer a direct line into the character, or temperament, as expressed in the physical body of the architecture. At the drawing board in Via Mozza, Michelangelo likely prepared scores of paper modani. As he worked, many more were produced that never left the drawing board as part of his generative process of tracing, flipping, and cutting. This tempering of disegno was the first step in the transmutation of the temper of Michelangelo onto the completed architecture. The forging of templates, requiring multiple cuts or Hephaestian 'beatings', is a process by which the drawing is prepared to leave the drawing board. For this next part, we now consider how the modani inhabit this journey from Via Mozza to the hands of Michelangelo’s assistants.

203 Its likelihood as a full-scale drawing may be confirmed with an overlay on the Rossi plate from his 1739 survey and concurring quite close as well with Portoghesi’s 1964 survey. Although the ornaments do not match exactly, the magnitude of the ink wash drawing suggests that it was indeed drawn full-scale. To my knowledge this is the first time anyone has suggested that this profile was made in ‘la propria forma’. To arrive at this, consider: the total height of the ink wash is approximately 265 mm. On the Rossi plate for the same profile (Tav. VI), beginning with the plinth or pedestal and moving upward through the lower torus, cavetto, double-torus, cavetto, and upper torus, one finds a near match in height when scaled to the dimensions given by Rossi. I am using the following conversion: 1 braccio fiorentino = 20 soldi = 240 denari = 583.6mm, from Palma 1877: 135.
Figure 2.1  Detail of map of Via Mozza and San Lorenzo, after Matteo Florini’s map of sixteenth century Florence (1600). Original map found in Attilio Mori & Giuseppe Boffito, Florence nelle vedute e piante. Studio storico topografico cartografico. Florence: Tipografia Giuntina (1926). © Author of dissertation.
Figure 2.2  Quarry drawing showing marble blocks for San Lorenzo façade, Michelangelo (ca. 1518). Excerpted from Charles De Tolnay, *Corpus dei disegni di Michelangelo*, no. 441r (1976-1980). Casa Buonarroti, Florence, Archivio Buonarroti, I, 128, fol. 243.

Figure 2.3  Sketch of the foundations for Michelangelo’s workshop at Via Mozza, Michelangelo. Original in Casa Buonarroti, Florence, Archivio Buonarroti, I, 29. Photo © author of dissertation

Figure 2.5  Modano for the cornice of San Giovannino in Florence, Bartolomeo Ammannati. Courtesy Gabinetto dei Disegni e delle Stampe, Uffizi, Florence (3462A).
Figure 2.6  (top) Modano for the cornice of San Giovannino in Florence, Bartolomeo Ammannati. Courtesy Gabinetto dei Disegni e delle Stampe, Uffizi, Florence (3463A).

Figure 2.7  (bottom) Modano for the architrave of San Giovannino in Florence, Bartolomeo Ammannati. Courtesy Gabinetto dei Disegni e delle Stampe, Uffizi, Florence (3464A).
Figure 2.8 Modano for St. Peter in Rome, Antonio da Sangallo il Giovane. © Gabinetto dei Disegni e delle Stampe, Uffizi, Florence (7976A).
Figure 2.9  Modano in Alessi, Il Libro dei Mistri (forthcoming)

Figure 2.10  Sacoma for the Corinthian order, Vincenzo Scamozzi (1615). Excerpted from L’idea della architettura universale, Ridgewood, N.J: Gregg Press (1964).

Figure 2.17  Mason tracing a template on top of a partially squared block (Stuttgart, 1477). University of Heidelberg, Codex Palatina Germ 17, Kings Paralipomenon I and II, Ezra, Tobit, Judith, Esther, Job (1477).

Figure 2.18  Medieval craftsmen drawing directly on the stone (1360). Excerpted from Günther Binding, *Medieval building techniques*. Stroud: Tempus (2004). Bibliothèque de l’Arsenal, ms. 667, fol. 10.
Figure 2.19  Master mason at a drawing table, Rodericus Zamorensis, Speculum vitae humanae, fol. 73 (Augsberg 1477). Excerpted from Günther Binding, Medieval building techniques. Stroud: Tempus (2004).


Figure 2.23  Modano for a fireplace bracket, containing evidence of pouncing, Giovanfancesco da Sangallo, Rome (16th c). Excerpted from Millon and Lampugnani, The Renaissance from Brunelleschi to Michelangelo: The Representation of Architecture (1994), pg. 499, no.117.  Gabinetto dei Disegni e delle Stampe, Uffizi, Florence (317Ar).
Figure 2.24 Cartoon for The Trinity, Santa Maria Novella, Masaccio (1427). Excerpted from Carmen Bambach, *Drawing and Painting in the Italian Renaissance Workshop: Theory and Practice, 1300-1600*, Cambridge University Press (1999).

Figure 2.27  Section drawing of San Lorenzo façade, Michelangelo, possibly as a template for the wood model maker. Excerpted from Charles De Tolnay, Corpus dei disegni di Michelangelo, no. 504r (1976-1980). © Casa Buonarroti, Florence, 51A.
Figure 2.28  Doryphoros as the canon of Polyclitus, Museo Archeologico Nazionale di Napoli.
Figure 2.29 Overlay of Corpus 203v and Corpus 204v, showing points of match and deviation. Original drawings in the care of Casa Buonarroti, Florence. © Author of dissertation.
Figure 2.30  Detail of *Corpus* 203r (figure A.1). Original drawing in the care of Casa Buonarroti, Florence. Photo © author of dissertation.

Figure 2.31  Detail of *Corpus* 203r (figure A.2). Original drawing in the care of Casa Buonarroti, Florence. Photo © author of dissertation.
Figure 2.33  Personification of *Ingegno*, Cesare Ripa (1615). Excerpted from Cesare Ripa, *Nova iconologia di Cesare Ripa pervgino*. Padova: Per P. P. Tozzi nella stampa del Pasquati (1615).

Figure 2.34  Sculptor’s drill (trapano). Excerpted from Charles Seymour, *Michelangelo’s David: A Search for Identity*. New York: The Norton Library (1967), fig. 4.
Figure 2.35  Actual size overlay of Corpus 539 and Corpus 534 showing implausibility of attribution to Laurentian library. Original drawings in the care of Casa Buonarroti, Florence. © Author of dissertation.

Figure 2.36  Verse fragments juxtaposed with figural sketch, Michelangelo. Excerpted from Charles De Tolnay, Corpus dei disegni di Michelangelo, no. 225v (1976-1980). Casa Buonarroti, Florence, Archivio Buonarroti, XIII, fol. 169.
Figures 2.39 (top) / 2.40 (bottom)  Detail of Corpus 539r (figure A.21). Original drawing in the care of Casa Buonarroti, Florence. Photo © author of dissertation
Figure 2.41  Profile studies, Laurentian Library, Michelangelo. Excerpted from Charles De Tolnay, Corpus dei disegni di Michelangelo, no. 202r (1976-1980). © Casa Buonarroti, Florence, 9A.
Figure 2.42  Detail of Corpus 535v (figure A.11) showing evidence of a sliding tracing template

Figure 2.43  Detail of Corpus 535v (figure A.11) showing evidence of tracing and free-hand used together.
Figure 2.45   *Temperancia*, Lucas van Leyden (1530). Rijksmuseum (Netherlands).

Figure 2.46   Boboli slave ("schiavo che si ridesta"), Michelangelo, held in the Galleria dell’Accademia, Florence. Excerpted from Ficacci, L., & Rapetti, C. (2008). *Carrara, Michelangelo e il marmo*. Milano: F. Motta, pg. 140.
Figure 2.47 Overlay of Corpus 537 and Corpus 534 showing implausibility of attribution to Laurentian Library. Original drawings in the care of Casa Buonarroti, Florence. © Author of dissertation.
Figure 2.50 Detail of Corpus 537v (figure A.16) showing inked line adjacent to cut line.
Figure 2.51 (left) Drawing and cutting tools, Giovanni Antonio Tagliente, Opera Nuova, fol. 25r (1530). Excerpted from Carmen Bambach, *Drawing and Painting in the Italian Renaissance Workshop: Theory and Practice, 1300-1600*, Cambridge University Press (1999).


Figure 2.54  Detail of Corpus 536v (figure A.13). Original drawing in the care of Casa Buonarroti, Florence. Photo © author of dissertation.
Figure 2.55  Matching of the ‘forma’ in Corpus 538r with the confirmed tracings on Corpus 534r, after Wallace (1994). Original drawings in the care of Casa Buonarroti, Florence. © Author of dissertation.

Figure 2.56  Detail of Corpus 538v (figure A.19) showing residue of template use in black pencil (lapis nero).
Figure 2.57  Detail of Corpus 538r (figure A.18). Original drawing in the care of Casa Buonarroti, Florence. Photo © author of dissertation.

Figure 2.59 (right)  Personification of Prudenza, Cesare Ripa (1615). Excerpted from Cesare Ripa, *Nova iconologia di Cesare Ripa pervgino*. Padova: Per P. P. Tozzi nella stampa del Pasquati (1615).

Figure 2.60 (bottom)  Punishment of Tityus, one Michelangelo’s so-called ‘gift’ drawings to Tommaso Cavalieri (1532). Excerpted from Charles De Tolnay, *Corpus dei disegni di Michelangelo*, no. 345r (1976-1980). Royal Library, Windsor, inv. 12771r.

Figure 2.61 (left)  Resurrection of Christ, Michelangelo (1532). Excerpted from Charles De Tolnay, *Corpus dei disegni di Michelangelo*, no. 345v (1976-1980). Royal Library, Windsor, inv. 12771v.
Figure 2.62  Studies for a Virgin and Child with notes to Antonio Mini, Michelangelo (1524). Excerpted from Charles De Tolnay, Corpus dei disegni di Michelangelo, no. 24Or (1976-1980). Trustees of British Museum, inv. 1859-5-14-818r.
Figure 2.63  Origin of Painting, fresco, Giorgio Vasari, Sala Grande in Casa Vasari, Florence (ca. 1572).

Figure 2.64  Origin of Painting, fresco detail exposed with raked light exhibiting score marks in plaster, Giorgio Vasari.
Figure 2.65  Frontispiece, De humana physiognomonia, Giovanbatista della Porta, Napoli (1586).

Figure 2.68  Detail of Corpus 525v (figure A.7).  Original drawing in the care of Casa Buonarroti, Florence.  Photo © author of dissertation.
Figure 2.69 Study for a monumental portal, Michelangelo (ca. 1560). Excerpted from Charles De Tolnay, *Corpus dei disegni di Michelangelo*, no. 615r (1976-1980). Casa Buonarroti, Florence, 73A.

Figure 2.70 Study for Porta Pia, Michelangelo. Excerpted from Charles De Tolnay, *Corpus dei disegni di Michelangelo*, no. 619r (1976-1980). Casa Buonarroti, Florence, 106A.
Figure 2.71  Detail of *Corpus* 528v (figure 2.32) showing pochéd profile.

Figure 2.72  *I tre primi libri...*, Gherardo Spini (16th c.) Excerpted from Franco Borsi, *Il disegno interrotto: Trattati medicei d’architettura*. Florence: Gonnelli (1980), pg. 25.


Figure 2.76 Profiles, *De architectura*, Cesare Cesariano (1521). Excerpted from Cesare Cesariano, *De architectura, facsimile of 1521 Como edition*, Milano: Il Polifilo (1981), fol. 47v.

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**IONICARVM SPIRARVM EX DIVERSIS MEMBRIS SYM- METRIATIS PERMVATATISQ TORIS AC SUPERCILIUS FIGVRA**

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**Cymatium, called cyma reversa.**

**Plinth, called abacus.**

**Echinus, called ‘nuovolo.’**

**Annulets, called ‘regoli’ or ‘gradetti.’**

**Hypotrachelium, called frieze.**

**Astragal or ‘tondino.’**

**Apophyge, called ‘collarino.’**
Figure 2.77 Profiles, Michelangelo. Excerpted from Charles De Tolnay, Corpus dei disegni di Michelangelo, no. 530r (1976-1980). Casa Buonarroti, Florence, 9A.
PART II: TEMPERING STONE
BETWEEN VIA MOZZA AND SAN LORENZO

...spirit (spiritus) is a very tenuous body, as if now it were soul and not body, and now body and not soul
Ficino

But it is not possible that two things along should be conjoined without a third; for there must needs be some intermediary bond to connect the two
Plato

material incarnations: from paper to tin

On the last day of March, 1524, Michelangelo documented the transfer of several large blocks of marble from the workshop at Via Mozza to the fabbrica of San Lorenzo. One of these blocks, sized 4 braccia high by 1.5 braccia long by 3/4 braccia wide, was tagged for lavoro di quadro, a sizable specimen requiring seven assistants to move it. In preparation for the work on the San Lorenzo site, he purchased a sheet of tin for making rigid templates.3 While the figural work of the Medici Chapel was largely carried out in the Via Mozza workshop, the fitting and cutting of the architectural work had to occur at the building site in direct relation to the existing building. The characterization of the architecture was a combination of near and far, where Michelangelo’s imagination in Via Mozza was projected onto stones being cut at San Lorenzo. Between these two sites, the templates traveled, although it was not the paper drawings hitherto examined that made this journey. Before following the massive marble block to the building site, they first had to be transferred onto a more substantial medium - something with the durability to survive the rigors of workshop use. As paper objects, modani could still be modified, traced, copied, or showed to the patron. Their translation onto other materials, however, played a key role in their signification as tools for tempering as they proceeded from ephemeral to more durable objects. Once traced onto a more firm substrate, modani could be effectively used to match profile edges and act as guides during the multiplicity of carvings required in making the lavoro di quadro.

Documents from 15th and 16th century building campaigns suggest that this transferring procedure was reflected in rather precise terminology between the templates made for design purposes and those made explicitly for the quarry or building site. Such a distinction between terms occurred at the construction of the Troyes cathedral in the 1450s, for example, where the

1 “…Ipse vero est corpus tenuissimum, quasi non corpus et quasi iam anima, item quasi non anima et quasi iam corpus”, Ficino, De vita, III.iii.31 (Kaske and Clark 2002: 256-257).
3 “… una carta istagniata per fare modani”, Ricordi, CXIX (Ciulich and Barocchi 1970: 125).
paper templates, referred to as false moulds ("faulx moles") were distinguished from their wood counterpoints, which were simply "moles". These "false" paper templates could be easily carried to the quarry, where they would be transferred onto wood and take on their role as construction-ready templates. In Spain in the 1560s, at the construction site of the Escorial, wood templates made from drawings were known as "moldes" to differentiate them from their parent drawings on paper, called "contramoldes".

In northern Europe between the 12th and 15th centuries, the preferred substrate for stone-cutting templates was wood, as has been well demonstrated by Lon Shelby, who presented ample evidence for the common use of wood templates in England and those regions north of the Alps. In the Italian cities, the use of wood was commonly associated with large templates, such as those used in column profiles, bell casting, or the guiding of vault curvature. In guiding the *lavoro di quadro*, thin metal sheets were often the preferred template material. As early as 1378, for example, documents at the *Opera del Duomo* note the purchase of large amounts of tin for making *modani*. And around fifty years later, during Brunelleschi's supervision of the Duomo lantern construction, the *Opera* record a payment for a "*modano di fero*", a metal template, for guiding the stone-carving. Similar transactions are indicated by Il Cronaca in the building of the Strozzi Palace, and, in the Veneto during Palladio's work on the Basilica in Vicenza, several references point toward the common purchase of metal sheets for *sagome*. Unfortunately, no metal templates of any kind are known from the cinquecento building site, so their qualities cannot be physically confirmed. However, medieval representations of rigid templates are often

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4 See, for example, "...A Jaquet le maçon pour porter lesd. faulx moles a Airgermont per ses despens, 3s. 4d." (Murray 1987: 147); and a payment to a certain mason Nicolas Savetier in 1497, "...pour porter a Colleçon Faulchot aucuns faulx mosles..." (Murray 1987: 172).
5 See documents from the Escorial in Wilkinson 1991: 263-275. On the discussion of moulds and countermoulds, see, "Al quinto capitolo, que trate que los aparejadores de canteria tienen cada uno un oficial de carpinteria en las casas de su traza y conviene que no los tengan, sino que los contramoldes se hagan en el taller del aparejador de carpinteria...Parece a la Congregacion, que los oficiales que fueron necesarios ocuparse en hacer contramoldes concernia se les mandase hacerlos en la casa meyor de traza donde se pueden ayudar el uno al otro y ser visitados del aparejador de carpinteria y sobrestantes." (Wilkinson 1991: 267, fn. 16); cf. Kubler 1982: 35.
6 Other much less common template materials included canvas and parchment (Shelby 1971: 142-143). Shelby notes that in England the wood for templates was often imported at a considerable expense.
7 There were certainly exceptions, and, as templates were sometimes traced and cut onto their rigid materials by carpenters, e.g. Vasari, *Vite* (Milanesi 1906: VIII, 371), it is not often clear what materials are being used as the template on the construction site. I have seen Italian references of possible wood templates for making *modenature*, for example, in Palladio's Basilica in Vicenza, a purchase of "...2 tavole da far le sagome" (Burns 1991: 207) and payments to a carpenter, Masetto Martin, "*per sagome & altre future apertinenti a tal fabrica*..." (Burns 1991: 208). Michelangelo records a payment to the carpenter Baccio di Puccione, "...*per un modano d'una mensola*" on April 14, 1524, although it is not clear in this case if he is speaking of a full-size wood model or a flat template; cf. Ruschi 2007: 84.
8 On the 10th of April 1378, the *operarii* of the Loggia delle Signoria contract with ser Agnolo Trulli de castro sancti Nicholay for "...*libras centum uiginti stangarum ferri pro columnis loggie grosse modeni, de quo ispe ser Agnolus habet modenum et mensura et simile habent operarii dicte opera*." (Frey 1885: 289, doc. 28).
10 17 November 1491, a payment for "*foglie sengnati che ssono per modello degli usci delle loggie...*", in Goldthwaite 1973: 193. I am interpreting 'sengnati' as 'stagnati' (tin).
11 On the Basilica, "...Adi 2 Marzo [1550] have M.o. Alovise spezapreda per comprar 12 sfogi de bande de Sagome per la comise, troni 3, marchetti 12." (A trono is a silver coin equal to one lira). And for the stone mason Sbari, a purchase of "*un pezo di lama di fero da fare e 2 sagome*" on the 12th of March 1555. Both references found in Burns 1991: 204 and 207.
distinguished by their exhibition of a small square or round hole made in the surface of the template for hanging at the workshop or worksite (figures 2.20 and 3.1).

Based on surviving ricordi, Michelangelo’s favored material for the modani at the Via Mozza workshop was tin (fogli stagnati). Costing four to five soldi for a single foglio, a typical purchase of three tin sheets equaled the day rate of a highly skilled capomaestro. Costing four to five soldi for a single foglio, a typical purchase of three tin sheets equaled the day rate of a highly skilled capomaestro.12 Equivalent in cost to about 60 sheets of regal-sized paper, the use of metal templates certainly represented a substantial investment in the quality and durability of the profile transfers. During a flurry of activity on the Medici Chapel and Laurentian Library throughout 1524, Michelangelo noted at least six separate purchases of tin sheets. They included, among others, payments for, "una carta istagnati per fare modani" (on March 15), "quattro bande di ferro stagniato per fare modenature" (on March 31), and "tre fogli stagniate pe' modani delle finestre di fuora della liberria" (on April 15).13 It is not clear how much, if any, Michelangelo involved himself in the actual fabrication of the metal templates. Evidence suggests that the transfer from paper to tin was largely carried out by the San Lorenzo scarpellini, although this task was often undertaken by carpenters on other building sites across Italy. Although Michelangelo did not make the metal templates himself, he involved himself right up to the point of the actual stone cutting, making verbal and possibly graphic modifications as the stone carvers worked. And since their creation from his paper versions represented the most durable and least malleable iteration of the paper profile cut, one may surmise that the decision to initiate such a transfer onto tin was made by the artist himself.

Tracing the paper onto tin, however, appears to be more than just a practical solution to the problem of construction reuse and site durability. The use of thin metal sheets, in fact, may be one of the distinguishing characteristics in the use of the term modano, especially as it

12 Ricordi, CXVI and CXVII (Ciulich and Barocchi 1970: 114 and 122); cf. Wallace 1994: 171. Palladio's purchase of tin sheets in Vicenza (noted above) is nearly equal to the price paid by Michelangelo in Florence.
13 Respectively, Ricordi CXVI, CXIX, and CXXIII (Ciulich and Barocchi 1970: 114ff). Other, similar references are found in Ricordi, CXVII, CXXIII, and CLIII.
14 Vasari suggests this in Vasari, Vite (Milanesi 1906: VIII, 371), as do documents from Palladio's building site at the Basilica (Burns 1991: 208). Michelangelo, while commonly employing carpenters, appears to have relied on the stone carvers to produce the tin templates. See, for example, where he suggests that the tin sheets were both purchased and made by his assistant stonemason Meo delle Corte: "E a dì ultimo di decto [april] deci 13 soldi e un quattrino a Meo della Corte per ferro stagniato che io lo mandai a chomperare per fare modani per la sagrestia", Ricordi, CXXIII (Ciulich and Barocchi 1970: 129); or where he makes a payment to Bernardino Basso, a stone-carver and capomaestro, "per tre fogli stagniati pe' modani delle finestre di fuora della liberria", Ricordi, CXXIII (Ciulich and Barocchi 1970: 133). On the façade of S. Pietro di Castello in Venice by Palladio, the sagome were probably made by masons after the drawings given to them by Palladio (Zorzi 1967: 30, doc. 1).
15 For recent comments on this, see Mussolin 2006: 95-96 and Thoenes 2009: 25-37. Manetti describes how Brunelleschi often dictated the ornaments of a building verbally just before the time of execution, and how he managed the construction, "cosa per cosa (bit by bit)", directly on the construction site as the work occurred. See Manetti, Vita di Filippo Brunelleschi (Perrone 1992: 123-124) and Saalman 1980: 116.
16 The intermediate metal template has been generally dismissed as having any significance beyond its immediate practical requirements on the building site. In fact, it has yet to be discussed in any substantive manner within the context of Michelangelo. In a post-Enlightenment reading on the practice of template-making, the metal version is a transparent carrier of the profile between the paper and the stone, easily explained by the need for more durable surrogate templates on the construction site.
compares to the closely related word, *modello*. Within 14th and 15th century documents there is some elasticity between the use of *modello* and that of *modano*. Not only are there direct textual inconsistencies, but there appear instances of *modello* that refer clearly to flat templates. In Filarete’s *Trattato*, for example, at the end of book eight, we find what seems to be an apparent reference to flat template drawings:

I explained the means and the drawings and I gave direction as to that which I wanted done first, and then [I explained] the constructed models (*modelli*) of the ornaments of the edifice that I wanted to make first.

mostrati i modi e gli disegni e dato a intendere in prima quello volevo fare, e così fatti i modelli degli ornamenti dell'edificio volevo prima fare....

One wonders, in fact, what exactly was meant by the architect making ‘*modelli*’ of ornaments, and if this could refer to flat template drawings. This suspicion is confirmed upon the cross-referencing of the same passage in Filarete’s Palatino MSS. The word "*modini*" is used in place of *modelli* in this same passage, further highlighting the slippage between "*modello*" and "*modino*".

In Devoto’s *Avviamento all Etimologia Italiana*, "*modino*" is described as a derivative of the Latin *modulus* (measure) with the addition of a suffix derived from the Latin word *pampinus*, or grape-leaf. Since the Italian *modello* also owes its origin to the Latin *modulus*, the association with grape leaves suggests the notion of the *modano* as a kind of ‘leaf-model’. As two-dimensional models, *modani* could be directly implemented on the construction site without the use of intervening devices, such as those measuring tools and dividers required for copying three-dimensional models. Since paper would be inadequate for the rigors of the construction site, the use of an analogous, more durable material would be necessary to retain the drawing-like (i.e. flat) qualities of the paper template. Hence, tin emerges as a pliable, flat material that embodies the qualities of a leaf-like drawing as well as acting as a durable construction implement.

18 The authoritative copy of Filarete’s *Trattato* is the Codex Magliabechianus, Firenze, Bibl. Naz. II, I, 140. The Codex Palatinus is a contemporary 15th century copy that was probably derived from a common ancestor with the Magliabechianus, perhaps Filarete’s autograph (now lost). Since the Palatinus was not copied directly from the Magliabechianus, we can be less certain of Filarete’s original language. On the various extant MSS of Filarete’s *Trattato*, see Finoli and Grassi 1972: civ - cxxxix.
19 Devoto 1968, see entries for "modine" and "modano".
20 Cartoons, another type of flat model, share many of the same properties as *modani*: they were models of the same size as the realized work, they could be traced or otherwise copied directly onto the work, and they were leaf-like. However, a key difference is that *modani* were two dimensional models that facilitated the construction of three-dimensional space.
21 Alberti describes a procedure of copying models in *De statua*, as does Cellini (Milanesi 1857: 205-206) and Vasari (Milanesi 1906: I, 154 and Brown 1960: 190ff); all require substantial mechanical apparatus to obtain a direct copy. Some have speculated the Michelangelo used a mechanical copying method, although this seems dubious; see discussion in O’Grody 1999: 136-144.
22 This would also support the conclusion that most Italian *modani* were often made of tin instead of wood, since, at the size required to make ornamental stone carvings, a wood template would be more panel-like than leaf-like.
Curiously, among the wide range of materials associated with *disegno* in the 14th and 15th centuries, metal is rarely, if ever, mentioned. In Florence, a *disegno* or *disegnamento* might reside on paper, clay, wood, or plaster, but the use of metal appears to be associated only with the making of templates. Upon the acceptance of a new model by the *Operai* in 1367, for example, the committee insisted on the destruction of every previous *disegno* submitted, "...whether it be of clay or of wood or on paper...". In a competition for the design of a column, the *Operai* called for a full-size plaster *disegno* constructed on the exterior cathedral wall, facing a busy street so citizens could judge for themselves. Filarete referred to a *disegno rilevato di legname*, clearly a three-dimensional model made of wood. Among the various materials available in the 15th century worksite, metal does not appear to be appropriate for acts of *disegnare*. However, the close association between the flatness of a drawing and the flatness of the metal must have opened up associations between *disegno*, as acts of imagination, and the working of the stone through flat templates. Just as the cutting of paper was an analogous practice to the cutting of stone, the leaf-like quality of the paper operated analogously with the leaf-like quality of the worksite template.

As conceiving ornaments was the responsibility of painters and sculptors trained in *disegno*, an important practice developed around the requirement of translating two-dimensional drawings on paper or parchment into tools for use by stone carvers. Modani were a key type of model that connected *disegno* with the worksite, a contention that is confirmed by Vasari's previously discussed connection between *profili* and the role of *disegno* for architects. Flat drawings, as opposed to three-dimensional models, invited the architect to construct spatial depth within the invisible realm of the imagination, and it was the surrogate tin models that propelled the imagination into a direct analogue with the actual carving of stone. Working from paper to tin allowed the leaf-like characteristic of a drawing to bear directly on the architect's thinking in the future stone. In other words, it facilitated an immediate connection between the imagining of the building detail in section and the means by which it would be executed. The importance of modani as imaginative devices hinges on their understanding as types of modelli, and thus falling under the rubric of *disegno*.

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25 Filarete, *Trattato di architettura* (Finoli and Grassi 1972: I, 40). The association of *disegno* with both models and drawings has suggested that the technical use of *disegno* had a broad usage, similar to today, in fact, when one speaking of a 'design' may be referring to a drawing, model, or idea. For an introduction, see the dispute between Michael Hirst and Carmen Bambach on Hirst's use of the term *modello* to refer Michelangelo's demonstration drawings to patrons (Hirst 1988: 79; Hirst and Bambach Cappel 1992: 172-173). Alberti seems to clearly refer to a drawing when using *modello* in *Della pittura*, Book III, for example, although *modello* is absent from Vasari's and Baldinucci's drawing types ("*schizzo*, *disegno*, *cartone"), see Bambach Cappel 1990: 497.
26 Beside Alberti's contention that ornaments were the responsibility of painters, mentioned in Part I, a host of other Florentine documents from the period attest to this relationship. See Mustari 1975: 185ff and Oertel 1940: 239ff.
27 Vasari, *Vite* (Milanesi 1906: I, 169-170)
In 14th century Florence, when two-dimensional modelli were traced onto tin, they became modani.\(^{28}\) The consonant 'n', present in all forms of modano (such as modino, modeno), appears in Florentine building documents initially in its Latin form, modinum, by the mid 14th century. While templates use was certainly nothing new, the application of modani emerged as a term defining specific types of models that could be produced by the capomaestro and directly implemented by stone carvers on piece-work. One of the more direct distinctions was recorded on the building site of Santa Maria del Fiore in early 1383, when a simultaneous order was placed for four sheets of metal for "modeni" and four sheets of parchment for "modelli". The metal sheets provided a substrate to make modani for cornices, while the parchment sheets for making modelli were distributed among painters, goldsmiths and the capomaestri Corsum and Francesco Talenti.\(^{29}\) Initially speaking, anyhow, the distinction between modelli and modani originated in the differences between those trained in disegno, who made the modelli, and those who perform the actual stone cutting with the aid of leaf-like modani.

The point has been raised, however, that by the 16th century the paper templates were also referred to as modani, as Michelangelo often labeled his own paper drawings as a 'modano' (e.g., figure A.1).\(^{30}\) When Alberti sent his "modoni" to Gonzaga, for example, he probably was speaking about paper drawings, not metal templates.\(^{31}\) And when Palladio mailed his "sagome" to the building committee at San Petronio in Bologna, he surely had in mind the paper versions.\(^{32}\) Interestingly, the erosion of a clear distinction between metal templates and paper drawings coincides more or less with the arrival of modanatura as a theoretical discipline.\(^{33}\) The rubric of proportioning stone profiles adopted the language of the building site as it moved from an embedded discipline of sculptors and painters to a metaphysical undertaking governed by theory. The pinnacle of this progression was represented by Scamozzi, who wrote that, "the templates (or profiles) are the true portrait of the detailed form of the parts".\(^{34}\) In this metonymic procedure,

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\(^{28}\) That a modello might also be a two-dimensional (non-template) paper drawing is discussed at length by Hirst. Bambach disputes the use of modello in this way, asserting that in the 16th century the term is nearly always in association with plastic, three-dimensional objects (Hirst and Bambach Cappel 1992: 172-173). Michelangelo, for his part, appears to have used the term in his letters predominantly in reference to a three-dimensional model rather than a drawing. See survey of his letters on the term in Bambach Cappel 1990: 497-498 and the index of Michelangelo’s letters (Barocchi 1994) under the term modello and its variants.

\(^{29}\) Recorded on 19 March 1383, "Quattour modeni ferrei, quorum tres erant pro cornicibus. / Quattuor modelli in cartis pecudiantis, quorum duo fuerunt fatti per magistros pittores et aurifaces, unus pro fundamento et alter pro lievo; et alii duo pro fundamento, unus factus per Corsum, et alter per Symonem Francisci Talenti", (Guasti 1887: 265 doc. 341).

\(^{30}\) That Michelangelo also thought of modani as being made with paper is evident in Ricordi, CXXIII (Ciulich and Barocchi 1970: 132) with a payment for "...dua quatrini di carta per modani".

\(^{31}\) See Part I for a discussion on the letter of Feb 27, 1460, where Alberti writes: "E [i] modoni de Sancto Sebastiano, Sancto Laurentio, la logia, Et V[ergilii] sono fatti, credo non vi despiaceranno" (Braghirolli 1869: 8).

\(^{32}\) See, for example, a letter dated 25 April 1579 from Palladio to Giovanni Pepoli, "Mando a V.S. il disegno et sagome delli tre ordini, eccetto del capitello et base del ordine ionicho, quale già fecci delì; il rimanente, che sonno de porte nichii et altro, mandarolle unaltra fiatta; et occorrendo le sagome del porticho, et avisandomi, mandarolle anche elle..." (Gaye 1839: III, 332-333, doc. CCCIII). In further support that the sagome were made of paper, it is also noted by Gaye that this letter was addressed with a "canone di banda con disegni et sagome" (Gaye 1839: III, 333)


\(^{34}\) "Le sacome sono il vero ritratto della forma particolare delle part", Scamozzi 1964: II, 139-140.
what was originally a metal template (*modano, sacoma, or sagoma*) came to signify not only the paper version but also the stone profiles themselves. One sees this already in Palladio, for whom the *sagome* or *modani* signified a drawn profile as well as the stone profiles themselves. In reference to the stone profiles of the Pantheon, Palladio marveled:

> the capitals of the Pantheon are carved in olive leaves; the architraves, the frieze, and the cornices have the most beautiful *sagome* or *modani*.

> *I capitelli [del Pantheon] sono intagliati a foglia, gli architravi, i fregi e le cornici hanno bellissime sagome o modani.*

Palladio and Scamozzi's invocation of the immaterial quality in the stone profiles owes much of its power to the architect's imagination inhabiting the space between the leaf-like template / drawing and the full-bodied stone. Embedded in the metonym between the tool (template) and the tooled (cut stone) is the notion that an architect must imagine the cutting of stone through the translation of a two-dimensional leaf-like material into the depth of an experiential, three-dimensional space. Such a procedure empowers the mind's eye in the imagining of figurative qualities of character as well as atmospheric conditions such as light and shadow. Templates retain the agency of drawings and models as vehicles of *disegno*, but they do so through analogous practices to those on the construction site. As such, they are model-like as well as leaf-like, and they empowered as direct tools for construction at the same time. Such a peculiarity suggests a dialectic procedure between their use as on-site practical tools and their inclusion as *disegno*. In fact, it is their very directness to the construction process that ultimately makes the connection between *disegno*, as a dialogue between mind and hand, and the architect's imagination to work between the drawing board and the construction site.

**Corpus 534 and the abundance of the copy**

Just as was observed in his transfer techniques with cartoons in Part I, where the shifting and sliding of the cartoon was exploited to great creative effect, the time utilized in the progression from paper to tin was elongated or contracted as needed for creating the well-tempered profile. The tempering of *disegno*, while preparing the paper drawing to leave the drawing board, was an act of breathing life into the profile. Rather than departing the drawing board as 'frozen' or 'finalized', the paper template thus continued to evolve within the shifting situation of the building site and Michelangelo's own temperament. In this way, we should not

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35 See Palladio, *I quattro libri dell'architettura*, Book I, ch. XIII; Book I, ch. XXVI; Book IV, ch. X. See also Scamozzi “...le *sacome* sono il marco e sigillo dell'opera stessa, dalle quali ne risulta la perfettione, o imperfettione dell tutto” (Scamozzi 1964: II, 139).

allow modern predilections toward formal separations into drawing stages to skew the actuality of Michelangelo's working method.

Fortunately, a large folio exists that records the continued prerogative of the artist to adjust and modify the templates even as they were leaving the workshop. Corpus 534 (figures A.8 and A.9), currently in the care of the Casa Buonarroti, contains tracings of paper template drawings for the Pietra Serena (hard, grey Tuscan stone) in the portal between the ricetto and the reading room of the Laurentian Library. Acting as a spectacular collage of details, this folio is also notable because of the remarkable correspondence between the drawn profiles and those of the stone as it was actually carved. Unlike any of the other surviving templates thus considered, the modani recorded on 534 are the only profiles that come close to matching the in-situ stone work.

A close examination of the recto and verso reveals multiple notable factures. Beginning on the recto (figure A.8), three profiles are displayed on Corpus 534, referred to from left to right as profiles A-B-C, respectively. Profile A is labeled in Michelangelo's hand as, "the copy of the cornice of the modani of the doors for the library given to Cecone (la copia della cornice de' modani delle porte della libreria date acCechone)." Profile B, also in Michelangelo's writing, is indicated as, "the modano given to Cecone / for the jambs of the said doors of the library (el modano dato acCechone / degli stipit delle dexte porte della lib[re]ria)." And finally, profile C outlines a stair nosing detail, labeled as, "the modani of the stair treads given to Cecone (e' modani degli scaglioni dati a cCechone)." All three profiles (A-B-C) were first traced in pencil (lapis nero) before they were inked, as may be seen prominently a detail of profile A. Flipping the sheet over reveals two more profiles, rotated at ninety degrees with respect to the recto (figure A.9). The upper profile (labeled 'D') is noted as the "modano of the said doors of the frontispiece facing the ricetto (modano delle dexte porte del fro[n]tone to[n]do dirieto); and the lower profile (E) reads, "the modano of the frontispiece of the said doors facing the reading room (el modo[no] del fro[n]tone (above: frontespitio) tonodo (crossed-out) delle dexte porte, cioe del dinanzi))." These profiles were both traced in pencil only; there is no evidence of inked trace-over.

The consensus among scholars is that this folio is a 'workshop copy', as is confirmed by Michelangelo's autographed affirmation that profile A is 'la copia'. By this interpretation, Corpus 534 is simply a tracing of the paper templates made before departing the workshop - a kind of record for the artist's own keeping. Beginning with the early work done by Geymüller (1904) and Thode (1908-1913), this account has been widely accepted, and it was recounted again in the

37 Corpus 534 (Casa Buonarroti 53A) is in the care of the Casa Buonarroti in Florence and was viewed personally by the author on June 7, 2012. See Appendix for bibliography.
38 A possible exception is Corpus 540 - a cut-off or 'negative' template that closely matches in-situ work in the Medici Chapel. See Part I.
drawing’s most recent publication in 2012.\textsuperscript{39} The identification of Ceccone as a stonemason, a trusted agent for nearly 15 years, along with the indication that the profiles on 534 are ‘copies’, leads scholars to conclude that this folio records a moment after the paper \textit{modani} have been cut but before they have been passed to the on-site stone masons.\textsuperscript{40} Michelangelo’s practice of making workshop copies is perhaps correct, but scholars have failed to account for certain irregularities in the factures of the drawing. For instance, profiles A (on the recto) and E (on the verso), are nearly identical, although when overlaid reveal subtle differences. Also, why are the profiles on the recto traced first in pencil and then in ink, while on the verso the profiles are only traced in pencil? These clues complicate the notion that 534 is simply a record of workshop copies. This prevailing interpretation depends on the assumption that the paper templates, upon leaving Michelangelo’s drawing board, would not have been modified further, and that the line from his hand to the cut stone was more or less a linear one without interruptions or changes along the way. Recent scholars such as Mussolin, Joannides, and Brothers, however, have suggested that Michelangelo’s working method deserves re-examining, opening the door for a more nuanced interpretation of \textit{Corpus} 534 as it acts between paper and tin.\textsuperscript{41}

A comparison between the similar profiles A and E, two variations on a pediment profile for the grand portal between the vestibule and the reading room of the Laurentian Library, offers surprising interpretations.\textsuperscript{42} The overlay shown in figure 3.2 articulates the difference: beginning from the lower ornaments, the progression from cyma - two drips - and a cavetto are nearly identical.\textsuperscript{43} Passing along the soffit, continuing vertically around the bead mould and onto the fascia, the sequence of ornaments between the two profiles is also quite similar. The only notable difference occurs in the width of the soffit, which is 18 mm longer in profile A than it is in profile E. Their striking similarity in the midst of minute difference suggests that tracings A and E share the same parent template, although during the tracing Michelangelo continued to modify the profile. In this case, the artist must have shifted the template 18mm to the left during the tracing of A as part of the search for the well-tempered profile, a possibility that is supported by a line break in Profile A where he lifted the pen in order to shift the template. Such a clue throws

\textsuperscript{40} There has been some unsettled controversy over the identity of Ceccone, leading to different conclusions as to the dating of the drawing. Wittkower first identified Ceccone as Francesco di Masino da Corbignano, leading to a dating of \textit{Corpus} 534 to 1526 (Wittkower 1934: 186ff). However, the correspondence of the ‘negative’ template matching with Profile C to \textit{Corpus} 540, and the dating of its poem to 1533, has caused recent scholars to think otherwise. The most recent and plausible scholarship reasons that Ceccone may be identified as the stonemason Francesco d’Andrea di Giovanni Lucchesini da Settagnano, an longtime associate of Michelangelo who worked between San Lorenzo and the macigno stone quarries for almost fifteen years (Cooper 1994: 496-497). Ceccone was an expert assistant who had quarrying and carving experience in most of the major Florentine building at the time, including Santa Maria del Fiore, the Servite Loggia, and San Miniato (Wallace 1994: 81-82). In a contract dated August 20, 1533 (Ciulich 2005: 2009-210, no. LXXXVII), Ceccone, together with four other stone masons, agreed to supply, carve, and supervise the construction of the double-sided portal between the Library reading room and the vestibule as well as the famous freestanding stair. \textit{Corpus} 534 has generally been associated with the work stipulated in this contract, as the details traced in the profiles more or less match those executed.
\textsuperscript{41} Mussolin 2006: 95; Brothers 2006: 188; Brothers 2008: 10; Paul 2000: 133; Wallace 1992: 124.
\textsuperscript{42} The near match between these profiles was described previously in Catitt 2007: 127.
\textsuperscript{43} See Appendix for taxonomy of mouldings.
into question what, exactly, Michelangelo sent to the construction site, and it asks for a reconsideration of the prevailing notion of 534 as a simple workshop copy. If this folio was intended to record that which was to be constructed, it is contradicted by the simple observation that profiles A and E are two different versions of the same stone detail.

A possible explanation may lie in an analysis of what was actually constructed. Fortunately, several detailed building surveys exist, the most current being that published by Portoghesi and Zevi in 1964. The other ornaments being relatively congruent, the 1964 survey shows an overall soffit width of 132mm, while Profile A measures 122mm along the soffit, and Profile E, 104mm. The various relationships between the drawn profiles and the built work, as measured by Portoghesi and Zevi, are shown in figure 3.3. Rossi's authoritative 1739 survey provides an even closer match between the frontispiece profile as it was built and Profile A as shown on Corpus 534 (figure 3.4). The 'copia', then, (profile A) is the most likely parent for what was actually cut on the building site, meaning that either a new paper template was drawn after 534 or further modifications were ordered by Michelangelo as the tin surrogate was being made. Perhaps our contemporary notion of 'copia' has skewed the possible interpretations of this folio; assuming, as it were, that profile A is an identical facsimile indistinguishable from the original paper template. In fact, it seems entirely possible that the 'copia' noted next to profile A points to an in-progress design rather than a finalized or finished profile, designating a more evolved or fuller iteration of the profile line.

Michelangelo's use of 'copia' in other instances points toward the original notion of copia as residing in 'copius', 'plenty' or 'abundance', building a case for a more nuanced interpretation of the word on Corpus 534. Within his lyrical oeuvre, for instance, copia appears in multiple places, where he clearly employs the word within the context of 'abundance' rather than 'facsimile'. In an epitaph written in 1544 for Cecchino Bracci, the living body is understood as a kind of surrogate 'copia' for the lifeless corpse - suggesting that it was life itself which separated the dead body from its living 'copy':

Dead, I'm more alive and dear today to him  
from whom death's robbed me, that I was alive;  
if he loves me more now than when he had plenty (copia) of me,  
then death is good for one who grows by decreasing.

44 My reasoning here follows somewhat that used by Krautheimer in his "Introduction to an 'Iconography of Mediaeval Architecture" (1942). Here he makes the argument that medieval notions of a copy were very different than our own, tending to stress exactitude in qualities (such as square-ness, cross-ness, or round-ness) over precise geometrical mimicry (Krautheimer 1942: 8-10). Schwartz provides another starting point, where he distinguishes between two kinds of copying - one, imitating the process of making, and two, reproducing appearances (Schwartz 1996: 216ff).

45 See Oxford English Dictionary under the entry 'copy': "Plenty, abundance, a copious quantity"; from Latin, "abundance, plentitude, multitude". For Erasmus, who in 1512 published the rhetorical treatise, De Utraque Verborum ac Rerum Copia (Copia: Foundations of the Abundant Style), 'copia' was "the faculty of varying the same expression or thought in many ways by means of different forms of speech and a variety of figures and argument" (Boon 2010: 47). On this origin and the relation to modern use, see Boon 2010: 41-76.
Più che vivo non ero, morto sono
vivo e caro a chi morte oggi m’ha tolto;
se più c’averne copia or m’ama molto,
chi cresce per mancar, gli è ’l morir buono. 46

And later, in an imagined dialogue between Love and Michelangelo, the artist envisions the desire for his beloved as having such great abundance, or copia, that no amount of physical fulfillment would be enough to quench his longing. Here, the poet pleads to Love:

Even so, I’d say of her [i.e. his beloved] that, even if she grants what I am in abundance (gran copia), your reward won’t slake my lofty desire.

Anzi di lei vo’ dire:
s’a quel c’aspiro suo gran copia cede,
l’alto desir non quieta tuo mercede. 47

In his prosaic writings as well, Michelangelo seems to uphold this interpretation. Figural models prepared in clay, for example, undergo a process of ‘copying’ as they are chiseled into marble. 48 And contracts, when produced in the vernacular, were oftentimes prepared simultaneously in Latin, the Latinized version being known as the "copia". 49 The word ‘copia’, it seems, relates to a profusion of quality as well as quantity, suggesting that Michelangelo’s ‘copia’ given to Ceccone was ultimately a matter of tempering, i.e. producing a more exact material manifestation, rather than simply producing a workshop duplicate. 50 It was in the mimicking of the profile through multiple tracings of the same parent template, and not in the precise reproduction of the shape of the template, that Michelangelo instigated a productive procedure of abundant thinking. Just as in the tempering of disegno discussed in Part I, the ‘copying’ of the profile leaving the drawing board was leveraged to great qualitative effect.

Another facture on Corpus 534, hitherto unexamined by scholars, furthers this assertion. All three profiles on the recto (A-B-C; figure A.8) were first traced in pencil, guided by the paper template, and then they were outlined in ink, freehand. On the verso, both profiles (D-E; figure A.9) were traced in pencil only and never received an ink trace-over. As was argued in Part I, Michelangelo’s use of ink on the paper templates generally signaled a higher level of certainty, since multiple, rapid tracings in ink increased the possibility of smearing (esp. Corpus 536, figure

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46 Translation and transcription by Saslow 1991: no. 204, 366.
48 See, for example, in Michelangelo’s letters, “...di questa seckimana che viene farò choprire le figure di sagrestia che vi sono bozzate, perché io voglio che e’ chominicino a murare l’altra sepultura a rischontro di quella che è murata, che è squadrata tucta o pocho mancha”, Carteggio, DCCLII (Barocchi and Ristori 1967: II, 227).
49 As in, “Io dico che detto contratto non intesi che fussi recitate, presente papa Clemente, come ne ebbi poi la copia...”, Carteggio, MI (Barocchi and Ristori 1967: IV, 150). Papal versions of contracts would have been typically written in Latin. See, for example, Milanesi 1875: 635-639. Copies that were meant as facsimiles (e.g. Carteggio, XCVI, DCLXXIX, and CMXXXVI), such as those made of letters or receipts, were often qualified with the phrase, “a punto”, or “exactly”, so as to emphasize the exactitude between the original and the duplicate.
50 Michelangelo’s noted copying of the Codex Coner is another example of how the act of copying was considered by the artist as a fundamentally productive, rather than reproductive, act. cf. Brothers 2008: 50-64.
A.12). By this logic, the template profiles on the recto received ink as a solidification following the pencil from a sliding parent template.

Indeed, what 534 records is not the finality of templates before leaving the drawing board but rather another, perhaps more assured, step in the tempering process. While Michelangelo traced and cut paper in the search for the well-tempered profile, he also maintained the prerogative to make changes even as the profile became more certain. The profiles on 534 were not only meant as workshop records but were also utilized as a productive activity for the copious imagination. This points to the notion that the paper templates remained open even as they were slated for tracing onto tin sheets. As the artist was sending the paper templates to the construction site, he continued to agonize over the profiles.

The necessity of Tin

The progression between two and three dimensions, embodied in the latent agency of the leaf-like template, takes place in the imagination. Michelangelo's templates, imbued with spiritus, operate between the architectural idea and the sensible world. For Ficino, the imagination (phantasia) acts like a mirror between the immaterial Idea (anima) and the material body (corpus), the images of which are perceived by the soul through a hot, vapor-like medium of the spiritus. A closer look at Ficino's spiritus opens up revealing details in the progression from the concetto to the built work of San Lorenzo, further elucidating the non-linearity of the templates discussed in 534. What emerges from this analysis is the criticality of the paper-tin transmutation in the projecting between the worksites. In so doing, the tin template is seen not only as an analogical link between Michelangelo's imagination, the drawing, and the stone, it is also revealed as a crucial hinge point governing the emergence of the experience of the architecture itself.

It should be stated in the beginning that Michelangelo's notion of spiritus was remarkably consistent with Ficino, appearing regularly in his poetry. In general, the artist upholds Ficino's tripartite division between body, spirit, and soul, assigning to the spirit (spirito) the role of the

51 Ficino, Commentary on Plato’s Symposium, sixth speech (Jayne 1944: 189).
52 Ficino’s theory of the spiritus relies on Galenic-Aristotelian notions of pneuma, the vital, air-like entity that moved between the heart and the brain and was governed by the proper mix of body humors (Evans 1945: 291-292). Augustine, who first translated pneuma as spiritus laid the foundation for the Neo-platonic three-part division of perception, providing the distinction between corporeal, spiritual, and intellectual vision (Summers 1987: 114). On pneuma and its transmission into the Italian Renaissance through architecture, see Kenda 2006: 1-21.
messenger agent. The spirito is linked with Love (Amore) as the driving force between the intellect and the senses. This took place along a variety of metaphors, such as the spirit as the medium of love (Rime 41, 59, 60), or the spirit that sees the heart's fire, as in Rime 72. In several poems, such as Rime 157, the spirit dwells in the heart, a conventional image found in Dante and Peripatetic physiology, but in accord with Ficino nonetheless. For the clearest distinction along Ficinian grounds, one discovers an epitaph written near the end of Michelangelo's time at San Lorenzo (1534):

I say to you, who've given to the world
your soul, your body, and your spirit as well:
within this dark coffin is your destined place

Io dico a voi c'al mondo avete dato
l'anima e 'l corpo e lo spirto 'insieme
in questa cassa oscura è 'l vostro lato  

In looking closer in De vita, Ficino explains that the spiritus itself consists of a further three-part division: the natural (spiritus naturalis), the animal (spiritus animalis), and the vital (spiritus vitalis). The tripartite spiritus gives Ficino the advantage of offering a broad range of celestial associations in the transition between body, soul, and character. The spiritus naturalis, for example, is associated with Jupiter and acts of conception (conceptus); it is therefore the least material-like and closest in quality to the soul. Through Jupiter, the spirit receives taste, nutrition, and reproduction. The spiritus vitalis, attended by the Sun, oversees birth and mitigates the body and soul through the sense of smell. Located midway between the natural and the vital spirit, the third division of the spirit, the spiritus animalis, belongs to Mercury and governs acts of nourishment. From this understanding, the progression from the immaterial to material originates in conception, then passes through a period of nourishment, and finally results in the birth of the Idea in the manifest body.

Certain curiosities emerge when Michelangelo's modani are understood as analogous to the spiritus, whose influence mitigates between the breath of the artist and inert building materials. The various material manifestations of the templates offer remarkable associations within Ficino's physiology of the three-part spirit. Just as the invisible is made visible through the spirit (or vise-versa), the occult Idea is made manifest through the templates. The tripartite procedure may be summarized as:

spiritus naturalis - conception - paper template(s)
spiritus animalis - nourishment - tin template
spiritus vitalis - birth - stone (i.e. a piece of stone)

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54 Translation and transcription by Saslow 1991: no. 110, 244.
55 On Ficino's three-part division, see his De vita, I.ii.22, III.xi.73, II.xi.78; see also Walker 1985: 134.
By relating the templates in this way, the *spiritus* is found to encompass both the templates (in paper and tin) as well as the actual stone detail. It thus accounts for the entire range of activities between conception and the birth of the building through the stone detail; between occult and manifest. Additionally, the location of the tin template emerges as a hinge point within the three-part *spiritus*. As the mid-point within the in-between entity (the *spiritus*), it occupies a pivotal position in the entire progression between corporality and the artist's concetto. Such a recognition confirms the non-arbitrary role played by the metal templates in what is often viewed as a simple, pragmatic solution to the use of fragile paper templates. Here, the tin template becomes the messenger between the paper and the piece of stone: the nourishing force between conception and birth.\(^{56}\)

It should come as no surprise, then, that tin, one of the ancient world’s seven known metals, contains remarkable alchemical associations with nourishing and generation. A principally Jovial metal, tin kept company with the most common qualities attached to Jupiter, the most temperate planet on account of its middle position in the Ptolemaic cosmos.\(^{57}\) Regarding Jovial attributes, the 16th German philosopher Agrippa of Nettlesheim wrote succinctly on the subject:

> Things under Jupiter, amongst elements, are the Air: amongst humors, blood, and the spirit of life, also things which respect the increase nourishment, and vegetation of life...amongst metals, tin, silver, and gold, by reason of their temperateness...\(^{58}\)

Tin therefore radiated a certain temperance, and through this it was understood as an airy material - associated with breath, blood, and, by extension, the *spiritus*. In light of its temperance, tin was a supple material, and, like gold and silver, it could be easily worked.\(^{59}\) Biringuccio notes how tin, when combined with other metal such as copper or iron, vitalizes the other metals and introduces a *spiritus* to the alloy. Such a procedure is demonstrated through the increased resonance of the metals upon having tin mixed with them, "...just as if puts the spirit there and vitalizes the substance".\(^{60}\) Cennini writes that a principle use of tin is in the making of a drawing stylus - an alloy of two parts lead and one part tin. The tin acts as a hardening agent that vitalizes

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\(^{56}\) Filarete describes a similar procedure. With the help of the patron, who supplies the idea, a conception occurs within the mind of the architect (Finoli e Grassi, *Trattato*, I, 40). After a gestation period of nourishment (*fantasticare e pensare e rivoltarselo per la memoria in più modi*), the architect gives birth to a small wooden model (*...uno disegno piccolo rilevato di legname, misurato e proporzionato come che ha a essere fatto*...), or, perhaps in our context, the architect gives birth to a shiny template (another kind of *disegno*).

\(^{57}\) "...nothing can be thought of that is more temperate than Jupiter (*neque temperatius aliquid cogitari quam Iuppiter*)", Ficino, *De vita* III.19 (Kaske and Clark 2002: 346–347). Vitruvius echoes this sentiment, believing also that Jupiter is the most temperate planet, *De architectura*, IX.i.16 (Granger 1931: II, 235).


\(^{59}\) Biringuccio, *De la pirotechnia* (Carugo 1977: 15r).

\(^{60}\) "...anzi non altrimenti che se vi mittasse lo spirito & viulificatesse le sustantie...", ibid., 15v.
the material after it has been, "well beaten with a hammer". It also, in its flatness, was a common material for mirrors, a fitting orientation for the template as a mirror between the material and idea.

As a shiny metal that is often pounded into leaf-like form, its tendency toward flashes of reflected light also gave rise to Mercurial associations. Its particular whiteness of tin makes it a natural companion of quicksilver, the metal most often connected with Mercury. Under Mercury, tin acquires traits of quick wittedness, inventiveness, and swiftness, and it becomes a fitting metal to act a messenger or translator between paper and stone. Ficino notes that when one makes an image out of tin, the character of Mercury is invoked, thus suggesting a curious connection between Michelangelo's profiles and the materiality of his metal templates.

The relationship of the concetto to the enlivened materials - paper, tin, and stone - passes through a series of stages as it emerges from increasingly durable materials; thus subjecting the procedure to Ficino's theory of material resistances discussed in Part I with regard to drawing materials. In this case, once copied onto tin, the fluid capacity of the paper template to accept modifications becomes increasingly solidified, with the most manifest resistance to change occurring in the hardened stone itself. Paper, in its translucence, resides further up the chain of being, receiving power from its the moon (in its whiteness) and vegetable origin. As such, it is more inclined toward celestial influence but less likely to retain it. Conversely, tin, as a harder material yet still with a degree of suppleness, retains such influence more forcefully. It positions the template as a Mercurial device whereby the sharpness of the wits embodied in the profile are made manifest in the sharp metal edges of the well-filed template. By this reasoning, the divine transcendence of the profile from paper to tin to stone may be understood through the hardening of the template edge in its various material character.

It should also be noted that as the visible, sensible hardness of the material increases, its capacity to presence the invisible concetto becomes more acute. Thus, it is precisely the impenetrability of cold, hard stone upon which the vivacity of the carved figure or detail resides.

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61 "...ben battuto a martellino", Cellini 2004: XI. The importance of hammering in the tempering process and the release of vital forces is discussed later in Part II.
62 On tin mirrors, see Hadsund 1993: 3-16.
63 Ficino relates tin to quicksilver and Mercury: De vita III.2, III.18, as does Agrippa (Tyson 1993: 94-95). Biringuccio reiterates the connection with quicksilver in De la pirotechnia (Carugo 1977: 59).
64 Ficino, De vita, III.ii.12
65 Aristotle associates transparency in De Anima with "the uppermost shell of the physical Cosmos", De anima, 418b; see also Copenhaver 1984: 529. On the relationship of the Moon to materials of vegetable origin, see Ficino, De vita, III.ii.78.
66 In 16th century metallurgy, tin was considered a hardening agent in the mixture of metals, e.g. Biringuccio, De la pirotechnia (Carugo 1977: 61).
67 As described in Part I, an analogous process of subtraction / emergence of the concetto has already taken place with the paper templates. However, the concetto is not fully present yet; the paper template is only a model. While it has emerged by a parallel practice of subtraction and cutting, the concetto still resides, unreleased, from the brute block of stone (waiting to be assembled).
Likewise, the malleability of soft, warm materials, such as paper or clay, provide an analogical material realm by which the artist imagines the invisible through parallel practices of cutting and taking away. These materials may presence the concetto more readily, although they cannot retain it, leading to a lifeless body lacking in the animating quality supported by hard materials. Michelangelo beautifully characterizes this procedure from soft to hard materials in a sonnet written for Vittoria Colonna in 1545:

If the portion that's divine has well-conceived
the face and gestures of someone, then through that
double power, and with a short-lived, lowly model,
he can give life to stone, which is beyond craft's power.
And it's no different with the roughest sketch:
before one's eager hand takes up the brush,
he checks and reworks the most beautiful and clever
of his learned ideas, and lays out his subjects.
It's the same with me: at birth I was a model
of little worth, to be reborn through you,
noble and worthy lady, as a noble and perfect thing.

Se ben concetto ha la divina parte
il volto e gli atti d'alcun, po' di quello
doppio valor con breve e vil modello
dà vita a' sassi, e non è forza d'arte.
Né altrimenti in più rustiche carte,
anz'una pronta man prenda 'l penello,
fra ' dotti ingegni il più accorto e bello
prova e rivede, e suo storie comparte.
Simil di me model di poca istima
mie parto fu, per cosa alta e prefetta
da voi rinascer po', donna alta e degna.68

Beginning from a simple model in a lowly material ("breve e vil modello"), Michelangelo likens his moral rebirth to the progression an artist undergoes from simple modeling materials or rough sketches to more noble materials expressive of the manifest concetto -- a divine procedure that is beyond the power of mere craft, or technical skill. At birth, Michelangelo's soul begins as a mould-able model ("model di poca istima"), an outward appearance lacking inward grace, and through the removal of excess by way of fierce ardor ("fiero ardor"), the inner soul is made

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68 Translation and transcription by Saslow 1991: no. 236, 400. An earlier version of this poem by Michelangelo emphasizes the progression from humble to hard materials, as well as introducing several interesting images, such as the use of the forceful hammer (martello) to mitigate the rebirth of the concetto in living, alpine stone ("pietra alpestra e viva"). It also re-states Michelangelo's desire to work in a simple model (d'umil materia un semplice modello).

Da che concetto ha l'arte intera e diva
le membra e gli acti d'alcun, poi di quello
d'umil materia un semplice modello
è il primo parto che da quel deriva.
Po' nel secondo im pietra alpestra e viva
s'arrogie le promesse del martello,
e sì rinasce tal concetto bello,
che 'l suo eterno non è chi 'l preschiva.
Tal mi stesso naqqui e venni poi,
umil model per opra più prefecta
rinascer po' di vo', donna alta e degna.
Se ìl manco adempie, e 'l mie superchio lima
vostra pietà, qual penitenzia aspecta
mie fiero ardor, se mi gastiga e 'insega?

manifest. Likewise, such an advancement may be compared to the evolution an artist takes from rough paper sketches ("più rustiche carte") to its most completed and beautiful conception using the paint brush ("pennello").

Consistent with Ficino's theory of material influences, the artist's use of softer materials such as clay and charcoal were more open to the consequences of outward beauty, although they required their translation into more durable materials to solidify the force of invisible, inward beauty. As the progression from paper to tin unfolds, a dynamic translation occurs. First, in its alchemical transmutations, and second, in its evolution along Neo-platonic influences of material resistance.

**Tempering the profilo II: the lima**

In following the tempering procedure from disegno to stone, the mediating character of the Jovial, tin templates served a critical role in the emergence of well-tempered building. It is through the tin surrogates that the modani were solidified as construction tools, a key transformation along the path toward the increased durability of the tempered edge. Furthermore, on close inspection, the tin templates are found to have their own tempering practices, introducing several pertinent images that help deepen the associations between tempering and Michelangelo's act of producing and finishing stone templates.

In exploring these points deeper, it is important to recall that the preparation of the tin templates required a different set of tools than those of the paper versions. With paper, as Cellini pointed out, the cutting of the profile edge occurred by way of the forbici (scissors). The scissored edge may be observed not only in Michelangelo's paper templates but on those of Ammannati as well.

As tools manufactured for cutting, the forbici most likely went through some kind of tempering process, briefly discussed in Part I. In cutting tin, however, the hardness of the material required the introduction of an extra step in the tempering process: after first trimming the traced profile edge with metal snips, the craftsman had to hone the rough edge with the use

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69 cf. Michelangelo, poem 84 (Girardi 1960: 84 and Saslow 1991: 197) where he examines how within marble or the strokes of a pin reside both rich and worthless images, and it is a matter of the artist's ingegno to reveal such varied qualities:

\[
\text{Si come nella penna e nell'inchiostro}
\]

\[
\text{è l'alto e l basso e 'l mediocre stile,}
\]

\[
\text{e ne' marmi l'immagin ricca e vile,}
\]

\[
\text{secondo che 'l sa trar l'ingegno nostro}
\]

70 Michelangelo commonly worked in clay in both figural and even architectural models. The model he sent from Rome for the completion of the Laurentian Library stairs, "un modino fatto di terra dal nostro Michelangelo", was probably made in clay, see 1533 contract in Milanesi 1875: 707 and Elam 1981: 594. Clay and wax are commonly mentioned in his Ricordi in activity surrounding the Via Mozza workshop, e.g. Ricordi, CXIII and CXVI. Cellini praises Michelangelo's use of soft materials in preparing full-scale, preparatory models for his figures in Cellini, Trattato della scultore (Milanesi 1857: 197). See discussion on clay models in O'Grady 1999: 64.

71 On Michelangelo's templates, evidence may be found esp. in Corpus 203r, where a serrated cut line exhibits suggests the rapid movement of scissors. In Ammannati's templates, see esp. Uffizi 3462Ar (discussed in Part I) where the evidence of scissors may be clearly observed along the vertical fascia, although it is not visible in the reprint. Ammannati's modani were personally observed in the Gabinetto Disegni e Stampe degli Uffizi, May 28, 2012.
of a tempered, serrated file. Called a *lima*, the file offers an even more direct analogy to the idea of tuning or sharpening, as this is a tool whose task is directly related to making fine adjustments in the material.

At the Via Mozza workshop, Michelangelo regularly employed metal files in the final shaping of stone, tin, and wood. Metal file use is confirmed in connection with the filing and shaping of tin templates when the artist recorded a purchase of several *lima* on May 31, 1524, for the explicit purpose of making *modani*.\(^{72}\) Iron *lime* were also recorded on Palladio's construction sites, and Cellini specifically recommends the use of a various types of *lime* in producing the finer work on Carrara marbles.\(^{73}\) As a tool for slowly eroding the metal edge through swift and rapid movements of the hand, the *lima* recalls the image of *Temperanza* and her bow and arrow, where slight changes of aim held great effect. It therefore suggests that the skillful passing of the file on the metal edge led to a kind of tempering of the tin template. Certainly, for instance, the quality of the sound produced by this encounter could be identified by the with quality of the filed edge.\(^{74}\) Craftsmen learn quickly that the sounds of the tools on the material indicate proper use - a tuning of the ear with the finished edge.

For Dante the *lima* held a unique ability to impart the temper of a sculptor onto the work. recalling that the origin of tempered tools lies in the forge, In Canto XXVII of the *Inferno*, he invoked the horrifying legend of the tyrant Phalaris and his bull - a hollow, cast bronze execution device crafted by the sculptor Perillus. Upon locking the victim inside, the bull would be heated with fire, and, to the delight of the tyrant, the sufferer's pain would become that of the brazen bull as his shrieks are channeled through the animal's mouth and nostrils (figure 3.5). Phalaris' first victim: Perillus himself.

As the Sicilian bull that bellowed first with the cries of him whose file (*lima*) had tempered it -- and that was only just -- used to bellow with the victim's voice so that, although the bull was made of bronze, it seemed transfixed by pain...

*Come 'l bue Cicilian, che mugghiò prima Col pianto di colui, e ciò fu dritto, Che l'avea temperato con sua lima muggiava con la voce de l'afflitto, si che, con tutto che fosse di rame, pur el pareva dal dolor trafitto...*\(^{75}\)

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72 “*E dexo di [may 31] per lime per fare modani soldi sei a dua quatrini...*”, *Ricordi*, CXXXIII (Ciulich and Barocchi 1970: 130).

73 On Palladio construction sites, see Burns 1991: 2004; on Cellini, see Milanesi 1857: 198-199.

74 A common legend has Pythagoras recognizing the direct relationship between the proportion of sounds and that of the materials that produce them (Heller-Roazen 2011: 81). Tin, especially, has special associations with sound, as is discussed later in Part II on Biringuccio's metallurgy of bell-casting. It has also been known to 'cry' or 'scream' when bent (Levi 2011: 153).

A small but noteworthy detail resides in the role of the Perillus' lima, the tool by which the terrible device received its temper. Here, the sculptor's productive file is contrasted with the destructive irony of the horrendous contraption used against the sculptor himself. The revulsion of the image is actually made possible through the unwitting tempering power of the sculptor's lima, and it relies on a juxtaposition of the creative Demiurge with the consummation of his work through the destructive power of fire.

The heat of the forge played a pivotal role in tempering the architecture through the hardening and tempering of the sculptor's tools. During the spring and summer of 1524, for example, Michelangelo noted several payments to scarpellini for buying charcoal used for the tempering of cutting and filing tools.76 A rather expensive commodity (3 lira and a half for a soma, or load), the use of specially prepared charcoal would have been the only way to achieve a sufficiently hot fire for hardening the chisels and files.77 Around the same time, we learn of the employment of a full-time tool sharpener at the San Lorenzo worksite, a stone carver from Fiesole named Chovone, a reaffirmation of Michelangelo's commitment to high quality tools in the hands of his craftsmen.78 This squares with Vasari, who stresses the criticality of tempered carving tools, as well as Cellini, for whom the sculptor's tools must be "stietto" - sharp as a forged knife.79

The hardening of the tool edge was a key poetic image for Michelangelo, as may be surmised from his own reliance on the sculptor's lima in matters of tempering the soul. In this way, through the searing heat and its subsequent cooling, a material that would normally be softened achieves its opposite: consummate hardness. In recalling the forza di levare, we discover through Michelangelo's verse that it is not the sculptor's chisel that is responsible for revealing the concetto; rather it is the sculptor's lima - the tool for polishing, finishing, and tuning:

If your grace builds up what I lack, and files down my excess, what penitence should my fierce ardor expect, if it is to chastise and teach me?

Se 'l poco accresce, e 'l mie superchio lima
vostra mercé, qual penitenzia aspetta

76 See references to the purchase of charcoal for sharpening in Ricordi, CXXII (Ciulich and Barocchi 1970: 131-132).
77 Given their particular hardness, Biringuccio describes a special process for tempering files: "This is done with the soot of ram's horn or ox hoofs, crushed glass, and common salt, all moistened with vinegar. This composition is smeared all over the file (lima), and then all these things are heated together well and suddenly quenched in vinegar, urine, or cold water", Biringuccio, De la pirotechnia, Book IX, Ch. 6 (translation Smith 1942: 372). Theophilus (12th century) describes the procedure of tempering steel files as such: "Burn the horn of an ox in the fire and scrape it. Mix with it a third part of salt and grind it vigorously. Then put the file into the fire and, when it is red-hot, sprinkle this composition over it on every side....", On divers arts (Hawthorne and Smith 1963: 93-94). See also, Vasari, Vite (Milanesi 1906: I, 109ff), where he also recounts Alberti's novel use the use of goat's blood in the tempering of carving tools to carve into the porphyry threshold at Santa Maria Novella.
78 "...E a di undici d'agosto 1524 rende' a Chovone, scarpellino da Fiesole, soldi cinquanta sei, e' quali avea spesi in charboni per assottigliare per l'opera di San Lorenzo", Ricordi, CXXII (Ciulich and Barocchi 1970: 132); cf. Wallace 1994: 111, fn. 227, who describes how in 16th century Florence, the employer usually paid the expenses for sharpening and repairing iron tools on large projects.
79 Vasari, Vite (Milanesi 1906: I, 109) and Cellini, Trattato della scultura (Milanesi 1857: 199); 'stietto', or 'stiletto', is a dagger-like instrument derived from the Latin stilus, a writing instrument.
The tiny, yet exact, material removals enabled by the file made it an ideal tool for tuning moral excesses of the artist, an image that is only possible through a parallel image in the tuning of the material body. Later, complaining of the relentless power of the lima to presence his mortal limitations, Michelangelo resigns himself to the futility of such an effort:

From what sharp, biting file
does your tired skin keep growing thin and failing,
O ailing soul? When will time release you from it,
so you'll return to heaven, where you were
pure and joyful before,
your dangerous and mortal veil cast off?

Per qual mordace lima
discresce e manca ognor tuo stanca spoglia,
anima infima? or quando fie ti scioglia
da quella il tempo, e torni ov'eri, in cielo,
candida e lieta prima,
deposto il periglioso e mortal velo?

As the lima files away to reveal a chastised soul, ultimately without success in the mortal realm, the file becomes an object of ire in the exasperation of a life of unfulfilled desire for divine grace.

A related image occurs in Petrarch, whose poetry is well-known to have deeply influenced Michelangelo, where Love must wield a tempered lima in order to file away his hardened heart:

I did not think that by force of [Love’s] file
a little point of strength or worthiness
would ever fail within my hardened heart,
but so it goes when one thinks he’s above it.

Io non credea per forza di sua lima
che punto di fermezza o di valore
mancasse mai ne l’indurato core;
ma così va, chi sopra ’l ver s’estima.81

The tempering of the lima is what allows the tool to temper one’s heart; opening it for Love’s wounding arrow. This clarifies one of the main principles in the transfer of tempering: it is through the influence of a tempered tool that a material receives its temper.82 With the fire-like image of the forge, a hardened tool is propelled by Love’s heat, enlivening the stone blocks according to the profile of Michelangelo’s tempered templates. Whereas the temper of disegno is in the whittling of the cut paper, the temper of the tin modano is in the moderation of the profile edge.

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80 Translation from Saslow 1991: no. 236, 400. See also Dante, Purgatorio 15:15, “che del soverchio visibile lima...”
82 This falls under the principle of what the 20th century anthropologist Sir James George Frazer called “Sympathetic Magic”, where sympathetic materials or objects (‘like produces like’) that exhibit certain qualities may transfer those qualities through touching or across distances (Frazer 1922: 12ff). For Marcel Mauss, in his General Theory of Magic (1902), this relates more precisely to what he calls the principle of “contagion”, which is not an association between objects but rather a physical transfer of properties, or a “fusion of images” (Mauss 2001: 81-85).
through slow erosion of the edge with a tempered tool. And since Michelangelo was not cutting the stone himself, he had to rely on the tempering process to act as Love's surrogate in the transfer of his own hand from his drawings at Via Mozza onto the stone blocks at San Lorenzo. One may now follow the tempering, so to speak, by following the heat; the dry, vapor-like *spiritus*. Beginning with Michelangelo's searing desire, the profile emerges on paper through furious acts of cutting and tracing; then, the paper template is traced onto tin, where the *lima*, tempered by the hot forge, erodes and tunes the profile edge to match the paper; and finally, using a similarly tempered tool, the Mercurial template guides the finishing off of the stone block.

The forger's fire, as a catalyst for material transmutations, served as a poignant metaphor for the *spiritus*: a dynamic, shapeless, vapor that was invisible, yet present. The heat of the forge could temper tools for use on the hardest materials, but it could also act as a host for the softening, mixing, and alloying metals. It is in this way that tin, as one of the seven principle metals known in the ancient world, played a critical role in its power as a hardening agent in making bronze - traditionally a mix of four parts copper; one part tin. Vannoccio Biringuccio, whose *De la pirotechnia* (figure 3.6) is an astonishing record of 16th century metallurgical practices, describes a procedure where the addition of tin to copper enables the sonorous capacity of metal to be called forth - of particular importance in the making of bells.

What others say, that it [tin] produces no sound itself is also true, but by hardening other metals it makes them sonorous, just as if it puts the spirit there and vitalizes the substances.

*Et e vero anchor quel che dichino alcuni che non ha suono per se. Ma con lindurire gli altri metalli, gli fa sonori, anzi non altrimenti che se vi mettesse lo spirito & viviscasse le sustantie* 84

Biringuccio understands tin as an enlivening material; where it breaths life into other metals in the same way that the spirit (*spirito*) brings vitality to material. This follows tin's association with Jupiter, the most tempered planet, who oversees airy matters, including those of sound and smell. 85 Although it had no sound making qualities in itself, tin is required to harden metals sufficiently enough to receive the strike of the bell clapper without shattering.

Such a discovery is a reminder that tin was not only Jovial, it was also related to the Orphean tuning of the soul through sweet sounds of music. 86 Without tin, there would be no striking of metals to create music, no matter how beautifully cast were the measures, ornaments,

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83 The seven metals were traditionally associated with the seven planets: silver (Moon) - gold (Sun) - copper (Venus) - iron (Mars) - lead (Saturn) - Mercury (quicksilver) - Jupiter (tin). The white, silver-like qualities of tin, along with its willingness to alloy with other metals, have also led to corollary associations with Mercury and quicksilver. Pliny writes about the use of tin for mirrors, an object often associated with Mercury, from Pliny the Elder, *Natural History*, Book 34, Ch. 48. Ficino often treats tin as Mercurial, e.g. *De vita* III.2.32, and III.18.12.

84 Biringuccio, *De la pirotechnia* (Carugo 1977: 15); translation from Smith 1942: 60.


86 Jupiter, according to Ficino, is one of the four planets that speaks through song (included with Mercury, Venus, and the Sun). The other three planets (Saturn, Mars, and the Moon) speak with voices, not song, *De vita* (Kaske and Clark 2002: 361).
or profiles. Indeed, both Biringuccio and the 12th century metallurgist Theophilus write on the
dullness of sound achieved through the improper mixture or treatment metals during the casting
process. Tin also had other sound making properties as well, due especially to its ability to be
pounded into thin sheets, and it is for this reason tin was the favored material for organ pipes.
The hard, thin metal walls resonated well as the air was pumped through the hollow tubes,
transmuting breath into spirit, and thus filling the church with its harmonious sounds.

Ficino, who was the first to translate Orpheus' hymns from the Greek, wrote forcefully
about the power of music to act between body and soul. As an ardent lyre musician himself,
Ficino spoke toward a common Neo-platonic contention that music is a vital presencing of the
spiritus, capable of healing, seducing, and even harming:

But musical sound by the movement of the air moves the body: by purified air it excites the aerial
spirit which is the bond of body and soul: by emotion it affects the senses and at the same time the
soul: by meaning it works the mind...by its nature, both spiritual and material, it at once seizes,
and claims as its own, man in his entirety.

As a vapor-like substance, able to powerfully affect us, music was a particularly lucid embodiment
of the spiritus. Song was both material, as relating to air, as well as immaterial, as relating to the
movements of the soul, and, through the ears, the spiritus could have direct access to the soul.

Air, having no music making ability on its own, required an intervening material such as tin to
make it present to the ear. Materials that enable the making of music, then, would assume
natural associations with the spirit, and therefore making harmonious sounds would have an
innate relationship between the weight, shape, and type of materials used in their generation.

Such an assertion recalls the story of Pythagoras wandering near a blacksmith's shop, only to
behold that the harmonization of the hammers inside must be directly related to their various
weights. It was by this inspiration that Pythagoras constructed his theory of number and material

87 Striking metals, of course, makes sounds, as the famed story of Pythagoras recalls. However, the resonance of metals
as a sonorous experience relied on tin more than any other of the seven ancient metals.
88 Theophilus emphasizes the importance of the proper tin mixture in the tuning of bells, On divers arts (Hawthorne and
Smith 1963: 179), as does Biringuccio, De la pirotechnia (Smith 1942: 268). Francesco di Giorgio stresses the
importance in alloying proper bronze for bells, writing that the material should be comprised of "perfetto rame e stagno,
non pelosi, bene allegati e fusi in questa lega, che diciotto o vinti di stagno per cento di rame se li dia, e così arà
perfetissima lega.", Trattato di architettura ingegneria e arte militare (Maltesi and Degrassi 1967: I, 244).
89 On leaf-like tin as the optimal material for organ pipes, see Biringuccio, De la pirotechnia (Smith 1942: 374-377); On the
specific qualities of tin to be "...spread out thinner than paper", see Smith 1942: 60. The sounding vessels for theatres
described by Vitruvius were made of bronze, De architectura, V.v.1, (Granger 1931, I, 277).
90 Ficino signed his letters to his fellow philosopher Poliziano as "Orpheus". A summary of Ficino's relationship with the
Orpheus myth may be found in Voss 2002: 227-241.
91 "...concentus autem per aereum in motu positam movet corpus: per purificatum aereum concitat spiritum
aereum animae corporisque nodum: per affectum, affectum sensum simul & animum: per significationem, agit in
mentem...per naturam, tam spiritalem quam materialem, totem simul rapit & sibi vindicat hominem", Ficino, from his
commentary on the Timeaus, transcribed and translated by Walker 1985: 137-138. Ficino also writes in De vita, "Hermes
Trismegistus, Pythagoras, and Plato tell us to calm and to cheer the dissonant and the sorrowful mind with constant and
harmonious lyre and song", (Kaske and Clark 2002: 135). References to the spirit-invoking powers of music may be
found throughout Ficino's Commentary of Plato's symposium; principally in the Third Speech, Ch. III; cf. Voss 2002: 232-
233.
92 "In general, then, let us lay it down that sound is a stroke transmitted through the ears, by the action of the air upon the
brain and blood, and reaching to the soul (psyche)", Plato, Timeaus, 67a (Bury 1929: 172-173).
proportions. Gaffurius, in his 1492 *Theorica musicae*, imagines that it was from this material phenomena that the laws of harmonic proportion originated, a proposition that could be interpreted across several methods of producing music (figure 3.7). His work with Cesare Cesariano, discussed later, will serve as a key bridge between musical and architectural proportions as debated in the early 16th century.93

The movement between cosmic proportions, or the invisible, and its presence through material is the role of the *spiritus*. It is also, as has been argued, the role of the *modani*. The associations between *spiritus* and music open up important considerations in the role of *modani* in the tempering of architecture. For Michelangelo, cutting a paper template recalls certain associations with the playing of music, where the tuning of the profile originates in a poetic frenzy not unlike that of Orpheus and his lyre.94 Michelangelo's obsessive and inventive search for the profile edge has been well-documented in scores of sketches, such as the figure 1.10 and 2.32. With the scissors, however, the flat drawings transmute into construction implements, and they thus assume an added propensity toward the *causa instrumentalis*.95 As 'instruments', they were not only representations of future building details, the *modani* were also devices for 'playing'; that is, they could fill the hands in the original sense of the word 'manipulate' - as a contraction of *manus* + *plere*, to fill. In this way, the *modani* could be manipulated through flippings or tracings, or they might be observed casting a shadow *in-situ*. Once on the construction site, tin templates, being both leaf-like and endowed already with a certain spirit (due to their material), would be played through the passing of the *lima* over the edge, where the stone carver knows the proper sound of the file just as a musician knows the tuning of an instrument.

Tempering, as a theoretical mode of tuning or harmonizing musical instruments, was formalized within 16th century Humanist circles reassessing the commensurability of Pythagorean musical ratios.96 Although the concept of temperament in musical instruments dates to Aristoxenus, Vitruvius' source for musical proportions, it was first systemized only in 1523 with

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94 The one remaining eye-witness of Ficino's skilled use of the lyre describes his playing as such: "There is frenzy; when he sings as a lover to the singing of his beloved, he plucks his lyre in harmony with the melody and rhythm of the song (El furo est, cum cantat amans cantante puella / ad flexum, ad nutum percutit ille lyram)", by Bishop Campano, quoted in Voss 2002: 234, n. 33.
95 The *causa instrumentalis* is, in effect, a fifth cause added the Aristotle's principle four: final - efficient - material - formal (as outlined in *Physics* II.iii). It is a sub-category of the efficient cause related to the agency of God on earth. Essentially Thomist, the instrumental cause distinguished between God as the creator (*causa principalis*) and the apostles who carried out his work on earth. Such a discernment may be extended to the understanding of physical laws as well, where the efficient cause relies on some other device or agent in its causality. See Aquinas, *Summa Theologica*, I.Q.45.a.3. Ivan Illich speaks provocatively about the contemporary movement toward the replacement of *causa efficiens* with the instrumental cause, leaving us with "a cause without intention" (Cayley 2005: 72-73).
96 The cultural milieu surrounding the new emphasis on the practice of tempering in the 16th century is discussed at length in Heller-Roazen 2011: 75-88. For a general history of tempering, or diminution from pure ratios in music, see Barbour 1972: 1-13. The relationship of *temperare* to the tuning of sounds dates at least back to Horace, who wrote in *Camina* 4.3.18 "O Pierian girl, you who / temper the golden tortoise shell’s sweet melodies (O testudinis aureae / dulcem quae strepita, Pieri, temperas)", cited in Spitzer 1963: 83.
the publication in Florence of the *Toscanello in musica* by Pietro Aron.\(^{97}\) One of the fundamental problems with the Pythagorean system was the reconciliation of the perfect fifth (3:2) with the octave (2:1), a mathematical impossibility that became increasingly problematic for performers and theorists within the growing complexity of musical theory in the 16th century.\(^{98}\) Modern musicians refer to this as the ‘cycle of fifths that does not close’; meaning that one may continue playing fifths indefinitely without ever reaching the same pitch again. This gap between the fifth and the octave is often referred to as the ‘Pythagorean comma’ or the ‘diatonic comma’.\(^{99}\) As the formerly closed system of the Pythagorean monochord evolved toward open, infinitely expandable or divisible intervals of tones, the incommensurability of certain musical ratios became a matter of great debate.\(^{100}\) Temperament, and there were many types, was rationalized in the 16th century as a method of tuning a stringed instrument so that certain notes would digress slightly from pure ratios. Over the course of the entire musical scale, formerly irreconcilable relationships such as the fifth and the octave, could be, to the human ear, in harmony through proper temperament. The formalization of these early experiments eventually led to the 12-tone system of sharps and flats that we have today, where the equally spaced tones across octave are known as ‘equal temperament’.\(^{101}\)

Realizing that aural harmonies could not always be achieved through musical ratios alone, the discipline of tempering in music developed as a method of commensuration between the hidden and the sensible through small digressions from pure ratios.\(^{102}\) This gap between the divine and the sublunary was in fact the space of the *spiritus*, the necessary messenger between the gods and man and between body and soul. Such a gap was first proclaimed by Plato in the *Timaeus*, and it was subsequently upheld by Ficino in his commentary on it. Although mortal

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\(^{97}\) For recent research on the resolution of Pythagorean disharmonies by Aristoxenus, see Litchfield 1988: 51-73. Vitruvius relies on Aristoxenus rather than Pythagoras to explain musical proportions in *De architectura* V.iv. On Aron see Barbour 1972: 26 and Heller-Roazen 2011: 81.

\(^{98}\) Musical composition began to employ major and minor thirds and sixths, intervals that more readily illuminated the incommensurability of Pythagorean tuning. Modern equal temperament, where the fifth is slightly flattened from its ‘pure tone’ of the Pythagorean system, does not encounter these discords, and after twelve octaves the cycle of fifths reaches the same pitch from which it began (Heller-Roazen 2011: 80-81). See also Barbour 1972: 4.


\(^{100}\) This also coincides with the gradual erosion of the divine power of number. Music and instruments from before the 16th century generally worked within the Pythagorean system, avoiding, as it were, certain dissonances. On the shifting attitudes toward the divine power of number in architecture, see Hersey 1976: 192-197.

\(^{101}\) The Pythagorean tuning was a monochord based on the perfect fifth, 3:2, and not the equal spacing of tones across the octave. The idea of equal spacing only became possible after sound was widely understood abstractly as a matter of string vibrations, eventually measured in *frequency*. Pythagoras understood sound as a relationship of weight to tone, or strength length to tone: a perfect fifth was the dividing of a five part string into three and two, for example, with the plucking of the two together making a consonant chord (Heller-Roazen 2011: 84-85).

\(^{102}\) This debate dates from Aristoxenus (4th century BCE), Vitruvius’ source for musical knowledge. Aristoxenus sought a tuning system that emphasized the harmonies favored by practicing musicians themselves, rather than those advocated by the followers of Pythagoras with their reliance on whole integer, mathematical ratios. On Vitruvius’ reliance on Aristoxenus, see Moyer 1992: 186ff; on a general overview of Pythagoras and Aristoxenus, see Litchfield 1988: 51ff and Barbour 1972: 1-6. The debate between number and the ear was revived by the Accademia Fiorentina in the mid-sixteenth century surrounding the proper performance of music. One side: music shall not be written, shall not conform to scales and other formal devices - rather it is known by the ear, and it is regulated in time just as the planets regulate our daily influences. Its knowledge is hidden, esoteric, and a master is one who is in tune with these influences; other side: music shall be written, is shall have theory, conform to mathematic proportions. Knowledge is gained through notation, regulation through the clock, and mensural polyphony. See discussion in Nosow 2002: 176ff.
beings were fashioned by the Demiurge out of the same materials (hyle) as the Cosmos; that is fire, earth, water, and air, the bonds between those materials were not indissoluble, as they were in their original constitution in the World Soul. Through its sharing of divine materials, the human soul retained its inherent harmonic constitution, but it was corrupted by the body through its being twisted, polluted, and sent into constant, disorderly motions called "sensations". Despite such deprivations, however, the vibrations of the cosmic substances remain active within mortal beings, and it is up to the spirit to bridge between the chasm and reconnect the soul to its origin. The tuning of the particular, changing circumstances of the material body with the unchanging, eternal qualities of the World Soul was, according to Ficino, the proper activity of temperare. It was a practice that sought to bring harmony to the 'corruptions' of the body through its alignment with universal form - an activity that could only occur through the active participation of materials.

As it was passed down from the Greeks, however, the tempering procedure related much more to how the spirit could tune the soul through the balance of materials within the human body. Since the body, corrupted by sensations, was nonetheless made of divine material, it was up to the physician to harmonize one's bodily materials with those of their heavenly ancestors. This was accomplished through knowledge of the vibrations of the cosmos - movements such as the daily play of the planets, the slower shifts in the firmament, or the fixed auspices of one's horoscope. The backdrop for these deliberations took place within the mixture of the four humors and the fluid materials of the body that were the causes of sickness and health as well as character and mood. Traditionally defined as blood (Gr. haima), yellow bile (chole), black bile (melanchole) and phlegm (phlegma), the proportion of these fluids within the body dictated one's temperament (figure 3.8). The balance of humors within the body depended on the relationship between earthy materials and esoteric, hidden knowledge of celestial movements and influences. The movement of one's actions in the quotidian world sought its auspicious concordance with the movements of the heavens, and herein lay the key to one's character, daily

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103 Plato, Timaeus, 42d-43d (Bury 1929: 93-97). In his commentary on the Timaeus, Ficino wrote of the "aerial spirit which is the bond of body and soul (spiritum aereum animae corporisque nodum)", from Walker 1985: 137-138.

104 Ficino relates tempering to the spiritus and the celestial bodies throughout De vita; e.g. De vita, III.20 and II.18.65-80. Temperare, as a practice of harmonizing strings, was clearly present in the vernacular as stated by Dante: "E come giga ed arpa in tempora tesa / Di molte corde fan dolce tintinno / A tal da cui la nota non è intesa", Paradiso 14:118. Properly speaking, as J Murray Barbour states, 'tuning' is different than 'tempering': "...thus for any tuning it is possible to obtain a monochord in which every string-length is an integer. A temperament is a modification of a tuning, and needs radical numbers to express the rations of some or all of its intervals" (Barbour 1972: 5).

105 Ficino calls this tempering process "natural magic (magia naturali)", where "natural things seek to obtain the services of the celestials for the prosperous health of our bodies (rebus naturalibus ad prosperam corporum valetudinem beneficia captat, offici mentionem)", Apologia, De vita (Kaske and Clark 2002: 396-399). Music played a key role in summoning the spiritus, the principle messenger between celestial and natural bodies (Voss 2002: 227 and 232).


107 On the history of the four humors, or tempers, see the work of Van Wageningen 1918: 374-382; as specifically related to Galenic medicine, see Evans 1945: 292-293. For a comprehensive historical treatment of the four humors, see Arikha 2007. For a brief summary of the number four and its myriad of symbolic associations in Pythagoras and Plato - the four elements, four humors, four seasons, four cardinal virtues, etc., see Spitzer 1963: 64-68.
mood, and sickness. By understanding and being able to predict these movements, as would be the expertise of a physician, one may align one's own body mixtures and routines (diet, sleep, air) with those of the heavens. The tempered soul was ultimately a mirror of *Anima Mundi* as expressed in the play of the planets across the heavenly firmament.\(^{108}\)

What Ficino demonstrates in *De vita* is that tempering is finally a matter of the movements of the *spiritus*, and it is through meticulous practices both ordinary (sleeping, drinking, eating) and extraordinary (music) that one may discover one's propriety among the movements of the heavens. He writes:

> While therefore you temper the strings and sounds in the lyre and the tones in your voice, consider your *spiritus* to be tempered within.\(^{109}\)

Tempering, as a mode of practicing theory, thus opens up powerful associations for the making of architecture.\(^{110}\) Like the slight raising or lowering of string tones, or the precise introduction of particular herbs, foods, or smells to the body, the tempering of architecture relied on micro-adjustments.\(^{111}\) Just as such amendments came through highly particular conditions, such as breathing air tempered with the smells of aromatic pears or the drinking of wine tempered with iron water, the tempering of architecture occurred within the fastidious qualities and proportions of materials.\(^{112}\) As a device for according architectural details through tiny corrections, then, *modani* were the consummate instruments, since they facilitated such practices as the whittling, tracing, and filing of the architecture.

Just as in the tuning of a musical instrument, such micro-practices were crucial for discovering and revealing the character of the architecture through the materials. As was

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\(^{108}\) On the tuning of the individual soul to the world soul, see Ficino, *De vita*, III.26 (Kaske and Clark 2002: 390-91); on the relation of this activity to the *spiritus* in Ficino, see comments in Walker 1985: 139-140. On the tempering power of music, see *De vita*, III.21 (Kaske and Clark 2002: 361). Ficino expresses this rather clearly in a letter to the Medici Prince Lorenzo di Pierfrancesco, where he reminds the Prince that, "the whole of heaven is within us and the fiery vigor in us testifies to our heavenly origin," and advising him, "Onward, then, great-minded youth, gird yourself, and together with me, temper (*tempera*) your own heavens....", cited in Bullard 1990: 698-699. As Ficino wrote in his commentary on Plato's *Symposium*, "...the basis of these [preparations] is a temperate combination of the four elements, such that the body is most like heaven, whose substance is temperate...thus the heavenly glow will easily light up in a body much like heaven (*vero fundamentum est elementorum quattuor temperata complexio, ut corpus nostrum caelo, cuius est temperata substantia, sit simillimum...sic enim et caelestis fulgor facile lucebit in corpore caelo persimili*), Fifth Speech, Ch. VI (Jayne 1944: 71 and 174). See comments on this passage in Panofsky 1968: 138; as it relates to Michelangelo in Summers 1981: 394.

\(^{109}\) Ficino, *De vita*, II.16 (Kaske and Clark 2002: 215).

\(^{110}\) A recent summary of the architectural context of temperance may be found in Deupi 1999: 33-83 and Frascari 1998: 1-36.

\(^{111}\) A current view of tempering may be found in Coyne 2010: 1-70. For Coyne tempering is a mode of micro-adjustments made pervasive through digital media, a non-expert practice of tweaking oneself to his or her environment. When everybody tunes to each other, now possible through social media, Coyne argues, a certain collective mood or temperament emerges. However, from this point of view, tuning has lost its harmony, so to speak, and it is defined merely as a collection of micro-opinions rather than as an ontological imperative (as it resides in the German *Stimmung*, for example). In equating satisfaction or contentment ("I like") with a tempered state, the multilayered ethical dimensions of *temperare* are lost.

\(^{112}\) On tempered air, see Ficino, *De vita*, II.18.80 (Kaske and Clark 2002: 225); on tempered wine with iron water, see *De vita*, II.6.60 (Kaske and Clark 2002: 181).
explored in Part I on shadows and facial profile, tiny adjustments in the profile line - in its configuration, materials, or quality - offered great potential in expressing one's inner character or temperament. This was why painters such as Alberti, Leonardo, and Vasari placed so much emphasis on the profile or outline in formulating a theory of painting. Modani, as tempering devices, were instruments for deriving and translating the temper, or character-enlivening aspects of the architecture into stone details. The root words of modani, 'modus' or 'modulus', are commonly related to measure, units of measure, length, or module. However, modus also related to 'manner' or 'way', and it offered interesting connections to the character-deriving possibilities of modani through 15th and 16th century music theory. Gaffurius, in book IV of De harmonia, describes the three ancient musical "modes (modos)", and he relates their origin to the particular character of the place or ethnic groups from which they derived. In modern music theory, there are seven modes, each of which offer a distinct character or mood to the musician or composer. The character-deriving aspects of modus remains active today in the Italian word for fashion, moda, and in the English word still in common use to denote grammatical distinctions in verb tenses, i.e. 'mode'. The common English word 'mood', or character, also contains historical linkages.

Gaffurius, a devoted follower of Pythagoras, nevertheless provides the earliest mention of the practice of temperament (originally called participatione), whereby practicing organists would introduce small, indefinite diminutions in tuning the fifths. Aron's 1523 treatise, where tempering procedures were first systematized, connects the tempering of musical instruments with the performance of proper musical proportions - a key factor in experiencing the musical mode. Tempering, as an activity of slight diminutions from pure tonal ratios, appears as a critical discipline in deriving the proper character of the music. The template, then, as an affective device for translating and making small alterations to architectural proportions, could be employed by the architect to temper the architecture.

Not able to work the stone himself, Michelangelo relied on the parallel practices inherent in the making of modani to act as analogue devices for tuning the building detail. The small, meticulous alterations taking place in the paper or tin acted as vehicles for tempering the profile

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113 Devoto 1968, under the heading "modano".
114 Gaffurius, De harmonia, 83r, cited in Moyer 1992: 81. The most common three are: Dorian, Phrygian, and Lydian. The practice of relating musical modes to ethnic origins dates to Boethius (6th century CE), De musica 1.1. On a related note, Vitruvius writes of the Doric and Ionic orders as originating in the character and places of their respective ethnic groups, De architectura IV.i (Granger 1929: 203ff). See also Rykwert 1996: 113-114, 143.
115 The seven modern musical modes are: Ionian, Dorian, Phrygian, Lydian, Mixolydian, Aeolian, and Locrian. On modes in music, see Brent and Barkley 2011.
116 The OED cites Germanic rather than Latinate origins for most usages of 'mood'. However, under a related entry for 'mode', from the Latin modus, several examples demonstrate the English use of 'mode', a technical term in grammar usage as well as a pun for 'mood'.
118 Aron 1523: ch. XLI, entitled "De la participatione et modo da cordare l'instrumento".
edge according to the giudizio dell’occhio: the non-rational faculty of internal vision that relied on attunement, or what Ripa referred to in his ekphrasis on Temperanza as "tuned intelligence (accorto intelletto)".\textsuperscript{119} The eye’s judgment could not rely solely on specific laws of harmonic proportion; rather, like the tempering of a string, it had to rely in the end also on a keen judgment of sense only obtainable through practice.\textsuperscript{120} This knowledge was fueled by Love’s desire to know the divine constitution, or concetto, through its manifestation in earthly beauty.\textsuperscript{121} It required a proximate attention to materials and their occult potentialities, a musician-type knowledge acquired only through the playing of the sculptor’s instruments.

When the finality of judgment is reserved for the eye (or internal eye) rather than axiomatic proportions, the space of tempering is opened up as a material practice of micro-corrections within the divine realm of harmonic ratios. This helps explain Michelangelo’s reliance on tracing and flipping as opposed to compass and rule in according the profile edge. Since the compass was a harmonic device for dividing and proportioning the lines of the building site, an analogous practice to proportioning string lengths, it was subject to the same possibilities of incommensurability encountered by Pythagoras. Recognizing the gap between cosmic and sublunar substances, as well as their common origin, tempering introduced a procedure for commensurability within the corporal realm of materials.

**Tempering the profilo III: bell casting**

The spirit-like nature of the modani having now been discussed, the procedure of translating the filed tin template onto the block of stone remains to be considered. The template, as a temporal instrument, relies on enlivening the stone’s corporal character to bring forth the temperament of the profile. After a procedure of micro-adjustments, the template is now matched to a material entity in the translation from a two dimensional profile to a three dimensional stone block. Before addressing this, however, it is worth pausing to consider similar practices that employed tempered profiles in making harmonious bodies. From these we may introduce how the music of the template-as-spiritus may act as vibrations for the body of the architecture.

\textsuperscript{119} Ripa 1615: 508-509. See discussion on Ripa’s entry on Temperanza in Part I.
\textsuperscript{120} Barbaro, in his commentary on Vitruvius’ term eu rhythmia, reminded his readers of the importance of the manifestation of axiomatic ratios within the bounds of material, calling it the "temperament of proportions applied to matter (il temperamento delle proporzioni applicate alla materia)”, Barbaro 1567: 162; see commentary on this passage in Mitrović 1998: 674.
\textsuperscript{121} This relationship is best expressed by Michelangelo in his poetry, e.g. Saslow 1991: no. 38, 118. For recent discussions, see Hub 2005: 103-130, and Hub 2008: 93-140; see also Clements 1954: 324ff and Summers 1981: 203-233.
Bell-casting, as was mentioned above by Biringuccio, actually provides powerful associations for the understanding of such a transmutation. Utilizing a large wooden template, making the bell mould in many ways paralleled the practice of transferring the tempered profile to the *lavoro di quadro*. Although the theorization of weight and sound in small bells had been known since Pythagoras, the translation of such knowledge into the making of large bells in the 16th century was still highly localized and largely workshop-based.\(^{122}\)

Our earliest knowledge of these practices comes from Theophilus, whose 12th century treatise, *On divers artes*, described the casting procedures of large bells in ways that remained relatively unchanged until the time of Biringuccio four centuries later.\(^{123}\) By the time of *De la pirotechnia*, the derivation of large bell proportions had become theorized through the development of the bell scale - a graphic diagram indicating the relationship between the tuning of the bell, its weight, and the width of the bell's mouth (figure 3.9). Using the minute steps of the bell scale, the profile and thickness of the bell wall could be derived for making the earthen, casting moulds. Knowing that the bell profile had to be carefully orchestrated in order to achieve a tempered sound once cast, Biringuccio provided for his readers the appropriate profile drawing. Whereas Theophilus relied on rules of thumb to describe bell proportions, Biringuccio noted the importance of "geometrical reason (geometrica ragione)", and he considered the construction of the bell outlines within the "arte del disegno".\(^{124}\)

Interestingly, the drawn bell scale, as *disegno*, came to the attention of architects, and the development and dissemination of the bell-scale in the 15th and 16th centuries relied largely on its depiction in architects' treatises and sketchbooks. The earliest known bell scale drawings appeared in the late 15th century in works by two architects: the Codex Barberini, circa 1487, by Giuliano da Sangallo (figure 3.10); and Francesco di Giorgio's *Trattato di architettura ingegneria e arte militare*, also appearing in several manuscripts the late 1480s (figure 3.11).\(^{125}\) The curiosity of architects in bell-making is a matter of some relevance, given the surprising affinities between the various problems facing both bell-makers and architects. In Francesco's detailed reflection on bell-making, for example, he points out that a bell has a particular site, and its measures depend on whether it is located in the flat landscape, the seashore, or a mountaintop.\(^{126}\) In depicting the bell scale alongside the text, Francesco demonstrates the criticality of proper proportions in making the bell when considering the site. Stressing the importance of practiced

\(^{122}\) Large bell-making was a separate discipline than that of small bell making - the two sizes are distinguished in Latin by *cymbala* - small bells - and *campanae* - large bells. See translator notes in Theophilus, *On divers artes* (Hawthorne and Smith 1963: 167-168,176-178). See also Scaglia 1976: 486-487.

\(^{123}\) Theophilus provides an exceptional description of bell-casting practices. In his description of small bells (*cymbala*), he comes the closest to providing a theory of proportional weights and tuned bells. In his work on large bells, however, he does not give such measures and probably relied heavily on workshop practices. Theophilus' manuscript was not widely available in the 16th century.

\(^{124}\) See, for example, Theophilus, *On divers artes* (Hawthorne and Smith 1963: 176), "The clapper should be long enough to project a hand's width below the bell. It should be thicker at the end for the length of a palm and thinner above."; On the reliance on geometrical reason and *disegno*, see Biringuccio, *De la pirotechnia* (Carugo 1977: 94).

\(^{125}\) Biringuccio, whose father was an architect, was from Siena.

\(^{126}\) Francesco di Giorgio Martini, *Trattati* (Maltesi and Degrassi 1967: I, 244)
judgment in the realization of bell profiles ("el sito parte di discrezione"), the link between architecture and bell-making is solidified through *disegno*. Francesco's connection between the bell scale and the "dolcezza" of the bell is a strong demonstration on how *disegno* may be seen as a form of knowledge (figure 3.12).\(^{127}\)

As suggested by the bell scale, both architecture and bell-making relied on the translation of a flat, profiled edge into a three-dimensional, material body. The correlation between proportioning bells, *disegno*, and actual practice has been luckily recorded in the surviving notebooks of Buonaccorso Ghiberti, the grandson of the famed Lorenzo.\(^{128}\) The *Zibaldone*, as it is called, is a collection of workshop notes and empirical theory related to the various activities of 16th century bronze casting, including insight into the making of bells, artillery, and sculpture. Among other drawings, Buonaccorso includes two renditions of the bell-scale (figures 3.13 and 3.14), one for lighter bells (with smaller steps) and another for bells up to 12,000 pounds (and having larger steps). It also includes detailed instructions on how to translate the bell scale into the practical requirements of the actual casting of the bell. The key device in this translation was a large, flat template made for shaping the earthen bell-mould - a flat board cut from wood and called, to our delight, a "*modano*". In figure 3.15 one may clearly see the rotating wood *modano* that has been fashioned for shaping the clay 'core' - the interior part of the two-part mould needed to realize the interior and exterior profiles of the wall of the bell.\(^{129}\) Biringuccio provides instructions on a similar procedure, although the core is shaped using a stationary *modano* and with a rotating core affixed to a trestle (figure 3.16).\(^{130}\)

The construction of the *modano* was a key activity of the master bell-maker, and it became the principle device for translating the bell scale into the realization of the bell. Biringuccio opens his exposition on bell making by explaining that the design of the bell begins first with the making of a full size drawing (figure 3.17) laid out on the ground or the floor:

> prima a tutto si disegna in terra in un spazzo o sopra a una tavola piana la campana a ponto alta & larga, & con tutte le sue parti come far la volete\(^{131}\)

\(^{127}\) On Francesco di Giorgio's assertion of *disegno* as a form of knowledge, see his *Trattati* (Maltesi and Degrassi 1967: II, 489): "non puo senza il disegno esprimere e dichiarare el concetto suo"; "...per non avere el disegno sono difficilissime ad intendere...". On a recent work that examines Francesco di Giorgio's notion of *disegno*, see Raihi 2010: 43-81.

\(^{128}\) Codex BR 228, Biblioteca Nazionale di Firenze, the "Zibaldone di Buonaccorso Ghiberti". The notebook was personally viewed by the author on June 11, 2012. Key pages, background, and selected translation translations of this notebook were published by Scaglia 1976.

\(^{129}\) This rotating strickle was also called the "*centino*". In modern parlance, the exterior mould is known as the 'cope'. Ghiberti calls the core the 'bischera', a Tuscan slang word for the male member; Biringuccio also refers to this part of the mould as the male member - the 'maschio' - although he notes that some masters have called this the 'anima', *De la pirotechnia* (Carugo 1977: 95r).

\(^{130}\) Theophilus also notes this possibility in turning bell cores (Hawthorne and Smith 1963: 167-169).

\(^{131}\) Biringuccio, *De la pirotechnia* (Carugo 1977: 94r). Translation by author.
From this drawing, a wooden template could be fashioned that guided and regulated the bell thickness and shape. Buonaccorso, then, offers his own rendition as to how the modano is constructed using ad hoc proportioning rules and the measures derived from the bell scale. In a expository drawing of the modano, he actually records the micro-steps of the tempering process through vertical proportioning marks (figure 3.18). Figure 3.19 takes this one step further and shows how the vertical ticking would be translated into the actual bell. This certainly confirms the observation of Francesco di Giorgio that, “the partitioning of the measures to their proportions will be demonstrated in how the modano is made”. Francesco's accompanying drawing of a constructed bell section may in fact be interpreted as another procedure for how to construct the bell modano (figure 3.12).

For these architects and craftsmen, the bell profile was derived through a combination of theory and centuries of collective workshop experience. Although the formalization of the bell scale appears to be a late-medieval innovation, experienced bell-casters continued to emphasize the heuristic side of practice. No matter the power of geometrical reason and number, the perfection of the bell profile had, in the end, to rely on knowledge gained from the workshop. Without such knowledge, the full potential of the bell to vibrate the spiritus remained elusive. Biringuccio, for example, stresses the importance of "historians (historiographi)" and the "master bell-founders (maestri campanati)", in addition to the knowledge discovered through "reason (ragione)" and "rule (regole)". And both Buonaccorso and Francesco's depiction of the modano construction relied as much on conventional bell-making practices as it did his bell scales.

Such a reciprocity between speculative knowledge and direct, material experience was one of the early tenets of disegno as understood by 15th century writers on the matter, and it might partially explain the preoccupation of the bell scale by then-practicing architects. The elder Ghiberti, Lorenzo, offered one of the earliest formalizations of a 'teorica disegno', explaining that “...disegno is the foundation and theory of these two arts [of painting and sculpture]”; and that the sculptor must be a "most perfect practitioner of drawing (perfectissimo disegnatore)". Writing in his treatise on sculpture, I commentarii, disegno was elevated into a theory for art as an intellectual pursuit where the sculptor himself was responsible for an understanding of the principles of his art. For Filarete, who knew Lorenzo and probably spent time in his workshop, disegno operated as a pragmatic and speculative instrument by which the architect practices. In his Trattato di Architettura, Filarete writes not like his contemporary Alberti, using cultivated Latin

132 The accompanying text reads, in part: "You know when drawing the bell modano that a good bell wants to be 6 parts high beginning form the bottom to where the crown begins, that is, from b. to A. (Sapi che quando ai a segnare el modano de le canpane che la canpana buona vuole essere alita 6 [parti] dal principio di sotto a dove chomincia a vogiere el cielo di fuori cioè da .b. a .A...)” Transcription from Scaglia 1976: 498; translation by author.

133 “...E delle misure in proporzioni loro qui alcuna partizione, come el modano sia da fare si dimonstrari”, Francesco di Giorgio, Trattati (Maltesi and Degrassi 1967: I, 245).

134 "...el disegno è il fondamento e teorica di queste due arti", Lorenzo Ghiberti, I commentarii, II.4 (Bartoli 1998: 47).
or scholastic rhetorical devices, but rather as one who writes as he speaks (in the volgare) and has, in fact, drawn, sculpted, and constructed many things himself. The art of disegno was the bridge between personally acquired empirical knowledge and theoretical knowledge of principles. By the late 16th century, when Vasari offered a more formalized definition of disegno, the correlations between eye and hand discussed by Filarete and Lorenzo Ghiberti had endured. Writing in the introduction to the 1568 edition of the Lives, Vasari asserted the importance the inner eye and the practiced hand:

> when the intellect sends forth refined and judicious ideas, the hand that has practiced disegno for many years exhibits the perfection and excellence of the arts as well as knowledge of the artist himself

> quando l’intelletto manda fuori i concetti purgati e con giudizio, fanno quelle mani, che hanno molti anni essercitato il disegno, conoscere la perfezione et eccellenza dell’arti, et il sapere dell’artefice insieme

It may also be recalled that, for Vasari, the drawings proper to architects were profiles (profili), an assertion appearing just a few sentences later. As a theory of the profile line, then, the drawing of the bell scale connects the practice of bell-making to disegno and the realization of architecture. Interestingly for the relationship of disegno to the tempering template, the bell-scale is one of the few instances where an architectural drawing is directly related to the proportional imagining of sounds. The fact that architects such as Sangallo and Francesco di Giorgio chose to include the bell scale in their architectural treatises illuminates the importance of the profile in as an imaginative device for tempering - since it relied on the simultaneous imagining of the practical as well as speculative scrutiny.

As has been shown, the commensurability of relationships between tone, weight, and profile thickness was a matter of theory as well as empirical knowledge through practices. It is the collusion of these two types of knowledge, however, that ultimately led to dexterity in the tempering process. As in the tuning of string instruments, the harmonizing of the bell scale with the particular casting process at hand was neither theory nor practice per se; rather the procedure was more akin to a ‘practicing of theory’ involving the tuning of the imagined sound to the visual construction of the profile line. As the bell maker constructed the wooden modano, then, he must have silently ‘heard’ the song of the chiming bell in his imagination. Biringuccio writes that in laying out the full size drawing of the profile, the bell-master is to consider "the

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135 "perché in questi esercizi mi sono dilettato ed esercitato, come in disegno e in isculpire ed edificare.....", Filarete, Trattato di architettura (Finoli and Grassi 1972: I, 11).
136 Vasari, Vite (Milanesi 1906: I, 169-170). Translation by author. The full excerpt reads: "Ma sia come si voglia, questo disegno ha bisogno, quando cava l’invenzione d’una qualche cosa dal giudizio, che la mano sia, mediante lo studio et essercizio di molti anni, spedita et atta a disegnare et esprimere bene qualsche cosa ha la natura creato, con penna, con stile, con carbone, con matita o con altra cosa; perché quando l’intelletto manda fuori i concetti purgati e con giudizio, fanno quelle mani, che hanno molti anni essercitato il disegno, conoscere la perfezione et eccellenza dell’arti, et il sapere dell’artefice insieme."
137 Ibid.
cause of the sound, which is a certain effect proceeding from the access of air which circulates outside and touches it...".138

The judgment of the ear was more than a kind of sensible knowledge in itself, however, based on a rational faculty of cogitation.139 Although it had sensible qualities (hot, dry, clear), material (vapor-like), and a place in the body (heart), the spiritus nonetheless contained invisible qualities because of its associations with cosmic influences. The material image of air touching the bell is what enabled the occult harmony embedded in a well-proportioned profile to become manifest through the experience of the ears, since it is air that most closely resembles the material of the spiritus. Temperring, while contingent upon earthly beauty, ultimately relied on the vaporous workings of the imagination, a fundamentally material divination.140 A beautiful bell chime was not only pleasing to the ear, it also satisfied the spiritus, an angelic material fueled by Love. As embodiments of the spirit, modani, as for bells or stones, conducted between these two realms vis-à-vis the agency of the profile. Because of their flatness, they engaged the mind's eye unlike other three-dimensional models in that the bell-maker had to imagine the entire body of the bell from only a profile edge. Once imagined, he could both hear and see the future casting; considering it within potential celestial influences. These templates, just as those employed by Michelangelo in the guiding of stone, were thus instruments of the Muses as well as practical tools for the workshop.141

The beating of the martello

For Biringuccio the imagination provided the seat for material images, as in the enlivening of the bell profile through the spirit-granting quality of tin, or in the circulation and touch of air around the bell. Most likely acquainted with Michelangelo,142 he closes De la pirotechnia with an impassioned account of the mind's eye in another context: in the material imagination of the fire of love. A surprising end to a monumental exposition on the empirical practices of the art of the forge, Biringuccio finds it necessary to recall that the forge is both a practical and a spiritual undertaking:

138 “la causa del suono qual e uno certo effetto percedente dalo accostamento del aere che fuor circundando la toccha...”, Biringuccio, De la pirotechnia (Carugo 1977: 94r).
139 As described, for example, in Summers 1987: 8ff or Deupi 1999: 35.
140 This discussion revolves around the question of religious images and what constitutes idolatry. Ficino repeatedly censures the power of a strictly visual approach to the imagination, and he invokes the latent power of materials to provoke health, faith, and love, e.g. De vita, III.19 and III.20 (Kaske and Clark 2002: 343-354).
141 The spiritus is the instrument of the Muses generated in the heart for nourishing the mind (brain, reason), Ficino, De vita I.2 (Kaske and Clark 2002: 111).
142 Biringuccio was chief artillery minister during the defense of Florence in 1529 at the same time that Michelangelo was engaged in the re-design of the city's fortifications. It seems highly plausible that they knew each other.
As I [reexamined my work], there immediately appeared in my mind's eye the many sublimates and smoky tinctures that had been made by the burning and most powerful fire of love.

Biringuccio's ruminations on love provide a fitting setting to introduce a few related images that were essential to Michelangelo's tempering process. Manifest beauty relied on the fury of the artist as revealed through such practices henceforth discussed as tempering procedures: the flipping, cutting, and sliding of paper; or the whittling, filing, and polishing of tin. The heat of the forge adds to our exploration of tempering, because it helps bind the vapor of the spiritus, fire, and the practices of tempering in a concise manner particularly relevant to Michelangelo. Ultimately, his modani may be seen as products of such material associations.

Biringuccio's appeal to the heat of the forge in discovering the "fire of love" conjures deep connections with Michelangelo's own relationship with fire and the forces of Love; revealing the space of tempering in surprising ways. In spite of his fame as a marble sculptor, interestingly enough, Michelangelo appeared to have limited interest in the direct practice of the forger's art. His most noteworthy outcome was the casting of a monumental bronze sculpture in 1507 of Julius II for the facade of San Petronio in Bologna, a work as problematic and difficult for him as its ill-fated destruction three years later by the resentful Bolognese. However, in a poem written just before leaving the building fabric at San Lorenzo in 1532, he powerfully invokes the image of fire as it relates to himself as a creator. And it is through his poetry that we may enter into these associations most clearly. The sonnet is worth quoting in full:

Only with fire can the smith shape iron from his conception into fine, dear work; neither, without fire, can any artist refine and bring gold to its highest state nor can the unique phoenix be revived unless first burned. And so, if I die burning, I hope to rise again brighter among those whom death augments and time no longer hurts. I'm fortunate that the fire of which I speak

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143 Biringuccio, De la pirotechnia, 167r. Translation from Smith 1942: 444.
144 In the modern context, tempering is often considered antithetical to poetic fury or ambition (Deupi 1999: 36), perhaps a product of the sobriety of 19th century "Temperance" movements originating in Victorian England (Smith 1993). In the Neo-platonic context, however, tempering was poetic madness - a precise tuning of the body and the world soul. In particular, see Ficino's discussion of poetic madness "But the whole soul is filled with discord and dissonance; therefore the first need is for poetic madness...[which] quells dissonant discord and tempers the various parts of the soul (totus autem anumus discordia et inconcinnitate repletur. Poetico ergo furore primum opus est...dissonantem pellat discordiam, et varias partes animi temperet). Also, in the unification of the soul through the desire for divine beauty, one undergoes 'four furors' which are governed by tempering procedures, Ficino, Commentary, Seventh Speech, ch. XIV (Jayne 1944: 231-232).
145 Michelangelo did, however, frequent the forger's workshop during projects at San Lorenzo, as in, "A dì venti di maggio un ducato largo a lLodovicho che gicta l'artiglierie, per una squadra di ferro", Ricordi, LXXX (Ciulich and Barocchi 1970: 86).
146 Weighing in at 10,000 pounds, the statue was one of the largest cast since antiquity. Michelangelo had little interest or experience in bronze casting, but he remained in Bologna at the orders of the Pope. Other bronze casts are attributed to Michelangelo, including a lost bronze of David.
still finds a place within me, to renew me,
since already I'm almost numbered among the dead;
or, since by its nature it ascends to heaven,
to its own element, if I should be transformed
into fire, how could it not bear me up with it?

Sol pur col foco il fabbro il ferro stende
al concetto suo caro e bel lavoro,
né senza foco alcuno artista l'oro
al sommo grado suo raffina e rende;
né l'unica fenice sè riprende
se non prim'arsa; ond'io, s'ardendo moro,
spero piú chiar resurger tra coloro
che morte accresce e 'l tempo non offende.
   Del foco, di ch'io parlo, ho gran ventura
c'ancor per rinnovarmi abbi in me loco,
sendo già quasi nel number de' morti.
   O ver, s'al cielo ascende per natura,
al suo elemento, e ch'io converso in foco
sie, come sie che seco non mi porti? 147

Since fire seeks to revert to its origin, i.e. "al suo elemento", the fire within Michelangelo desires the same resolution - that is, a return to its divine source. This statement relies on the theory of resonating materials discussed earlier from the *Timeaus*. Earthly materials were corrupted by the bonds that hold them together, but they nevertheless retained the qualities of their celestial provenance as well as their ultimate desire to return to their source (as a magnet desires iron). Recognizing the agreement of materials, Michelangelo asserts the power of the inner fire to desire the eternal fire of divine beauty. As a tuning of the gap between the fire of the spirit and the fire of the heavens, it is a remarkable confirmation of the space of tempering.

What is more, the ardent forge provides a generous metaphor for the tempering procedure, since one of its more enduring images relied on the iron smith at work (figure 3.20). Ripa, for example, recounts a possible rendering of *Temperanza* as having "in her right hand a pair of tongs holding red-hot iron, and in her left hand a vase of water, into which the ardent iron is tempered".148 The clashing of the primordial opposites of hot and cold, fits well with Michelangelo's invocation of rebirth through death. Like the phoenix, the glowing iron 'dies' when quenched in cold, fluid-like material, only to be 'reborn' through its transmutation into hardened steel. So it is as well with the cooling of a bell, where Biringuccio advises a quenching bath of cool air. "Take them [the bells] out hot as soon as they have cast them," he writes, "often, instead of attaining the desired temper (tempera), the bells crack in shrinking."149 In all three cases of

148 "...nella destra mano terrà una tenaglia con un ferro infocato, & nella sinistra un vaso di acqua, nel quale tempera quel
149 "...lhanno le cavano fuore per tal modo calde che assai volte in scambio di pigliar la tempera che credeno ritirando se
lo spezzano", Biringuccio", De la pirotechnia 97v, translation by Smith 1942: 270. Theophilus also stress the importance
of proper cooling in the bell-making process, *On divers artes* (Smith 1963: 175). On Biringuccio's commentary on the
tempering of iron, see De la pirotechnia, 137r and Smith 1942: 371-372.
red-hot materials - Temperanza's iron, Biringuccio's bronze, and Michelangelo's spirit - the forge initiated the according of earthly materials with their origin in the celestial body.

Curiously, the invocation of the smith marks a notable digression from Michelangelo's more familiar image of the marble sculptor removing the excess to reveal the concetto buried within. Noting that the potential of the concetto resides also in the heat of the forge, one wonders how to square these two practices: on the one hand, there is the brute marble block, a cold material where the internal eye pierces the body of the stone, dissecting it through a process of chipping, filing, and polishing; on the other, the smith works a hot material where the internal eye relies on an alchemic procedure of transmutation to turn the concetto into "caro e bel lavoro". Indeed, although Michelangelo invokes the smith as a metaphor for the artist in general, whereas the removal of marble would have been a personal endeavor, the parallel use of "concetto" is revealing. Whether it be on hot iron or cold stone, the materials already have divine potential through their commonality with the celestial firmament, and it is by the artist's concetto that the gap between the two materials may be tuned.

The common image here is, of course, the beating hammer. Whether in striking hot iron or chipping impenetrable stone, the poet's hammer is a symbol of the creative power of the divine smith. This is often considered as a kind of composite image of Hephaestus and Plato's Demiurge - where the laboring smith is transformed into a symbol of poetic furor and divine creation. It was within this context that the 16th century sculptor Vicenzo Danti wrote:

more wood and more coals did I burn in vain than the most ancient Sicilian Smith fired in Aetna.

più Legne, e più Carbon' io arsi in vano / che in Etna non ne tien' contanti accesi / l'anticissima Fabbro Siciliano

For Michelangelo, the hammer of Hephaestus was the hammer of poetic fury, an image already touched upon with Fanti's representation of Michelangelo assailing a stone bock (figures 2.52 and 2.53). What is easily overlooked, however, is the role the hammer played in the presencing of the work beyond what is perceived strictly speaking through the senses alone. The hammer was not only employed in the removing of stone to reveal an figure, it also released the pent-up power

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150 On the image of the smith and the notion of the 'artificial' in the 15th and 16th centuries, see Sawday 2007: 167-183
151 Cellini writes on the importance of a tempered hammer for the sculptor, Trattato della scultura (Milanesi 1857: 199-200).
152 This composite existed even during the time of Euripides, when Hippolytus stated, "This is the punishment wrought by the Demiurgos who works like the blacksmith who transforms the iron and plunges it from fire into water", cited in Spitzer 1963: 66; cf. Petrarch, "in vain around the forge he works his arms / the very ancient smith of Sicily (le braccia a la fucina indarno move / l'antiquissimo fabbro ciciliano)", Canzoniere (Muse 1996: 70-71, no. 42).
154 Ficino's doctrine of furor poeticus provides a summary of these associations, where the poet produces "not by art but by some divine inspiration" - an embodiment, perhaps, of Orpheus, who presences the spiritus through the frenzy of harmonious song; see Ficino, Commentary, Seventh Speech, ch. XII, XIV, XV (Jayne 1944: 230-233) and comments in Tigerstedt 1968: 459-60, 473-474.
of the material itself to act as a mirror of its divine origin. Ficino summaries this quite well in *De vita*:

> It is probable that, if images (*imagines*) have any power, they do not so much acquire it just at the moment of receiving a figure as possess it through a material naturally so disposed; but if an image eventually acquired something when it was engraved (*insculpitur*), it obtained it not so much through the figure as through the heating produced by hammering. This hammering and heating, if it happens under a harmony similar to that celestial harmony which had once infused power into the material, activates this power and strengthens it as blowing strengthens a flame and makes manifest what was latent before... Yes, and just as the touch of the broom or the wild strawberry excites a dormant madness, thus perhaps hammering and heating alone brings out the power latent in the material, if it is done at the right time.\(^{155}\)

The manifesting power of the hammer thus had as much to do with the rhythmic beating of the material as it did in the revealing of an image; and the work was not revealed in its final appearance but rather in the process of making. This was the power of Michelangelo's *concetto* in the Neo-platonic sense, since, as Ficino suggests, the figure must be wrought in a "material naturally so disposed". Materials appropriate to the hammer, such as marble or iron, have a latent potential for manifest beauty, but they depend on the harmonious beating of the well-tempered tool, tuned to celestial harmonies.

For Michelangelo, the hammer is a key poetic metaphor, appearing in several places across his written oeuvre. In one key sonnet, the artist imagines the hammer as giving birth to the "*concetto bello*" through the hammer of "live, alpine stone (*pietra alpestra e viva*)".\(^{156}\) The image of alpine stone containing the latency of life within, only to be released through the beating hammer, could be interpreted as a near-confirmation of Ficino's theory of harmonic beating. Elsewhere, in an overheard exchange between Benedetto Varchi and Michelangelo, Varchi stated,

> Signor Buonarroti, you have the brain of Jupiter

> *Signor Buonarroti, avete il cervello di Giove*

To which Michelangelo replied:

> But one needs the hammer of Vulcan to make something come out of it

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\(^{155}\) *Probabile enim est, si quam vim imagines habent, hanc non tam per figuram nuper acquirere, quam per materiam possidere naturaliter sic affectam. Ac si quid denuo acquiring dum insculpitur, non tam per figuram comparari quam per calefactionem contusionem quadam provenientem. Quae quidem contusio calefactioque facta sub harmonia coelesti simili harmoniae, quae suondam materiae virtutem infuderat, excitat virtutem ipsum alque corroborat, sic flatus flammam: et manifestam efficit ante latentem...immo vero sic tantus scopae vel arbuti suscitat rabiem consopitam, sic forte contusio quaedam et calefactio sola latentem in material virtutem prodit, facta videlicet opportune*, *De vita*, III.18 (Kaske and Clark 2002: 342-343). See also, *De vita* II.10 for an account of how the beating of gold into leaves releases its potential to temper the body when ingested. See comments on this passage in Pérez-Gómez 2006: 18.

\(^{156}\) *Po’ nel secondo im pietra alpestra e viva*

s’arrogie le promesse del martello,

e si rinascie tal concetto bello,

che ’l suo ecerno non è chi ’l preschiva.

The implication here is that Michelangelo brushed aside the creative potential of the mind alone, invoking the divine smith Vulcan as both the metaphorical and actual agent in the bringing forth of beauty. The association of Jupiter, tin, and the *spiritus* adds further interest to the exchange, suggesting that the hammering of tin into leaf-like sheets, Jovial qualities are released into the material. Perhaps the most poignant confirmation of the divine potential of the hammer, however, resides in an extended commentary on the potency of the artist's hammer to act as an extension of divine will:

> If my crude hammer shapes the hard stones into one human appearance or another, deriving its motion from the master who guides it, watches and holds it, it moves at another's pace. But that divine one, which lodges and dwells in heaven, beautifies self and others by its own action; and if no hammer can be made without a hammer, by that living one every other one is made. And since a blow becomes more powerful the higher it's raised over the forge, that one's flown up to heaven above my own. So now my own will fail to be completed unless the divine smithy, to help make it, gives it aid which was unique on earth.

> Se 'l mie rozzo martello i duri sassi forma d'uman aspetto or questo o quello, dal ministor che 'l guida, iscorge e tiello, prendendo il moto, va con gli altrui passi. Ma quel divin che in cielo alberga e stassi, altri e sé più, col proprio andar fa bello; e se nessun martel senza martello si può far, da quel vivo ogni altro fassi. E perché 'l colpo è di valor più pieno quant'alza più se stesso alla fucina, sopra 'l mie questo al ciel n'è gito a volo. Onde a me non finito verrà meno, s'or non gli dà la fabbrica divina aiuto a farlo, c'al mondo era solo.

As these powerful images have demonstrated from Biringuccio, Ficino, and Michelangelo, the strikes of the hammer are, in the end, the micro-adjustments of tempering.
They are the steps on the bell scale or the ground markings of the column profile; they are the tweaks of the lyre strings, the smelling of rose water, or the filings of a metal edge. Beat by beat, the hammer of the forge slowly, but furiously, transmutes materials into alignment with their celestial provenance. Fueled by love, these practices are ultimately presenced through their corporal, tempered instruments: the heart, the lyre, or the modano.

These tools, then, sing the song of the spiritus - an assertion summarized by Aristotle's use of breath, or pneuma, the Greek predecessor of Ficino's use of spiritus:

So it is reasonable that Nature should perform most of her operations using breath (pneuma) as an instrument (polychrston organon), for as some instruments serve many uses in the arts, e.g. the hammer and anvil in the smith's art, so does pneuma in the living things formed by Nature.

Tempering the profilo IV: column entasis

In the tempering of a round body such as a bell, the template was oriented perpendicular to the surface, has already been seen in Buonaccorso's image of the modono on the bell mould (figure 3.18). As in the making of stone shapes through modani, the use of flat templates in bell-making to derive three-dimensional bodies created strong links between the harmony of the profile line and the sonorous body of the bell. Rather than relying on a horizontal projection of the modano for entablature, templates for round bodies such as a bell relied on the circular movement of a lath or rotating stickle - an association with the perpetual movements of the heavens. The examination of another round body, the architectural column, greatly widens our field of associations between tempering and the realization embodied in templates. With the bell template, the practice of translating a profile line into a harmonious body provided a fruitful starting point for analogous practices in architecture. In the expansion of these practices into architecture, the proportioning of a column demonstrates how the space between axiomatic proportion and lived experience opens the door for Temperanza. As will be seen, the parallel

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158 Michelangelo was also careful to separate himself from those who had mere technical mastery, as in Carteggio, MI (Barocchi and Ristori 1967: IV, 150), where he declared that, "...si dipinge col ciervello et non con le mani; et chi non può avere il ciervello seco, si vitupera: però fin che la cosa mia non si acconia, non fo cosa buona"; and also, "...io non fu' mai pictore né scultore come chi ne fa bottega", Carteggio, MCIX (Barocchi and Ristori 1967: IV, 299).
159 See discussion on the alchemy of tin, above.
160 Translation by Saalow 1991: no. 46, 128-129; cf. a similar image by Dante in Paradiso, Canto II: "The motion and the power of the holy wheels / must be derived from the blessed movers / as the work of the hammer from the smith; Lo moto e la virtù d'i santi giri / come dal fabbro l'arte del martello / da' beati motor convien che spiri". Translation from Petrocchi 1966-67.
161 This image resides quite literally in another English derivative from the Latin temperare: the verb 'tamper' - "to beat lightly or tap, especially in clay", fr. OED under 'tamper'; cf. Spitzer 1963: 193, n.2.
162 On rose water and tempering, see Ficino, De vita (Kaske and Clark 2002: 155).
practices of bell tempering and column tempering create a web of associations between the profile line and material harmonies.

The tempering procedure specifically reveals itself in the laying out of the column *entasis*, the slight swelling or thickening of the column shaft as an adjustment for what is now known as 'optical refinement'. Vitruvius writes in Book Three that this practice developed from ancient architects who observed that temple intercolumniations following strict rules of proportioning and spacing often exhibited a lack of grace or clumsiness (figure 3.21). Such an illusion was due to how the "air consumes and lessens in appearance the diameter of the shafts". For this reason, he contends, a process of slightly thickening the column diameters should be undertaken, a procedure closely related to the proper column spacing or interval. No rule or formula could be provided, as the amount of adjustment depended on the judgment of the eye; achieved, as it were, by enacting a tempering procedure called "temperatione". In his discussion on the *entasis* in Book Three, Vitruvius states:

> It is on account of the variation in height that these adjustments [temperaturae] are added to the diameters to meet the glance of the eye as it rises. For the sight follows gracious contours; and unless we flatter its pleasure, by proportionate alterations of the modules (so that by adjustment [temperatione] there is added the amount to which it suffers illusion), an uncouth and ungracious aspect will be presented to the spectators. \(^{165}\)

Later, in Book Six, he summarizes his theory of proportion and optical correction, again relying on the practice of tempering. \(^{166}\) Although architects should first determine their column proportions by fixed units, he states, properly refined proportions are only to be found through the slight adding and subtracting from such fixed units as determined by "use or beauty (usam aut speciem)" and the "nature of the site (ad naturam loci)". As in Book Three, the putting in place of such corrections or adjustments were again understood by Vitruvius to be a practice of "temperatura". \(^{167}\) Presumably, proportional corrections were necessary because of the gap between axiomatic proportions and that of the corporal, material world - what we may call the architect's equivalent of the Pythagorean comma. For Vitruvius, the construction of the *entasis* was indicative of this problem: in following mathematical ratios alone, the particularities of the material body would lose its gracefulness.

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\(^{164}\) "...ideo quod per latitudinem intercolumniorum aer consumit et inminuit apsectu scaporum crassitudinem", De architectura, III.iii (Granger 1929: I, 176-177).

\(^{165}\) "Haec autem propter altitudinis intervallum scadentis oculi species adiciuntur crassitudinis temperaturae. Venustates enim perseguitur visus, cuius si non blandimur voluptati proportione et modulorum adictionibus, uti quod fallitur temperatione augeatur, vastus et invenustus consciencientibus remittetur aspectus", Vitruvius, De architectura, III.iii (Granger 1929: I, 178-181).

\(^{166}\) Other uses in Vitruvius of temperare in connection with adjustments or corrections include, De architectura, IV.iv.3, V.vi.7, V.x.5, VI.i.1, VI.iv.2.

\(^{167}\) "Cum ergo constituta symmetriarum ratio fuert et connensus ratiocinationibus explicati, tum etiam acuminis est proprium providere ad naturam loci aut usum speciem, adictionibus temperaturas efficere, cum de symetria sit detractum aut adiectum, uti id videatur recte esse formatum in apsectuque nihil desideretur", Vitruvius, De architectura, VI.ii (Granger 1929: II, 20-21). On tempering in the symmetry of theatre design, see De architectura, V.vi.
The practice of providing such 'refinements' should seem familiar by now. In the tempering of the bell-scale, for example, small modifications accounted for how conventional workshop practices were reconciled with the requirements of the site and the mathematical ratios of the bell scale. In music, they were the difference between tuning, through pure, rational proportions, and tempering, to accommodate the ear - a condition that was ruminated upon by Aristoxenus, Gaffurius, and Aron. And in the human body, these corrections were the physician's practice of making slight alterations to the body humors through diet and behavior; thus harmonizing the mortal and celestial bodies. Now, in architecture, we encounter a similar space between mathematical proportion and the appropriateness of their realization within the material body of architecture. It is thus that adjustments, or temperatura, must be employed by the architect to achieve the commensurability of mathematical relationships with that of lived experience.

The introduction of the entasis to an otherwise cylindrical column meant, in effect, that the verticality of a column must now be defined by a profile line. The constructing of such a line fell within the proper knowledge of an architect, requiring specialized training in mathematics as well as a good degree of practical experience and shrewdness. Since Vitruvius neglected to articulate an exact method, Alberti formalized the earliest version of how to construct the column swelling in De re aedificatoria. At the end of Book Six, he describes in detail the method of constructing the profile line, beginning, as it were, with the marking out of a full size drawing on the ground or the wall. After making a mathematical description of how to construct the graceful curve, Alberti concludes:

Using the above instructions, then, the line known as the profile [finitor] may be constructed. Along this line a thin template [tabula gracilis] may be fashioned, with which workmen may obtain and define the correct shape and definition for the column.

As may be seen, Alberti not only constructs a drawing for the column swelling, he describes how the profile shall be transferred to the worksite through the employment of a wood template: a thin

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168 Even Polykleitos, who provided one of the earliest known 'canons' of the human body, wrote that, "perfection lies in many numbers, except for a little". Quoted in Coulton 1977: 109. On the canon of Polykleitos as both qualitative and quantitative, see Summers 1981: 382-383.

169 On optical refinements in Greek architecture, see Coulton 1977: 108-112. For a broader treatment on the subject, see Haselberger 1999, and esp. Korres 1999: 70-104.

170 "Itaque his quas recensuimus perscriptionibus linea quae finitor dictur composita est. Ad cuius lineae modum tabula gracilis deformabitur qua fabri lapicidae iustum columnae ambitum et finitiones captent atque terminent", Alberti, De re aedificatoria, 109v; translation by Rykwert, Leach and Tavernor 1988: 188. It is interesting to speculate as to why Alberti thought it necessary to mention template-making in a treatise intended for patrons. Following the importance of modani to patrons by Vasari, Palladio, and Alberti himself, mentioned above, it is plausible that this passage is in support of the interpretation that templates were more than just practical instruments for the construction site. They were also key rhetorical devices for allowing the patron to imagine the future construction.
piece of wood that has been cut to fit the profile line, called the *finitor*. Alberti states that this procedure -

...is not a discovery by the ancients, handed down in some writing, but what we have noted ourselves, by careful and studious observation of the works of the best architects.

In other words, the realization of the column profile through a template was probably a matter of course among contemporary 15th century architects. Following the absence of images in Alberti's original treatise, his template-making procedure is illustrated in the popular Tuscan translation provided by Cosimo Bartoli in 1550 (figure 3.22). It should be no surprise, then, that Giovanni Rusconi's 1590 translation of Vitruvius included a rather vivid illustration of wood templates in the realizing of the column *entasis* (figure 3.33). By that time, the treatises of Palladio, Cataneo, Vignola, as well as the Vitruvian translations of Cesariano and Fra Giocando had all articulated a practical method of deriving the swelling of the column, although the method of deriving the actual profile line varied greatly among the treatise writers. Philibert De L'Orme in 1567 (figure 3.34) and Scamozzi in 1615 (figure 3.35), following Rusconi and Bartoli, included images of the wood template along with their descriptions of the column profile.

The 16th century translators of Vitruvius retained and even strengthened his use of *temperatione* as it related to material adjustments within pure ratios. When Barbaro rendered Vitruvius' Book Three discussion of the column height as corrected for the eye, for example, he wrote that such corrections should be made "with beautiful temperament (*con bello temperamento*)". And, elsewhere in Book Three, he adds in his own commentary that:

Such is the power of proportion, such is the necessity and the utility of it in things, that one cannot translate any delight to the ears, nor to the eyes or the other senses without the propriety and the agreement of reason; and that which delights or pleases, and not something else, does so because it contains proportionate measure and moderate temperament.

171 This procedure is described in *De re aedificatoria*, VI.8. Pietro Lauro in the 1546 translation of Alberti calls the wooden template a "sottl tavola"; the Bartoli translation (1550) describes the template following Alberti's Latin term, "centina". Preferring to replace Vitruvius' Greek (*entasis*) with terms from the Latin language, Alberti use of the *finitor* recalls his understanding of the profile lines of the human body. In his treatise on sculpture, *De statua*, the *finitor* is the profile line based on the relationship between the invisible, perpendicular vertical axis of the human body and the visible perimeter edge. The determination of such an edge would become the principle purpose of the *finitorium*, Alberti's tool in *De statua* for measuring the profile of the body.
173 An analysis of the various methods of producing the *entasis* by Renaissance writers was provided by Becchi 1988: 149-164.
174 These images follow Alberti's notion of the *finitor*, where the center axis is shown as it relates to a profiled outer edge.
175 Barbaro 1567: 133. Translation by author.
For Barbaro, Vitruvius' use of tempering appears to fall within the Aristotelian notion of tempering as a moderating impulse governed by reason. Cesariano, whose translation coincided closely with the building works at San Lorenzo (1521), keeps this sense and introduces important connections with the celestial or spiritual implications of the tempering process. Also retaining Vitruvius' use of *temperaturae* (rendered as "temperature"), Cesariano adds that the swelling of the column is like that of a pregnant woman or of a man who carries a heavy load (figure 3.21). For Cesariano the tempering process takes on a dynamic character subject to the qualitative proportioning of the animated body. Following this, his commentary and illustrations help bridge between Vitruvius, who viewed tempering as an act of making small digressions away from rational proportions based on the *modulus*; and Ficino's cosmic understanding of tempering as the practice of making micro-adjustments within context of the *spiritus*. Both stem from a similar point of view, where tempering is a qualitative procedure of imposing judgment on merely quantitative rules.

Cesariano relied on a theme already encountered in the making of bells, where there was a fundamental relationship between the well-tempered profile and the mirror of experience through the senses. In his examination of Vitruvius' column orders in Book IV, Cesariano demonstrates this connection between bells and columns in a remarkable woodcut of the orders (figure 3.36). Like Vitruvius, he discusses the several varieties of the Corinthian capital, characterizing the Corinthian column as essentially an Ionic column but with a different and more varietal treatment of the capital. Hidden among these variations in the woodcut illustration, however, is a small profile drawing of a bell, easily missed among the potpourri of column foliage (figure 3.37). Drawn as a diagram of the bell profile, Cesariano implicitly connects the bell profile with the column profile in the juxtaposing of images. He also explicitly relates them in the accompanying text, stating that:

...The variety of these [columns] and of other imitated capitals of the symmetries of the bells and vases.

...La varietate de li quali & de altri capitelli imitati de le symmetrie de le campane & vasi: si como e signata la dictione R(x)

The unifying principle among the bell and column is their "symmetrie", a Vitruvian term for relating the well-proportioned human body with that of a temple. The principle of symmetry


followed in the ancient tradition of establishing a human canon of proportions realizing the harmonious relationships among the parts of the body as they relate to the whole. "As in the human body, from cubit, foot, palm, inch, and other small parts comes the symmetric quality of eurhythm," states Vitruvius, "so it is in the completed building." In this way a column diameter, for example, may dictate the proportions of the rest of the building parts through their commensurate relationship to the column diameter as the principle *modulus*. Still, although the body adheres to a symmetrical relationship between part and whole, the application of such a principle to buildings requires the procedure of slightly adding or subtracting material away from a strict following of the module, that is, symmetry must be tempered once placed into contextual and material situations, what Vitruvius called "eurhythmia".

Such was the case in understanding proportional refinements with the column *entasis*. By likening of the column swelling to a straining man or pregnant woman, Cesariano magnifies the life movements of the body, a notion that would have certainly resonated with Michelangelo. At the same time, the linking of the column bell profile through symmetry suggests a celestial presence of the *spiritus* through the sounding of the profile. In Cesariano's commentary on Vitruvius' chapters on music, he substitutes much of Vitruvius' reliance on Aristoxenus with the writings of his contemporary, Gaffurius, discussed already in the context of empirical musical practices. Gaffurius allowed Cesariano to introduce the importance of cosmic associations with musical interval and number, a tendency that was somewhat muted in Aristoxenus. In his illustration demonstrating the harmonic intervals, Cesariano provides another reference to the bell (upper left) as well as a drawing of the sounding vase (upper right), both of which adhere to the principle of symmetry (figure 3.38). Tempering, then, is a proper conceptualization of providing symmetry through its material manifestation, where the harmony of the profile is manifest through the *spiritus*. Note, for example, in Gaffurius' illustration of *musica mundana* (figure 3.39) that the...

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180 "Uti in hominis corpore e cubito, pede, palmo, digitò celerisque particulis symmetres est eurhythmiae qualitas, sic est in operum perfectionibus", Vitruvius, *De architectura*, I.ii (Granger 1929: I, 26-27). This term is explicitly linked to various writers on proportions from ancient Greece in *De architectura*, VII.preface (Granger 1929: II, 71-77). For a discussion on Vitruvian 'symmetry', see Rykwert 1996: 109-110; for the term in Cesariano, see Hersey 1976: 104-105.  
181 Vitruvius, *De architectura*, I.ii  
182 Eurhythmny resulted from digressions in 'symmetria' as appropriate to the situational context, *De architectura* I.ii.3. The key discussion on this occurs in Book VI.ii. Here Vitruvius states that, once the appropriate proportions have been determined, "there will follow upon it an adjustment of the proportions to the decor so that the appearance of eurhythmny may be convincing to the observer (sequatur eam proportionis ad decorum apparatio, uti non sit condiserantibus aspectus eurhythmiae dubius)"; *De architectura*, VI.ii.5 (Granger 1929: II, 22-23). For Barbaro, *eurhythmia* was the result of the adjustments made to proportions on account of their material, Barbaro 1567: 162.  
183 A thorough discussion of Vitruvius' and his 16th century commentators' inclinations toward musical proportions is beyond the scope of this dissertation. It would suffice to recall that Vitruvius relied on the work of Aristoxenus rather than Pythagoras in his discussions on music (*De architectura*, V.iv). Aristoxenus is generally regarded as opposed to Pythagoras in the history of musical theory because of his insistence on the ear over pure ratios in the proper playing and tuning of musical instruments. Some musicologists have even stated that Aristoxenus was the first to derive a system of equal temperament, where the musical octave would be divided into equal parts rather than relying on the commensurability of the monochord. Recent scholarship on Aristoxenus is summarized in: Litchfield 1988: 51-55. Barbaro, whose knowledge of music was on par with the leading scholars of his day, relied much more on the Pythagorean line of theorists, through Ptolemy, in his commentary on musical proportions, moving away from Vitruvius' more practical applications of music to architecture; for more on Barbaro and musical proportions, see Mitrovic 1996.  
184 Cesariano introduces Gaffurio in his commentary on Book Five, chapter four.
monochord represented by the serpent moves along a wavering line, perhaps a vibrating string, plucked by Apollo and tempered by the three heads of Prudence.

This subtle shift in thinking is closer to the notion of tempering as temporal practices of filing, whittling, and beating, while at the same time acknowledging its long precedent for tempering in the making of architecture. Alberti's and others' linking of the template to the profile provides a critical connection between the architectural template and historical notions of sensible refinements, or the reasoned departure from strictly axiomatic ratios in building. When Cesariano connected the bell profile with the column profile, he broadened the notion tempering present in discussions on the *entasis* to encompass other types of materially present profiles. Such a relation is a reminder of the tempering power of templates, since it is through the template that the occult, symmetrical properties of the profile are manifest in experiential ways through context and material. Cesariano's reflection on the column *entasis* reinforces the dual role of the profile to act between the manifest and the occult.

**Tempering the *profilo* V: stone**

While such discussion of the finer aspects of architectural theory probably held little interest for Michelangelo, it is important for our argument nonetheless. First, the use of *temperatione* by Vitruvius, and its subsequent upholding by his 16th century commentators, demonstrates that the notion of tempering as applicable to the fine-tuning of architecture was well-known during the time of Michelangelo. Second, the emphasis by the treatise writers on the constructing of a template for procedures requiring micro-adjustments establishes the critical link between tempering and the practice of template-making. And finally, the cosmic implications of the profile line as bridged by Cesariano in the juxtaposition of the *entasis* with the bell profile shows how the practice of template-making was also conceived as a presencing of the invisible within the sensible realm of materials. That the template was discussed within these treatises already demonstrates its meaningfulness beyond a merely practical teaching.

We now seem poised to discuss the next step in the tempering process, which is in considering how the tin templates transfer their temper onto the stone blocks themselves. Realizing now that this procedure was becoming increasingly remote from the intimacy of Michelangelo's drawing board at Via Mozza, the tracing of the *modani* onto the stone blocks is actually the first step in the transubstantiation of the stone blocks into those stones indirectly cut by the invisible hand of Michelangelo. The Mercurial template discussed above - durable, sharp, and quick-witted - still leaves open the question of the efficient cause; that is, in what is the role of
the *scarpellino* actually cutting the stone. What ought to be confronted at this point is how this procedure accounts for the simple fact that Michelangelo did not cut the stones himself, nor did he assemble the cut stones with his own hands. The peculiarity of architecture as a projective activity realized through the hands of others, however, remains deeply ingrained within the very existence of *modani*. They operated not only between idea and building but also between Michelangelo and his assistants.

With the help of Aristotle, the templates may be better seen as products of Michelangelo's hand as well as agents for his hand within the work of others. In particular, the criticality of the paper template facing the tin may be analyzed through the distinction made by Aristotle between substance (*ousia*) and material (*hyle*). Among the four causes (formal-final-material-efficient), *hyle* relates to the material cause and *ousia* accounts for the formal cause.\(^{185}\) *Hyle* is the principle of individuation, sensibly present, while *ousia* accounts for the invisible principle of 'thing-ness' or 'essence'. That a collection of bricks and wood may be called a house, for example, is known by its *hyle* and its *ousia*: *ousia* relating to the general concept of "house" or its quiddity, while the materials of the house, its *hyle*, distinguishing it as a particular house (i.e. *this* house). Thus, one may change the materials of a house, resulting in a different house, but it still may remain a house; and, conversely, one may use the same materials as were used in the house to make something else, although it may no longer be recognizable as a house.\(^{186}\) It is this distinction upon which Catholic theology argues for the doctrine of transubstantiation, where, through the ritual of the Holy Sacrament, the substance (*ousia*) of bread and wine may be altered into the body and blood of Christ, even as the outward, sensible appearances (*hyle*) remain as bread and wine.\(^{187}\)

A related theological concept known as 'consubstantiation' relies on the same Aristotelian distinction between material and substance. Instead of a total alteration of the *ousia* implied in transubstantiation, however, consubstantiation recognizes the simultaneous presence of both the original substance (bread and wine) with its altered state (body and blood of Christ). Within this reasoning, the template drawing, receiving Michelangelo's hand, is now substantially altered to become a template drawing imbued with his presence. Following this, both the template, as a construction implement, and Michelangelo are simultaneously present within the paper (its *hyle*).

\(^{185}\) The locus *classicus* on Aristotle's four causes is found in his *Physics* 194b. Using the example of a saw, Aristotle ontologically distinguishes it among each cause: the Final cause, or the purpose or use of the saw - in this case the cutting of wood; the Material cause, or that from which the saw was made (iron); the Efficient cause, or the human agent who brought the saw into existence, i.e. the smith; and the Formal cause, what Aristotle describes as: "characteristics or the type, conformity to which brings it within the definition of the thing we say it is, whether specifically or generically".\(^{186}\) Aristotle, *Metaphysics*, 1041a-b; *Physics* 189b. In Neo-platonist writings, the house was often used as an illustration for the progression between idea and material, see Ficino, *Commentary on Plato's symposium*, Fifth Speech, ch. V (Jayne 1944: 172) and Plotinus, *Ennead* 1.6.III.\(^{187}\) Transubstantiation, some have argued, is also one of the principles behind the intelligibility of 20th century conceptual art, expressed most prominently in *An Oak Tree* (1973) by Michael Craig-Martin.
Meanwhile, the paper remains unaltered, and its outward, sensible appearances are the same as they were before the artist's interventions. They have now been consubstantiated from paper templates into the paper templates by the hand of Michelangelo.

From this, Michelangelo's hand is extended onto the cut stone through direct contact from one medium to another. The touching or ‘facing’ of the paper to the tin and the tin to the stone enables a transfer of Michelangelo's hand from the drawing board to the construction site, a process that has already been discussed in the transfer of temper between tempered tools and tempered templates. It is the physical contact of the materials that initiates the translation of the profile between the various materials. Technically speaking, there is no translation of the causa efficiens here; rather, what is being altered is the presence of Michelangelo within the cut stones themselves. Upon being cut using Michelangelo's modani, the artist's presence is now imprinted within them.

This is not to suggest, however, that the stone-carvers were transparent, anonymous agents. Rather, each carver was carefully chosen by Michelangelo for the specific work to be performed. In this way, knowing each carvers' skill and signature, he could anticipate in what manner the profile would be translated from his template onto the proximate (or distant) stone block. This is well-demonstrated in the previously examined ‘copia’ drawing (Corpus 534 - figure A.8 and A.9), where the stone-carver Ceccone was specifically identified as the executor of the given, paper template.\textsuperscript{188} What is more, documentation from the San Lorenzo building sites shows that most of the stone-carvers hired by Michelangelo were life-long acquaintances, many of which hailed from his home town of Settagnano.\textsuperscript{189} It could well be argued, then, that Michelangelo constructed his profiles in anticipation of who would eventually carve them; they were meaningful collaborators rather than anonymous functionaries. It was not only the profile that carried Michelangelo's presence, it was also the signature of the carver who was specifically chosen by the artist to execute it.

The procedure that enables the consubstantiation of the paper template may be considered within the context of tempering as well. Fundamentally speaking, the modano had the capacity to alter the substance, or ousia in the Aristotelian sense, of the stone by relying on its physical proximity to the stone block. That is, in facing Michelangelo's paper template to the tin and the tin to the stone, a material consubstantiation is induced. Similarly, the process of how objects transfer their temper between materials and bodies was surmised by Ficino in multiple practices described in De vita. Here, temperance may be emitted from that which is well-
portioned, such as that of properly mixed wine, or it may radiate its temperament through the latent potency of the material itself, such as the power of gold to temper the body and "save the humors from corruption".190 The tempered mixture or material, having both occult and manifest presences, relied on the manifest practices of proximity - ingestion, touching, or breathing - to influence the corporal world.191 In this way, tempered materials may also temper the body through sound (music), as has been discussed, or odors, in the breathing of tempered air.192 As well, a tempered food, drink, or medicine, may tune the humors of the body through ingestion.

The invisible power of the template thus requires a manifest practice based on proximity to alter the substance (ousia) of the stone block. Since Ficino's preoccupation in De vita was the healthy body, nearly all of his examples relate to the tempering of the human constitution. Michelangelo's first exposure to the possibility of transferring temper between materials arose almost immediately from the cradle. It was during his infancy when his wet-nurse, the wife and daughter of stone masons from Settagnano, passed to Michelangelo his lifelong propensity toward the stone chisel. This story was famously recounted by his biographer, Ascanio Condivi, and it confirmed how the temperament, or temperatura, of materials (in this case, the nurse's milk) may be have great influence on the temperament of the proximate body:

The nurse was the daughter of a stone carver and the wife of a stone carver, so Michelangelo used to say in jest, but perhaps in earnest as well, that it was no wonder he delighted in the use of the chisel, knowing that the milk of the wet-nurse has so much power in us that it often transmutes the temperatura of the body, thus introducing it to another inclination from a very different nature.

La balia fu signiuola d'uno Scarpellino, et similmente ino uno Scarpellino maritata. Per questo Michelagnolo, suol dire non esser maraviglia, che contanto dello Scarpello dilettato si sia. mottegiando per aventura, o forse ancho dicendo da dovero, per saper che il latte della nutrice in noi ha tanta forze, che spesse volte transmutando la temperatura del corpo, d'una inclinatione, ne introduca un altra dalla natural molto diversa.193

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191 On how temper transfers through adjacency, see De vita, II.7 (Kaske and Clark 2002: 186-187), discussed in terms of ingestion of food; in terms of ingestion of tempered medicines, De vita III.22 (Kaske and Clark 2002: 363); in terms of sound, De vita, II.16, II.20 (Kaske and Clark 2002: 215, 235); in terms of smell, De vita, I.10, II.16 (Kaske and Clark 2002: 135, 215), The medium for transfer was always the spiritus, meaning that, beyond direct adjacency, airy transfers (such as sound and smell) were the most effective. See notes on the transfer of qualities as a theory of magic in above discussion on the transfer of temper through tempered tools.

192 cf. Ficino, "For just as things which are most tempered in quality, and at the same time aromatic, temper both the humors among themselves and the natural spirit with itself, so odors of this kind to for the vital spirit; so again harmonies of this kind do for the animal spirit (Sicut enim res qualitate temperatissimae simulque aromatae tum humores inter se, tum spiritum naturalem secum ipsa contemporant, sic odores eiusmodi vitalem spiritum, sic rursum similis quoque conceptus spiritum animalis)", De vita, II.16 (Kaske and Clark 2002: 215).

193 Ascanio Condivi, Vita di Michelangelo (Mariana 1928: fol. 2v); Translation by author. This passage conjures the image of Filarete 'nursing' the idea for nine months, Filarete, Trattato di Architettura (Finoli and Grassi 1972: I, 41-42). As well, in terms of tempering, one finds the connection between mother in child in Jakob Horst, Levini Lernii Occulta naturae miracula (1600), "For what the earth is in the fruitfulness of grain, [so] is the womb in the begetting of children and offspring. Thus just as the earth in which the seed should become a good plant must be properly tempered, not too hard, not too loose, not too moist, etc., so must the womb be properly tempered", cited in Crowther-Heyck 2002: 919.
Vasari adds to this anecdote, stating that what separated Michelangelo from his rival Raphael could be traced precisely to how they were nursed. Raphael, he stated, had been nursed directly from his mother, and this alone may account for his legendary and magnified gentilezza.\textsuperscript{194} Without robbing the story of its delight, one could also restate that the mother’s or nurse’s milk had the power to alter the substance of the body of the infant without changing its material. The medium of this transference lies in the temperatura of the milk, present in the manifest practice of the suckling child.

By extension, it could be easily surmised that the tempered template may follow similar principles in the transfer to the stone, where proximity induces an altered substance, even as the material (hyle) remains. The template is such an instrument, and it concords the stone block with celestial influences through the spiritus, as summarized by Ficino:

Through tempered things the life which resides in the spiritus is recreated; through tempered things the spiritus is conformed to celestial things.\textsuperscript{195}

In looking closer at the actual transfer of the profile, as Michelangelo’s tin templates lay on the stone block, several of Ficino’s transferring principles may be observed. In so doing, it would help to first speculate on how the practice of tracing and cutting the stone might have occurred. Several representations of 15th and 16th century Italian construction sites provide clues. The first is taken from a 15th century manuscript showing the construction site of Alberti’s work on the Tempio Malatestiano in Rimini (figure 3.40). What interests us here, aside from the fascinating lifting device, is the stone masons at work. The drawing suggests what is still well-known through conventional stone cutting practices even today: the masons first begin the carving process by squaring the irregular shapes of the stone blocks, a practice embedded in the term lavoro di quadro.\textsuperscript{196} The squaring was aided by the use of a quartabuono, shown here in a 16th century collection by Beluzzi (figure 3.41). Once squared, a template would be traced upside down on the short, vertical face, and it would be traced again on the opposite short, vertical face in the same orientation, thus creating an imagined cornice block in between the two end tracings. The two tracings create a mirror of each other on each side of the block, with the in-between reflection emerging as the extruded body through the stone block. Such a practice is suggested in a detail view of the large 1520 painting by Piero di Cosimo, Costruzione di un Palazzo (figure 3.42). In a close examination of the stone carvers in the middle of the painting, they can be seen working on opposite sides of an upside down cornice block (figure 3.43).

\textsuperscript{194} “...tirai dal latte della mia balia gli scarpeggi e ’l mazzuolo con che io fo le figure”, Vasari, Vite (Milanesi 1906: VII,137). For a specific discussion on this passage and the contextual framework of the wet-nurse topos in the 16th century, see Wallace 2009: 51-55.

\textsuperscript{195} “Per res igitur temperatas vita permanens in spiritu recreatur. Spiritus per temperata coelestibus conformatur”, Ficino, De vita, II.14 (Kaske and Clark 2002: 207).

\textsuperscript{196} Among the varieties of stone carvers, oftentimes specific carvers were tasked to square the rough hewn blocks - known as squadratori, from Wallace 1994: 120.
Rather than beginning from the top and extruding the cut, as is suggested in representations of template tracing from the Gothic period (figure 3.44), the masons appear to take a series of horizontal passes across the entirety of the stone, incrementally connecting profile tracings on the opposite faces. As the profile lines matched, the stone body gradually emerged.

With this in mind, let us return to the transfer of temper between Michelangelo's modani and the San Lorenzo stone blocks. The imagining of the full body within the profile line began even before the blocks arrived at the worksite. Perhaps in light of his inclinations as a sculptor, Michelangelo took an unusual interest in the rough hewn shapes and character of the stones while they were still in the quarry. This certainly follows in the tradition, now largely lost with industrialized materials, where material selection was based on its individual, particular qualities related to its place of origin.

For Michelangelo, this reasoning survives in two notebooks, or quaderni, which are filled with stereotomic drawings representing hundreds of blocks for the San Lorenzo fabbrica. These drawings, representing both quarried blocks as well as orders for requisition, are the earliest representations in Michelangelo of the relationship of the material to the future stone work. They are a remarkable collection that quickly demonstrate his unusual commitment to engaging the architecture along the totality of the Neo-platonic chain of being - between the invisible concetto and the corporality of the material. They also show that, in terms of the quarry work, the lavoro di quadro was treated with the same emphasis on the quality of the material as the figural work. Several sketches of these blocks record his intention to imagine the concetto as emerging from future stone work. In particular, one may see an assembly of blocks in their future purported relationship for the San Lorenzo facade (figure 3.45); a future monolithic column for the facade with a carefully ruled entasis (figure 3.46); and an astonishing denotation of the dynamic body imagined within a block rotated among multiple views (figure 3.47).

The marble blocks for San Lorenzo followed a fascinating journey from the high mountains of Carrara and Pietrasanta to the building site, a story meticulously recounted already by Wallace and others. What is important here is the demonstration with the block drawings that Michelangelo’s imagination inhabited more than just the finished stone, cut and installed. He

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197 As a speculation requiring more research to confirm, the difference in orientation between the representations of Gothic tracings and that of the Renaissance may be due to the greater inclination of Gothic masons’ depictions to make markings directly on the stone. It also may be due to the orientation of the types of ornament: a cornice block receding into space as a horizontal element, with the profiles in Gothic stones tending toward verticality.

198 Among other 15th and 16th century treatises, this is most obvious in Alberti’s second book in De re aedificatoria (De materia). Vitruvius provides an early version of this tradition in Book II of De architecture.

199 William Wallace has published a transcription and analysis of these notebooks in an article in Wallace 1992: 117-140.

200 See Zanchettin 2012: 106-107 for a recent commentary on this drawing related to Michelangelo’s conception of stone construction.

imagined them beginning with their origin in the womb of the earth, and was intimately involved in their extraction; making, as it were, at least nineteen visits to the quarries during the years 1516-1519 (figure 1.12). In a telling remark, perhaps, Vasari called these 'wasted years', and some have speculated that his extended time in and around Carrara is what eventually led to the Pope's cancellation of the facade in 1520. In short, the tempering process could be said to have began even before the blocks were quarried, in the imagination of Michelangelo drawing possible stones.

Upon arrival to the building site, the blocks destined for lavoro di quadro would undergo a squaring procedure, as has been discussed. Once squared, the stone blocks would be faced by a tin template. The tempering of stone may be generally understood by following three principles: 1) the capacity of tempered materials, such as gold or tin, to radiate their temper; 2) properly proportioned, tempered proportions, such as water and wine or odors and air; 3) the consummation of the temper through the 'quenching' of the stone block as it comes to match Michelangelo's modano.

Let us first examine how the material itself, tin, radiates onto the stone. As Ficino explained, tempered materials have the latent potential to temper other materials through proximity. Tin already has an intrinsic capacity to embody the spiritus through its sonorous potential, as was discussed in the making of bronze. Additionally, in the hammering of the tin into leaf-like thicknesses, the working of the material in harmony with the celestial hammer creates a 'heating up', as Ficino explained, that adds to the temper. As well, the template's ability to transfer its temper lies in the proportioning of the profile itself, already well-tempered at Michelangelo's drawing board and upheld through the tempering power of the metal file (lima). Like well-proportioned wine, it holds the power to temper adjacent bodies through its well-tempered profile line.

The tin template, however, only induces the tempering process; it was the scarpellini who had to complete it. Once the templates had been traced onto the block, they were removed to make way for the chisels of the stone carvers. And until the cut stone matched the profile, the

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203 In an audacious maneuver not seen since antiquity, Michelangelo specified that the twelve columns for the San Lorenzo façade shall each be carved from a single piece of marble. Requiring the mobilization of an entire network of roads, hoisting machines, and specialized transport vehicles, these would be the single largest blocks extracted from the quarries for over a thousand years. Four out of the twelve actually arrived in Florence, and their whereabouts remains a mystery, see Wallace 1994: 72-74. Although monolithic stones conjure immediate associations with antique construction, their relationship to the architect's broader imagination cannot be overlooked. For Michelangelo, the imagining of a body within a single piece of stone, rather than as a body as assembled, perhaps held special significance.
stone had not yet received its temper. In alchemical terms, this moment anticipated the conjunctio, the chemical wedding, or the occasion, that is, when the block has been consecrated as that of the hand of Michelangelo (figure 3.48). All tempering processes, it will be observed, end in a critical, irreversible, and sometimes violent, moment of 'locking-in' the temper, i.e. where the iron is quenched, the bronze is cooled, or wine is at its proper clarity. The materials of the quenching bath are nearly always as important as the material to be tempered, as Vasari pointed out in his recounting of Alberti's invention of the temper bath with goat's blood. Such it is in the tempering of the stone, where the finishing off occurs during the 'quench' of the stone block through the exact matching of the body of the stone to its two-dimensional template. It is only at this very moment, when the mirrored sides of the traced block face each other, that the stone has been transmuted into the tempered detail of Michelangelo.

Aristotle's distinction between material and substance, Ficino's spiritus, and his theory of material influences combine to offer an account of how the metal template acts between paper, tin, and the completed stone detail. Taken together, they reveal the fundamental quality of the template as a non-arbitrary, mediating device, as well as the criticality of the transfer between paper, tin, and stone.

Between Via Mozza and San Lorenzo: concluding remarks

Part II began with the templates poised to leave Michelangelo's drawing board in the workshop at Via Mozza. Following an extended commentary on the in-between space, the passing of the modani between the drawing board to the worksite may now be seen as a non-linear procedure analogous to the whittling, tuning, and hammering of materials. Such practices, which have been linked above to broader notions of tempering, involve the constant dialogue between the internal eye, the senses, and the hand. They are propelled by a desire for manifest beauty as a mirror of the invisible.

Tempering, as has been shown, is both a practical and cosmic procedure for presencing the invisible within the contingent, corporal world of materials. Seeking a commensurability between the corporal world and the heavens, tempering relies on micro-adjustments as judged by both invisible and visible criteria, a process that was captured in 16th century debates about the tempering of musical proportions. Micro-adjustments allow for the materialization of immaterial

\[204\] The possibility of an unfinished stone raises some interesting questions related to the oft-mentioned discussion of Michelangelo's non-finito. Perhaps, unlike the slaves, the presencing of Michelangelo's hand only occurs in the lavoro di quadro upon the matching of the modano to the stone. The process of liberating the concetto has already become formidable through the making of paper modani, meaning that unfinished modani would be more analogous to Michelangelo's Slaves than would incompletely cut cornice stones.
relationships, as in the harmonization of incommensurable, axiomatic musical ratios, or the concordance of the healthy body with the movements of the heavens. It is these practices of making subtle adjustments and shifts that ultimately lead to the harmonization between manifest and celestial beauty through Michelangelo's conceit.

As the spiritus moderated between body and soul, so did the modani act as the messenger between the conceit and the stone block. Michelangelo's modani participated insofar as they progressed from paper to tin and finally to the cutting of the stone block. Tin templates, generally dismissed by scholars as a practical step in the preparation of paper drawings for the construction site, have been shown to play a pivotal role in Michelangelo's material imagination. The inexplicable clues in Corpus 534 lead one to question the linearity of such a movement from paper to tin, finally concluding that the 'copia' noted by Michelangelo must lead to a broader interpretation based on abundance rather than facsimile. The unaccountable factures on 534 help to confirm the non-arbitrary, informal progression of templates from Via Mozza to the building site.

The tempering of the bell and the column demonstrate through parallel practices how occult influences are presenced through the profile line. The relationship of the bell to the spiritus occurs through the latency of the material (tin) as well as the proportions of the profile line, as expressed in disegno. In drawing parallels with the practices of optical correction and the making of a template for the column entasis, the notion of tempering as a process of micro-adjustments is confirmed within the practice of architecture. Additionally, through an examination of Michelangelo's poetry, such material associations between forging, heat, and the beating of the hammer demonstrate how the alignment of celestial desires depends on manifest practices and material latencies.

With the transference of the profile line onto the stone block having begun, and the stone block in the midst of carving, the next questions are ready to be considered: how do the tempered stones become an assembly of stones, of well-tempered building? Up to this point, we have followed the tempering process from disegno to tin to the stone block; that is, from the conceit to the detail. This has been considered within the narrative space of the Via Mozza workshop, the space in between, and the San Lorenzo worksite. The issue of how such tempered details may be assembled into the body of architecture, then, now comes to the forefront.
Figure 3.1  Surveyor architects w/ square-holed template, *Psychomachia*, Prudentius (1289). Bibliothèque National, Paris, MS lat. 15158.
Figure 3.2  Overlay of profiles taken from recto and verso of Corpus 534 (Profile A from figure A.8 and Profile E from figure A.9), showing points of match and deviation. Original drawings in the care of Casa Buonarroti, Florence. © Author of dissertation.
Figure 3.3: Overlay of profiles taken from recto and verso of Corpus 534 (Profile A from Figure A.8 and Profile E from Figure A.9) and building survey drawings provided by Portoghesi and Zevi (1964). © Author of dissertation.
Figure 3.4 Overlay of profiles taken from recto and verso of Corpus 534 (Profile A from figure A.8 and Profile E from figure A.9) and building survey drawings provided by Rossi (1739). © Author of dissertation.
Figure 3.5 Phalaris condemns Perillus to the Bronze Bull, Pierre Woeiriol (16th c.). Los Angeles County Museum of Art, inv. M.88.91.89.

Figure 3.6 Frontispiece, *De la pirotechnia*, Vannoccio Biringuccio (1540). Excerpted from Carugo, *De la pirotechnia di Vannocio Biringuccio*. Milano: Ed. II Polifilo (1977).

Figure 3.8  The four humors, *Quinta Essentia*, Leonhard Thurneysser, Leipzig (1574).
Figure 3.9  Bell scale showing relationship of bell weight to its mouth width, _De la pirotechnia_, Biringuccio (1540). Excerpted from Carugo, _De la pirotechnia_. Milano: Ed. Il Polifilo (1977), pg. 271.

Figure 3.11  Page with details of bell profiles and bell scale, Francesco di Giorgio Martini (15th c.). Codex Torinese Saluzziano, fol. 67v. Excerpted from Maltese & Degrassi, Trattati di architettura ingegneria e arte militare, 2 vols. Milano: Il Polifilo (1967).
Figure 3.12  Detail from figure 3.11 showing derivation of bell profile through disegno, Francesco di Giorgio Martini.

Figure 3.13  Bell scale (small), Zilbadone di Buonaccorso Ghiberti, Codex BR 228, fol. 57v. Biblioteca Nazionale Centrale di Firenze.
Figure 3.14  Bell scale (large), Zilbadone di Buonaccorso Ghiberti, Codex BR 228, fol. 51v. Biblioteca Nazionale Centrale di Firenze.

Figure 3.15  Rotating modano, Zilbadone di Buonaccorso Ghiberti, Codex BR 228, fol. 74v. Biblioteca Nazionale Centrale di Firenze.
Figure 3.16  Construction of the profilo and rotating bell core, *De la pirotechnia*, Biringuccio (1540). Excerpted from Carugo, *De la pirotechnia*. Milano: Ed. Il Polifilo (1977), pg. 270.

Figure 3.17  Detail of figure 3.16 showing bell template drawing, full-scale, Biringuccio.
Figure 3.18  Drawing of bell modano, Zilbadone di Buonaccorso Ghiberti, Codex BR 228, fol. 56r. Biblioteca Nazionale Centrale di Firenze.
Figure 3.19  Bell proportioning, Zilbadone di Buonaccorso Ghiberti, Codex BR 228, fol. 56v. Biblioteca Nazionale Centrale di Firenze.
Figure 3.21  Column entasis and optical correction, Cesare Cesariano (1521). Excerpted from Cesare Cesariano, *De architectura, facsimile of 1521 Como edition*, Milano: Il Polifilo (1981), fol. LX recto.
Figure 3.22  Template-making for entasis, Leon Batista Alberti (after Bartoli). Excerpted from Rykwert, Leach, & Tavernor, On the art of building in ten books. Cambridge, Mass.: MIT press (1988), pg. 187.

Figure 3.33  Template-making for entasis, G. Antonio Rusconi, I dieci libri d'architettura di Giovanni Antonio Rusconi secondo i precetti di Vetrivio, nouamente restampati, & accresciuti della Pratica degli Horologi Solari. Venetia (1660), fol. 59.
Figure 3.34  Template-making for entasis, Philibert De L’Orme, *Le premier tome de l’architecture de Philibert de l’Orme*. Paris: Fédéric Morel.

Figure 3.35  Template-making for entasis, Vincenzo Scamozzi (1615). Excerpted from *L’idea della architettura universale*, Ridgewood, N.J: Gregg Press (1964), fol. 145, parte seconda.
Figure 3.37  Detail of figure 3.36 showing bell profile.

Figure 3.38  Sounding vases and bells, Cesare Cesariano (1521).
Figure 3.39  *Musica mundana*, Gaffurius, *De harmonia musicorum instrumentorum opus*, Milan (1518), fol. 94v.

Figure 3.41 (bottom) Quartabuono, I trattato delle fortificazione, Belluzzi (16th c.). Excerpted from Franco Borsi, Il disegno interrotto: Trattati medicei d’architettura. Florence: Gonnelli (1980), pg. 143.
Figure 3.42: Costruzione di un Palazzo, Piero di Cosimo (1520). Courtesy of Ringling Museum of Art, Sarasota.
Figure 3.43  Detail of masons carving from figure 3.42.

Figure 3.44  Detail of masons carving (1447-1450). Excerpted from Günther Binding, *Medieval building techniques*. Stroud: Tempus (2004), pg. 191. Österreichische Nationalbibliothek, Vienna, Cod. 2549, fol. 164.
Figure 3.47  Block of marble with figure inside, Michelangelo. Excerpted from Charles De Tolnay, *Corpus dei disegni di Michelangelo*, no. 227r (1976-1980). Trustees of British Museum, inv. 1859-6-25-544r.
Figure 3.48 Chemical wedding, *Rosarium philosophorum*, Frankfurt (1550).
PART III: TEMPERING THE ASSEMBLY

SAN LORENZO IN MOVEMENT

...with temperance one measures the movements of the soul.
Ripa

...if love in relation to man desires human beauty itself, and the beauty of the human body consists in a certain harmony; and if that harmony is a kind of temperance, it follows that love seeks only that which is temperate, moderate, decorous
Ficino

Assembling the building stones at San Lorenzo

During the spring of 1525, blocks of sober-grey, Tuscan macigno arrived on the San Lorenzo building site at a furious pace, destined for installation in the vestibule of the Laurentian Library. Unlike the façade project and the New Sacristy, both conceived primarily in marble, the library would be carved and assembled exclusively from the local building stone. This meant that the work could proceed quickly, aided by local expertise, craftsmen, and geography. On the 15th of April alone, in the year 1525, roughed-out stones arrived for 12 window thresholds (soglie), 13 column bases (base); 4 cornice stones (cornici), and three pilasters (pilastri). Continuing a practice begun during the planning of the façade project, observed already in the stereotomic quaderni drawings (figure 2.2), the blocks had been prepared at the quarry for specific locations. Michelangelo would specify the dimensions, numbers, and locations for the blocks, all of which would be rough cut (abozata) at the quarry before being carted to San Lorenzo. Even blocks having a similar size and shape, such as pilaster bases and capitals, would be distinguished from each other. The entire library was thus conceived and executed as a highly differentiated assembly of stone members, orchestrated across scores of individuals working between Via Mozza, San Lorenzo, and the macigno quarries. Upon arrival to the building site, the stones would have been subsequently carved and fitted to Michelangelo’s modani, following in the manner discussed in the previous chapter. The question of how he imagined the assembling of these stone details, however, remains to be considered. Given the role of the modani in the

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1 “...con la temperanza si misurano i movimenti dell’animo”, Ripa, Iconologia (Ripa 1615: 508). Translation by author.
2 “Praeterea si amor erga hominem pulchritudinem ipsam desiderat; humana autem corporis pulchritudo in quadam concinnitate consistit. Concinnitas est temperantia est; sola quae temperata, modesta, decora sunt, exigat amor”, Ficino, Commentary on Plato’s symposium, first speech, ch. IV (Jayne 1944: 41, 130). Translation by Jayne.
3 Ricordi, CLXXIII (Ciulich and Barocchi 1970: 187-189). These notes are from a “libretto” of 22 pages a list of stones delivered to the construction site at San Lorenzo. See also, Wallace 1994: 158-159.
4 Quarry notes describe such stones as, “un pezzo di chornice abozata”. Ricordi, CXII (Ciulich and Barocchi 1970: 211). Or as having been, “ciachavato e abozate alla detta cava”, fr. Hyman 1975:109 and Wallace 1992: 238. Once they were rough-cut at the quarry, they would undergo a process of squaring on the building site as described in Part II.
5 The record of shipments for the library stones are preserved in two small books, the so-called “Libretto I” and “Libretto II” and transcribed in Ricordi, CLXXIII and CXII, respectively.
realization of the concetto, a close examination of them with this question in mind seems paramount.

The assembly of building parts at the San Lorenzo site must have been reinforced by Michelangelo's propensity toward imagining the body through its parts, a practice focused through his deep interest in human anatomy (e.g. figures 4.1 and 4.2). This approach seems indicative of the tale, frequently repeated among 16th century writers, of the Greek painter Zeuxis. Confronted with the task of painting the subject of Helen (in some versions, Venus), he gathered together five lovely maidens from Croton in order to take from each their most beautiful features; assembling, that is, an imagined body from the likenesses of the most worthy parts (figure 4.3). This narrative was repeated by Condivi in 1553, who not only invoked Zeuxis' tale in connection with his biography of Michelangelo, but also extended it to include the image of the artist as a bee gathering pollen from many different flowers in order to make honey. Also, Vasari reinforces this in his commentary on disegno, where, in the imagining of the figure, the painter or sculptor is to join together, "from that which is most beautiful - hands, heads, bodies or legs". From the architectural point of view, the most fitting analogy in this regard comes from Alberti, who, in a passage from Della Tranquillità dell'Animo, compares the humanist experiment of collecting and putting together existing literary fragments to the making of a mosaic that is "knitted together" and "bound around the edges".

In this third Part, the constructing of architecture through its parts will become the backbone of an argument about how Michelangelo's templates temper the architecture through edificatory practices such as gathering, assembling, or "knitting together", as Alberti states. After first tempering the stone block, larger building assemblies such as cornices and column orders act as tempering members within the evolving, emerging body of architecture. Rather than viewing the building as a frozen entity of unchanging relationships, a product of a modern bias toward representations of completed buildings, tempering is considered herein as a mode of

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6 Michelangelo intended to collaborate with the anatomist Realdo Colombo to provide illustrations for a treatise on anatomy. This was possibly in reaction to the publication of Vesalius's De humani corporis fabrica in 1543 and widely understood as being illustrated by Titian, a painter that Michelangelo felt lacked disegno, from Summers 1981: 398. On dismemberment see, cf brothers, 145. Vasari commented on Michelangelo's sensitivity toward the parts, "Nè si vidde mai grazia piú risoluta nel tutto e nelle parti, come nelle mensole, ne’ tabernacoli, e nelle cornici...", Vite (Milanesi 1906: VII, 193).

7 The most common source was for this story was Cicero, De inventione, 2.1.1. On Renaissance interpretations, see Summers 1981: 186 and Panofsky 1968: 15.

8 Relating the honey making to the making of art introduces a certain materiality not present in the original. The relevant passage in Condivi is, "...non solamente ha amata la bellezza humana, ma universalmente ogni cosa bella, un bel cavallo, un bel cane, un bel paese, una bella pianta, una bella montagna, una bella selva, et ogni sito et cosa bella et rara nel suo genere, ammirandole con maraviglioso affetto, così il bello dalla natura scegliendo, come l'api raccolgano il mel da fiori", Condivi, Vita di Michelangelo (Mariana 1928: fol. 42v). The honey bee as related to poetic inspiration may be found as far back as Plato, Ion, 534a. It was also one the personal emblems chosen by Filarete in a self portrait medal in the Victoria and Albert Museum, London.


edifying through intention, desire, and Michelangelo's concetto. Since the notion of a 'completed building' seems especially problematic, not the least of which lies in the simple fact that none of Michelangelo's San Lorenzo projects were finished during his time in Florence, well-temperedness is explored as an act of building rather than as a finished entity, i.e., as well-tempered building rather than as a well-tempered building. The assembly of the building members thus becomes a non-arbitrary mode of slowly tuning the parts, just as the tempering of the stone blocks resulted from the micro-adjustments of modani at the drawing board and on the building site. Following in the Neo-platonic narrative where the smallest bodies or the simplest materials may act as a mirror of the celestial body, San Lorenzo's tempered stones are understood as having a harmonizing potential as they become the building blocks for the architecture.

**Modani as devices for assembly**

Conventionally speaking, 16th century modani often exhibited obvious notes and marks that would have instructed the scarpellino about alignment and assembly sequence. Such was the case with the modani of Ammannati, for example, of which three remain from his work on San Giovannino, located nearly adjacent to the San Lorenzo building site. One of the modani, a profile for an architrave consisting of three stones, prominently demonstrates how the architect imagined and specified how the future stones would register with each other as well as with adjacent stones (figure 2.7). Along the right margin Ammannati inscribed a register line, pointing to it with an arrow and denoting, "first piece of the Cornice (primo pezo della Cornice)" (figure 4.4). Presumably, this line indicates where, along the edge of the modano, the 'first piece' of the cornice would align. As well, rotated 90 degrees to align with the left edge of the modano (figure 4.5), Ammannati gave detailed instructions on the orientation and sequence of the stones, writing, "this end of the modano goes above the capital (Questa fine Di Modano posa sopra Il capitello)". Among the two other modani from San Giovannino, the practice of registering and orienting the stones by marking on the template itself appears to be a matter of course: in the profile for the

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11 A good introduction to this bias may be found in Harries 1980: 36-43. Summers compares the concetto to 'intention' in Summers 1981: 229-233.
12 When Michelangelo locked the Via Mozza workshop for good in 1534, the San Lorenzo fabbrica must have seemed like an open construction site. On the Medici Chapel, most of the lavoro di quadro was intact, but still incomplete was the stuccoing of the walls, at least seven of the figural sculptures, and the floor. The Medici tombs themselves were hastily assembled. In the Laurentian Library, missing was still the famous staircase, the carved ceiling, the floor, and the reading desks. On the timeline of the Library, see Wittkower 1934: 123-218; on the Medici Chapel, see Wallace 1994: 134. Although the façade contract was cancelled in March 1520, marble continued to arrive on the building site for another two years. See Wallace 1994: 75-76.
13 The issue of Michelangelo's non-finito is a complex one, beyond the scope of this work. Carabell captures in a recent essay the implications of the concetto through the unfinished 'slaves' in a similar manner as I am using it here - where realization is a bitter-sweet act, based in Eros, but ultimately as an exercise in self-identity (Carabell 1997: 83-105). Although not mentioned by Carabell, the relation to the Greek sophosyne, as "know thyself", hence temperance, may be a relevant insight.
14 The Ammannati modani were introduced in Part I.
main cornice (figure 2.6), Ammannati describes the detail as being made "of two pieces high from the drip stone (di dua pezi in alteza dal gociolatoio)" (figure 4.6); and in the profile for the Attic cornice in Uffizi 3462A (figure 2.5), a vertical register line is firmly drawn inset 64 mm from the left margin. Ammannati appears to give clear signals as to what should align with what, where to cut, and how many pieces of stone comprise the detail.

This practice may also be observed in the contemporary modani of Antonio da Sangallo il Giovane. In an unpublished, full-scale and uncut modano for a window frontispiece, Sangallo constructed a complex sequence of profiles using dry point (punta secca) with a overlay of free-hand ink (figure 4.7). Beginning along the bottom edge and continuing vertically for the entire profile, the modano exhibits a dry point and ink registration line. The significance of this line as such is confirmed with the double arrows, drawn in free hand near the paper edge, possibly denoting an alignment with a door or window jamb. Most interestingly, the registration line records a 75mm cut, beginning at the bottom, possibly from the dry point or some other knife-like tool such as a temperino (it was not scissors). The cutting suggests the tentative start of the finished modano, or it might be related to the practice of registering stone edges through small cuts in the template edge, well-recorded in the exquisite modani of the late 17th century Italian architect, Domenico Martinelli (figures 4.8 and 4.9). In these one may observe the small, triangular cut made along the registration line at the top and bottom margins, definitively designating the line of alignment and giving the stone carver a secure working edge.

Curiously, Michelangelo's modani contain no such marks. Unlike Sangallo and Ammannati, he appears to forgo any formal steps in specifically instructing the scarpellini regarding the orientation, alignment, or registration of his templates, at least as evidenced in our surviving set of paper templates. Corpus 204 (figure A.3), the only one of Michelangelo's templates to contain writing for the stone carvers, merely identifies on the recto the destination of the stone profile (i.e. "el modano della colonna della sepultra doppa di sagrestia"). It has been carefully cut on all non-profiled edges, suggesting a possible relationship with the stone joints in the overall size of the paper template, but this cannot be confirmed. And on the large folio of traced templates, Corpus 534 (figures A.8/A.9), the profiles appear to float on the page, with several bleeding off the sheet without any apparent registration line or orientation marking. Standing in stark contrast to the constructed, definitive registration marks of professional architects, Michelangelo's modani appear to be in a state of constant flux, able to be shifted, revised, or readapted for new purposes. It only takes a quick look at other profile studies (figures 4.10 and figure 4.11), for example, to observe the motive power of his floating profiles, lacking definitive relationships with formal working edges, lines, or guidelines.15

15 One exception to this is the full size wall drawings in the Medici Chapel, taken up later in Part III.
That being said, the lack of organizing marks on the modani should come as no surprise. First of all, as was demonstrated in Part I, the surviving modani were in-progress artifacts, existing as fragments of a complex process of parent and offspring templates derived through tracing. Construction marks from compass and rule, as well as definitive marks for the mason, would naturally be lacking in such a practice. Secondly, as the analysis of Corpus 534 revealed in Part II, the transference of the paper drawings to the construction site was a non-formal process of continual modification and revision, at least up to the point where the stone cutters began their work. Tempering, as a procedure of micro-adjustment, was a back-and-forth 'tuning', relying on the free movement between the concetto and the realized stone. Even as the building was being assembled, it could be surmised, Michelangelo continued to guide the work. Although the parts were imagined as an assembly, their assembly into a building was still dynamic and not completely pre-determined in the making of modani.

Michelangelo's profiles appear, at first glance, to be disembodied details, generally removed from their context and open to dynamic reinterpretation. Among recent scholarship, he has been cited for his apparent interest in fragmenting and re-assembling the ancient lexicon according to his own liking or caprice. One of the most telling examples of this resides in Michelangelo's red chalk drawings copied after Bernardo della Volpaia's Codex Coner, a collection of antique exempla drawn around 1514 and now in the care of the Soane Museum in London. As is well-known, Michelangelo's knowledge of architecture before beginning the projects at San Lorenzo was limited. In 1516, when the first drawings of the San Lorenzo façade appear, his experience with architectural profiling was mostly confined to his experiences in painting architectural scenes on the Sistine ceiling and the façade of a small chapel for Leo X at the Castel Sant'Angelo (1514). Before beginning the façade project, Michelangelo underwent a series of autodidactic drawings as part of his familiarization with the discipline of architecture; relying, as it were, on the systematic prototypes presented in Volpaia's sketchbook.

The drawings that Michelangelo chose to copy from the Codex Coner indicate an obvious interest in the isolated assemblies and details of architecture over the body of architecture as a completed and unchanging whole (figure 4.12). Whereas Volpaia included a measured, systematic study of antique buildings, including ground plans, elevations, and details, Michelangelo focused almost exclusively on the individual profiles and building members - never copying a single groundplan. And in Volpaia's studies of elevation views of ancient monuments,

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16 Vasari famously referred to this as "license (licenza)", Vite (Milanesi 1906: VII, 193), and it has been one of his most discussed terms. See, for example, Brothers 2008: 64-68; Hirst 1988: 92-93, and Elam 2005: 60-62.
17 An overview of recent scholarship on the Codex may be found in Hemsoll 2003: 29-62 and Brothers 2008: 50-64.
18 Hirst 1988: 93.
Michelangelo illustrated only two, both of which only partially. In his rendering of the Arch of Constantine, for example, he altered the measured proportions given by Volpaia, adding on the same sheet a series of isolated details - two variations on an Attic column base as well as a study of a composite Ionic / Corinthian column capital (figures 4.13 and 4.14). What is more, even as he emphasized the detail, Michelangelo's copies eschewed Volpaia's carefully dimensioned and proportioned profiles. Instead of following the ruled and compassed drawings of his predecessor, he drew in red chalk and in free hand, frequently modifying proportions and the sequence of moldings among the details (figures 4.15 and 4.16). He omitted all textual references provided by Volpaia, and he eliminated formal configuration or orientation devices such as the plumb line or other vertical axes indicating alignments. What seems to emerge is an embedded desire for a dynamic assembly of building elements based on fragmented parts, each of which contains a certain wholeness or potential within itself.

This sentiment would have certainly been reinforced by the simple fact that, beginning with the work on the Medici Chapel in 1519, Michelangelo was orchestrating multiple and overlapping building projects at the San Lorenzo fabbrica. Often a great source of frustration for scholars, the complex circumstances at San Lorenzo between 1516 and Michelangelo's departure for Rome in 1534 have led to much confusion untangling the web of drawings, documents, and other artifacts. Generally speaking, the façade project ran from his initial quarry visits in 1516 to its cancellation in March 1520; the Medici Chapel from 1519 to 1533, with a three year break between 1527 and 1530 during the Medici siege of Florence; and the Laurentian Library operated from the initial concepts in 1519 to 1533, with the same three year break. On top of this, the Via Mozza workshop continued to receive stone and host carvings for the ongoing work for the Tomb of Julius II, a nearly lifelong project. With so much coincident building activity focused at the same worksite, it should be no surprise that several modani, in fact, have been recently subject to revised attributions, as was briefly discussed in Part I. Corpus 535 (figures A.10/A.11), for nearly a century thought to belong to the Laurentian Library, has now come to light as a profile for lower cornice of the Medici Chapel; and Corpus 537 (figures A.15/A.16), attributed by scholars to the Library, have been definitively shown for the first time in this dissertation to belong to the splayed upper storey windows of the Medici Chapel. Having multiple projects on the same site surely facilitated Michelangelo's inclination toward dynamic assembly, taking parts

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19 ibid.
20 Micheal Waters has recently corrected many assumptions about the mutability of the column orders, even after Serlio's canonization of the printed orders in the early 16th century. Using the technology of unbound, freely circulating prints of building parts and ornaments, architects throughout Europe were collecting and assembling fragments of ancient buildings in non-conventional ways, see Waters 2012: 488-523.
21 Seen notes in Part I for bibliography and scholarship on the prevailing attribution of Corpus 537 to the Laurentian Library.
from various projects and re-mixing them, a tendency already observed in his early education with the Codex Coner drawings and use of ancient exemplars in general.²²

**Assembling through drawing: manifest practices**

It would help to examine a few of Michelangelo’s drawings in search of clues for how he imagined the relationship between individual stones and their joining together. At first glance, drawings of larger assemblies seem to be limited to presentation-type drawings, where the overall proportions and dimensions are demonstrated for the benefit of the patron (figures 4.17 and 4.18); or they are partial sketches exploring figural programs and their relationships with the *lavoro di quadro* (figure 1.10).²³ In terms of assembling the architecture, these drawings exhibit few clues as to how Michelangelo imagined it, leading some scholars to suggest that his primary concern was to intentionally conceal the assembly work.²⁴ A deeper look reveals a more complicated assessment, however. Examining a few key drawings shows that Michelangelo held a deep concern for the dynamic potential of edification.

A brief examination of a drawing made while in Florence for the all-marble Tomb of Julius II quickly reveals Michelangelo’s propensity toward the efficacy of assembly (*Corpus* 463, figures 4.19 and 4.20).²⁵ Beginning on the verso (figure 4.20), one discovers a series of rapidly sketched profiles linked through free-hand proportioning exercises in ink over red chalk. The most striking lines here are certainly the two diagonals, one at a slope of 1:1, defining a square, and the other at a slope of 3:1, derived from three squares ticked off vertically along the main axis. Certainly atypical of his profile sketches, as has been seen, it demonstrates nonetheless that Michelangelo saw great potential in the edified assembly of interchangeable, multiple profiles.²⁶ Although the diagonals assert a strict geometric order over the assembly of the profiles, a procedure he generally avoided, the motive search for a figural character remains in the use of multiple overlays (figure 4.21), juxtaposed profiles through rotation (in red chalk, figure 4.22) and a overdrawn profile to the left that has been temporarily unbridled from its geometric structure (figure 4.23). Flipping to the recto, Michelangelo exhibits another series of sketches, also from

²² Scholars have also compared this to Michelangelo’s projects where multiple figural programs are assembled in an architectural narrative, such as the facade and in the Tomb of Julius II.

²³ The notion of Michelangelo’s ‘presentation drawings’ are explored at length by Hirst, who calls them *modelli* in Hirst 1988: 79-90. Bambach disputes the use of *modelli* for such drawings, although she acknowledges their typology, Bambach Cappel 1990: 497-498.

²⁴ This sentiment has probably been most influence by Ackerman, who wrote, “In laying masonry, Michelangelo notably avoided any emphasis on the unit (block or brick). He disguised joints as much as possible in order to avoid conflict between the part and the whole, and to sustain the experience of the building as an organism”, Ackerman 1961: 48.

²⁵ *Corpus* 463 (Casa Buonarroti 74A) is in the care of the Casa Buonarroti and was viewed personally by the author on June 10, 2012.

²⁶ On the significance of the diagonal in this drawing, related also to Antonio da Sangallo’s *modano* for St. Peters (Uffizi 1149r), see Maurer 2004: 178-179.
the Tomb and most likely related to the construction of the profiles on the verso (figure 4.19).27  These markings expand the edification procedure to include the imagining of the stones in the quarry. As well, two differently scaled sketches appear to investigate the laying out of the possible building joints in the plan view: to the left, a joint is clearly rendered with two parallel lines stretching from the outside to the inside corner; and to the right, a smaller-scaled rendering of stones indicates a possible marking of individual blocks, through a ticking-off along the serpentine cornice.

Moving beyond a relatively isolated example, however, a series of drawings related to the façade construction helps introduce how Michelangelo envisioned the entire edification process - from quarried block to assembled architecture - as a tempering procedure of tuning, mixing, and harmonizing. As the individual block is tempered, so do the blocks temper the members of architecture as they are assembled. Having this in mind, then, it would be fruitful to start with the smallest parts, the stones themselves, and follow their temper. Corpus 509r, for example, a drawing of a column capital for the façade, depicts two orthographic views of the same stone (figure 4.24).28 The upper drawing delineates the construction of the capital using the stylus, compass, and straightedge, a rare but excellent demonstration of Michelangelo's use of conventional architects' tools. Below, the imagined capital has been transformed into a block of stone, labeled as such through nomenclature familiar within the quaderni used in the quarries.29 The juxtaposition of these two drawings shows how Michelangelo derived the dimensions of quarried blocks from the tempering procedure of marking, tracing, and defining character in the imagined detail. Remarkably, it appears from this drawing that the stone detail and its originating block were conceived simultaneously in a dynamic dialogue between idea (such as dimension, orientation, and proportion) and material. Following this, the block would have then entered into a larger catalogue of requisite stones, such as we have already seen in figure 3.45 (Corpus 441r), or it might have been added to a column assembly drawing destined for the quarry, such as figure 3.46 (Corpus 442r).

Aside from a noteworthy adherence to the Neo-platonic governance of idea and material, this also appears to be a prudent procedure of looking forward in order to obtain a reasoned description of what to quarry - how many and what size, orientation and shape. While being placed on the requisition sheet, it appears that Michelangelo also added another crucial piece of information: a letter or other symbol that keyed into a larger model or drawing.30 The pulled-apart, or 'exploded' configuration of figure 2.2 suggests that a series of individual stone drawings

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27 The assertion is put forth by De Tolnay, following prevailing scholarship (De Tolnay 1975-1980: 100).
28 Corpus 509 (Casa Buonarroti 78A), in the care of the Casa Buonarroti, was personally viewed by the author on June 10, 2012.
29 Stone blocks were labeled in the quarry drawings by their specific dimensions in length, width and breadth, as may be observed in Corpus 509.
30 These symbols have been analyzed by Wallace 1992: 121.
must have been first made like Corpus 509 (figure 4.24), after which the derivative blocks would have been assembled on a sheet. Other quarry-bound drawings, such as figure 4.25 (Corpus 444) and figure 4.26 (Corpus 450r), indicate a slightly different approach, where instead of the blocks floating on the page, they appear to be stacked on top of each other. Corpus 444r, especially, was clearly drawn beginning from the bottom of the sheet and proceeded vertically, as if building from the ground upward. Having now a strict orientation related to their placement in the facade, quarrymen could proceed knowing the proper grain pattern for their position in the assembly. The notations are a little more cramped and the block drawings slightly more distorted, as if Michelangelo is, quite literally, building with blocks in his imagination. And if one takes account of the indexing letters on each stone, it will be noticed that the alphabetic sequence, beginning with 'A', takes as its starting point the bottom-most stone. From there the upward movement of stones roughly follows the sequence of the alphabet, suggesting, once again, a stacking of stones from the ground up.31 Taken together, covering some 196 individually quarried blocks of marble, both approaches offer a powerful glimpse as to how Michelangelo conceived the facade as an assembly, simultaneously working both backwards and forwards between the quarry and the tempered detail on his drawing board.32

The individuality of the blocks of marble is evident even in the earliest stages of the design. In a large folio depicting a complete profile through the San Lorenzo façade (Corpus 504r - figure 2.27), made over a year before Michelangelo had even signed the façade contract, he systematically denotes, proportions, and exposes the various components comprising the solid marble construction.33 Constructed with an extensive underlay of black chalk (*lapis nero*) and stylus (*stilo*) lines, the drawing exhibits ample evidence of the use of compass, measuring rule, and straight edge, with the ink overlay suggesting where individual edges and joints between stones would occur (figure 4.27). Additionally, on the right side of the drawing and following parallel to the facade profile, a gridded network of nascent black chalk lines suggests a reference to the projections of the existing brick wall with which the marble will enjoin, an enticing forerunner to Serlio's drawings on the binding of bricks and stones published in Venice only few years later (figure 4.28).34 An inked portion of the grid at the bottom of the sheet (figure 2.27) indeed confirms this suspicion, as well as Michelangelo's inscribing of "la parete (the wall)" vertically along the right side of the façade profile, about halfway up (figure 4.29).35 Corpus 504

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32 Michelangelo's quarry block drawings are recently discussed in Zanchettin 2012: 106-110.
33 Corpus 504 (Casa Buonarroti 51A), in the care of the Casa Buonarroti, was personally viewed by the author on June 10, 2012. See background on this drawing in De Tolnay 1975-1980: 41-42. On the dating of the drawing, see Millon and Smith 1988: 60-62. Michelangelo's contract for the façade with Pope Leo X was enacted on January 19, 1518 (Milanesi 1875: 671).
34 This gridded network was probably drawn first, or at least before the ink, since one observes lines with the same drawing material underneath the façade profile. On Serlio's drawing, see Sebastiano Serlio, *Tutte l'opere d'architettura et prospetiva* (Hart and Hicks 1996: 372-373).
35 The connection of the gridded network to the existing brick projections was first made by Elam 1988b: 108-111. See also Maurer 2004: 181-182.
(figure 2.27) clearly shows Michelangelo’s concern for the logic of assembly, not only in joining with the existing building, but also in how it the character of the individual stone profiles would have enjoined to enlist a profiled character of the façade as a whole.

It has also been suggested that this drawing acted as a guide for the carpenter in making a wooden model for the façade. It closely matching Michelangelo’s existing model in the Casa Buonarroti (figure 2.4), the scale, overall magnitude, and meticulousness of the drawing imply that it may have served as an in-progress template or guide or for a model that was never constructed. This seems reasonable, since it has been recently shown that Michelangelo issued, apparently as a matter of course, model-specific, paper templates for the carpenter to guide him in fashioning the wooden model columns. Three drawing fragments, at one time a single sheet, document this practice: Corpus 183v, Corpus 182r, and Corpus 184v. When placed together in their original position, a carefully ruled, red chalk column profile emerges, complete with its proper swelling (figure 4.30, after Hirst). The large, reconstructed drawing (nearly 60 cm) corresponds almost exactly with the lower order columns of the wooden façade model, giving strong credence to the possibility that this drawing was once intended as a tiny modano. Given Michelangelo’s interest in the assembly of the architecture, it is reasonable to assume that he would have shown equal concern in how the model was made, since the wood model would have acted as an analogue and guide to making the marble architecture. In this way, both the façade and the façade model were assembled entities derived from a collection of smaller, stereotomically derived parts. Thus, just as the façade model acted as an analogue for the assembly process, so did the making of a miniature modano facilitate Michelangelo’s imagination in the edification of the architecture through templates.

Aside from the Casa Buonarroti model, there was another wooden model constructed, now lost, that was apparently somewhat smaller. Michelangelo himself clues us into this when he ordered his nephew Lionardo, thirty-five years after the cancellation of the façade, to hand over two wooden models of the project remaining in Florence to the desirous hands of Cosimo I. Several 16th century accounts make mention of its existence, one in particular referring to the model as a "cosa maravigliosa et bella". Scholars have surmised that it was this model, and not the Casa Buonarroti model, that was the one sent to the Pope in Rome, following repeated requests on his behalf to see a design from Michelangelo. One wonders, perhaps, if Corpus 504r was connected to the existing wood model still in the Casa Buonarroti by De Tolnay (1980). As the dimensions of the drawing do not reasonably match the model, the direct connection is dubious, and more recent scholarship does not make this assessment.

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36 Corpus 504r was connected to the existing wood model still in the Casa Buonarroti by De Tolnay (1980). As the dimensions of the drawing do not reasonably match the model, the direct connection is dubious, and more recent scholarship does not make this assessment.
37 This was first documented by Hirst 1988: 103, plate 201.
40 The Pope demanded a wood model over the original model proposed by Michelangelo to be made in clay. For this sequence of events surrounding the multiple models, see Millon and Smyth 1988: 69-73, cf. O’Grody 1999: 83.
504r (figure 2.27) could have also served as a template for the making of it. What seems interesting is the potential for both models to serve the dual role of construction guide and rhetorical device - a condition already observed in the multiple uses of *modani*, where they served as instruments of the architect’s imagination, aides to construction, and drawings for the patron. One explanation, generally accepted by contemporary scholarship, is that the Casa Buonarroti model was intended to guide construction. However, it has also been argued that it was this model represented in Jacopo da Empoli’s painting of Michelangelo presenting the San Lorenzo projects to Pope Leo X, making us wonder if, like the *modani*, the model could have served both purposes (figure 4.31). The use of the model as a construction aid would be consistent with Michelangelo’s insistence on the making of miniature templates for the model maker, as both the model and the building relied on the purposeful assemblage of building parts derived from *modani*. As well, the model, which had been originally painted, could have easily contained graphic information, such as symbols and letters, keying it back to the aforementioned quarry drawings.

**Combining and mixing: material origins of tempering**

As has been shown, through different types of drawings and models Michelangelo engaged in an animate, dynamic process of assembling moldings, profiles, and blocks into larger building members. At the same time, the careful attention paid to certain technical aspects of this work, such as cataloguing, sizing, and joining with the existing building, suggest that a high degree of practical foresight was involved. A more thorough consideration of the tempering procedure reveals that these two inclinations are not, in fact, in opposition; rather they magnify each other through their apparent juxtaposition. To understand this, it will be fruitful to return, once again, to practices. Up to this point, the practice of tempering has been focused on according the invisible and the visible through procedures of small adjustments, such as the hammering of stone, tuning strings, or the shifting and whittling of templates. In exploring this, we had to break open the equivalence of number and quality offered by Pythagoras and introduce procedures where small digressions from axiomatic ratios could result in great qualitative effect and celestial harmonies, a course of action that Michelangelo called the “*giudizio dell’occhio*.”

Moving beyond the specific stones and now contemplating their edification, tempering practices

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41 See Millon and Smyth 1988: 72-73.
42 Wallace has suggested that the drawings could have been indexed to a model, although he does not point specifically to the Casa Buonarroti one; see Wallace 1992: 121. On the painting of the model, see restoration notes in Smyth 1992: 263-267.
43 Condivi comments on Michelangelo’s propensity toward studying all aspects of the construction, such as scaffolding, ropes, and tools (Condivi 2006: 40-41.
44 In connection with Giordano Bruno, Alberto Pérez-Gómez calls this the “disciplined imagination” (Pérez-Gómez 2006: 19). Victor Deupi points out that our modern disinterest in temperance in understanding the creative process results from an assumption that “restraint is antithetical to ambition” (Deupi 1999: 36).
such as combining, mixing, and joining emerge as requisite considerations in revealing how the tempered stones temper the architecture.

Looking back, the primordial idea of 'mixing' appears in Greek notions of krasis - a term used to denote a mixture of bodily humors, qualities (for climate), or the four elements. It was this term that was used by Alcmaeon of Croton in the earliest theories of the bodily humors, formulated in the sixth century BCE. Galen, whose father was an architect, connected the theory of the four humors with bodily physique and character, the healthy mixture of which he denoted as eukrasis, or well-mixed. In the strict medical context, Roman physicians translated the Greek krasis as temperamentum, maintaining the connection between mixtures of bodily fluids, character, and health. The sense of temperamentum as a healthy moderation of extremes in other materials and practices continued, however, with a good summary provided by Columella in De re rustica, writing in the first century CE. In speaking of the proper soil for growing wine, he discusses how it should be tempered between hot and cold, and moist and dry, just as the body:

There is need, one says, of much intermixture (temperamento) among these so different extremes, as is requisite also in our own bodies, whose well-being depends on a fixed and, so to speak, balanced proportion of the hot and the cold, the moist and the dry, the compact and the loose.

Included in the Roman tradition, Vitruvius maintained the connection of temperare with the body, strengthening the original associations with climate and quality along the way. When he renders advice on choosing a site for a city, for example, he notes that the temperatura of the site can be judged according to the character (qualitates) of the animals who dwell there. Each site has its unique mixture of the elements, and like the natural dispositions of the various animals, the site reveals its temperament through the mixture of its elements, e.g. vapors, winds, and earth. And in Book Two, when Vitruvius introduces his commentary on materials, the proper activity of joining together building materials is understood as a process of temperare, a particularly apt use of the term for the current inquiry:

Now I...will deal with the materials which are adapted to the execution of buildings; how they seem to be generated by Nature, and in what mixtures and assemblages of elements are blended (temperentur).

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45 Wageningen 1918: 376.
46 Evans 1945: 289.
48 "Opus est, inquit, inter has tam diversas inaequalitates magno temperamento, quod in corporibus quoque nostris desideratur, quorum bona valentudo calidi et frigidi, umidi et aridi, densi et rari certo et quasi examinato modo continetur", Columella, De re rustica, 3.12. Translation from Columella 1941. Interestingly, Columella's work was among the manuscripts, along with Vitruvius, that was 'rediscovered' by the humanist Poggio Bracciolini in the library of the monastery of St. Gall in 1415; cf. See Etlinger 1977: 98-99.
49 Vitruvius, De architectura, I.iv; Other connections between temperare and climate in Vitruvius include De architectura, I.vi and VI.i.11-12. Other, late Latin connections between temperare and climate are cited by Spitzer 1963: 193, n.1.
50 "Nunc...quaes aptae sunt aedificiorum perfectionibus, quemadmodum videantur esse ab natura rerum procreatae quibusque mixtionibus principiorum congressus temperentur..."; Vitruvius, De architectura, II.i.9.
Other uses in this regard include the proper temper of sand and lime when making plaster; the mixture (temperatura) of elements within travertine or in winter oak; and tempering of materials through mixing when altering the colors of building materials. All of these uses are in addition to the already discussed use of temperare by Vitruvius in Part II for the making of optical corrections or adjustments.

Augustine, a key source for Ficino, would retain the relation between tempering and assembling, but he expressed the potential within the term to take on more metaphysical associations, writing in the City of God that, “The peace of the body consists in the duly proportioned arrangement (temperatura) of its parts.” The act of temperare, then, was not a mere description of putting materials together, which may have been rendered appropriately in the Latin miscere, also ‘to mix’; rather, the elements, materials, or qualities were assembled with intentionality, i.e. toward the desire of a harmonious state.

Having this in mind, it helps to point out that a second Greek word, sophrosyne, descended into the Latin lexicon related to temperance, providing a basis for notions of harmony within the requisite practice of combining or mixing. Generally speaking, sophrosyne was the Greek virtue of self-restraint, mastery over the passions, and self-knowledge. Phidias, it may be recalled from the opening pages of this dissertation, claimed this virtue in his defense of sculpture over poetry, believing that the workmanship of materials produced in him a "more temperate artificer” than that of Homer, who practiced his craft through excessive exaggerations. The transition into Latin of this term is credited to Cicero from a widely read passage offered in the Tusculan Disputationes. After a long argument on the virtues of the moderate life, he concludes:

And from these considerations we may get at a very probable definition of a temperate man, whom the Greeks called σωφρων (sophron); and they call that virtue σωφροσύνη (sophrosyne), which I at one time call temperance (temperantiam)

51 “And so when lime receives water and sand and then strengthens the structure, the following seems to be the cause: just as other bodies, so also stones are blended (sunt temperata) of the elements”, Vitruvius, De architecture, II.v.2 (Granger 1931: I, 99).
52 “...by the nature of their composition (temperatura) they have much moisture and also not much earth, but much air and fire”, Vitruvius, De architecture, II.vii.2 (Granger 1931: I, 107).
53 “But the winter oak because it is blended (temperata) with all the elements, has great advantages in building”, Vitruvius, De architecture, II.ix.9 (Granger 1931: I, 137).
54 “The use of this is buildings is often necessary, so that we must know how the tempering (temperature) of materials for the purpose is carried out by special craftsmanship”, Vitruvius, De architecture, VII.x.1 (Granger 1931: II, 121).
55 “Pax itaque corporis est ordinata temperatura partium...”, Augustine, De civitate dei, Book 19, ch. 13; originally cited in Spitzer, 71.
56 On the lexical distinctions between temperare and miscere, see Spitzer 1963: 81-82.
58 “...temperans, quem Graeci σωφρων appellant, eamque uirtutem σωφροσύνη uocant quam soleo euidem tum temperantium...”, Cicero, Tusculan Disputationes, 3.8. Translation from Yonge 1888: 98.
In examining the Greek term more thoroughly, an entire range of associations come to light in understanding tempering as a harmonizing practice. Plato established much of the early thinking embedded *sophrosyne* by including it among the four cardinal virtues in the *Republic*, where he compares it to a kind of concord (*symphonia*) in which one constructs a cosmos rooted in self-mastery and moderation. And in a penetrating passage from the *Symposium*, the physician Eryximachus relates how *Eros* acts as the binding agent in the harmonious mixing, or "*sophron krasis*", of physical qualities of the universe, combining, as it were, the images of *krasis* and *sophron* in a single statement. The culminating episode, however, occurs in the *Phaedrus*, when Plato asks us to imagine the soul divided into three parts: a tempered (*sophron*) horse, a distempered horse, and a charioteer. When the charioteer is confronted with the beauty of his beloved, the tempered horse restrains his master from quenching physical desire, while the distempered beast lurches the charioteer forward to take hold of him. In the end, the clash between the two horses is resolved when the erotic desire for beauty perseveres within the reins of the tempered horse, who keeps his master under the guise of modesty and self-restraint. The horse's bridle and bit as a metaphor for temperance remained a powerful association well into the Renaissance, as was rendered by Ripa (figure 1.5) and painted by Raphael (figure 1.6).

What emerges is how the particularly Latin image of *temperare* is indebted to practices of mixing, combining, and joining; while, at the same time, is understood as being propelled by intentionality and a desire for beauty. Following this, the common rendering of *Temperanza* as mixing water and wine (figure 4.31) appears to be a uniquely Latin innovation, although Greek Stoic physicians, such as Philo of Alexandria, would commonly cite the mixing of wine and water as it related to *krasis*. In Latin the image was discussed in Apuliues' second century CE work, *De Mundo*, although it was found as early as Horace, who sang, "What the wines of Chios cost / Who with due heat our water can temper". The pervasive image of pouring water into wine successfully captures the practices of mixing and combining while retaining the overtones of world harmony that follow in the various Latin and Greek usages.

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59 Plato, *Republic* 430e. Cited originally in North 1966: 172. This source is probably the most enduring in terms of the inclusion of *Temperantia* within the medieval Christian canon of the four cardinal virtues.
62 Further sources of *temperare* in Latin writers may be found in North 1966: 263.
65 "Quo Chium pretio cadum / mercemur, quis aquam temperet ignibus", Horace, *Odes*, 3.19. translation by author. The most complete discussion of the range of meanings in Latin thinking comes down through Cicero, as in *De Natura Deorum* 2.19.49; *Orator* 6.21, 16.51, 26.95; *De republica* 6.17.
These same themes would be taken up by the vernacular poets of the 13th and 14th centuries, where they return more decidedly to Platonic themes of love and beauty. Indeed, the perseverance of these ideas would provide key precedents for Michelangelo's own understanding of the term in his own lyrical verse.67 Among the copious instances of *temperare* in the *Divina Commedia*, for example, the following verse employs a wide range of associations, reinforcing ancient themes as well as introducing new ones:

Then, like a clock that calls us at the hour
when the bride of God gets up to sing
mattins to her brigrdowm, that he should love her still,
when a cog pulls one wheel and drives another,
chiming its ting-ting with notes so sweet
that the willing spirit swells with love,
thus I saw that glorious wheel in motion,
matching voice to voice in harmony (*tempera*)

*Indì, come orologio che ne chiami
ne l'ora che la sposa di Dio surge
a mattinar lo sposo perché l'ami,
che l'una parte e l'altra tira e urge,
tin tin sonando con si dolce nota,
che 'l ben disposto spirto d'amor turge;
cosi vid' io la glorioua rota*

Here, one observes the now familiar association between the audible and the non-audible aspects of music; tempered, as it were, with the movements of the heavenly wheel. Flowing through the spirit (*spirto*), the combining of several voices (*voce a voce*) causes a swelling of love. The debut of the mechanical clock, a cunning image of the tempered voices' rhythmic "tin-tin", would actually become a common image of late representations of *Temperanza* (figure 4.32). The invocation of the mechanical clock, and its association with the original Latin *tempus* (time), helped to modernize *Temperanza* through the long-established reciprocity between the temper of the body and the heavenly movements of the spheres.69

Petrarch inherited these themes and built upon them, emphasizing the role of love as a tempering force. In the *Canzoniere*, for example, we find:

Love, you who makes me want this,
show me the way to go and be my guide
and keep my verse tempered (*contempre*) with my desire,

*Amor, ch' a ciò m'in voglia,*

67 In particular, Michelangelo's debt to the Petrarchian love poem, in both content and lyrical structure, has been well established. See Saslow 1991: 41-52; Lucente 1987: 216-226; and Cambon 1985: 31-32; 50-56. On Petrarch's use of *temperare*, more or less consistent with Dante, see his *Canzoniere* 23, 35, 73, 119, 125, 207, 224, 248, 359. The notion of a "*stil novo*" originated in Dante, *Purgatorio*, 24


69 It has been argued that *Temperanza*’s association with the mechanical clock is related to the emergence of technology as a force for cultural and moral change. See White 1969: 199-200.
And regarding the notion of tempering as a practice of assembling toward beauty, Petrarch sings:

He'll see, if he arrives in time, all virtue, all loveliness (bellezza), all regal-mannered ways joined in one body, tempered marvelously.

Vedrà, s'arriva a tempo, ogni vertute, ogni bellezza, ogni real costume giunti in un corpo con mirabil tempre. 71

And finally, in examining Michelangelo’s own verse, we find the typical notions of joining as a practice of tuning the four humors. Following Dante and Petrarch, the binding agent and compelling force for Michelangelo is love: 72

When sense spreads it excessive, searing heat beyond your beautiful face to some other one, it loses strength, lord, much like a wild alpine torrent in many branches. Then the heart, which is more alive the hotter the fire, hardly finds agreeable the more infrequent tears and less heated sighs. The soul, faced with such error, is glad that one of them dies, so it can go to heaven, where it seems to aspire. Reason distributes the torments among them, and all four tempers, made more steady, agree among themselves to love you always.

Spargendo il senso il troppo ardor cocente fuor del tuo bello, in alcun altro volto, men forza ha, signor, molto qual per piu’ rami alpestro e fier torrente. Il cor, che del piu’ ardente foco piu’ vive, mal s’accorda allora co’ rari pianti e men caldi sospiri. L’alma all’error presente gode c’un di lor mora per gire al cile, la’ dove per c’aspiri. La ragione i martiri fra lor comparte; e fra piu’ salde tempre s’accordan tutt’a quattro amarti’ sempre. 73

In order to face his beloved, in this case Tommaso de’ Cavalieri, Michelangelo first disassembles his deeply conflicting four tempers, imagined here as sense (senso), heart (cor), soul (alma), and

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70 Petrarch, Canzoniere 73, translation from Musa 1996: 122-123 with modifications by author.
72 On the binding force of love, see Ficino, Commentary on Plato’s Symposium, third speech, ch. III, “...so that it may justly be said that love is a perpetual knot and binder of the world (ut mertio dci posit amor nodus perpetuos, et copula mundi)”, Jayne 1944: 152.
73 Translation and transcription by Saslow 1991: no. 93, 218.
The tempers then undergo an accordance (s'accordan) through the singular desire to "love you always (amarti' sempre)". It seems that a similar procedure is at work in the dissecting and re-fitting of the classical lexicon of moldings and profiles.

Although it had a spirited history as a poetic image of mixing, composing, or assembling, temperare still retained in the 14th and 15th century its more common connections to the material practices of the workshop. In Cennini's Libro dell'Arte, for example, tempering is discussed throughout as an alchemical process of binding together materials, such as paints, glues, and gesso. Here, the painter's materials are divided into pigments, extracts and minerals, and binding agents such as oil, egg yolk (for tempera painting), or wax. In one characteristic passage, Cennini advises the painter on how to apply highlight pigments:

Take white lead ground with water, and temper it with yolk of egg; and it blends like an ink wash, but it is harder for you to handle, and more experience is needed.

_Togli la biacca macinata con acqua, e temperala con rossume d'uovo, e sfumma si a modo d'acquerelle d'inchiostro. Ma è a te più malagevole, e vuolsi più pratica._

Indeed, Cennini frequently cautions the painter in matters of tempering, reminding him of the importance of knowledge gained only through experience, helping to confirm the discussion in the previous chapter around Biringuccio's remarks on bell casting. In the 15th century treatises, the use of temperare as a mixing of materials within craft contexts is upheld by Filarete and Alberti, and it is used as such in 16th century writers such as Vasari, writing on technique, Rusconi, after Vitruvius. One could remark, in fact, that it is the very commonality of the tempering practice, relying, that is, on intentionality within material, that imbues the term with so much metaphorical potential.

In bringing this brief survey to a close, it is the occult capacity of the act of mixing that we may return. As tempering is simultaneously a manifest practice as well as an ensconced tuning of elements, so it is in the edification of architecture from its various building parts. When Michelangelo assembled the tempered stones of San Lorenzo, he did so under the guidance of the internal eye; purposefully, or erotically, aimed toward an imagined beautiful body - the

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74 I have not found a precedent for the distribution of the four tempers in this manner; they appear to be Michelangelo's invention. Interestingly, this poem was one of two of Michelangelo's verses set to music by the French composer Jacques Arcadelt, as cited in Saslow 1991: 218.

75 In Brunetto Latini's Tesoretto, the coupling of accordare (to accord or tune) with temperare reinforces their close relation. And using a common image of the four humors in the body, Latini solidifies their concordance; see Spitzer 1963: 92. See commentary on this coupling in Cambon 1985: 63-64.

76 Thompson 1956: 43

77 Cennini, Il Libro dell'arte, XXXII, translation by Thompson 1954: 19.

78 "E così, se hai a fare a tempera e anche a olio, si possono mettere tutti questi colori, ma questa è altra pratica e altro modo, il quale è bello, chi lo sa fare", Filarete, Trattato di architettura (Finoli and Grassi 1972: II, 668).

79 "It is said that iron, if tempered (temperato) with white lead, gypsum, and liquid pitch, will not suffer rust", Alberti, De re aedificatoria, III.11 (Rykwert, Leach, Tavernor 1988: 77).

80 Vasari, Vite (Milanesi 1906: I, 164)

81 Rusconi 1660: 109
concetto. At the same time, the joining of stones into larger constructions remained a fundamentally empirical procedure of fitting, cutting, and adjusting. Rather than viewing these activities as in opposition, as a binary between theory and practice, they follow in the long tradition of temperare, where edification inherently contains both visible and invisible constructs. Ficino summarized this 'mixing' between the visible and invisible when he stated:

And so from this mixed nature of love, we assert that it is a certain mean passion between beauty and absence of beauty, sharing in both.

As a process without finality, like the health of the body, the proper assembly of the beautiful relies on the free exchange between the concetto and the material - of presence and absence. The modani, as tempering the part, can be thought of as the first step in tempering the architecture.

The clarity of these currents is exhibited again in Ficino. In examining the role of love in the mastery of the arts, Ficino offers a few examples of practical activities, such as medicine, music, and divination; stating that the one "teacher and ruler (magister artium et gubernator)" of all arts is Love. Since both love and unfulfilled love are both humoral, the tempering template and the emotion Michelangelo displays in the fashioning of poetry are both temperings. What is more, through Love the exercising of a particular art may be understood as a practice of binding or joining various materials, where the putting together of sublunary elements become a mirror for the harmonious combinations of the celestial firmament, a fine summary of the notion of tempering being proposed herein. Commenting on the art of astronomy, Ficino writes:

There is a kind of friendship among the stars and four elements which is the subject matter of astronomy. Here...two loves are found, for there is a moderate love among them in which they blend (consonant) their forces together most temperately (temperatissime); and there is also an immoderate love in which each of them loves itself too much and leaves the others, so to speak. From the moderate love derive a pleasant temperature (aeries temperies) in the air, tranquility of the sea, fertility of the earth, and health of animals; from the immoderate, the opposite conditions.

Building site in movement I: the case of the ricetto

The motive force of Love, binding together the activities of the arts, the universe, and the body itself, opens the door for a more thorough discussion of the so-called 'binding' forces that

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82 The range of significances is held in the Vulgate with the words of Paul, "... Deus temperavit corpus (God tempered the body)...", 1 Corinthians (12:24). Cited in Pieper 1966: 146.
83 "Atque ita amorem ex huiusmodi mixtione medium quendam affectum esse volumus inter pulchrum et non pulchrum, utriusque participem"; Ficino, Commentary, Sixth Speech, ch. 2 (Jayne 1944: 79, 184)
84 "Inest sideribus et elementis quattuor amicitia quaedam, quam astronomia conderat. In eis duo illi quodammodo amores reperiuntur. Est enim eis mderatus amor, quando invicem mutius viribus temperatissime consonant. Est et amor immoderatus, quando unum aliquod illorum se ipsum amat numum, alia quodammodo derelinquit. Ex illo aeris grata temperies, aquae tranquillitias, terrarum fertilitas, animalium sanitas; es hox contraria proficiscuntur", Ficino, Commentary, Third speech, ch. 3; Translation by Jayne 1944: 152.
drive the proportioning and judgment of assembly. As is well-known, Michelangelo viewed the proportion of figures in terms of the body in movement, an idea that has been captured in the terms *figura serpentinata*, coined by Lomazzo, and *contrapposto*, an ancient sculptural technique of representing the figure through a slight shifting of weight to one leg.\(^85\) What mannerist artists demonstrated, however, was that the employment of such formal devices would not necessarily lead to a sense of vivacity in the work.\(^86\) The non-formal nature of the dynamic profile has already been explored in the context of the stone blocks themselves through the tracing, stretching, and cutting of *modani*. Since it has been now suggested that the assembling of the building stones is as well a process of tempering, one wonders what an analysis of Michelangelo’s actual movements on the building site might reveal.

As was discussed earlier, Michelangelo’s profiles and templates generally lack any apparent formal indexing marks tying them to a larger construction, unlike the *modani* of Sangallo or Ammannati. However, the very dislocation of the profiles announces that their assembly could take place within an architectural building site in motion, where each building joint acted as an invitation for adjustments and alterations. In this way, the *concetto* could emerge from the architecture in an analogous way to the removal of stone in the emergence of the figure. Both emphasize the edification process over the final product through the direct imagining of the material body. Just as Michelangelo utilized the space between Via Mozza and San Lorenzo as a mirror for projecting future constructions, so did the San Lorenzo *fabbrica* act as a dynamic site for continual revisions and adjustments while construction was occurring. Specifically, in turning to the drawings and in-situ work of the Laurentian Library vestibule, one discovers a host of clues into how edification relied on the concurrent consideration of the building stones and their assemblage. In particular, these drawings are focused through a brief period between December 11, 1524, when *macigno* blocks for the vestibule began arriving to the site, and February 23, 1525, the point at which Clement VII gave his final approval for Michelangelo’s design. Enough documentation survives to reconstruct a remarkable few months immersed in a building site in movement, where Michelangelo continued to draw details and assemblies in the midst of near-daily stone deliveries and laboring *scarpellini*. In one letter, he wrote to Francesco Fattucci stating, "I am working as hard as I can".\(^87\)

It would be fitting at this point to introduce *Corpus* 528r (figure 4.34), a drawing of the west vestibule wall, dating from late February 1526.\(^88\) On the San Lorenzo building site, the

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\(^{86}\) One is reminded of efforts to formalize these discoveries, such as Hogarth’s S-shaped Line of Grace (1772), based, as he stated, on Michelangelo’s twisting figures.


\(^{88}\) *Corpus* 528 was dated by Wittkower (Wittkower 1934: 154-155) to February 1526.
Medici Chapel had been underway for nearly six years, and the reading room and vestibule were in a state of open construction, with foundations begun only in September 1524. Although construction on the reading room portion had proceeded rapidly, Michelangelo's proposal for the vestibule passed through a number of iterations with Rome; the main sources of disagreement being the method of admitting light to the room and the nature of the stair.\textsuperscript{89} Corpus 528\textit{r} represents the latest drawing for the vestibule's \textit{lavoro di quadro}, and, aside from the niches depicted in the lower storey, the relationships of the various members are more or less what was constructed. Flipping the drawing over (figure 2.32) recalls the series of profiles related to the second storey column base studied in chapter one. A series of profiles intermixed with these column base profiles are studies for the \textit{macigno} base molding, or \textit{zoccolo}, where the floor meets the base of the wall in the vestibule's lower order. It may be recalled that a \textit{modano} exists, \textit{Corpus} 525\textit{v} (figure A.7), in which a version of this very profile has been traced and cut-out in scale 1:1. This drawing was briefly studied in Part I in relation to 528 and the profile of the main storey column base. It is the interconnectivity of these two drawings, depicting multiple versions of several details as well as an overall building assembly, upon which Michelangelo's movements on the building site will be explored.

\textit{Corpus} 525 is an extremely complex artifact containing, between the recto and verso, over twenty unique, identifiable drawings, most of which relate to the edification of the vestibule.\textsuperscript{90} In terms of the free standing stair, 525 provides some of the most informative sketches related to Michelangelo's intended design, a source of some controversy since it was built much later and without his immediate supervision.\textsuperscript{91} On the recto (figure A.6), layered within the sketches of the stair, an array of inked profiles, variations on the \textit{zoccolo}, may be observed. Both the stair and the profile sketches are rendered over top of a series of drapery and figural studies, generally considered by scholars to be from the hand of an assistant.\textsuperscript{92} Beyond the cut profile itself, to which we shall return, \textit{Corpus} 525 offers some clues into how the tempering of the building

\textsuperscript{89} On the many versions of the stair design, see a recent recounting in Gronegger 2007: 105-109.
\textsuperscript{90} \textit{Corpus} 525 (Casa Buonarroti 92A) is in the care of the Casa Buonarroti and was personally examined by the author on June 11, 2012. See Appendix for bibliography. Beginning on the verso, there is some evidence that this template received a tracing from a now-lost parent, although the visual evidence is inconclusive. Unfortunately, preservationists have glued archival paper along the cut profile, obscuring a clear view of the edge. The translucence of the paper, however, allows for a strong suspicion that the entire length of the cut edge was at one time inked. With this in mind, the most convincing evidence of a lost parent template occurs in the one instance where the inked line breaks free from the red chalk overlay. At this place on the drawing, one may observe a possible traced line with the characteristic ink smudge that often occurs when inking a traced edge, a phenomenon that was examined at length in Part I with \textit{Corpus} 536. Out of all the extant templates, this \textit{modano} has certainly been the most widely published and most thoroughly studied. Yet, in spite of appearing in over fifty publications, most recently in 2012, few scholars have explored the significance of it as a full-scale template drawing. Up until a recent restoration, the profiled edge has remained largely obscured from scholars due to preservation techniques, reflecting a clear bias toward the figures within the drawing over its potential to be studied as a material entity. Compare, for example, \textit{Corpus} 525 published in the \textit{Corpus} (De Tolnay 1976-1980: IV, 525) and the same drawing published Ruschi 2007: 132-133. The profile line was once partially obscured due to the overlay of preservation paper with brown wash, fortunately now removed, allowing for the examination of the verso profile but concealing the recto.

\textsuperscript{91} The stair was brought largely into its current form by Ammannati in the 1530s, apparently benefitting from a clay model of the stair sent to Florence from Michelangelo's workshop in Rome.
\textsuperscript{92} A recent summary of scholarship and discussion on the figural studies may be found in Cattiti 2007: 132-134.
continued as it was assembled. Although Michelangelo concurrently directed the larger building assembly as well, demonstrated in *Corpus* 528r (figure 4.34), it seems likely that the finer adjustments in building joints, profile sequences, and proportions of ornaments occurred even as building stones were being carved. In this way, the building would have acted almost as a 1:1 model, remaining open to continued adjustments as construction unfolded.93

As has been observed in other contexts, such minute changes in the joining of building stones could also have profound effect in the character of the joined assemblies, a defining practice in the broader understanding of tempering. When observed from the recto (*Corpus* 525r - figure A.6), for example, a series of inked profiles related to the vestibule base molding begin to show how the assembly of profiles might suggest a logic of their assembly on the building site. Among these drawings, there is a systematic study of four profiles (A-D) all sharing a similar lower portion: beginning from the bottom of the profile, they each comprise of a plinth, large torus, small torus, and a cimbia. Beyond the shared lower portion, however, the four profiles all exhibit different versions for their top most portions: profile A exhibits an ogee, fillet, torus, and fillet; profile B, a fillet, cavetto, fillet, and torus; profile C, an ogee, fillet, torus and cavetto; and profile D, a torus, and a cavetto, with an ogee overlaid.

These profiles demonstrate what has already been seen in the copying of the Codex Coner - that Michelangelo freely disassembled the classical lexicon and experimented widely with composing new and unusual profiles. Taken together, however, the profiles suggest that such experimentation was hardly an arbitrary process of mixing and composing. The repetitive use of a single portion while proposing widely different alternatives for another portion appears to be a common practice, something that may be alternatively viewed in the systematic replication of three profiles also on *Corpus* 202r (figure 2.41). On this sheet one finds variations on column bases for the Medici Chapel, with a systematic study of the topmost profiles. As well this may be seen in a sheet of studies for the second story cornice of the vestibule, *Corpus* 532r (figure 4.35), where one discerns a thrice-drawn sequence of cornice projections while concurrently exploring variations on the lower profiles. It cannot be incidental Michelangelo approached the profiling of the buildings in such a non-arbitrary way, and it calls to mind Dante’s invocation of the ‘ting-ting’ of the clock, where the repetition of the anticipated hour brings the voices into temper. Since this appears to be a normative practice, one wonders, then, if there might be an analogue practice with the measured movements of the construction site.94

93 It has been suggested that Brunelleschi’s Old Sacristy acted as a 1:1 model for the New Sacristy, Mussolin 2006: 100.
94 Leonardo da Vinci linked the tracing of the profile to a memory device. In his *Libro di Pittura*, he demonstrates how physiognomic features such as noses and ears may be memorized by repetitive tracing of their profiles. See Rosand 2002: 88-91 and Brothers 2008: 54.
In examining the profile practices with such movements, the possibility seems strong that Michelangelo was drawing these profiles for the base molding in the exact moment that they are being carved and installed. As assembling a wall would require multiple building joints, well demonstrated by Michelangelo in the San Lorenzo facade drawing (figure 2.27), it is likely that, in the assembly of the building, revisions continued to occur even as the blocks were being set into the wall. Such an assertion relies on a noted gap in the building documents between the drawing of the building facade assembly, (figure 4.34, *Corpus* 528r), dated to the end of February 1526; and the extant building ledgers recording the delivery of pre-designated, roughed-out stone blocks for the vestibule assembly. Examining these, one is struck by the fact that blocks of *macigno* for the basement order began arriving on the building site in early December of 1525, nearly three months before the purported making of the facade sketches, the base molding profile sketches, and the stone template itself. Not only that, but documents record the explicit assignments and payments to *macigno* stone carvers during the exact period that the design was supposedly being 'finalized' for the pope. What was going on during this time? Carvings, of course, and it was Michelangelo, conducting a building site in constant movement, who instigated construction through drawings and templates even as the larger assembly was being developed.

Given the obvious reciprocity between the imagining of the profiles and the arrival and carving of material, it is possible that the building itself acted as a continuous demonstration of the emerging *concetto*, at the same time that it was being constructed.95 Greek builders used the term *anathyrosis*, a practice of fitting and adjusting building members (before mortar) while the building was in progress. The use of levers, levels, and smoothing of surfaces constituted one of the defining characteristics of Greek construction practices.96

In a closer comparison between the profiles highlighted on *Corpus* 525r (figure A.6) and what was actually built, this becomes even more convincing. The accounts documenting the delivery of *macigno* at San Lorenzo include a detailed record of the arrival of the building stones related to the these very profiles highlighted.97 Among a record of blocks comprising the basement and main storey, a distinction is made between the "*imbasimento*", or base block, and the "*scaglione*", which comprised the remainder of the base molding assembly. In closely examining the in-situ vestibule base, a joint dividing the upper and lower stones occurs between the termination of the cimbia and the initialization of the upper torus.98 What is more, the division

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95 Often such slight adjustments would lead to a great narrative effect, a Carabell discusses this well in connection with Michelangelo's sculpting practices, Carabell 2007: 90-91.
97 These accounts are collected in the so-called Libretto II and recorded by the San Lorenzo site provveditore, Daneillo de' Ricci. They are a daily account of stone deliveries for the vestibule from December 11, 1525 until August 2, 1526. See Ricordi, CXCII (Ciulich and Barocchi 1970: 202-211). Wallace discusses and analyzes these deliveries in Wallace 1994: 160-165 and esp. Table 10, 165.
between the higher and lower portions appears in exactly the same place as it does in Michelangelo's imagined profiles on 525. In figure 4.36, a comparison between the as-built stone joints and profiles (after Rossi) with Michelangelo's profile studies confirms this assertion, where the lower portion of the sketched profiles matches the *imbasimento* as it was built, even as the upper portion, or *scaglione*, exhibits an array of different possible profiles. Given Michelangelo's propensity toward conducting a building site in movement, it seems plausible that the sketches on 535 represent a dialogue between an already carved and installed *imbasimento* with alternative proposals for a future *scaglione* - a search for the well-tempered character as the wall is being assembled.

In searching elsewhere for support of such a narrative, one may look no further than *Corpus* 534 (figures A.8/A.9), the so-called 'copia' of traced profiles sent to the building site. It will be recalled that, after an analysis of 534, the notion of the 'copia' was amended to leave open the possibility of further alterations as the traced templates landed on the construction site. Not surprisingly, then, a similar dislocation of major portions of the profiles may be observed within these profiles as well, possibly even related to the building joints. Beginning on the verso (figure A.9), where profile D relates to the cornice of the door frontispiece facing the Library vestibule, it may be seen in the overlay (figure 4.37) with the in-situ carvings from the Rossi survey that the profiles are a near match. However, the upper cavetto, originally part of the traced template, has been omitted from the finished work. Similarly, with profile A on 534r (figure A.8), a large portion of the cornice for the reading room frontispiece was altered with respect to the template sent to the building site. In this case, a comparison of the profile with the in-situ stone work reveals that the top-most cyma recta was omitted with respect what was actually carved (figure 4.38). Since 534 records a tentative moment when the templates were leaving the Via Mozza workshop, these changes probably occurred as they were being traced onto tin or stone and carved on the building site, when Michelangelo decided with the *scarpellini* to alter or omit these final ornaments. And finally, it should be pointed out that the way he chose to record the templates on 534 was probably indicative for this approach. Since several of the profiles bleed off the edges of the sheet, specifically A and E, one assumes that some portion of the original templates was not traced, demonstrating once again the dislocation of the profile with respect to more conventional notions of Vitruvian symmetry.

Once on the building site, the templates would have facilitated reassembly by being floating, ready-made possibilities, freed from a narrative of compassed, modularly constructed profiles. The omitting of formal reference devices effectively released the motive potential of the profile, where the templates could be shuffled and re-assembled on the building site, possibly

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99 Recall that Michelangelo labeled the tracings of the templates on 534 as a record of templates sent to Ceccone, one of the stone carvers working at San Lorenzo.
even between projects, according to emerging and changing circumstances. Whole stones, it appears, were even carved without a definitive model of the overall assembly. This comes from an account of Vasari given on the uncertainty surrounding the completion of the vestibule's freestanding stair, of which apparently many stones had been hewn without any definitive model to guide the stone carvers. The materiality of stone and its building joints acted as an invitation for such practices, where the work of the scarpellini came in direct contact with Michelangelo's concetto. In other words, just as stone was arriving on the building site, precisely labeled in the parts, the assembled character was still being developed.

This would certainly be consistent with Michelangelo's unusual sculpting practices, where, in approaching the block from one side only rather than the four-sided approach typically enacted by sculptors, he could leave material available for adjustments in the work as it emerged. The block, then, was not a passive receiver of an a priori mental image; rather it was a work in movement, where the physical maneuvers and assailments of the artist were met with a dynamic, shifting, and mutable work. As such, just as in the tuning of stone details at the building joint, small adjustments in the emerging figures could be leveraged to great narrative effect. In the Rondanini Pietà, for example, on which Michelangelo labored until only days before his death, he continued to soothe or exaggerate the postures of Christ and Mary as fitting for the evolving concetto. In a similar manner, the materializing wall in the ricetto could remain available for modifications as discoveries between adjacent profiles prompted revisions and adjustments to the emerging character of the building. Such a fragmentation of the profiles into joined building stones would be akin to what has been observed in the set of inked profiles on 525, where multiple alternatives were systematically studied through higher and lower sets of moldings. In this way, the profiles were not just an inventive re-shuffling of disembodied moldings, i.e cavetto, torus, ogee, etc.; rather, they involved imagining a stone profile as comprised of several blocks, with each block remaining open for revisions as the project developed.

Building site in movement II: assembling the istoria

100 After going to Rome to persuade Michelangelo to come back to Florence to finish the work at San Lorenzo, and Michelangelo refusing, Duke Cosimo, "dimandò finalmente della scala della libreria di San Lorenzo, della quale Michelangnelo aveva fatto fare molte pietre; e non ce n'era modello né certezza appunto della forma..." as stated by Vasari, Vite (Milanesi 1906: VII, 236); cf. Wittkower 1934: 176.
101 There practices are well exposed by Carabell in her analysis of the unfinished sculptures, the Awakening Slave and St. Matthew in Carabell 1997: 96-101.
102 Carabell gives the example of the unfinished Rondanini Pietà, where Michelangelo was exaggerating the postures of Christ and Mary through the slow rounding of the faces toward each other, Carabell 1997: 104.
103 This would be consistent with David Hemsoll, who suggests in a recent article that the second storey columns of the Library vestibule were a non-arbitrary "mixing" or "hybrid" of different styles - Corinthian and Doric (Hemsoll 2003: 52). One imagines that this could have been a dynamic process directly unfolding as the stone was being carved.
Tempering was, and is, a temporal undertaking; a harkening back to the original relation of *temperare* from *tempus*. As we have seen, the building site in movement created a temporal space wherein Michelangelo could engage the construction as it occurred; i.e., making templates, drawing details, and settling on larger building schema, all within the same documented time period. Certainly, then, when Michelangelo was said to have "compasses in the eye (seste dell'occhio)"105, it was not only to measure precise distances but it was also to measure the precise actions at the appropriate moment. When invoking the profoundly temporal aspect of tempering, the full range of the *modani* to participate in the making of the architecture starts to become clear. As devices used in time, a mere physical match between the shape of the stone and a tempered *modano* did not account for the entirety of its capacity to temper the architecture. Its ability to transmit formal instructions to the masons appears to be only one aspect of its full potential on the construction site. Additionally, as Corpus 525 demonstrates, *modani* also provided a site for Michelangelo's imagination to unfold within the in-process materialization of the building character, either as in-situ models at the construction site or as imaginings of future constructions while construction is underway. At this point the shared properties of *modani* as both models and drawings begins to become more apparent: as full size models they may participate in a particular physical and temporal situation; as drawings, however, they retain their fundamental attributes as *profili* inhabited by the imagination.

In ruminating within the *ricetto* for a bit longer, one is immediately struck on Corpus 525 (figures A.6/A.7) with the wide diversity of drawings, layers, and drawing materials present on both recto and verso. Although a precise historical reconstruction of Michelangelo's sequence of drawing is tenuous at best, what seems certain is that this is not only a collection of sketches that have landed in a non-arbitrary way on this *modano*. When the cut template edge is placed in relation to the stair designs - drawn in multiple views and even with a rare use of perspective, a dialogue between the part and the in-process assemblage becomes present. What is more, the constant presence of the figural sketches underneath must have reinforced the motive potential of the building details, a phenomenon explored at length in Part I in the vivacity of the anthropomorphic profile.106 The juxtaposition of large drawing / small detail with small drawing / large building assembly opens the imagination to inhabiting the body of construction on multiple levels. The employment of a range of drawing tools, from the tracing of a building template to the use of red chalk, demonstrates the free and interchangeable use of tools for building, sculpting, and figure drawing. One senses, perhaps, that he may have been present in the vestibule building site while making these drawings. The dynamic collection of drawing practices and

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104 Spitzer 1963: 80-83  
105 Vasari cites Michelangelo as stating "che bisognava avere le seste negli occhi e non in mano, perchè le mani perano, e l'occhio guida"; Vasari, *Vite* (Milanesi 1906: VII, 270).  
106 Both Corpus 525 and Corpus 528 originate from the same assistant's figural drawings underneath.
materials exhibited on this drawing is evidence enough to look deeper into the practices; placed, as it were, on a 1:1 template drawing crafted for the stone mason.

To help understand this, a broader search into the temporality of Michelangelo’s concetto becomes necessary. On Corpus 525 the juxtaposition of the 1:1 cut line with the human figures, the stair, and the smattering of other details reflects a non-arbitrary method of materializing the building narrative, what Alberti famously referred to in De pictura as the istoria. Explaining how the composing of a painting should unify the various parts through the narrative portrayed, he notes that, "bodies ought to join together in the istoria in both purpose and size [officio et magnitudine]"107 In this context, Alberti censures the example of a man who "...is placed in a building as in a closed casket where there is scarcely room to sit down". And he laments at the absurdity of, "...one who paints the Centaurs fighting after the banquet to leave a vase of wine still standing in such tumult."108 Within these examples there is an incongruity in their istoria, and there is a disconnect between the bodies of the painting and one’s expectations within the imagined allegory, narrative, or figural scene. In architecture, this point is reinforced in De re aedificatoria when he reveals that the reading of an appropriately constructed wall is like the reading of a good istoria.109 What is key to the present argument is the introduction afforded by the istoria for understanding the temporality of construction, where embedded into the assembled building is the invisible narrative of its edification. Exactitude in the act of composing was of equal importance to the composition itself.

The argument for a dynamic, shifting istoria during construction is consistent with Michelangelo’s propensity toward the use of full size architectural models as surrogate characters in a spatial or architectural situation. Indeed, the artist’s reliance on 1:1 models was certainly a signature of his practice as an architect.110 Performed in less expensive and resistant materials, full size models allowed him to work as a sculptor might - constructing with hands directly in the material. As full-size, these models were available for judging in relation to the body and the surrounding context, and they were often inserted directly into their respective architectural situations.111 Aside from the practical advantages of working through possible technical questions, the employment of full size models allowed for a more intimate encounter with its

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108 De Pictura, Book 2.
109 Alberti, De re aedificatoria, VII.10 (Rykwert, Leach, Tavernor 1988: 220).
110 By the time Michelangelo began at San Lorenzo, full-scale models had been an occasional practice in Florence for centuries. Among 15th century examples: Filarete records making full-scale models of ornaments in his Trattato di architettura (Finoli and Grassi 1972: I, 241); on the Strozzi Palace, full-scale models of metalwork were performed (Goldwaithe 1980: 377); Brunelleschi ordered a full size model constructed and hung in place to judge the lantern ring (Saalman 1980: 271-272).
111 One is reminded of Alberti’s recounting of Protagoras in Della pittura, "...dicendo che l' uomo era modo e misura di tutte le cose...", Bk. I, ch. 18.
istoria. As well, tempering as a purposeful adjusting of building members was most effective when performed, as the hands would on the construction site, in the scale of 1:1.112

It was in this manner that Michelangelo, when asked by Pope Paul III to design the facade for the Palazzo Farnese in Rome, sought to have a full size wooden model made for his design of the monumental facade cornice.113 As reported by Vasari, a magnificent, six braccia section of cornice was indeed constructed "according to the size that it had to be".114 Not only that, but Michelangelo had the cornice model hoisted and placed in-situ, as if it were already part of the facade, "pleasing the Pope as well as all of Rome".115 Aside from the noteworthy rhetorical advantages of such a feat, it also allowed Michelangelo to evaluate the work from the ground, with his body, and in place, with his eye. While in place, the cornice could be judged within an analogical temporal situation - light, shadow, and relationship to its surroundings. In light of Vitruvius’ commentary on the tempering of building members through optical corrections, this episode shows the potential of the motive building site in the adjustment and meticulous assembling of building members. As is suggested in Cesariano’s rendering of the practice of optical correction (figure 3.21), Michelangelo’s model enabled him to offer micro-adjustments to even the smallest parts, judging them against the istoria as expressed high above the city.116 Although there is no documented evidence of alterations to the cornice following this demonstration, a separate incident involving Brunelleschi clearly shows this process at work. In constructing and hanging in place a full size wooden model for the lantern ring at Santa Maria del Fiore, the architects deduced that the 10 braccia oculus diameter was too large. They finally reduced the dimension to 9 2/3 braccia, a remarkably small adjustment for a building assembly almost one hundred meters in air.117 By being able to raise and lower their respective models, what was typically a distant eye could be brought within the range of the giudizio dell’occhio. Although the assemblies would be beyond the range of intimate inspection, their istoriae still

112 The history of full size models has not been written. On 15th century Italian models in general, see the excellent survey in Lepik 1994: 143-233.
113 In his praise of Michelangelo’s modeling practices, Benvenuto Cellini pointed out that, unlike professional architects who derive their relief models by first making measured drawings, Michelangelo worked in the opposite way - demonstrating to stone masons and carvers first through the use of clay models. In this way he could develop grace (grazie) out of the smallest parts; relying, as models do, on the immediacy of hand and the giudizio dell’occhio. Originally cited in Summers 1981: 271-272.
114 “della grandezza che aveva a essere”, Vasari, Vite (Milanesi 1906: VII, 223)
115 “che piaciuto a Sua Santitá, e tutta Roma”. Vasari, Vite (Milanesi 1906: VII, 223). The full passage reads, “[Michelagnelo], non potendo mancare a quel papa, che lo stimava e accarezzava tanto, fece fare un modello di braccia sei di leganame della grandezza che aveva a essere, e quello in uno de’canti del palazzo fe porre, che mostrassi in effetto quel che aveva a essere l’opera: che piaciuto a Sua Santitá, e tutta Roma...” Not everyone was impressed with this stunt. Some critics of this practice even went as far as to mock the affair, as if a true architect should not have to depend on the elaborate staging of full size models to persuade clients and refine the architecture. In one documented case, Michelangelo’s execution of a full scale wooden cornice model for the Palazzo Farnese was heavily criticized by Nanni di Baccio Bigio, a close associate with the architects of the Sangallo family, who went around Florence stating the Michelangelo did not understand “niente d’architettura”. Carteggio, MLXXXIII (Barocchi and Ristori 1967: IV, 267-268). Its design was also criticized by Giovan Battista da Sangallo in a well-known letter to Paolo III outlining its poor adherence to Vitruvian principles, letter transcribed in Carteggio, MLXVI (Barocchi and Ristori 1967: IV, 242). This episode is recalled in Ackerman 1961: II,74, Saalman 1980: 67, and Mussolin 2006: 106.
116 One also wonders if Scamozzi is illustrating full-scale models in the manner of Michelangelo’s Farnese cornice.
relied on the smallest parts, as the imagination could transpose the eye within even the closest view.  

The advantages of making large scale drawings and models was broadly discussed in the cinquecento. Vasari, in his introduction to the art of sculpture, offers an extensive commentary on the advantages. Alberti touched upon this in the Part I discussion on the making of full size profile drawings, where he advocated that painters should avoid making small drawings, "because in small drawings large weaknesses are easily hidden". Along the same lines, in the making of full size models, Scamozzi reasons:

And [it is] very well to advise that Models ought to be viewed with the same quantity and quality and clarity of natural light that one would be able to see in the work itself...

E molto bene da auuertire che i Modelli deono veduti con la medissima quantità, e qualità, e chiarezza di lume naturale, che si douerà vedere l'opera stessa...

and offers, as well, a witty comparison:

some Models are similar to small birds, in which they may not be discerned well whether they are male or female, although when made large they are known like Eagles...

con tutto ciò i Modelli sono à simiglianza di piccioli uccelli, i quali per allhora non si discernono bene se sono nè maschi, è femine; mà fatti poi grandicelli si conoscono per Aquile...

So, it seems, in their physical relation to the body, large models reveal their character more fully than smaller ones. Writing in April of 1523 to Francesco Fattucci, Michelangelo proposed to Giulio de' Medici, the future Clement VII, to begin the marble carving for the ducal tombs in the Medici Chapel from exactly this point of view. Knowing that the delicate *istoria* between the figural programme and the *lavoro di quadro* required the aide of large models, he offered to construct two full-scale wooden models, "grandi a punto chome ànno a essere", one for each of the Medici tomb ensembles. Once complete, he wrote, he would populate the wood models with full-size clay models of the figures.

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118 The Farnese cornice was floated above Rome sometime in 1547, and Michelangelo was already in his seventies. However, from an early age as a young protégé in the Medici Garden, where he learned to emulate fellow sculptors modeling in clay, he produced a steady stream of figural and architectural models in a wide variety of materials, including clay, fired clay (terra cotta), wax, and wood. For a recent analysis and summary on Michelangelo's use of architectural models, see Mussolin 2006: 95-111; for a summary of Michelangelo's models for both sculpture and architecture, including an appendix surveying the documented references to models, see O'Grody 1999. On Michelangelo in the Medici Garden, see Vasari, *Vite* (Milanesi 1906: VII, 142).

119 These include the much higher propensity toward errors and patching, Vasari, *Vite* (Milanesi 1906: I, 154-155). Cellini also praises the use of full size models in his *Trattato della Scultura*, VI (Milanesi 1857: 197)


121 Scamozzi 1964: Parta Prima, 52

122 ibid. Perhaps not incidentally, the Eagle among the most Jovial birds, and thus contains distant associations with tin.

123 See Carteggio, DLXXI (Barocchi and Ristori 1967: II, 366), "Dipo, riapichando el Chardinale, gli ofersi di fare e modegli di legniane, grandi a punto chome ànno a essere le sepulture, e farvi dentro tucte le figure di terra [e] cimatura, della grandezza e finite a punto chome ànno a essere...". Historically speaking, Michelangelo appears to be one of the
Receiving a favorable response, Michelangelo arranged for the construction of a magnificent wood model assembly, in scale 1:1, of the entire bay for the ducal tomb, beginning from the floor and continuing over three meters to the first storey cornice (figure 4.39 - the tomb of Giuliano de’ Medici without the figures gives an approximate idea of its magnitude). Consuming ninety-five man-days of time, 150 feet of model-grade wood, and two lime-wood trees, the project employed the daily work of four carpenters from early January of 1524, to March 10, 1524. It seems that a good deal of effort was placed on producing a detailed model, since one of the main craftsmen on the model was a highly skilled carpenter named Bastione, called an intagliatore, who commanded one of the highest day wages of anyone at the San Lorenzo building site. Although models were originally proposed for both ducal tombs, only one of the two was ever completed.

It has often been assumed by scholars that the completed wood model acted as a manifestation of Michelangelo’s design for guiding the stone carvers. The employment of Bastione, plus the sheer amount of carving to be completed in a short period, it is said, points to a desire by the artist for a comprehensive guide for the nearly dozen or so carvers floating through the construction site in the spring of 1524. While this may be so, it could well be argued that the model participated more readily within the emergence of the concetto itself. Evidence suggests that it primarily served the in-progress, and continuously evolving tomb design, an integral part of the building site in movement. In addition to the ambiguity in the documents of what was actually modeled, some questions become apparent when thinking through how the model may have specifically guided the carvers in the first place. First of all, how the translation process between the wood model and the stone carvings might have occurred is not entirely clear. Wooden frame-like apparatuses were common in the 16th century for transposing figural models, but their implementation in the lavoro di quadro seems dubious. Moreover, the exact

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124 Michelangelo definitively states that the model was complete on March 10, which was, “...l’ultimo di che fu finito uno de’modegli delle dua sepulture della sagrestia”, Ricordi, CXVI (Ciulich and Barocchi 1970: 117).

125 Evidence mainly surrounds the ambiguity in the documents related to the extant tomb drawings. There is widespread disagreement among scholars as to when and how the current solution relates to the extant sketches. For a recent assessment, see Ruschi 2007: 78. The position that the model is an in-progress aid is forwarded also by Mussolin, who argues that Corpus 199r (Casa Buonarroti, 72A) relates to the payment of Bastione for the making of four balustrades on March 10, 1524, placing the continued development of the model contemporaneous with that of the sketches, Mussolin 2006: 101.

126 On the use of the talaiò, or transposing frame, see O’Grody 1999: 136-138. Inconclusive evidence suggests that Michelangelo used such frames (see, esp. Ricordi, CXIII (Ciulich and Barocchi 1970: 132). Still, they are always mentioned in the context of figural, rather than architectural, models.
accuracy of the models, "fine a punto chome ànno a essere", ought be taken in a broader context than is normally assumed. When assembling the model, for instance, rather than modeling the actual sarcophagus in wood, Michelangelo thought it appropriate enough to have a large wooden chest imported from the Via Mozza workshop to act as a stand-in for it. With this in mind, it could easily be stated that the model had both imaginative as well as directive purposes.

Besides, it seems likely that the carvers would still have had to work from templates, even after the model was complete. Interestingly enough, several modani exist from this period and can be connected to the making of ornaments modeled in the full-scale tomb model. Corpus 540 (figure A.24/A.25), the cut-off or leftover of a template for the making of a scroll or bracket, has been identified with the four brackets, or mensole, underneath the Duke's flanking tabernacles (figure 4.40). On April 23, 1524, Michelangelo recorded a payment to Baccio di Puccione for fabricating a, "a wood modano of a bracket", a full size wood model that was no doubt related to the Corpus 540 template drawing, bearing on the recto, as it does, an employment roster dated just a few days earlier - April 15. Since both the wood model and the template were completed over a month after the tomb model, they were probably a result of post-model deliberations surrounding the spirited evolution of the tomb assembly. This sequence is upheld by another related modano, an uncut profile that relates to an adjacent one on the tabernacle or possibly for the first storey cornice (Corpus 535v - figure A.11). On the recto (figure A.10) it also contains an employment roster; this one from a week earlier - 9 April 1524. Relevant here is the purchase of two five braccia measuring rules by Michelangelo at the beginning of April - which is the exact height of the tomb from the floor to the first storey cornice. By this acquisition one may surmise that stone carvers had already, one month after the model, made adequate progress enough to begin preparing modani for these carvings. In fact, within days after the model completion, Michelangelo oversaw the hiring of nearly a dozen scarpellini, the purchase of carving tools, and the acquisition of several sheets of tin for modani. Consistent with the notion of a worksite in movement, the dating of these two modani certainly throws into doubt the linearity of a formal design process that might proceed from Michelangelo to model to carver. It also suggests that the wood model may have preceded the production of the tin modani.

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129 One may add that, while Bastione's salary of 30 soldi per day was high compared to his fellow stone carvers (normally paid around 20 soldi per day), it should not be taken as a confirmation that this level of compensation was directly related to his skill as a carver. It could also have been due to the difficulty of the work: Piero di Baccio, for example, a laborer who helped beat and mix clay for Michelangelo's figural models, was paid 30 soldi per day, from Wallace 1994:103.
130 "...u[n] modano d'una mensola di legniame", Ricordi, CXXIII (Ciulich and Barocchi 1970: 129).
131 "...e a dì decto [primo d'aprile] a Stefano per dua regoli di braccia cinque...", Ricordi, CXVII (Ciulich and Barocchi 1970: 122).
132 See purchases of tin in April of 1524 for modani in Ricordi CXXIII, CXXIV, and CXXV.
As making the model relied on analogous practices to those of cutting stone - tracing, assembly, and cutting, it also acted as a surrogate to the figural activity of the internal eye. In its construction, it facilitated a more dynamic encounter with the istoria - between the tomb and the room, the figures in the tomb, and the figures in the room. As full size, it provided a magnificent stage from which to perform in-situ experimentation. Just as with his full-scale figural study models (figure 4.41), the Farnese cornice, or Brunelleschi's ring model, the projection of the design could not be separated from its materialization. Built in place, the full size model was immersed in situation, and the relevant character of the building narrative was imagined within an analogous spatial-temporal setting. In this way, it provided guidance for others as well as guidance for Michelangelo's imagination. As in the template for the ricetto, the model was a subtle body, lacking the fullness of the occult yet still manifest. Since it was being made as construction was occurring, it blurred the line between a model and the activity of building. It was both 1:1, like a building, but also it was projective, like a drawing. In juxtaposing the activity of construction with its future possibility, it presumes the understanding of the building as a material body, where its presence is read through the istoria of its physical edification.

Assembling the poetic image: Corpus 538

As has been shown, Michelangelo envisioned assembling the projects at San Lorenzo as dynamic, in-movement, and animated through a direct encounter with full-scale models and the building under construction. Prevailing interpretations of his architecture often overlook the deep accountability that the temporality of edification had in the manifest experience of the work, taking, as a matter of course, the building as a completed and coherent body. The stretching, whittling, and tracing of modani that took place at the Via Mozza drawing board was a mirror for the adjusting, shifting, and filing of building members as they were joined together into shifting the body of the building. By introducing the notion of the istoria, Michelangelo's giudizio dell'occhio reconnects with its temporal dimension in understanding both the story of the making as well as the making of the story. With this, the multiple possibilities of tempering as both a practice and a mode of imagining the architecture could be related to the original association between temperare and tempus. Occult or hidden relationships, either cosmic or poetic, would be presenced through manifest practices of a seemingly practical nature.

Before entering our final discussion on the assembly of San Lorenzo, it would be worth briefly considering another parallel tempering practice involving the mirror-like stature of the modani. In so doing, the subtle materiality of the modani to facilitate between the corporal, material world, and the invisible realm of the soul becomes ever more apparent. In particular,
what concerns us is the curious ability of the *modani* to act, not only as devices for the character of the architecture, but also in their simultaneous capacity to support poetic verse. Although not yet touched upon substantially, three of the extant *modani*, *Corpus 536r* (figure A.12), *Corpus 538r* (figure A.18), and *Corpus 539r* (figure A.21), may be simultaneously discussed as templates as well as sheets containing poetry fragments. Indeed, Wallace credits the poetry with having saved these sheets from the tribulations of the worksite.\(^{133}\) Scholars have long noted them but have been puzzled or dismissive of possible connections between the verse and the template or its corresponding detail.\(^{134}\) Even if he was just utilizing a fragment of paper near the drawing board, however, the use of cut *modani* was nonetheless a selecting action.

Certainly a direct formal correlation between any of the verses and the particular *modano* on which they were written seems tenuous at best. However, this does not preclude the possibility of a connection, nor does it make it non-arbitrary or a matter of merely utilizing a scrap piece of paper.\(^{135}\) What comes to light when examining the verses, in fact, is a hidden world of revisions, cuts, and assemblages, a condition concealed in most editions of the poems. Yet a small residue of these practices happens to remain on the extant *modani*. As was finely documented by Frey (1897) and most recently in the definitive Italian edition by Girardi (1960), Michelangelo's poems are not the result of an *a priori* text in his mind, after which he reached for the nearest scrap of paper in order to materialize it, polished and complete. Rather, most poems that have come down to us in their so-called 'finished' state are the result of dozens of tentative revisions, often encompassing multiple sheets, and sometimes spanning several years of edits. Within all this, what has been shown is that his poems were something upon which Michelangelo was deeply self-conscious, reflective, and tirelessly devoted.\(^{136}\) Examining the practices of some of these poetic assemblages on the *modani* expand the notion of the tempering template. Not only were the templates tempering the architecture, they were also participating in tempering the poetic verse.

The most poignant example of this occurs on *Corpus 538*, the cut-off portion of a template for the threshold step between the Library reading room and the vestibule (figure A.18). The verse on the *modano* has been associated with Michelangelo's poem "*Non so se s'è la desialta luce*", a sonnet that was probably meant for Tommaso de' Cavalieri, a younger, Roman nobleman with whom the artist had formed an excited passion. It was written between 1532 and 1533 shortly after they became acquainted, a moment that would square with the detail work at

\(^{133}\) Wallace 1994: 173

\(^{134}\) Publications on the *modani* containing poetry verse have not attempted any meaningful connection between the poetic lines and the cut lines. See Appendix for bibliography on the *modani*.

\(^{135}\) See commentary in Barkan 2011: 63 and 291 on Michelangelo’s relationship with ‘left-over’ sheets.

\(^{136}\) Cambon 1985 provides a thorough literary analysis of Michelangelo's verses in the context of their high degree of revision.
that time underway in the Library. The verse describes the torturous state of unfulfilled desire by
the stricken artist, now that he has met, and cannot forget, the eyes of his beloved:

I don't know if it is the longed-for light
of its first maker, which my soul feels;
or whether, from my memories of people,
some other beauty shines forth in my heart;
or whether reports or dreams bring someone
before my eyes and present to my heart,
leaving behind something unknown and smarting
that is, perhaps, what now leads me to weep.
What I feel and seek, and who might guide me to it,
are not within me; nor can I see clearly
where I might find them, though others seem to show me.
This, lord, has happened to me since I saw you:
a bitter sweetness, a yes-and-no feeling moves me;
certainly it must have been your eyes.

For the present argument, any critical poetic assessment will be set aside, focusing
instead on the physicality of the modano as an accomplice in the tempering of the verses. The
sonnet, as it reads above in the so-called 'final' version, is only the most recent of at least seven
full, structural variations, each exhibiting multiple revisions and recompositions. With this, Corpus
538 is but one of six different sheets containing poetry fragments related to this poem, two of
which have fragments on both the recto and verso. Without delving too deeply into the technical
aspects of how the poem in its current form came to be assembled, it will be quickly realized in
the brief exposition below that "Non so se s'è la desiata luce" is the result of a dynamic assembly
of images, expressed in verse, that has been whittled, stretched, fragmented, and carefully re-
assembled.

Michelangelo was composing a sonnet in the Petrarchan fashion, having the formal
structure of fourteen lines. In this sonnet form the first eight lines open up a proposition or a
problem, following the familiar rhyme scheme of a-b-b-a / a-b-b-a. The next three lines begin with
the 'turn' or 'volta' (on line nine), after which the sonnet moves toward a resolution, where, in the

final three lines, a resolution is proposed. The concluding six lines together comprise a rhyme sequence c-d-e / c-d-e. In Michelangelo's most recent version recounted above, it will be noted that he carefully adhered to the standard sonnet structure, both in formal rhyming schemes as well as in the narrative structure: proposition-volta-resolution.

It was within the boundaries the Petrarchan 'template', perhaps, that one may look closer into the orthography of the writing. Not only were the verses made to 'fit' within the formal structure of the sonnet, they also had to meaningfully fit within the confines of a non-arbitrary, cut template edge. In composing his verses, Michelangelo commonly engaged the sheet as a dynamic site upon which to flip, rotate, and mirror, a condition well-noted in other sheets from his poetic oeuvre (e.g., figure 4.43). Writing on the modani, however, required that he orchestrated the cut lines of poetry with the cut lines of the template edge. It might be carefully observed from Corpus 538r, for example, that the written lines directly respond to the cut template edge, and they clearly were scribbled after the modano had been cut. Text has been contracted to fit the cut edge, and blocks of revisions actually relate to the spacing of the molding cuts (see, especially, the text in block C of figure 4.42). Having now a sheet with a non-arbitrary edge that have been cut with a high degree of intention, the response of the verses to such a cut seems equally deliberate.

Interestingly enough, although this template drawing is associated by scholars with the sonnet’s opening line (as title), "Non so se s’è la desiata luce", the verse does not actually appear on it. Rather, Corpus 538 is principally concerned only with lines five through eleven; that is, the second quatrain and the three lines of the volta. Before even reaching for this modano to draft these lines, Michelangelo had already worked through five, multiply varied versions spread across four other sheets. As well, it should be reminded, Corpus 538 is likely one in a series of parent and offspring template drawings for the Library step detail that had been traced and copied, meaning its status as support for both material and poetic fragments is surprisingly consistent. Turning to the lines on the modano, one discovers there are actually three separate verse fragments spread out across the sheet, denoted in the transcription (figure 4.42) as A-B-C. Michelangelo probably scribbled a first draft of lines five through nine (B), and then, either immediately or sometime thereafter, offered revisions to lines seven and eight (A) and lines nine through eleven (C). The short fragment (C), it may be noticed, is compressed into a small area at the bottom of the template, exhibiting smaller script and a line above it to make a separation from

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138 See, as a starting point, the hundreds of examples in Petrarch’s Canzoniere. Some exemplary sonnets are numbers, 42 (with an image of Hephaestus), 65 (cited above in reference to the file, or lima), and 248 (cited above in reference to the well-tempered body)
139 Michelangelo employed other forms, as well as free-verse, but the Petrarchan sonnet appears to be favored among others.
140 This appears quite prominently in Michelangelo's poetry manuscript held in the Vatican, Vat.lat 3211, a document that has received extensive analysis in Barkan 2011: 235-286.
the above (B). Of the seven lines scratched onto 538, only two lines (five and six) would endure into the last version relatively unedited. By the time he arrived at this so-called final version, two sheets later, he had wholly discarded both versions of line seven (A-B), taken a variant of line 8 (A), and modified and included certain key phrases from ten and eleven (C). 141

Using *Corpus* 538 as a canvass for composing verse, he clearly engaged in a meticulous technique of cutting, re-arranging, substitution, and crossover; working tightly within the sonnet form as if it offered an analogical resistance to the concetto as a marble block or other physical material. Like with a marble block, the poem relied as much on the edifying procedures enabled by the paper as it did on an a priori poetic image of bittersweet love. As in the tempering of templates, where tiny, manifest adjustments may result in substantial, yet occult, alterations in the work, the minute amendments of the sonnet on 538 are part of a larger process by which micro-adjustments would significantly alter the poetic image. On line twelve, for example, where we learn that Michelangelo is addressing the poem to a "signor", a curious play with the istoria emerges when looking back over the various working sheets. On two separate occasions, Michelangelo first writes "donna", cancels it, and then writes "signor" above it, an oscillation that opens a poetic realm between the Petrarchan sonnet form (always to a woman) and his beloved Cavalieri, to whom he is actually addressing it. 142 That the artist wavered twice between the gender of his beloved could be interpreted on a variety of levels, the full significance of which does not concern us here. What does seem pertinent is that such a small adjustment, i.e., one word, was agonized over and altered in a manner that was leveraged significantly in constructing the poetic image. 143

The verse fragments on the other two modani participated in a similar narrative of parent and offspring verses, paralleling, again, the exact process demonstrated in the tracing and sliding of the architectural profili. On *Corpus* 539 (figure A.21) a profile for the splayed windows of the Medici Chapel, the six lines of verse document the genesis of the sonnet, "Sento d' un foco un freddo aspetto acceso", a poem to Cavalieri that Michelangelo included in a series of verses intended for publication. 144 A quick comparison between these initial verses and the version approved by the artist for publication reveals the extent of the mutation: 145

141 This interpretation and transcription is adapted from Frey 1897: 363-365. and Girardi 1960: 237-243. Frey's edited and transcribed version has since become the standard redaction of the poem.
142 See Frey 1897: 364 and Girardi 1960: 243. The inversion of gender was not uncommon in Michelangelo's multiple draft versions, esp. in poems from the 1530s when he became acquainted with Cavalieri. For a summary of Michelangelo's practice of gender inversion in his verse, see Saslow 1991: 49-52 and Cambon 1985: 58-60.
143 Cambon points out several more examples of this large narrative shifts based on tiny alterations to the verse. See Cambon 1985: 40, 67, 120.
144 During Michelangelo's lifetime, he actively sought to publish a collection of his sonnets with the help of Donato Giannotti and del Luigi del Riccio, two learned and literary Florentines, in the 1540's. Both of these men also acted as frequent editors, with Michelangelo frequently soliciting their (esp. Giannotti) aid in developing and revising his work. See Saslow 1991: 20, 53.
145 Transcription by Frey 1897: 127 and 413; Girardi 1960: 269-270.
Clearly it can easily be seen that these lines underwent significant revisions as they were passed from the parent verses on the *modano* to their offspring. Although Michelangelo’s subsequent autographs are no longer extant, we are able to furnish an end version of his revisions through extant copies related to their intended publication in the 1540s. What *Corpus* 539 exhibits are the first thoughts, or *primi pensieri*, to use Vasari’s nomenclature for sketch-like drawings, from which a now missing but extensive body of alterations and assemblies originated. One is also struck by the close attention paid even in the initial sketches to the sonnet form; following, as it does, the conventional rhyme scheme a-b-b-a / a-b-b-a.

A very similar situation may be observed on the final *modano* to be considered, *Corpus* 536 (figure A.12). On this template intended for the Medici Chapel, Michelangelo jotted the opening quatrain of a sonnet, adding, as of falling off into a dream, the words “piu e men...” (figure 4.44). The full transcription reads as such:

Che sie doppo molt’anni di chostei,  
Amor, se ’l tempo ogni belta distrugge  
Fama di lei e anche questa fuggie  
e uola e mancha piu ch’ i’ non vorrei  
piu e men....

There are no longer any extant fragments related to these lines, and they remain on this *modano* as a prelude for a moment of revision that never arrived or as a poetic image that was already complete enough in itself. Again, the close attention to the boundaries of the sonnet form at the genesis of the poem is striking; and it reflects a similar tension that we have already seen in the tempering of the architectural detail. Although exhibiting a lack of compass and rule, and largely freed from modularization and mathematical proportioning, they were still constructed following the formal practices of the template as a device for tracing: flipping, sliding, and trimming. In this way, both the sonnet and the profile emerged following a rigorous set of practices.

The fragmentary verses on the templates, while seemingly incidental or arbitrary, are in the end a vigorous affirmation of the tempering process - where a poetic composition is subject to

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146 Frey 1897: 413
the same practices as the architectural details vis-à-vis the templates. Just as these paper templates were acting as agents for the well-tempered detail, they were also supporting the emergence of the well-tempered poetic image. Their collision within the same sheet of paper, then, may be considered a matter of course. The poems and the templates were being constructed simultaneously, so they were characters together within the same istoria unfolding on Michelangelo’s Via Mozza drawing board. As the place for trimming and assembling, the drawing board provided the physical site for both architecture and the poetic image to meaningfully emerge. Having this in mind, it was Horace who provided an early example of the analogical connection between the practice of adjusting material entities and that of adjusting poetic verse. Seeking a potent image for describing the importance of removing superfluous content from one’s verses, he turned to the practices of the Roman marble sculptors, who, in the whittling away of the stone block,

\[
\text{You, O} \\
\text{Sons of Pompilius, condemn that poem which} \\
\text{many a day and many an erasure has not pruned and} \\
\text{whittled down and chastened tenfold to the nail \textit{[ad unguem].}}^{147}
\]

Here, the poem is imagined as a block of stone, requiring the physicality of trimming, whittling, and pruning to escape the condemnation that non-tempered verses, and badly prepared stone, invites.\(^{148}\) What is more, the propriety of the verses relies on the judgment of the fingernail, \textit{ad unguem}, whose solid extension from the sensitive fingertip is able to detect and suggest the minutest of alterations in a surface. In the making of \textit{modani}, these tiny alterations produced a narrative of discarded, left-over, and unused profile drawings that remained near Michelangelo’s drawing board. In inviting the assembly of the poetic image, the residue of the tempering process provided fitting support.

**Assembling the building with \textit{modani}: disegni murali**

At this point it becomes necessary to re-connect the tempering process with what has been discussed on the building site and to understand how a coherent body might have emerged from a construction site full of templates, roughed-out stones, and finished carvings. As was explored in Part I, Michelangelo’s tracing of his own templates allowed for the tempering of the

\(^{147}\) “vos, o / Pompilius sanguis, carmen reprehendite, quod non / multa dies et multa litura coercuit atque / praesectum deciens non castigavit ad unguem”, Horace, \textit{Ars Poetica}, 291-94, as quoted in D’Angour 1999: 411. Michelangelo was at least familiar with Horace enough to quote one of his more famous axioms in Hollanda’s dialogues, from Summers 1999: 120, n. 21.

\(^{148}\) This is well summarized by philologist Armand J. D’Angour, in his commentary on \textit{Ars Poetica}, “The \textit{oeuvre} is thus imagined as something whittled down from a block of marble or a lump of clay, and the image is rounded off at its close by \textit{ad unguem}” (D’Angour 1999: 415). Phrased in this way, completing a work \textit{ad unguem} appears quite close to the practice of tempering.
profile through a figural process of stretching and shifting. Then, templates were described as subtle bodies, the *spíritus* between the invisible and the visible, upon which the materiality of the flat, tin template facilitated the tempering of the actual building stone. One now wonders, in returning again to the templates, how the circulation of *modani* around the building site may have facilitated the assembling of building members. Although the building site in movement has exposed the importance of working in full scale, the propensities of the *modani* as 1:1 models have not yet been fully explored within their capacity to relate and aid the construction of larger building assemblies. Since they were free-floating devices for both building and imagining, perhaps in the same way that the *modani* themselves were shuffled, cut, and re-composed, the templates acted as surrogate building stones on the building site in the drawing and putting together of the architecture. After examining the possibility of *modani* to act as tempering devices, we now look to how the specific physicality of the templates contributed to the assembling of architectural details.

Fortunately, and quite remarkably, Michelangelo left behind a small assortment of drawings, scaled 1:1, that offer enticing clues as to how he imagined the assembly of building members. These are the so-called *disegni murali*, a series of wall drawings on plaster (*intonaco*) sketched by Michelangelo and his assistants within the opposing walls of the Medici Chapel apse (figure 4.45, right; figure 4.46, left). Uncovered only recently, during a 1975 restoration project, the drawings exhibit scores of proposals and studies related to work on the San Lorenzo building site between 1525 and 1526. Upon initial view, one is struck by the spectacular palimpsest of drawings using multiple techniques and materials; relying on the juxtaposition of architectural and figural drawings (figure 4.47). Employing a combination of red chalk, black chalk, and charcoal, they comprise an extensive network of ruled lines, free hand modifications, and rapid sketches. Scholars have been able to autograph the drawings through adjacent handwriting and drawing technique, especially following the figural drawings. Most likely reflecting a common practice of Michelangelo, the prevalence of multiple hands among the sketches conjures images of a dynamic graphic and verbal exchange between the artist and his assistants surrounding the rapidly evolving project.

The purpose of the architectural wall drawings has been widely debated, although it has been generally accepted that they preceded or were concurrent with construction; meaning, they

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149 See early work on the wall drawings in Poggetto 1979 and Elam 1981: 592-602
150 Technical analysis of the drawing materials and techniques may be found in Poggetto 2012: 151-159.
151 Authorship of the architectural wall drawings is widely accepted, although the hand behind several of the figural drawings remains a question of some debate. This is especially the case for the 'stanza segreta', a small room located underneath the New Sacristy which also displays copious wall drawings, all of which are figural. For an assessment of the most recent scholarship for both the wall drawings and the *stanza segreta*, See Poggetto 2012: 123-136.
were clearly for design purposes rather than as a survey of existing work.\textsuperscript{152} Paolo Dal Poggetto, who has published widely on the drawings, believes they were for instructing the craftsmen in making wood models or tin templates that would be been subsequently given to the stone carvers for execution in the \textit{pietra serena}.\textsuperscript{153} Wallace, in his assessment, agrees,\textsuperscript{154} although an alternative position regarding the drawings has gained traction since Elam’s published work on the drawings. Elam wrote that, while the drawings surely acted as models or \textit{exempla} for the stone carvers, their direct role in the fabrication of templates or models was dubious.\textsuperscript{155} Wood models for such straightforward ornaments would not have been necessary, and, besides, the design of the tabernacle details were probably worked through with paper templates. More likely, she reasons, they functioned as drawings related to contractual agreements with the stone carvers.\textsuperscript{156}

In briefly looking back, the long history of full size drawing on or adjacent to the building suggests that one of the primary uses of such drawings was indeed to provide direct guidance for cutting stone. Oftentimes, the geometric construction of the full scale drawing was a demonstration of an entire building assembly, such as a column or window, from which individual stones or templates could be derived. Full size wall drawings from Greek worksites have been found as far back as the 4th century BCE, where incised drawings denoting one of the temple columns were uncovered at the in Didyma at the Temple of Apollo.\textsuperscript{157} In Rome, a full size plan of a Corinthian capital was found in front of the Mausoleum of Augustus, very likely an aid for construction.\textsuperscript{158} Brunelleschi, when preparing for the cupola construction at Santa Maria del Fiore, was said to perform a full-scale plan drawing in the sand on the banks of the Arno.\textsuperscript{159} Such was the case in Northern Europe during the middle ages, where examples of full size floor drawings at the site of construction demonstrated a robust practice of drawing on the building, as in the choir of the Cathedral of Clermont-Ferend or the window tracery at the Cathedral of Saint Étienne in Bourges.\textsuperscript{160} Oftentimes an adjacent building or designated chamber, purposely built for such drawings and called tracing houses (\textit{trasura}), would contain a plaster floor specifically

\begin{itemize}
\item\textsuperscript{152} Poggetto reasons through this in Poggetto 1979: 168-169, basing his conclusions mainly on the presence of \textit{pentimenti}.
\item\textsuperscript{153} Poggetto writes, "...mostrare misure e rapporti al carpentiere che doveva esigere quei modelli in legno o 'stagniati', che a loro volta sarebbero stati esempi per gli scailpellini", Poggetto 1979: 169. He reaffirms this position in his most recent publication on the drawings (Poggetto 2012: 84).
\item\textsuperscript{154} Wallace 1994: 171
\item\textsuperscript{155} Elam 1981: 594. Mussolin has recently affirmed this position in Mussolin 2006: 102.
\item\textsuperscript{156} See one such extant contract for San Lorenzo from 1533 (Milanesi 1875: 707), and comments on this contract in Elam 1981: 594; discussed again in Poggetto 2012: 128-129.
\item\textsuperscript{157} Haselberger 1985: 126-132.
\item\textsuperscript{158} Bolgia 2003: 436-447.
\item\textsuperscript{159} Brunelleschi's demonstration was recounted by Giovan Battista Gelli in the mid-16th century (Fanelli 2004: 29).
\item\textsuperscript{160} See Schöller 1989: 36-38; Schöller also includes a very useful catalogue of medieval tracings in pg. 50-61. On French tracings, scratched into the buildings themselves, see Schöller 1989b: 227-235.
\end{itemize}
intended for incising large, stereotomic drawings. Examples of these still exist at Wells Cathedral and at York Minster (figure 4.48).  

Producing full size architectural drawings, however, may not always signal a direct relationship with the cutting and fitting of building members. This seems especially the case south of the Alps, where the propensity toward elevating painters into positions of authority over building projects was something that was discussed at length in chapter one. In the Florentine tradition in particular, painters and architects appeared open to expanding the purpose of 1:1 wall drawing beyond any the utility of construction. In one of the earliest known references to large scale wall drawings, a wall inside of the Florentine baptistry was plastered in 1339 for Andrea Pisano to produce a full size, in-situ design of the doors. And in 1357, near the building site of Santa Maria del Fiore, the building officials (Operai) specified that a wall facing Via dei Servi shall be plastered for the painting of two column designs in "true size (vera grandeza)", one by Francesco Talenti and the other by Giovanni Lapi Ghini, as part of a public deliberation on the best design. The open, public aspect of these examples, as well as the involvement of painters, suggests that they served primarily as surrogate characters in the judging of the istoria, and much less for direct use by stone masons.

Drawing directly on walls or ceilings was generally in the realm of painters, while the marking on the floor was the province of architecture, a posture implied by Alberti in his distinction between painters, working vertically, as on an easel, and architects, working horizontally, as on the earth. Although there were many exceptions, it is worth stating that the most common location for incised, full size architectural drawings was on the floor rather than the wall. In this vein, using Michelangelo’s wood model for the dome of St. Peter’s, the adjacent floor of the basilica was used as an active drawing surface during its vaulting, an incredible translation surface unfortunately no longer visible (figure 4.49). The tradition of drawing on the ground, embedded in the founding ritual of the templum, provides the archetypal practice for the "grounding" of architecture. The measuring of the earth, in 'geometry', certainly relates to the ground-plan as ichnographia, a literal 'foot-print', where the walking across the building site by the

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163 "Comandarono che a Servi si facesse intonichare e disegnare l'asempro della colonna e de' chapitelli in vera grandeza, il disegnamento di Francescho e quel di Giovanni Lapi Ghini", Guasti 1887: 116. That these wall drawings were prepared by a painter (or painters) is proven in a subsequent payment to "Iachopo di Chorso dipintore, per disegnare il disegnamento di Francescho a'Servi, lire iiij soldi ii", Guasti 1887: 117. Discussed at length in Oertel 1940: 239-240, 262.
165 "Gli Architetti Giacomo della Porta, e Domenico Fontana, che per ordine di Sisto V facendo lavorare 600 persone continuamente, e talvolta anche a notte, fecero voltar questa Cupola in 22 mesi, ne fecero prima delineare, nel gran pavimento della Basilica di S. Paolo, la pianta, e l'elevazione sopra un gran Modello di legno, che il Buonarotti, dopo di averne fatto uno in piccolo in terra, fece eseguire con molto suo studio.....Ma quelle linee cancellate...appena son più visibili." Cancelieri 1787: 114.
166 I thank George Dodds for providing an illuminating and informative manuscript discussing this topic, "Drawing as Ground / Drawing on the Ground: Graphic traditions in architectural production", unpublished manuscript.
architect identifies directly with the marking a place from which to edification begins.\textsuperscript{167} The San Lorenzo disegni murali, however, indicate the necessity for Michelangelo to work through certain situations vertically, like sculpture and painting.\textsuperscript{168} In this posture, the qualitative aspects of the figure were deeply embedded in the imagining of the construction, as if building a body in movement.\textsuperscript{169} In fact, among the scores of architectural fragments scratched on the walls, few or any represent footprints or horizontal views, a condition further illuminated by the realization that, generally speaking, floor drawing was often utilized for vertical carvings.\textsuperscript{170} Vertical lines are indeed analogues of the plumb line, and thus the upright, animated body. The walls become a canvass for the building site in movement, where Michelangelo and his assistants (standing upright) draw and deliberate over construction.

It is also true that no other medium could have supported such large drawings, and that it is likely that the Medici Chapel walls were plastered specifically for this purpose.\textsuperscript{171} Among the scores of smaller sketches, Michelangelo constructed, using a square and straight edge, two full size drawings of the pietra serena windows for the Library, one for the interior window (figure 4.50), and the other for the exterior view (figure 4.51).\textsuperscript{172} Reaching over four meters high, meticulously drawn, and matching nearly exactly the widows as-built, they provide an enticing point of departure for our inquiry. Unlike the other sketches and drawings along the apse walls, rendered completely within reach of the floor, the window drawings would have required a significant scaffolding effort as well as a small team of assistants to execute. Taken together, these two drawings represent the largest and only 1:1 drawings of whole building assemblies within Michelangelo’s surviving oeuvre. In imagining their extraordinary magnitude compared to the artist at work, figure 4.52 includes an overlay of the exterior window drawing and Michelangelo’s famous self-portrait in the posture of painting the Sistine ceiling. This remarkable sketch alone demonstrates thefigural power of the upright posture.

Having examined Michelangelo’s practices for making modani at the drawing board, where they were constructed horizontally, one wonders if an analogue practice may be observed in the window constructions, traced vertically. From this, it seems likely that, just as Michelangelo traced his own templates on the drawing board, he also traced them onto the plastered walls. Turning Michelangelo’s drawing board vertically, and transposing it directly to the site of work,

\textsuperscript{167} See Emmons 2010: 120-122, for a discussion of ichnographia as it relates to the architect walking across the building site, both literally and figuratively.
\textsuperscript{168} The walls of his Via Ghibellina workshop in Rome were apparently also utilized, as suggested in a late ricordo, dated the 1st of October, 1556. "E oggi...trovandomi in Spuleti ò dato iuli dieci per uno a’ dua Antonj mia servidori per conto di loro salario, e benché uno di loro non l'abbi scritto qui sempre, à avuto il suo salario, come aparisce scritto nel muro in camera mia." Ricordi, CCLXXVIII (Ciulich and Barocchi 1970: 320), cf. Poggetto 1979: 117.
\textsuperscript{169} On Michelangelo’s posture while carving, see Carabell 1997: 90-95.
\textsuperscript{170} One exception may be a cryptic plan drawing made for the Papal tomb project, shown in Poggetto 2012: 97-98.
\textsuperscript{171} This has been forwarded by Elam 1981: 592-594 and Wallace 1994: 171.
\textsuperscript{172} These drawings were most recently discussed in Catiti 2012: 53-67.
would have been consistent with the juxtaposition of 1:1 drawing and sketched profiles, for example, examined already in Corpus 525 (figure A.7), and it would square with his conducting of a dynamic building site where fragments of models, templates, and sketches were in a continuous state of deliberation and assembly. And it would have resulted in a remarkable demonstration of the istoria while concurrently constructing and assembling the architecture, something that has been observed already in the joining of profile fragments and assembling poetic verse.

A close examination of the window drawings themselves provide support for this claim. Beginning with the exterior window (figure 4.51), one may quickly note the prominence of the center plumb line, probably the first line drawn. Following this, a network of horizontal and vertical lines were drawn primarily in black chalk (matita), although some charcoal work is evident where Michelangelo worked through critical joints and edges. To focus on the segmental pediment, one may note such a switch in drawing materials. The cornice edges at the right and left of the wall drawing are both rendered in charcoal, an observation that may be confirmed in an even closer views of the two details (figure 4.53, left; figure 4.54, right). At the point where the pediment meets the window frame on the left side, Michelangelo draws a simple cavetto, although on the right side he offers a more elaborate cyma reversa. As well, the soffit on the left side appears horizontal while on the right it has a noticeable back slant.

Although the major proportions had been determined and drawn in black chalk, the switch to charcoal indicates a practice of tempering the cornice detail. It would make sense that the templates, full size and at-hand, might have provided the opportune device for in-situ adjustments. In the current example, the slanted soffit on the right edge (figure 4.54) is the strongest indication that a template, probably tin, was utilized. This is because a raked soffit would indeed appear in the tracing of a profile cut, but it would be highly unusual to show such a back slant in a frontal, orthographic view. In fact, what scholars have called 'pentimenti' might also be accounted for by the marks made by tracing the cornice template, rotated and placed flat against the wall. What emerges instead from the charcoal work is a kind of occult line, where the raked soffit, normally concealed by the drip edge, appears as if the stone were transparent. Through the template, the 'occult' or hidden qualities of the window drawing are made manifest, another example of the spirit-like ability of modani to act as a messenger between the visible and invisible.

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173 Poggetto refers to the ruled lines as having been drawn with "matita"; small corrections were drawn with "charcoal (carbone)". from Poggetto 2012: 84.
174 See Appendix for taxonomy of moldings.
175 Tin modani were connected to the exterior windows of the Library in Ricordi CXXIII (Ciullich and Barocchi 1970: 133-134): "E oggi, a di 3 d'apile 1525, ò renduto a Bernardino Basso per tre fogli stagnati per' modani delle finestre di fuora della libraria dua grossoni".
A few other examples are worth noting. On the left edge of the segmented pediment, the double rendering of the fillet edge suggests the use of a sliding template (figure 4.53). And, as well, on the left edge cornice of the interior window (figure 4.55), a possibly traced, charcoal profile effectively extends the width of the cornice and offers an alternative double-bead molding, much closer to what was actually constructed. The handling of a template would have provided a prudent device for the giudizio dell’occhio as it assessed the finer adjustments in the assembly of the building parts. Upon being held against the wall, a template suggests a cornice profile that might be stretched or slid, or parts of templates could be assembled with other parts, confirmed against its relationship to whole assembly through tracing. Once traced, Michelangelo could step away or move closer in a dynamic evaluation through the movement of his body in relation to the wall. Like the cornice model for the Palazzo Farnese, the external and internal eye would be reconciled through the engagement of near and far, something that is only possible in a full size model or drawing.

In terms of the prevailing debate over the purpose of the wall drawings, the notion of the traced templates offers a reconciliation to the two possibilities. In this way, it is not that the disegni murali were either for or not for the making of mason’s templates. Rather, the wall drawings relied upon previously made templates as well as facilitated the making of new ones at the same time. Their placement within the palimpsest of architecutonic sketches, figural fragments, covering multiple projects, provides a confirmation of the relationship between the istoria and the dynamic construction site. It shows how the movement of the building detail around the worksite might have instigated a dialogue among Michelangelo and his assistants in assembling the architecture. And the imagination may not have depended solely on the movement around the site: given their delicate, leaf-like quality, it may be also recalled that the primary posture of unused or stowed templates was generally on the wall in the first place, gently hanging from a peg or nail. Other related, flat tools such as squares and rules, traditionally hung on the workshop wall, as may be seen in Nanni di Banco’s familiar 15th century carving on Florence’s Orsanmichele (figure 4.56). A northern European example, the 16th century portrait of the master mason Herman tom Ring (figure 4.57), demonstrates this practice quite clearly. Thus it seems that a fluid connection would have easily been made between the potential of a template in walled-repose and the assembly of the architecture through drawings made on the wall. It also returns us to Butates and the origin of drawing through the tracing of the shadow: once vertical, the templates cast a shadow that invokes the missing presence of the architecture.

176 Most likely, the paper and tin templates resided in an adjacent mason’s shed temporarily next to the Medici Chapel which provided a locked and covered area for the scarpellini to carve and fit the hundreds of building parts under fabrication. For evidence of this shed, see Ricordi CXXIII (Ciulich and Barocchi 1970: 130).
177 From Shelby 1971: 142
178 See Part I for discussion on Butates.
Ficino, anatomy, and tempering the assembly

Just as the templates facilitated the materialization of character through the detail, they tempered the assembly of the architecture through their relationship to a larger whole. In both cases, tempering amounted to a figuration of the architecture, where character emerged in a temporal procedure involving the internal eye and the materiality of the leaf-like templates. At the encounter with the detail, this resulted from the dynamic sliding and tracing of the profile, well captured in the theory of physiognomy, where the body is the form of the soul. The question arises, however, how the character of the architecture might emerge from the joining and assembling of stone bodies, and how tempered parts may come together as a coherent body. In architecture, figuration relies on non-arbitrary, micro-adjustments relying on the physicality of the emerging work. This helps account, for example, for Michelangelo's slippage between classical ornaments and anthropomorphic profiles, examined in Part I, where figuration becomes both a noun and a verb: a bestowing of breath or spiritus. Figuration requires being able to see what is exterior and visible as well as what is interior, not yet visible, but present. As a work or building site in movement, it is one of the reasons that Michelangelo relied so heavily on anatomy when describing architecture.  

Ficino, once again, offers a framework for a possible interpretation for how figuration in architecture might occur. This approach, explained in his Commentary on Plato's Symposium, is two-fold: first, the assembled parts result in a manifest beauty, as many stars make up the firmament, and second, as residing in temporal space, they are assembled as the parts of the motive, animated body, and not simply as an static object. Both aspects, it will be revealed, rely on a process of tempering in order to make present the invisible potential of the assembled body.

Turning to the Commentary, Ficino explains that the first criterion of manifest beauty lies in how the living body has been materially prepared. Calling these "incorporal preparations (incorporales praeparationes)", they are essentially formal assessments such as size and color that govern the arrangement of corporeal parts. Ficino writes:

The preparation of the living body consists in these three things: Arrangement (Ordine), Proportion (Modo), and Adornment (Specie). Arrangement means the intervals of the parts, Proportion means their quantity, and Adornment means its shape and color.  

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179 Barbaro notes that the profile demonstrates both the interior and exterior of a work. Through the profilo, the architect becomes like an Physician, seeing inside: "...in questo l'Architetto come Medico dimostra tutte le parti interiori, & esteriori delle opere..." (Barbaro 1567: 30). An anatomical understanding of architecture was demonstrated in Giovanni Rusconi's commentary on Vitruvius, Dell'Architettura Dieci Libri, published a short time later in Venice (1590); cf. Frascari 1985: 85.

180 "His vero tibrus, ordine, modo, specie, constat viventis corporis praeparatio. Ordo, partium intervalia; modus, quantitatem; species, lineamenta, coloremque significat", Ficino, Commentary, Fifth Speech, ch. VI (Jayne 1944: 71,173).
Arrangement, or *Ordo*, as Ficino explains, is when "all parts of the body should have their natural place".\(^{181}\) Likewise, *Proportion*, or *Modus*, results when the parts of the body have a size which corresponds to the assembly of the whole body, as in eight heads corresponds with the height of the body. And finally, Adornment (*Species*), is the refinement of the body following the proper *modus* and *ordo*, that is, "the skillful drawing of lines, wrinkles, and the sparkle of the eyes".\(^{182}\) The three-part theorization of the beautiful finds an interesting parallel in Stoic conceptions of beauty, especially with Alberti, who understood it as a basis for the assembly of architecture through the governing rule of *concinnitas*.\(^{183}\) Conceived as a tripartite depending on number (*numero*), outline (*finitio*), and arrangement (*collocatio*), *concinnitas* relies on "a form of sympathy and consonance of the parts within the body,"\(^{184}\) where, "nothing may be added, taken away, or altered, but for the worse".\(^{185}\) For Alberti, the beauty would be guided by reason and the example of Nature:

> It is the task and aim of *concinnitas* to compose the parts that are quite separate from each other by their nature, according to some precise rule, so that they correspond to one another in appearance (*species*).\(^{186}\)

For Ficino, however, the arrangement of parts within a body is only the first criterion for the presence of the beautiful, and it could not be conceptualized through reasoned procedures alone. Although his three incorporal conditions are a necessary precondition, their presence in themselves does not manifest beauty. In reaction, perhaps, to the tradition of Stoic beauty, Ficino clearly believes that bodies do not receive their beauty by how they are arranged:

> But there are some who think that beauty consists in a disposition of parts, or [to use their own language,] size and proportion together with a certain agreeableness of colors. We do not agree with their opinion because, since this kind of disposition of parts would exist in composite things only, there could be no such thing as a beautiful simplicity."\(^{187}\)

\(^{181}\) "*membra quaeque corporis naturalem situm habeant...*, Ficino, op. cit.


\(^{185}\) "...*pulchritudo quidem certa cum ratione concinnitas uniuersarum partium im eo cuius sint: ita ut addiaut diminuiaut immutari possit nihil improbabilius reddat*, Alberti, op. cit. The judging of a body by these criteria finds its root ultimately in Aristotle's *Nicomachean Ethics*, II.vi.8-10. It was re-iterated in the rhetorical context by Cicero, *De oratore*, 3.45.1792, perhaps a source for Alberti.


\(^{187}\) "*Sunt autem nonnulli qui certam membrorum omnium positionem, sive, ut eorum verbis utamur, commensurationem et proportionem cum quadam colorum suavitate, esse pulchritudinem opinentur. Quorum nos opinionem propterea non admittimus, quia cum huiusmodi partium dispositio in solis sit rebus compositis, nulla essent simplicia speciosa*, Ficino, *Commentary*, Fifth Speech, ch. III (Jayne 1944: 67, 168). Ficino's disagreement may be sourced to Plotinus, who wondered, for example, how some faces that may have symmetrical parts do not appear as fair in Plotinus, *Enneads* 6.7. On this passage see also Pérez-Gómez 2006: 74 and Mitrovic 1998: 673-674."
In other words, he continues to ask, how else could materials such as gold, the sun or moon, or a sound be beautiful when they are not composite bodies comprised of parts? There must be another principle, he reasons, outside of any rational rules of reason, arrangement, or symmetry. For Ficino, *ordo, modus,* and *species,* are not conditions of beautiful bodies, rather they are the conditions by which matter must be prepared in order to receive celestial influence. In this way, that which is beautiful does not ultimately reside in matter; yet heavenly harmony relies on matter as a messenger or mirror for its manifestation. This gap between material and commensurate beauty is, as we have seen, the space of tempering - a notion that Ficino upholds:

But the basis of these *[ordo, modus, species]* is a temperate combination of the four elements, such that the body is most like heaven, whose substance is temperate, and does not interfere by any excess of humors, with the soul's work of incarnation. *For thus the heavenly glow will easily light up in a body much like heaven...*  

Just as in the commensuration of musical instruments, columns, or any other material body, the practice of tempering provides a backdrop by which sublunary materials accord with heavenly substance. Ficino concludes that:

> By these three elements *[ordo, modus, species]*, the bodies constructed out of many parts, such as plants, animals, combinations of several sounds, etc. are prepared to receive beauty.  

With this, Ficino also reminds us that, "nor do we love only this whole beauty all at once; but moved by our admiration, we love also its parts."  

Since the tiniest part contains the vibrations of the divine whole, each one of the profile details, in its tempering, also tempers the whole, and vice-versa. The connection of small parts and their whole assemblies relied on the dynamic movement between the internal and external eye, a phenomenon witnessed in several of the assemblies already examined: the Farnese cornice, the Tomb model, and the *disegni murali.* The templates or models, as surrogate stone blocks, acted in accord with the *spiritus* moving between the tiny parts of the building and its manifest beauty as constituent parts. In these, what was hidden to the eye was revealed through tiny, material adjustments that relied on direct empirical encounters. Once material had been prepared incorporally, perhaps in accord with Michelangelo's *concetto,* the tempering procedure was opened for material interventions facilitated through the tempering template.

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188 *Harum vero fundamentum est elementorum quattuor temperata complexio, ut corpus nostrum caelo, cuius est temperata substantia, sit simillimum neque aliquo humorum escessu ab animi formatione desciat. Sic enim et caelestis fulgor facile lucebit in corpore caelo persimili...* Ficino, Commentary, Fifth Speech, ch. 6 (Jayne 1944: 71, 174). A similar sentiment was forwarded by Lomazzo, where "Il fondamento delle quali e’ la temperata composizione di quattro elementi, in modo che il corpo nostro e’ molto simile a Cielo, la sostanza di cui e’ temperata," Lomazzo, Idea del tempio della pittura, ch. 26 (Panofsky 1968: 145); see also Lomazzo in the preparation of the living body with *ordine, modo, specie* in Panoksy 1968: 143 and Summers 1981: 394.

189 *His utique tribus ceu quisbusdam elementis corpora ex membris multis composita et arbores et animalia ac vocum plurium congregatio ad suscipiendam pulchritudinem disporuntur*, Ficino, op. cit.

190 *Neque faciem hanc simul totam solummodo, verumentiam partes eius admiratione commoti diligimus*, Ficino, Commentary, Fifth Speech, ch. 5 (Jayne 1944: 69, 171).
Ficino’s contrasting of corporal and incorporal points directly to Michelangelo’s deep commitment to anatomy as the genesis of architecture. In a well-known letter written by the artist to an unknown prelate, the artist offers a rare reflection on a theoretical approach to his architecture:

Monsignore reverendissimo--When a plan has diverse parts, all those that are of a single quality and quantity must be adorned in the same mode and manner and similarly their corresponding parts. But when the whole form of the plan changes it is not only permitted, but necessary, to change also the adornments, and similarly their corresponding parts: and the middle parts are always as free as could be; as the nose, that is in the middle of the face, is neither obligated to one nor to the other eye, but one hand is altogether obligated to be like the other, and one eye like the other, with respect to the sides and of the corresponding parts. Because it is a certain thing, that the members of architecture derive from the members of man. Who has not been or is not a good master of the human body, and most of all of anatomy, cannot understand anything of it.

Monsignore reverendissimo. - Quando una pianta à diverse parti, tucte quelle che sono a un modo di qualità e quantità, ànno a essere adorne in un medesimo modo e d’ una medesima maniera; e similmenti i lor riscontri. Ma quando la pianta muta del tucto forma, è non solamente lecito, ma necessario, mutare del tucto ancora gli adornamenti, e similmente e’loro riscontri: e e’mezzi sempre sono liberi come vogliono; si come il naso, che è nel mezzo del viso, non è obligato nè all’uno nè all’altro ochio, ma l’ una mano è bene obligata a essere come l’ altra, e l’uno ochio come l’altro, per rispetto degli lati e de’ riscontri. E però è cosa certa, che le membra dell’architettura dipendono dalle membra dell’uomo. Chi non è stato o non è buon maestro di figure, e massime di notomia, non se ne può intendere.191

This letter is commonly taken as a confirmation of Michelangelo’s commitment to Vitruvian symmetry, where parts necessarily correspond to whole through the proportional relationships available in the study of the human body.192 However, his forceful appeal to anatomical knowledge at the end of the letter changes the sense of the interpretation. By emphasizing the essential study of anatomy for making architecture, the human body becomes a model not only for its canon of manifest proportions, but also that which is hidden from view - its character depends on both. Architecture, as it were, must follow an in analogous approach, where invisible ‘preparations’ are presented through material constructions, both hidden and manifest.193

In studying anatomy Michelangelo could delve beyond exterior body measures and investigate beneath the skin into the joining and assembly of the body. Not only is there a necessary correspondence between part and whole, there is also, according to his letter, a necessary relationship between adornments ("adornamenti") and the larger work ("tucte forma"). The coupling of adornments with the whole work is a reminder of the criticality of the ornaments in the character of the architecture: in a contemporary sense, one may state that if the structure

191 Carteggio, MCCLXVI (Barocchi and Ristori 1967: V, 123). Translation by Summers (Summers 1981: 418) with modifications by author: Giovano Battista da Sangallo, in a letter written to Paolo III, heavily criticizes Michelangelo’s design for the Farnese Palace, appealing to Vitruvian principles and, at one point, describing the cornice as failing to find agreement between the right and left parts of the body, “...la mana del modano non aco(m)panga colla mano del morto”, Carteggio, MLXVI (Barocchi and Ristori 1967: IV, 242). Note also the use of ‘modano’ to describe the cornice profile rather than its template (see Part II discussion of the use of ‘modano’).

192 See Elam 2005: 49; Summers 1981: 419 is skeptical about a direct Vitruvian connection.

193 Architecture and anatomy share a shared commitment to construing measure and through synthetic constructions, from Frascari 1985: 80-90. Realdo Colombo’s 1559 publication of De re atanomica contains several overt analogies between architecture and the human body, using elements of a peasant’s hut to describe the fabric of the body. Michelangelo intended to collaborate with Colombo to illustrate his treatise (Summers 1981: 432-433).
changes, so must its ornaments. The attunement of the smallest detail, through the template, within the emerging work as a whole thus finds confirmation within Michelangelo's own writings.

Additionally, aside from a more thorough and direct encounter with the body's construction, an examination of the ligatures, muscles, and their relationships to bone structure opened the door for a deeper comprehension of the animated body in movement. Repeated attempts at studying body movements through the anatomical profile, according to Leonardo da Vinci, were key mnemonic aids to the painter. Anatomical examinations furthermore reveal the order of the body not only in its quantity of measure but also in its qualitative movements, a tendency well articulated by Cellini when describing the joint between the femur and the pelvis:

...that bone [pelvis] also has its socket well made and ordered (ordinata), where the said bone of the thigh [femur] turns in all directions, although nature has ordained that it not surpass certain bounds, that it maintain together with the nerves other things, its beautiful orders (ordini).

In other words, through an empirical encounter with the body's joints, the proportions of a body in movement could be commanded by the sculptor or painter. Vincenzo Danti, who claimed to have dissected eighty-three bodies, upheld the critical importance of anatomy in the arts of disegno, claiming in reference to Michelangelo that the practice directly led to "le belle proporzioni nelle sue figure". Anatomy allowed the artist to peer into the teleological aspect of human members, leading deeper understanding of the "coming to be" that seems critical in the tacit rendering of qualitative proportions. Indeed, as his letter shows, Michelangelo believes that anatomy, translates directly into the qualitative aspects of architecture - its figuration.

One may imagine how the profile of the template and its subsequent assembly might have invoked a more profound contemplation on the appropriate figuration of light, shade, and shadow an act that would have unfolded in the imagination within the dynamic worksite. In comparing the imagining of the Medici Chapel, for example, with Michelangelo's drawing of Tityus, a possible parallel may be seen between the temporal dimension of architecture and that of the moving body. Because the light in the chapel depends solely from clearstory windows, the direct sunlight which enters the room engages the surfaces in small areas, as occasional beams of light throughout the day move around illuminating the details of the room (figure 4.58). The air

\[\text{195 Summers 1981: 404, translation by Summers. Originally from Cellini, Sopra i principii e l modo d'imparare l'arte del disegno.}\]
\[\text{196 Summers 1981: 465, n. 53.}\]
\[\text{197 In his Trattato delle perfette proporzioni of 1567, Danti wrote, "La bellezza dunque del corpo humano non nasce, o non si vedi altrove, che nelle perfette attezze o vero proporzioni di tutte le membra, a tutte l'operazioni del l'huomo, lequali, anchor che sieno molte, hanno nondimeno, come per loro Maestra, e principale, quella dell'intendere. Laquale nell generazione del corpo humano è di manera considerata principalmente dalla Natura, che tutte l'altre operazioni dell'huomo, come ministre, servono a essa attezza" Danti 1567: 15. On Danti's treatise and the "coming to be" of qualitative proportions in Michelangelo, see also Pérez-Gómez 2006: 83.}\]
or atmosphere of the Medici Chapel thus depends on indirect light flooding the room; on delicate shade rather than direct sunlight generating hard light and shadow. Michelangelo’s *Tityus* is also rendered in such conditions, with the subtle breaking of non-direct light across the shaded body of the lying figure (figure 2.60). Although the templates directed the stone cutters through the generating of a flat profile, in forecasting the shadow, the relentless search for the profile had to also be imagined as a moving body in relief; that is, in the conditions of subtle shade. In the case of the body of architecture, the dynamic construction site leads to the movement of internal eye moving around the building assembly. Like *Tityus*, the stone had a body; the animation of which would depend on the break of light and shade across its surfaces placed in the architectural situation. In addition to adhering to quantitative proportions, the subsequent vivacity of the room relies on qualitative treatment of the stone as the flesh of the body, a temporal dimension that does not depend on shape alone. It has to do with the temperance of the body, and in its tempered mixture of the hidden qualities embedded in the profile lines.
Figure 4.3  Nineteenth-century interpretation of Zeuxis painting maidens, Jacques-Albert Senave. Royal Museums of Fine Arts of Belgium.
Figure 4.4 (top) Detail of right margin of modano (Figure 2.7), San Giovannini, Ammannti. Courtesy Gabinetto dei Disegni e delle Stampe, Uffizi, Florence (3464A).

Figure 4.5 (middle) Detail of left margin of modano (Figure 2.7), San Giovannini, Ammannti. Courtesy Gabinetto dei Disegni e delle Stampe, Uffizi, Florence (3464A).

Figure 4.6 (bottom) Detail of cornice modano (Figure 2.6) San Giovannini, Ammannti. Courtesy Gabinetto dei Disegni e delle Stampe, Uffizi, Florence (3463A).
Figure 4.7 Cornice and frieze modano, Antonio da Sangallo il Giovane. Courtesy Gabinetto dei Disegni e delle Stampe, Uffizi, Florence (1149Ar)
Figure 4.8  Domenico Martinelli, modano for Castello d’Austerlitz (1695). Excerpted from Aurora Scotti, *Domenico Martinelli architetto ad Austerlitz: I disegni per la residenza di Dominik Andreas Kaunitz (1691-1705).* Cinisello Balsamo: Silvana (2006), cat. no. 38. Original in Gabinetto dei Disegni delle Civiche Raccolte d’Arte di Milano, collezione Sardini-Martinelli - 2,13 (indice: “Piccoli Piedistalli per li vasi”).

Figure 4.12 Profile studies after the Codex Coner, Michelangelo. Excerpted from Charles De Tolnay, *Corpus dei disegni di Michelangelo*, no. 518v (1976-1980). Casa Buonarroti, Florence, 1A.

Figure 4.14 (bottom) Copies after the Codex Coner, Michelangelo. Excerpted from Charles De Tolnay, *Corpus dei disegni di Michelangelo*, no. 512r (1976-1980). Casa Buonarroti, Florence, 8A.

Figure 4.16  Copies after the Codex Coner, Michelangelo. Excerpted from Charles De Tolnay, *Corpus dei disegni di Michelangelo*, no. 511r (1976-1980). Original in the Trustees of the British Museum, inv. 1859-6-25-560/2r.
Figure 4.17 Portal study, Michelangelo. Excerpted from Charles De Tolnay, *Corpus dei disegni di Michelangelo*, no. 549r (1976-1980). Casa Buonarroti, Florence, 95A.

Figure 4.19  Stereotomic sketches, Tomb of Julius II, Michelangelo. Excerpted from Charles De Tolnay, Corpus dei disegni di Michelangelo, no. 463r (1976-1980). Casa Buonarroti, Florence, 74A.
Figure 4.20  Trabeation studies, Michelangelo. Excerpted from Charles De Tolnay, Corpus dei disegni di Michelangelo, no. 463v (1976-1980). Casa Buonarroti, Florence 74A.
Figure 4.21  Detail of Corpus 463v (figure 4.20). Original drawing in the care of Casa Buonarroti, Florence. Photo by author.

Figure 4.22  Detail of Corpus 463v (figure 4.20). Original drawing in the care of Casa Buonarroti, Florence. Photo by author.
Figure 4.23 Detail of *Corpus* 463v (figure 4.20). Original drawing in the care of Casa Buonarroti, Florence. Photo by author.
Figure 4.24  Steretotomic constructions, Michelangelo. Excerpted from Charles De Tolnay, *Corpus dei disegni di Michelangelo*, no. 509r (1976-1980). Casa Buonarroti, Florence, 78A.
Figure 4.26  Quarry drawing showing marble blocks for San Lorenzo façade, Michelangelo (ca. 1518). Excerpted from Charles De Tolnay, Corpus dei disegni di Michelangelo, no. 450r (1976-1980). Archivio Buonarroti, I, 144-145, fol. 260.
Figure 4.27  Detail of *Corpus* 504r (figure 2.27). Original drawing in the care of Casa Buonarroti, Florence. Photo by author.
Figure 4.29  Detail of Corpus 504r (figure 2.27).
Figure 4.30 Reconstruction using Corpus 183v, Corpus 182r, and Corpus 184v (after Hirst 1988) of modano used for wood model, San Lorenzo, Michelangelo.
Figure 4.31  Michelangelo presents the façade of San Lorenzo, the Laurentian Library, and the New Sacristy to Pope Leo X, Jacopo da Empoli. Excerpted from Pina Ragionieri, ed. Il volto di Michelangelo. Firenze: Mandragora (2008), cat. no. 9. Casa Buonarroti, Galleria, Florence, inv. 204.
Figure 4.32  Temperantia, Hendrik Goltzius (16th c). Original found in The Illustrated Bartch, vol. 3, commentary, Netherlandish Artists: Hendrik Goltzius.

Figure 4.33  Temperantia donning a mechanical clock, Philips Galle (1559). Original found in The Illustrated Bartsch. Vol. 56, Netherlandish Artists: Philips Galle.
Figure 4.36  Study of in-situ stone joints of vestibule base molding, after Rossi survey of 1739. © Author of dissertation.
Figure 4.37  Overlay of Corpus 534v, profile D, and Rossi survey of 1739, showing points of match and deviation. Corpus 534 is in the care of Casa Buonarroti, Florence. © Author of dissertation.
Figure 4.38 Overlay of Corpus 534r, profile A, and Rossi survey of 1739, showing points of match and deviation. Corpus 534 is in the care of Casa Buonarroti, Florence. © Author of dissertation.


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Non so se s’è la desiata luce
del suo primo fattor, che l’alma sente,
o se dalla memoria della gente
alcun’altra beltà nel cor traluce
o se fama o se sogno alcun produce
agli occhi manifesto, al cor presente,
di sé lasciando un non so che cocente
ch’è forse or quel c’a pianger mi conduce
Quel chi’ i’ sento e chi’ cerco e chi mi guidi
meco non è; né so ben veder dove
trovare mel possa, e par c’altri mel mostri.
Questo, signor, m’avvien, po’ chi’ vi vidi,
c’un dolce amaro, un sì e no mi muove
certo saranno stati gli occhi vostri

Non so se s’è la desiata luce
del suo primo fattor, che l’alma sente,
o se dalla memoria della gente
alcun’altra beltà nel cor traluce
o se fama o se sogno alcun produce
agli occhi manifesto, al cor presente,
di sé lasciando un non so che cocente
ch’è forse or quel c’a pianger mi conduce
Quel chi’ i’ sento e chi’ cerco e chi mi guidi
meco non è; né so ben veder dove
trovare mel possa, e par c’altri mel mostri.
Questo, signor, m’avvien, po’ chi’ vi vidi,
c’un dolce amaro, un sì e no mi muove
certo saranno stati gli occhi vostri
Figure 4.43  Sheet with poetic verses, Michelangelo. Excerpted from Charles De Tolnay, Corpus dei disegni di Michelangelo, no. 356v (1976-1980). Original held in the Vatican Library, Rome, Vat.lat. 3211, fol. 88v.

Figure 4.44  Detail of Corpus 536r (figure A.12)
Figure 4.45. Disegni murali, right wall (facing the altar niche), Medici Chapel, Michelangelo. Excerpted from Paolo Dal Poggetto, *I disegni murali di Michelangelo e della sua scuola nella Sagrestia Nuova di San Lorenzo*. Firenze: Centro Di (1979), figs. 274-275.
Figure 4.46 Disegni murali, left wall (facing the altar niche), Medici Chapel, Michelangelo. Excerpted from Paolo Dal Poggetto, *I disegni murali di Michelangelo e della sua scuola nella Sagrestia Nuova di San Lorenzo*. Firenze: Centro Di (1979), figs. 270-271.
Figure 4.47  Detail of disegni murali, Medici Chapel, San Lorenzo, Florence (ca. 1530). Excerpted from Paolo Dal Poggetto, Michelangelo: La “stanza segreta” : i disegni murali nella Sagrestia nuova di San Lorenzo, Florence: © Giunti Editore S.p.A (2012). Ministero per Beni e le Attività Culturali, fig. 110.

Figure 4.49  Section drawing of construction of chapel dome, Michelangelo. Excerpted from Charles De Tolnay, *Corpus dei disegni di Michelangelo*, no. 593r (1976-1980). Arezzo, Casa Vasari, cod. 12, cap. 22.
Figure 4.50  Detail of disegni murali, interior window for Laurentian Library, Michelangelo. Excerpted from Paolo Dal Poggetto, Michelangelo: La “stanza segreta” : i disegni murali nella Sagrestia nuova di San Lorenzo, Florence: © Giunti Editore S.p.A (2012). Ministero per Beni e le Attività Culturali, fig. 98.
Figure 4.51  Detail of disegni murali, exterior window for Laurentian Library, Michelangelo. Excerpted from Paolo Dal Poggetto, Michelangelo: La “stanza segreta”: i disegni murali nella Sagrestia nuova di San Lorenzo, Florence: © Giunti Editore S.p.A (2012). Ministero per Beni e le Attività Culturali, fig. 99.
Figure 4.52  Overlay of self-portrait (from Corpus 174r) with exterior window drawing from figure 4.51, using Michelangelo's bodily measure to indicate the size of the disegni murali. Corpus 174r is in the care of the Casa Buonarroti. Overlay © author of dissertation.
Figure 4.53 (top left)  Detail of figure 4.52 (exterior window).

Figure 4.54 (top right)  Detail of figure 4.51 and 4.52 (exterior window) showing evidence of template tracing.

Figure 4.55 (bottom)  Detail of figure 4.50 (interior window) showing evidence of template tracing.
Figure 4.56  Relief sculpture, Nanni di Banco, Orsanmichele, Florence. Photo © author of dissertation.

Figure 4.57  Portrait of Herman tom Ring, master mason, Munster (16th c.). Excerpted from Lon Shelby, “Mediaeval Masons’ Templates”, Journal of the Society of Architectural Historians, Vol. 30, No. 2 (May, 1971), fig. 2, pp. 142.
Let this be said about temperantia, little enough when one thinks of the magnitude of the subject, but perhaps too much in proportion to the size of this book.

Augustine

IN THE PROLOGUE of De re aedificatoria, the first treatise on architecture written since antiquity, L.B. Alberti famously stated:

Before I go any farther, however, I should explain exactly whom I mean by an architect; for it is no carpenter that I would have you compare to the greatest exponents of other disciplines: the carpenter's hands are but an instrument to the architect. 

This passage has been recently cited by theorists as the earliest indication of the current, deeply entrenched boundaries between design activity and the activity of construction. Mario Carpo, in several current texts, has coined this the "Albertian paradigm", which is the "ideal separation that Alberti first theoretically advocated between the intellectual act of design and the material act of building". Citing this, he concludes that for Alberti, "the design of the building is the original, and the building is its copy". Carpo advocates that new advances in algorithmic modeling and fabrication have overturned this centuries-old model of practice, leading to a new kind of pre-Renaissance 'master-builder'. However, for a variety of reasons, this is an oversimplified view of both the problem and the cause. To begin, although the hands of the carpenter were an instrument to the architect, they were not instruments in the same sense as we understand them today - as transparent tools of know-how. Alberti obviously held a deep concern for knowledge of the building site, materials, and techniques, proven already in the fact that two out of the first three books were dedicated to extensive discussions of materials and building techniques, many of which dictate first-hand knowledge. Furthermore, Alberti's identification of separate roles in edification does not preclude the formal separation of building and mental activity, nor does it lead

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1 Augustine, De Moribus Ecclesiae (P.L. 32. 1328), originally cited in North 1966: 379.
2 "Sed antequam ultra progrediar: explicandum mihi censeo quemnam haberi uelim architectum: Non enim tignarium adducam fabrum, quem tu summam caeterarum disciplinarum viris compares: fabri enim manus architecto pro instrumento est", Alberti, De re aedificatoria 2.26 (Rykwert, Leach, Tavernor 1988: 3); translation slightly modified by author. Rykwert, Leach, Tavernor render the final line as, "the carpenter is but an instrument in the hands of the architect". However, a more correct reading of the Latin is: "the carpenter's hands (fabri manus) are but an instrument to the architect".
4 Carpo 2011: 26; Carpo's notion of original and copy should be situated among his work in the evolution of architecture during the rise of the printed image in the 16th century, his topic in Carpo 2001. In this work he argues that the widespread distribution of the mechanically reproduced, printed image led to a nominalization of architectural knowledge. For a recent rebuttal of this see Waters 2012: 488-523.
5 To make this argument, Carpo relies first on a deterministic tie between media, technology, and culture. From this, the recent shift from identical copies (mechanical reproduction) to algorithmic variety has opened up space for a new kind of digital craftsman. Serial objects are not related by sharing identical shape but through a common 'body plan' or genetic origin, thus giving infinite variety within a common, parametrically driven model.
6 Pérez-Gómez has referred to modern instrumentality as "transparent know-how" (Pérez-Gómez 2002: 187).
to the current, widespread assumption that a building design may be totally prescribed before construction begins. If anything, the statement may be as much a clarification in terms (refuting the medieval association of architect to the Latin "tectum", the carpenter or roof builder) or an elevation of status from the traditional placement of architecture within the artes mechanicae to that of artes liberales. For Alberti, the carpenter’s hands were a rhetorical space where the architect negotiated edification through a constant dialectic between the building of the design and the designing of the building (figure 5.1).

While Carpo’s desire for examining the relation between ‘design’ and ‘build’ is admirable, the total reliance on digital fabrication required by algorithmic design reinforces these barriers as much as it dismantles them. Digital fabrication machines still require a totally transparent and anonymous operator producing a pre-determined design that cannot tolerate alterations once the fabrication process begins (figure 5.2). In spite of hopes otherwise, projects that are critically bound by these technologies generally ignore the expertise of craftsmen, the possibilities of non-industrialized materials, and other in-process potentialities. In this manner, construction remains, in the end, a “prosaic transcription” and not a “poetic translation” between immaterial and material. However, even Alberti acknowledged in both his writing and in actual practice that a building could not be completely pre-determined, and it was up to the architect to ‘nurse’ an idea into its material presence. Extensive letters from his building projects at both Rimini and Mantua record Alberti’s in-progress negotiations with builders and craftsmen using drawings, models, and words (figure 5.3). More broadly, it reminds us that, although architects guiding the translation from an idea into a future building is perhaps as old as the practice of architecture itself, the expectation that construction ought to be prescribed entirely before the shovel breaks ground appears to be an entirely modern infliction. This assumption, based on the notion that the materialization of architecture follows a linear path from idea to building, has led in the present condition to an unrelenting effort to formalize this procedure. While some degree of formalization is certainly necessary to synchronize a complex building project - even Michelangelo signed contracts, for example - the extent by which contemporary instruments and institutions re-define this Renaissance process through positivist methodology has become deeply troubling.

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7 On the coupling of archus and tectum in this context, see Rykwert-Leach-Tavernor 1988: 366 n.3.
8 Alberti wrote, “...And, I must confess, I have learned more on my own than I have from the author of any book.” (Rykwert, Leach, and Tavernor 1988: 89). Alberti would have found good precedent in this in his copy of Cicero’s Brutus, where he writes, “Examples where reason or personal experience trumps the words of the ancients or the philosophers are frequent...”. 
9 The juxtaposition of these two terms derives from Pérez-Gómez & Pelletier 1997: 8.
10 One famous letter written by Alberti to his on-site mason, Matteo de’ Pasti is reproduced here (figure 5.3). Other letters from his projects in Mantova document his further involvement with on-site negotiations using transmitted drawings and models, see Braghiroli 1869: 3-31. The architect as a nurse or mid-wife recalls several relevant associations, most prominently in Filarete’s assertion that an architect must ‘nurse’ and idea for nine months and give birth to a baby model. Also, specifically for Michelangelo and the Neo-platonic notion of transcendance through removal or ‘levare’, discussed in Part I, it does well to point out the related Italian term, ‘levatrice’, the mid-wife or the one who gives birth, see Cambon 1985: 81-82.
11 I use the term ‘architect’ here loosely to include all varieties of leaders of building projects. For a historical introduction to the word, see Pevsner 1942: 549-562.
Large entities are now heavily vested in maintaining and improving the strict formal line from idea to object, represented most prominently by the position of Autodesk, the distributor of computer software, and the American Institute for Architects (AIA). Upholding the notion that the design process is properly predictable and able to be formalized helps to maintain a market for software as well as a purpose for the AIA in the proliferation of professional legal support. According to the AIA, in fact, it is the architect's professional responsibility to ensure the integrity of such a linear and predictable progression. As specified in the AIA's current model contract documents, an architect must accept the untenable view that the professional practice of architecture is properly separated from its means of production. The 2007 standard contract between an architect and owner reads:

..the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work, [and] the Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures...in connection with the Work.  

Contrast this with the 1939 Standard Form of Building Contract issued by the Royal Institute of British Architects (RIBA), which states,

Subject to financial provisions...the Architect is not bound to adhere to his original design, and is not precluded from varying quality or quantity.

Imagine such a contract provision today. Overturning centuries of precedent, the AIA documents effectively demote the architect to a provider of 'design services', the realization of which takes place by an anonymous, interchangeable builder without the on-site oversight of the architect. The rigid, formalized separation of 'design' from 'build' has created a high demand for tools and knowledge that facilitate the desire to universally and legally categorize roles that have always relied on localized conditions and the shifting, rhetorical space between the various agents of edification.

These efforts have only been augmented by developments in new digital modeling and production tools, all of which appear to strive toward the goal of prescribing a complete and unambiguous virtual building. Such a model, exemplified in the proliferation of Building Information Modeling (BIM), not only contains a prescription of the physical configuration of all the materials, joints, and building elements, it also contains a host of invisible 'facts', such as material

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12 2007 AIA contract documents § 4.2.2. This shielding of the architect from responsibility to visit the construction site was not always the case. In the 1888 AIA model contract documents, no such clause is present, and specific stipulations are inserted which ensure the architect retains visitations rights to the site whenever necessary. A similar approach may be found as late as the 1937 AIA contract documents.

13 The Standard Form of Building Contract*, 1939, sanctioned by RIBA (London)
costs, environmental information, and engineering data. While the capacity of BIM software to synthesize complex building systems can hardly be disputed, the assumptions built into BIM development continue on the notion that it is the professional responsibility of the architect to anticipate, to the greatest degree possible, conflicts, problems, and potential changes during the construction process. In this paradigm, potential changes once construction has begun may only be viewed as problematic -- blamed on a negligent design team, improperly skilled or prepared building contractors, or a flippant client prone to changes of mind. There can be no doubt, however, that the domination of formal building processes over the conceptualization of building projects in BIM has the added effect of shoehorning an architect's imagination into a remarkably rigid and static thinking about construction. Additionally, any supposed advantages gained in pre-construction coordination between the architect and contractor are offset by boundaries enabled by the software to limit creative interaction between the architect and the builder as the build is being erected. In conceiving future constructions, BIM leaves little room for unconventional thinking with regard to materials and techniques, leading to a subtle power shift that has facilitated an increased dominance of the building contractor in the realization of architecture. The ossification of universal building practices is, in fact, deeply embedded in the development and proliferation of the software.

**Templates as tempering devices**

The ethical consideration of building requires an acknowledgment of not only the formal conditions of construction but also temporality in the act of making, a possibility that cannot be singularly reduced to 'workflow', methodology, or information databases. The directness of the poetic gesture requires, at some level, the immediacy of human narrative as acted out through exact, material intentionality. This means, at its root, that the materialization of a design stands as a parallel activity to that of designing its material condition, and one must maintain the prerogative to alter the work at any point during its realization. Peering more deeply into the intersections of technology, material desire, and architectural production, tempering has emerged as a practice that offers fertile ground on which to discover these meeting points. As an practice that crosses between technique and the ethical conception of building, tempering defines a fundamental relationship between 'design' and 'build' and does not rely on a particular position for or against certain technologies.

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14 The leader in the field of BIM software, Revit by Autodesk, is a shortening of the phrase, "revise instantly".
15 Innovative detailing requires the layering of time-consuming, two-dimensional detail drawing onto the larger information model.
16 Critical path management was invented during World War II for wartime necessities, and it has since become a part of daily life.
The case of Michelangelo's *modani* for San Lorenzo presents a micro-historical reading of *Temperanza* through their specific employment as tools working between ideation and realization and vice-versa. Taken in the modern understanding at face value, the *modani* are simple tools for ensuring consistency across the work of a team of stone carvers, and they operate as communication devices between the Via Mozza drawing board and the on-site building activity. Upon closer inspection, however, they offer a window into the inventive potential of material practices in the realization of an architectural idea. Since they are equally effective as *disegno* as well as construction implements, they embody the possibility of architects to meaningfully presence immaterial ideas through material means. In this way, the drawing board offers a direct analogical relationship to the construction site, where Michelangelo synthesizes a broad range of practical, formal, and narrative concerns using parallel practices with the future work of construction. Since the *modani* have a materiality all their own, they allow the artist to enter into a dialogue between an immaterial desire, or *concetto*, and the potential of materials to exteriorize such desires. Their transmutations between various materials, such as paper and tin, form deep links between the imagination of the architect and the capacity of the tools to temper the architecture. And through parallel practices, just as stone blocks are transmuted into cornices and architraves using tracing and carving tools, so does the paper become a template to guide such movements through acts of tracing and cutting - thus falling under the material-poetic imperative of the "forza di levare". The reciprocation between cutting paper and cutting stone occurs in a non-arbitrary dialectic, where the space between imagining construction and constructing imagination is active, dynamic, and generative.

*Modani* are moderating devices between the corporality of the architecture and its invisible, animating soul, and they have been explored through the metaphysics of Ficino's *spiritus*. Like other entities associated with the spirit, such as music, for example, they have the capacity to presence invisible harmonies through sensible, material means. Here, the movement between the chain of being is not uni-directional; rather, the material world contains critical seeds for heavenly consciousness. The principle role of *temperare*, both as an ethical practice and a moral virtue, is as a method of commensuration between cosmic or mathematical universals and the circumstantial, temporal conditions of the material body; achieved as such through manifest practices like mixing, binding, and joining. In tuning the body and soul the spirit rely on the reciprocation of the sublunary with the heavenly, where the material body resonates with the cosmic body because their materials share a similar origin. As a dialectic between the invisible and visible, tempering advances an alternative paradigm whereby non-formal, sequential practices such as mixing and joining, taking place through tiny alterations while the work is in progress, are leveraged to great conceptual and narrative effect. These microscopic readings of
constructive desire stand as the smallest units of material signification: they are the chisel marks, the slight adjusting of two stone blocks, or the exact yet minute elongation of the drip-stone. ¹⁸

Michelangelo's templates acted as tempering devices insofar as they moderated the particularly architectural posture of extending one's hand from a distance onto the construction site. In this way, the immaterial concetto, negotiated in sculpture through the "hand that obeys the intellect", required a messenger-instrument to moderate the material conditions on the building site, quite similar in fact to Alberti's understanding of the carpenter's hand ("fabri manus"). The analogical relationship between paper and stone relies on the finding that Michelangelo utilized his templates for both drawing and carving. Not only were they sent to the construction site, many of them remained at his drawing board as instruments for producing new templates. In other words, the template, and its capacity to demonstrate an architectural idea through material, also became a tool for discovering a new idea. Anchored by the slow, measured proportioning of a parent template, the quickness of the offspring templates gave wings to the imagination. Templates were an ideal medium to transmit the ferocity of the passions, since they are made in a parallel practice to that of stone sculpture. Unlike a marble block, however, present at hand, Michelangelo could not aim furiously at the projection of architecture.¹⁹ He may have worked quickly on the paper templates, since they are directly at hand, like the stone. But there was a hidden slowness embedded in them as well, since the architect's hand, unlike the sculptor's, must finally operate through the hands of others.

Once on the construction site, they were often employed as surrogate building stones for investigating the building assembly, a possibility that was explored specifically in the wall drawings in the Medici Chapel. As tracing devices, templates were a powerful tool for the figuration of the architecture, allowing Michelangelo to explore the poetic potential of the profile through dynamic, yet constructive, acts of sliding, flipping, and cutting. In this way, the profile lines were neither completely tooled nor were they totally without harness. This finding, up to now overlooked by scholars, has facilitated a deeper penetration into Michelangelo's well-known propensity toward blurring the lines between ideation and materialization. Tracing templates revealed a situational judgment that ultimately rested on the giudizio dell'occhio. Instead of strictly obeying the measured movements of the compass and the logic of the rule, the templates empowered the eye's judgment to regulate minute adjustments as necessary for the construction of qualitative proportion. They became the anatomical instruments by which the vivacity of stone profiles were brought forth.

¹⁸ This reading of the significance of the detail follows after Frascari 1984: 23-37 and Frascari 1989: 3-12.
¹⁹ For Heidegger knowledge through proximity was known as zuhanden (readyness-to-hand), Heideggar 1962: 78, 103, 137-140.
Modani, as was explored in Part II, underwent non-arbitrary material transmutations as they passed from the drawing board to the building site. In their tin incarnations, a material that was discovered to be well-suited to embody the spirit, they became instruments of consubstantiation. The reflective metal template leveraged the hand of Michelangelo from Via Mozza to San Lorenzo, facilitating an alteration of substance or essence (ousia) from stone blocks into stone blocks by the hand of Michelangelo. When Pope Clement VII asked specifically for a drawing of the library in Michelangelo's hand, for example, he understood that the directness of the artist's hand not only imparted his most clear intentions, it also imbued the drawing itself with spiritus. In the same manner, the stones at San Lorenzo were 'copies' of his metal templates, although not in the modern sense because they retained the 'soul' infused by the hand of Michelangelo. They copied the shape, but they did so 'copiously' through the authority invested and transferred by the tin cut-outs. By the time the template met the stone block, the transfer of the temper relied on a direct 'facing' between the two materials in a similar manner, as Ficino described, to the radiation of warmth or cold among adjacent materials. The thin metal template - heating quickly but not retaining its heat, relied on the stone to slowly warm up through hammering; and, following Ficino's theory of material resistances, it would ultimately depend on the most resistant material to retain the concetto within its fullest, most abundant manifestation.

As full-scale, modani provided a direct influence from Michelangelo's hand to the cutting of stone, and they could productively lay on the stone just as simply as the architect's hands lay on the paper. Able to be immersed into the situations of building, modani offered a productive investigation of the istoria as it emerged during the building process. In casting shadows and taking cues from full-scale models, they served as productive devices for imagining depth in-situ, in flipping between the profile and the profiled body. As well, although they were full size models, they also retained the properties of a drawing, and they could be carried around the building site to act as support for work in progress. Still, although portable in space and time, the modani were still case-specific, and they could not be conceived apart from those who would finally execute the stone work. Unlike modern-day templates, following in the logic of 'copy-paste', a particular modano would have no direct use outside of the specific project for which they were made. The light and air of each place, for instance, would be unique. As an exemplum, though, it offered a situation-based solution that could be useful for generating a new idea, thus initiating a new process of tempering to its use, the site, and purpose.

The building site in movement

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20 See letter in Carteggio, DCII (Barocchi and Ristori 1967: III, 20). On the rising importance in the late quattrocentro of the artist's hand in connection with the physical work, see Kemp 1977.
On October 1st, 1524, Michelangelo refused to pay the full promised amount to a piece-work carver named Francesco Sangallo, who had failed in his task to match his work in an acceptable way with parts that had already been carved. Francesco, who was part of a team of marble carvers employed on the lavoro di quadro of the Medici Chapel, had apparently suffered from a supervisory visit from the artist who was, at that time, operating principally from the workshop on Via Mozza. Francesco's reduced pay reminds us of the intensified rhetorical space established by Michelangelo among the centers of work in and between Via Mozza and the San Lorenzo fabbrica. The tempering procedure, while coherent, could not be reduced to a simple, linear progression between stone and paper. One is reminded at this point of the temporality of tempering, realizing that the materialization of architecture depends on a command of time on the progression from the occult to the manifest, and vice-versa. It becomes clear that architectural propriety depended on the realization of architecture to unfold within its proper time, a condition that required regular, on-site agency by the architect, such as that demonstrated by Michelangelo and his assistants.

Although there was a definite hierarchy between the artist and his assistants, they were hardly transparent agents. Evidence has shown that Michelangelo actively maintained life-long relationships with many of his stone carvers, and that modani were produced by the artist for use by specific carvers (recall Cecone from Corpus 534, Part II). And since Michelangelo continued to alter profiles up to the point of execution, it is easy to imagine that conversations with the scarpellini may have led to subtle alterations. From this, his templates assumed a key role in this procedure, since by means of these drawings his movements between and around the building sites could be extended beyond his immediate body, thus facilitating the monumental task of quarrying, roughing and filing the hard stone. As devices for tempering the building, their capacity to tune its realization was certainly a temporal procedure as much as it involved the physical transfer of a profile shape onto the building stone.

The tempering power of the templates was not a simple matter of instrumentality, where the temper followed a pre-determined, linear path of cause and effect from the architect's hand directly to the building stone. Rather, it was a complex, vibrant, and sometimes unpredictable process requiring prudent action at each stage of realization: the drawing board, the tracing onto

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21 Michelangelo had promised Francesco 2 ducats but only paid him 1 1/2 for this particular task, although he continued to be employed for several months during the height of carving on the Medici Chapel. See Ricordi (Ciulich and Barocchi: 1970: 147), “A Francesco da San Gallo darete uno duchato e mezzo; e questo è perché tolse a fare in choditmo, a dua ducati, el braccio d'un certo fрегio al paragone d'una parte che ce n'è facta. Anne facto uno braccio, e perché non è finito, e non sta bene chome l'altro, non gli voglio dare più, se non osserva di fare chome à promesso.” The fact that he was paid in piecework rather than by the ‘giornata’ indicates that he was probably hired for his special skill in making certain carvings. (Wallace 1994: 110). At this time the core group, paid around 20 soldi per person per day, was the capomaestro Meo delle Corte, Bondo, Bellegote, Biancalana, Michele di Castello. (Wallace op.cit.).

22 Michelangelo spent most of 1524 operating principally from the Via Mozza workshop, where he was working through the full size wooden models of the Medici tombs.
tin, the stone tracing, and the assembly. Michelangelo conducted what has been described throughout as a 'worksite in movement', where he immersed himself in all aspects of the enterprise. Borrowed from Umberto Eco's portrayal of an "opera in movimento" in his 1962 work, *Opera aperta* (*The Open Work*), the building site in movement is "characterized by the invitation to make the work together with the author" (figure 5.4).\(^{23}\) This stands in contrast, he believes, to underlying assumptions in modern aesthetic theory where the openness of a work of art relies largely on its "completeness" as a "balanced, organic whole", a status that is determined solely by the author.\(^{24}\) Based on Eco's understanding, the aesthetic value of an architectural work such as Villa Savoy would rely on its capacity to absorb varied interpretations across multiple perspectives and resonances. With the *opera in movimento* as it has been interpreted herein, the production of the building consisted in a sequential cycle of activity driven by conceptual and material desire rather than as a static object to be produced - of building as a verb rather than as a noun. Still guided by an author, but relying as well on the continuously changing building site, the dynamic *fabbrica* provided the conditions by which the tempering of the architecture unfolds. In this way, the shifting, flipping, and alteration of previously held assumptions or intuitions could be played out within the temporality of the evolving *istoria*. The materiality (or measure) of time, in this case, mirrors the temporality of template-making, with both sharing similar, manifest practices. It is thus through this embracing of *tempus* that the corporeality of the *modani* aligned with the qualitative, vivacious aspects of the imagined architecture.

Certainly the most poignant demonstration of the *opera in movimento* may be found in the *disegni murali* on the walls of the Medici Chapel, where the astonishing range of drawings provides a glimpse of the animated building site (figures 4.50 and 4.51). Recording several hands and inclusive of multiple projects occurring at in the 1520's at San Lorenzo, one could easily imagine this wall as a site of Michelangelo's rhetorical space while conducting a building site in movement. Given the fine grain of the *intonaco* surface, recent research has, in fact, indicated that these walls were probably specifically prepared as a site for drawing. Free-hand line work, ruled lines, figurative sketches, and handwriting all contribute to construct a palimpsest of conversations, dictations, and investigations. With strong evidence that full-scale templates were employed on the wall as tracing devices, *modani* may be clearly seen as key participants in the dynamic building site. The wall drawings demonstrate that the templates continued to offer themselves as productive devices for the imagination even as the building parts were being assembled. Michelangelo's passionate dedication to the well-tempered profile in the midst of the emergent architecture demonstrates how the materiality of the building site acted almost as a marble block for him, where the exteriorization of the *concetto* relied on the in-process assailment

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\(^{23}\) Eco 1989: 21; Eco 1976: 20. The English translation of *Opera aperta* was released in 1989, over 25 years after its original publication - a sure testament to its endurance as a contemporary theory amidst a rapidly changing, technological landscape.

\(^{24}\) Eco 1989: 3; Eco 1976: 2.
of the stone itself. The giudizio dell’occhio is enlivened while immersed in the material, relying on the open journey between the smallest part and the desired, poetic narrative. Unfortunately, for modern construction, it is the smallest details that are most apt to be distilled out of formal processes, even as they are the most important elements for the corporal vivacity of the work.

The building site in movement is supported by the Neo-platonic narrative where even the smallest parts of the universe are a reflection of the divine image. Since it remains an impossibility, even in today’s BIM saturated profession, to exhaustively predetermine all aspects of a building project, the dream of the perfect, universal language of build still eludes us. From this assumption, then, the animation of the smallest details while the work is in-progress becomes an architect’s imperative in presencing the totality of the project. As a Neo-platonic tool for generating parts, where the part is a mirror of the whole, the tempered template employs the smallest detail as a magnificent reification of poetic potency. This recalls Ficino’s commentary on the beholding of a beautiful body, where parts are cherished as much as the whole:

Nor do we love only this whole beauty all at once; but moved by our admiration, we love also its parts. There is born a particular love for a particular beauty, and so we are attracted to some man, a part of the world order, especially when in him a spark of the divine beauty clearly shines. 25

In the building site in movement, the work is recognized as a joining of beautiful parts that depend on some degree the changing circumstances of the emergent form of well-tempered building. In the specific example of San Lorenzo, Michelangelo’s template drawings demonstrate this synthetic procedure through the simultaneous consideration of building details at various scales, most poignantly seen in Corpus 525 (figures A.6/A.7) but appearing in multiple examples throughout his oeuvre. Tempering, for its part, recognizes that each part is a whole and each whole is a part, and that there may be a coherence in the body as it is being constructed.

If beauty is a continuous, dynamic journey between whole and part; relying, then, on the temporality of the emergent work, the particular condition of architecture as a projected activity may appear at first to contradict. We have attempted to resolve these two temporalities by narrating the work through the various centers of work. In so doing, the three dissertation Parts has followed the tempering procedure from the three worksites: Via Mozza, San Lorenzo, and the in-between. In Part I the search for the motive force of the profile through a vital process of tracing, flipping, and dragging, allowed Michelangelo to project his imagination on the worksite, through the materiality of paper templates at the drawing board. In Part II the modani guided the ‘coming to be’ of the stone by others, and drawings such as Corpus 534 (figures A.8/A.9), revealed how ‘copies’ of the modani led to a more ‘full’ or ‘abundant’ architecture as they passed

through various material transmutations. During this stage, Michelangelo operated largely between the two worksites. Part III introduced the notion of well-tempered building and placed the artist mostly at San Lorenzo conducting full scale models, wall drawings, and assembly drawings. What may be concluded from this is that, while there was a general directionality to the work, i.e. from Via Mozza to San Lorenzo, it was not an exclusively linear, uni-directional path, and at each stage of the tempering procedure Michelangelo retained a presence throughout.

**modanatura and the millimeter**

Returning now to where we began, the notion of Phidias as a more "temperate artificer" acquires new significance. The temporal condition of tempering meant that, in the moderation of tools (Part I), materials (Part II), and desire (Part III), the work emerged more virtuous than had it proceeded on undisciplined imagination alone. For Phidias, this required the physical resistance of stone to moderate the unbridled fancy of an imagination built on words alone. The exactitude with which Le Corbusier connected the work of Phidias to the *modénature* of the Parthenon suggests that, in architecture, such a resistance occurs in the exact the joining and assembling of materials through a procedure of well-tempered building. When Le Corbusier wrote in connection with the Parthenon that, "fractions of a millimeter come into play", he touched on something we have encountered repeatedly in the present work: that slight movements or changes in material dimensions are key practices in the exteriorization of the invisible. Practices of 'tempering' as such occur in slight adjustments of musical instruments, bodily ingestions, and bell and column profiles. The moderating, tuning, or tempering of architecture, then, occurs in these tiny adjustments, of the "fractions of a millimeter" made visible by touch, light, and shadow. Michelangelo's extensive use of parent and offspring templates, often through altering the dimensions of ornaments by millimeters, demonstrates how the materiality of paper, imagined as stone, extends into the tempering of the assembled architecture.

Contemporary practice, however, generally fails to address the potential of the millimeter to alter character or 'fitness' beyond the industrial assembly process. Luigi Moretti, whose 1951 article "*Valori della modanatura*" directly attacked this tendency by focusing on the modern contempt for profiling buildings. He pointed out that *modanatura* was, historically speaking, a mode of expressing architectural character that relied on ""the quality, conciseness, and resistance of the material itself". Recognizing the exactitude of elements such as the cornice beads in the Medici Chapel, some reaching as small as three millimeters in width, Moretti declared that with *modanatura* the materiality of the building could reach toward "erotic and ideal

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energies”. Moretti called the cornice an element of "thickening existence", and he compared its purpose in architecture as a type of music between, "certain relations of measure among its elements". Its penetration into the thickening of a room added an architectural element that tied together both space and time in a similar way as music. This confluence of tiny measures, understood as exact, musical cuts in material, re-states our understanding of tempering as a tuning of the building to its purpose, place, and climate.

Following in a similar line of thinking shortly after Moretti, in a lecture given by Carlo Scarpa to his students, he asked rhetorically:

In the end, how does one take account for the vibrations, if not in terms of the smallest relationships? These tiny relationships that illuminate certain modenature or sagome; likewise in French Gothic and Romanesque? One ought to become used to discerning [them] and acquiring a musical ear...

Che cosa sono in fin dei conti le vibrazioni, se non dei piccolissimo rapporti? Quei piccolissimo rapporti che fanno spendide alcune modenature o sagome, anche dei gotici francesi e dei romanici. Bisognerebbe abituarsi a distinguere, ad avere orecchio musicale...

Scarpa's "piccolissimo rapporti" in the profiling practices embodied in modenatura offer a way to look beyond the current study into a possible attitude toward edification in contemporary times. If we place our musical ear close to these tiny relationships, the possibility of edification as an inventive and poetic endeavor seems clear. As in the poetic 'whittling' of the edges discovered in how Michelangelo treated his poetic verses, the exhaustive reworking of building parts by the millimeter reveals how an expressive response to building and writing can be deeply related. Such an intersection between emotion and modenatura was well captured by Le Corbusier, who, when invoking Michelangelo's work on St. Peter's, praised his use of modénature, calling it, "as passionate as can be, fierce and full of pathos".

In an era when any interruption of pre-determined construction activities is viewed with general ire, the possibility of conceptually fertile micro-adjustments while construction unfolds offers great promise. This requires, to some level, a prudent 'opening' of the building site, where...
the architect recognizes specific instances where he or she may invite a design invention during edification. Tempering recognizes these movements of the building site - from manpower to millimeter - as each offering the opportunity to moderate conceptual thinking through materials, technique, and the temporality of construction. Michelangelo demonstrated that, while the audacity of a work of architecture includes a formal intentionality, such as in the San Lorenzo façade proposal, the animation of the project ultimately rested on the projection of one's character on the stretching and assembling of the building as a materially assembled body. His *modani* exemplify the possibility of an architect's tools as instruments of particularity, directly responding to the material, contextual, and even spiritual forces. Our close examination of the *modani* has revealed them as potent examples of non-linear, situational thinking - *exempla*, so to speak, of alternative modes of practice in current times. In the contemporary sense, tempering is no longer an activity of celestial alignment; however it may be seen as a mode of opening one's work to influence by the poetic impulse, where direct encounters with materials provide the medium for the imagination.

FINIS
Figure 5.1 Alberti’s hand, drawing his hand, autographed annotations of *Libri de familia*. Biblioteca Nazionale Centrale di Firenze, II.IV.38, c.119r.

Figure 5.3 (top)  In-progress construction letter written by Alberti to the mason Matteo de’ Pasti, the on-site supervisor of work at the Tempio Malatestiano in Rimini (1454). Pierpont Morgan Library, New York, MA 1734r.

Figure 5.4 (right)  Cover of Opera aperta, Umberto Eco (1962). © Bompiani, Milano.
Ackerman, James (1949). "'Ars sine scientia nihil est' Gothic Theory of Architecture at the Cathedral of Milan", *The Art Bulletin*, vol. 31, no. 2 (June 1949), pg. 84-111.


Berenson, Bernard (1903). *The drawings of the Florentine painters: Classified, criticised and studied as documents in the history and appreciation of Tuscan art, with a copious catalogue raisonné*. London: Murray.


Gaurico, Pomponio; Paolo Cutolo. (1999). *De Sculptura*, Edizioni Scientifiche Italiane, Napoli


Hollanda, Francisco de (1921) *De la pintura antigua*, Madrid.


Mussolin, Mauro (2007) "La Tribune delle Reliquie di Michelangelo e la controfacciata di San Lorenzo a Firenze", in Michelangelo architetto a San Lorenzo: Quattro problemi aperti, Mandragora, Firenze, pg. 183-199.


Varchi, Benedetto (1549), *Due lezioni di M. Benedetto Varchi*, Florence.


Zanchettin, Vitale (2012). "Michelangelo e il disegno per la costruzione in pietra: ragioni e metodi nella rappresentazione in proiezione ortongonale" in Michelangelo e il linguaggio dei disegni di architettura, pg. 100-119.


APPENDIX A :: MICHELANGELO'S MODANI

Figures in Appendix A are excerpted from Charles De Tolnay, Corpus dei disegni di Michelangelo. Novara: Istituto geografico De Agostini (1975-1980) and are in the care of the Casa Buonarroti, Florence, unless noted otherwise.

FIGURE A.1 - CORPUS 203 recto

FIGURE A.2 - CORPUS 203 verso
STEP 1: On a clean sheet (folio reale size), Michelangelo places several proportioning lines in black pencil, indicated by the dashed lines below. Guided by these lines, he draws a left-facing profile, as is his custom, free-hand. The watermark (Cardinal’s Hat - Briquet 3387) indicates original position on sheet, delineated by circle.

STEP 2: *N.B.:* step numbers correspond with paragraph numbers in text

STEP 3: Keeping its right-facing orientation, 203 is placed onto a new sheet. A right facing orientation facilitates tracing by the right hand. As 204 does not exhibit a watermark, its placement on the new sheet, or fragment of a sheet, cannot be determined.

STEP 4: 203v is traced and subsequently removed from the sheet. 204v is now observable.

STEP 5

STEP 6

Figure A.5: Hypothetical narrative between Corpus 203 and 204, related through tracing.
FIGURE A.12 - CORPUS 536 recto
STEPS 1-3: On a clean sheet (folio reale size), Michelangelo places a now lost parent template A, facing left. He traces first in pencil and then ink, as evidenced in the detail to the far right. Using a different parent template, he makes a new line in ink (profile B). Offsetting again and using the same or another parent template, he quickly draws profile C. In the rapidity of the work, the pulling away of parent template C causes the ink smudge on profile B.
STEPS 1-3: On a clean sheet (folio reale size), Michelangelo places a now lost parent template facing left. The lost parent is removed and further revisions are made in black pencil, as evidenced in the dashed circle detail below.

STEP 4: Corpus 537r is flipped. Michelangelo introduces an inked line just to the inside of the profile, visible in the circle detail to the right.

STEP 5: Corpus 537v receives its second cut, roughly following Michelangelo’s inked line on the verso.
d'accordo epassai a fico nella metà
forse qualcosa apriam e mi conduci

se fossa se sogno alcun produce
aggio di manifesto alcun prospere
è passa e lasciav rital desola alla metà
ogmasto a fede ose chiam e caduta
qualquesto siste me di mignidi
noturono appresi quel chi sento enosodone
amor melporti et fiel desis melnosti
amo amziando eno chi mignidi
aquel chi sentro eno teggi ben done
sistem mi bene epal carli melino ston

FIGURE A.18 - CORPUS 538 recto
STEPS 1-2: On a clean sheet (folio reale size), Michelangelo places a now lost parent template called "The Step", facing left. Evidence of its original tracing may be seen in the far left detail. After multiple revisions, he rapidly cuts "The Step", leaving Corpus 538 as a remnant of the process.

STEP 3: The lingering fragment is eventually flipped and receives a sonnet. This 'cut-away' or negative fragment is possibly traced again as is evidenced in the detail below.

Figure A.20: Demonstration of tracing in generating Corpus 538
FIGURE A.22 - CORPUS 539 VERSO

[Handwritten text and symbols on the page]

353
STEP 1: On a clean sheet (*folio reale size*), Michelangelo places a now lost parent template facing left. The lost parent is removed and further revisions are made in black pencil, as evidenced in the dashed circles below. The watermark (Cardinal’s Hat, Briquet 3373) indicates the original position on the sheet.

STEP 2: *CORPUS 539v*

STEP 3: The template is flipped and becomes a template for a new drawing. Corpus 539r is placed onto a new sheet and traced. The evidence is visible along the template edge highlighted by the dashed circles below.

STEP 4: The traced template of 539r, now lost, is cut and becomes either a template for a new tracing or is sent to the construction site to be traced onto tin.
FIGURE A.24 - CORPUS 540 recto
FIGURE A.2 - CORPUS 540 verso
> **Casa Buonarroti, 61A** (figures A.1/A.2 - *Corpus* 203): Profile for a column base for the double Tomb of the Magnifici, Medici Chapel (never realized), ca. 1533; 324x143mm. Watermark: "Hat C", Briquet 3387 (Roberts 1988) or Briquet 3394 (De Tolnay 1976-1980)

> **Casa Buonarroti, 59A** (figures A.3/A.4 - *Corpus* 204): Profile for a column base for the double Tomb of the Magnifici, Medici Chapel (never realized), ca. 1533; 324x145mm.


> **Casa Buonarroti, 92A** (figures A.6/A.7 - *Corpus* 525): Profile of the 'zocolo (molding base)' in the Laurentian Library, ca. Spring of 1525; 386x280mm.


> **Casa Buonarroti, 53A** (figures A.8/A.9 - *Corpus* 534): Tracings of profiles of the stair tread and cornices for the portal between the reading room and the vestibule of the Laurentian Library, ca. Spring of 1525; 360x553mm. Watermark: "Hat C", Briquet 3387 (Roberts 1988) or Briquet 3394 (De Tolnay 1976-1980)

Thode 1902-1913: II, 130, no. 34, 135 and III, 53, no. 108; Geymüller 1904: 44, pl. 4, fig. 4; Gotti 1875: II, 178-179; Cavallucci 1875: 176

**Archivio Buonarroti, I, 57, fol. 144v.** (figures A.10/A.11 - *Corpus* 535): Tracing of a profile for the Medici Chapel (non-cut), Spring 1524; 240mm x 125mm.


Ciulich and Ragionieri 2010: 72, no. 24 (n.b. drawing has been mirrored); Marongiu 2002: 51, no. 18; Residori 1998: 83, no. 50; Mastrocola 1992: 110, no. 50; Argan and Contardi 1990: 186-195; Roberts 1988: 18; Marani 1984: 76 no. 46; Tolnay 1976-1980: IV, no. 536; Barocchi 1964: no. 336; Girardi 1960: 25, 202; Düssler 1959: no. 44; Tolnay 1928: 476, no. 64; Frey 1897: 479, no. CXXXI; Guasti 1863: 279

**Casa Buonarroti, 60A** (figures A.15/A.16 - *Corpus* 537): Cornice profile for Medici Chapel, ca. 1530; 280x223mm

Thoenes 2012: 19, fig. 8; Brothers 2012: 163, fig. 14; Thoenes 2009: 28, fig. 8; Cooper 1994: 497; Berti 1985: 153; Elam 1981: 594 no. 4; De Tolnay 1976-1980: IV, no. 537; Hartt 1971: 198, no. 279, and 205, fig. 279; d'Ossat 1967: 308, 311, fig. 82; Fasolo 1965: 150 (mislabeled); Portoghesi -Zevi 1964: 240, 275, fig. 238, 1006; Barocchi 1964: 86, 89, 141; Barocchi 1964b: 44, cat. no. 93, fig LXVI; Barocchi 1962: I, 116, no. 93, fig. LXVI, pl. CXLI; Düssler 1959: 75, no. 98; Thode 1913: III, 44, no. 83; Gotti 1875: II, 179.

**Archivio Buonarroti, XIII, fol. 134** (figures A.18/A.19 - *Corpus* 538) "Negative" template of the edge of the door threshold at the entry to the reading room, Laurentian Library, with sonnet fragments on recto to Tommaso de' Cavalieri (Frey 1897: LXXV, "Non so, se s' e' la desiata luce"); 328 x 228mm.


**Archivio Buonarroti, XIII, fol. 127** (figures A.21/A.22 - *Corpus* 539): Cornice profile for Medici Chapel (NEW attribution), includes workshop tally and poetry fragment (Frey 1897: 413, CIX "Sento d' un foco un freddo aspetto acceso") 328mm x 228mm. Watermark: "Hat C", Briquet 3373 (De Tolnay 1976-1980), visible on recto.


**Archivio Buonarroti, I, 59, fol. 151** (figures A.24/A.25 - *Corpus* 540) Profile for the Medici Chapel; 295 x 187mm.

APPENDIX C

TAXONOMY OF MOLDING TYPES, AFTER PALLADIO

A. gola diritta (or cyma recta)
B. corona
C. gocciolatoio and gola diretta (or cyma recta)
D. cavetto
E. frieze
F. architrave
G. cornice (or cimacio) of the capital
H. abacus
I. gola diretta (or cyma recta)
K. collarino
L. astragal
M. shaft
N. shaft
O. cimbia
P. torus and gola
Q. plinth (or orlo)