

Architectural Sketches and Renaissance Cartoons: A Comparison of Reference

KENDRA SCHANK SMITH
University of Utah

Architectural sketches are a valuable and little studied aspect of the design process. An expanded meaning of architectural sketches will become clearer, through a comparison of the literal and figurative transference of visual images in Renaissance cartoons with the sketches used for design by architects. Although their uses and interpretations are sometimes different, these two types of referencing media illustrate the value and communication qualities of sketches. A comparison of the physical form of cartoons can elucidate how architects employ sketches for design thinking. They both rely on condensation, simplicity and are not necessarily beautiful. Instead their value lies in their usefulness in the design process. By looking at how architects have historically communicated, a method of viewing contemporary manners of architectural representation becomes evident.

This comparison can help architects learn about reference in representation. Architectural sketches and Renaissance cartoons each possess relative qualities of likeness and literalness that pertain to issues of reference. Each concerns a process that conveys concepts to a finished product, either a fresco or a work of architecture. The process is dependent upon the method or technique that affects and effects the ability to change as well as the evolution of the thinking inherent in this process. The media, either cartoons or sketches, acts to convey both thoughts and images. This discussion, then, is twofold: first it concerns the media as it helps to convey a visual image of likeness through the process. Second, the media assists design thinking, the ability to evoke the design through alteration and manipulations. These two media, sketches and cartoons, are not definitive in their literalness. They transfer relative images (likenesses) and relative ideas that through their media require interpretation. Although similar and suitable for comparison, they also contain differences that will help to put boundaries of understanding around a definition of architectural sketches in a design process.

A comparison of reference abilities first depends upon an exploration of the relative qualities of likeness that can also be an issue of literalness. Literalness is relative and questions a relationship between the image and what might be considered "real." We know philosophers have long argued about what is real versus what we perceive. It is not necessary to confront this polemic, rather it is possible to discuss instead what is more abstract versus what seems to provide a "point to point" visual image that requires less interpretation and more closely resembles the intended object.' Sketches' likenesses vary with their use in communication by each specific architect and in each specific situation. For example, a sketch may need to be closer to an imitation if the sketch is produced in front of, or for, the client. By contrast, an inspirational sketch which is personal and used for finding a concept might be more metaphorical or allusionary. Various writers on aesthetics have assigned meanings to words like imitation, copy, replica, likeness, similarity,

resemblance, analogy, metaphor and allusion. Their meaning is always dependent upon their relationship to an original that makes them representative.' Some modern definitions of words such as imitation, copy and replica treat the object and its representation as almost identical in all dimensions.

The Greek's phrase for "fine arts" was "imitative arts." In literature the term's use begins with Plato and was probably common in usage to distinguish between fine art and industrial production." In contrast to Plato's notion of the real world as mere imitation, Aristotle held that "the artist may imitate things as they ought to be."⁵ He used an imitation to show another dimension of reality. "A work of art is a likeness or reproduction of an original and not a symbolic representation of it."⁶ These words impart a view of an imitation as not necessarily an identical image but as an alteration of the original. With a sketch the architect can play with forms in another dimension, thinking about the three-dimensional, and choosing to select or disregard elements at will. Umberto Eco writes that the image need only be similar to the original in order for its creator to gain knowledge and communicate ideas. "A transformation does not suggest the idea of natural correspondence; it is rather the consequence of rules and artifice ... Similitude is produced and must be learned."⁷

To reiterate, the words used to describe likeness are numerous as each assesses a slightly different meaning. A "replica" evokes a diverse meaning from "allusion." It is this vagueness that reveals the conveyance issues for cartoons and sketches. The relative position of information transmitted differs as to idea or visual imagery. Sketches furnish a mode for thinking and communicating in the seeing world of architecture. Renaissance cartoons also convey information in a similar yet more restricted way.

A definition of sketches and particularly architectural sketches as compared to artists' sketches seems an appropriate beginning. Sketches are marks made on a page that are distinctly simple, quick and carry poignant concepts. They can also consist of three-dimensional "marks," that provide swift imagery. A dictionary definition suggests that a function of sketches is "to give the essential facts or points of — without going into detail." A sketch as a brief collection of thoughts manifest visually, can also be seen as "preliminary or preparatory to further development."⁸ Artist's sketches can act as studies in preparation for a piece of art in another media such as sculpture or painting. They also may stand alone as the finished conceptual element. Architectural sketches, on the contrary, exist primarily to support design for architecture, often a building. Although we know architects can use sketches as recording devices for travel, and they often are displayed as finished products, their primary function still remains as mechanisms for thinking."

Historically, sketches were more prevalent during the age of Humanism, as the individual's creativity was more sought after,

encouraged and retained." In addition to the number of retained sketches, the artists/architects of the Renaissance viewed images as direct vehicles of inspiration." These Renaissance artists and architects moved easily between two and three dimensions. They worked as sculptors, painters and architects simultaneously. Artists/architects such as Da Vinci and Michelangelo united creative endeavors under the concept of "disegno."¹² These versatile creators borrowed media and techniques with a cohesion of creative thought. The cherished position of the image, the cartoon being an example, makes a revealing comparison to architects' sketches.

RENAISSANCE CARTOONS AS CONVEYANCE

First, this discussion will consider how Renaissance cartoons convey information, contemplating allusion and reference. During the Renaissance, cartoons were treated primarily as a process. Viewed as preparation for the final product, the fresco, which appeared with color and detail, and as much life-likeness as the Renaissance painter's skills could determine, depended upon the transference qualities of the cartoon. Along with this preparatory function, cartoons took on additional uses that guided these artists in their art." As Armenino describes, cartoons facilitated the entire process. He wrote that the cartoon could embody the whole art. The cartoon could express the uniqueness of the art as an entity. He wrote:

We have now to treat of cartoons, which among us are considered as the most perfect mode in which, by our skill in design, we are able to express the whole force of the art, and which, to those who set about them in a proper manner, and with diligence, and who are carefully and industrious in finishing them, are so useful for the works which they have to execute, that what afterwards remains to be done, appears to give but little trouble."

The cartoon served to communicate design on several levels. As a literal transfer of image, it allowed artists to continually design throughout the process. The Renaissance cartoon transmitted an idea (or concept) from media in a process and it also provided a reference while the fresco was being produced. Although valuable as a part of the process, the object, the cartoon, took on new value from its relationship to the creative process.

As a literal transfer of images and information, the Renaissance cartoon was a point to point replication. In most cases, this transference meant that "...a stylus was pressed heavily along the lines, or else pricks were made at intervals and powdered charcoal was rubbed through the holes.""¹³ This produced a tracing from the cartoon directly onto the wet plaster.

Some frescos of the early 15th c. show clearly that their designs have been traced from cartoons, for their outlines are either indented or punctuated with pin-pricks.¹⁶

The technique of replication usually entailed the artist's sketch being transferred to a full scale image made on stout paper." Since the value of these cartoons was their ease in mobility, they were usually full scale reproductions of smaller artist's sketches. They constituted a pattern, simply as an outline, to be followed. The cartoon being the medium of process became an instrument that transported the relative points and spaces from conception of the sketched image to the surface of the fresco.¹⁸ It is possible to view this technique literally in a cartoon by Raffaellino del Garbo. Along the outline of the pen and ink wash sketch, are prick marks used for the transfer. The cartoon is 215x189 mm possibly representing the size of the amount of work for one day in the wet plaster fresco. This cartoon shows shadow defining volume, although the pricks are very linear and follow the outline of the figure. In some cases, artists considered the cartoon the work itself except for the "tint.""¹⁹

The Renaissance cartoon assisted in obtaining replication, the

original proportions and positions of the figures. It also may have represented the creative inspiration of the artist, where the individual expression and immediacy of the image emerged on the paper. The cartoon's value was revealed in its durability. Because it consisted of sturdy paper the cartoon would remain intact throughout the process.²⁰ The paper might need to be wetted and stretched or rubbed with powdered charcoal.²¹ The cartoon was required to perform without the chance of error, particularly because it contained a perfect example of intention.²² The cartoon was the expression of purpose, as it became a template for the completed project.

The cartoon as communicator of images to the intended product (the painting, fresco or tapestry), was also a thinking mechanism for the artist. Because it was very precise, it conveyed proportional information, but it was also an outline that could be manipulated later. The cartoon expressed what was most important and at the same time became a vehicle for changes necessary in the process.

The author of this invention had certainly a very happy idea, considering that, in the cartoons, we can see the effect of the whole painting, and that they may be corrected and drawn upon until they are approved of, which cannot be done afterwards to the picture itself."

ARCHITECTURAL SKETCH AND CONVEYANCE

An architectural sketch has some similar qualities. Its quickness, immediacy and lack of significant material value allowed it to be continually altered. For the sketch, durability is not important, the discoveries are carried to the next stage through the architect's memory or redrawn on a more permanent surface. The immediacy of the sketch is its strength. In this way, the architect can evaluate and alter an image within the space of a few minutes. This often is revealed as architects redraw a concept in fast sequence across a page. The first and subsequent images contain a theme, as reference assists in the evolution of the proposals. A sketch by Gianlorenzo Bernini for the Hollowed-out base of the Fountain of the Four Rivers provides indication of this manipulation of images. The images across the lower portion of this sketch show many variations in the design of a group of figures. In this play, it is possible to view a dialogue of "making and matching" as he slightly alters the form to comprehend the new form.²⁴ This dialogue is expressed as he makes one image and then rejects it to try another iteration. It might be assumed that these images appeared in quick succession until he either chose a new tact or found the image that satisfied him. Unlike the Renaissance cartoon these sketches are redrawn rather than traced. This comprises a transfer that is not literal but dependent upon allusion and the constant reforming of the intended image. Some of the images are more detailed, others less so, as he evaluated the forms as he drew. In a process of design, he was communicating the image to himself as he sketched, and it is also possible he questioned the opinion of colleagues. Either way the communication process is expressed through the images. Involved in this process of communication is the transference of ideas to himself or others. It is possible to view the concepts as a memory of his thought in the form of details. The images were precise enough to carry an idea, and also imprecise in the effort to stimulate dialogue and subsequent alteration.

Similar to a Renaissance cartoon it is possible to see the testing and redrawing in a search for form in the architectural drawing. It is also possible to view the lines, of the image itself, redrawn in a method of correction to find the optimum arc or shape. This also recalls a desire to "match" an image found in the mind's eye, one that is not realized until it is seen through the sketch. The sketch, then, is the physical remnant of the architect's thinking process, its value lies primarily in the design process for the architect. This evaluation process might be the immediate moment of the sketch, or the sketch might be referred to later in the design. The Renaissance cartoon also displays its value in the process, it transfers information to the artist,

transfers images that could be used to formulate decisions and literally transfers the image "point to point" to the surface of the fresco." In both cases, as sketches, they are "preparatory to something else."

The Renaissance cartoon could transfer, through pin-pricked images, the form of the final product, but it also allowed manipulation throughout the process. The cartoon although altered, carried the artists' concept of the product. An architect's sketch does not show completely in the final product and in some cases it does not show at all. The sketch, although changed throughout a long process, might carry with it the essence, or concept, of the project as a whole or the sketch might represent a rejected train of thought. For an architectural sketch, it is not necessary to view the whole image to make decisions. On the contrary, the Renaissance cartoon needed to be understood in its entirety for transfer. Although interesting, the actual cartoon was transferred in pieces. The sketch is not a replica of the finished building, the process involved is much more complex, but like a Renaissance cartoon it may be an outline to follow. This outline might be, in the case of a Renaissance cartoon, a simple drawn line, or in the case of an architect's sketch it may be a series of thoughts. Looking to the sketched images it is possible to view the outline used in both cases.

COMPARISONS

As a drawing technique, the outline a single line, appears in both cartoons and architects' sketches. The simplicity of a single line probes important for the modes of transfer. The Renaissance cartoon required clarity to identify the line meant to be replicated. This is especially true since the person drawing the cartoon might not be the one transferring the image. The architect's sketch provides an outline which is easy to read and comprehend. It also, expresses a need to work quickly to view and evaluate the image rather than absorb the time it might take to render a detailed description. The sketch captures quick impressions and ideas that may elude the architect; it becomes a vehicle in a creative process that is quick in terms of time and wit.²⁶ Werner Oechslin feels the sketch is the appropriate medium for designing. "[T]he sketch is ideally suited for capturing the fleetingness of an idea."²⁷ The individual dialogue of design requires mental and associative reflections that are not necessarily distinct from each other. In a broad sense, architects asked about first sketches see them as agents for discovery and manipulation.

Sketches are blinks of the eye, snapshots of the creative process. They are resting points for the wandering intellect on the quest for form — needed for keeping track and for checking; for being able to go back and find a new linear approach to an entangled train of thought, or even to take up an altogether different course.

Sketches are catalysts for the mind and, at the same time, the basis for return.

Sketches are, to all intents and purposes, the medium of change. They represent a manifestation of the various stages of the process of "taking shape." of the quest for the ultimate form.²⁸

Being able to view the whole project prior to its transference to the surface of the finished work, allowed the artist to manipulate the Renaissance cartoons for design. In this way, the cartoon also communicated design concepts and the artist could maneuver the image to insure it carried the original concept to the finished painting. Furthermore, the project could be continually modified through the flexibility of the cartoon.

For the sketches, designs, natural models and in short, all the

other labours which the artist had previously undergone, were for the solo use and purpose of uniting them properly together on the surface of the cartoon; and to speak the truth, in order to reprove those who care little to do this, or who, if they do set about it, do it carelessly: for in a well-finished cartoon, it will be observed, that even the most difficult part of every object is portrayed, so that by following the outlines, we work without any chance of error, by means of a perfect example and model of all that we intended to do. ... Michael Angelo. Leonardo da Vinci. Raffaello. Perino, Daniello and other excellent painters, always prepared the cartoon with the greatest care and industry.?"

The cartoon supported the artist's concept across media, and became the narrative carrying both details and meaning. The cartoon as a medium of process had a distinct advantage, because the artist could locate errors and correct them early in the process. The cartoon created a point of critical judgment where the transferring process was also enriching. In a process of translation from a beginning sketch to the finished fresco, the cartoon carried pertinent information. The ideas might need further condensation or elaboration, but the image of transference maintains both. Unlike the *Sinopie*, the cartoon carries scale.³⁰

The designs having been made in this way, the artist who wishes to work in fresco, that is, on the wall, must make cartoons; many indeed prepare them even for working on panel. The cartoons are made thus: sheets of paper, I mean square sheets, are fastened together with paste made of flour and water cooked on the fire. They are attached to the wall by this paste, which is spread two finger's breadth all round on the side next to the wall, and are damped all over by sprinkling cold water on them. In this moist state they are stretched so that the creases are smoothed out in the drying. Then when they are dry the artist proceeds, with a long rod, having a piece of charcoal at the end, the transfer to the cartoon (in enlarged proportions), to be judged at a distance, all that in the small drawing is shown on the small scale. In this manner little by little he finishes, now one figure and now another...³¹

In many cases, the cartoon was overlaid with a grid to correspond to the grid of a sketch. Because of the difficulty in preserving proportions from a sketch to the large scale of the cartoon, these squares transferred the image more dependably. Armenino cautions other artists not to depend too much on this more mechanical technique, he writes:

But it is necessary, at the same time, to caution persons not to trust too much to these first lines, nor, while placing them on the cartoons, by means of these squares, to throw aside their judgment, which enables them to correct many of these lines in the small design, and copy them afresh in their proper places, or whenever they may seem needful. This is rendered evident by the fact, that great errors may be concealed in small drawings, while those on a large scale, every slight error is detected: so that a thorough examination is necessary, to change false outlines and to make good cues, without having any regard to the limits given by the squares."

The grid technique suggests a more literal tracing but is actually less so than the pounced image transfer. Here the process, both precise and imprecise, conveyed crucial information. The cartoon by Pontormo for *The Angel of the Annunciation*, shows a very detailed, rendered image squared for transfer. The early experiment with wings on the back of this angel, in very faint lines, can be viewed. The transfer in scale must be manipulated by the designer, to add articulation and value.

As the small scale sketch with its "color" or "detail" could inform artists when working on the cartoon, so could the cartoon be a

reference for painting the fresco. "A highly finished cartoon could also serve as an "auxiliary cartoon" to guide the painter or his assistants while the underpainting was being executed.³³ This reference might reveal a third stage where the underpainting guides the finished layer of the fresco. This layering reflects the dependence of each stage on the process before it. Both Vasari and Armenino write about a process to preserve the cartoon by pricking through two sheets and pouncing the blank one." Here cartoons take on a role more pertinent than that of a carbon transfer, but rather act as the means for preserving a reference for the finished work."

Architectural sketches may take on a similar role, because they are not a replica but rather a check or reference throughout the design process. The design issues of process in cartoons can be compared to architectural sketches in their physical techniques and mechanisms for thinking. In this design sketch by Filippo Juvarra for a building design it is possible to view some aspects of his design thinking. Again the image is in an outline form presenting only the most vital information to critique the design. The sketch carries scale, proportioning and an image of the physical shape of the proposed building. This may be considered similar to a Renaissance cartoon in that the image conveys communication of proportions and scale to the surface of the fresco.

The connection of the sketch to the final product, the building, is more abstract than the tracing of a cartoon. Seldom does a sketch become transferred directly to the building. There might not be a direct correlation between the grid (a mechanical transfer) of a cartoon and the architectural sketch. It is possible to trace allusions as brief references from sketch to finished building but the connection is more on a level of subtly or transmutation. The concepts are "preserved" through the architect's mind or through a process of suggestion.³⁶

LIKENESS

Some of the differences may lie in the long process of architecture. The quick sketch by Juvarra is early in the process, and although it predicts scale and concept, the finished building could have little "likeness" to the sketch." Considering the process, the architectural sketch is a brief, two dimensional fragment often anticipating the completed building. A Renaissance cartoon has a more direct relationship to the final product. This is striking, as the cartoon stays two dimensional where the architectural product is three dimensional. Often these types of representational images differ from the intended product either in concept or identifiable shape. In other words, the abstraction can be achieved through different modes. Somehow the images transmit information to the artist/architect; the ultimate image manipulator. Subtle differences in shape and relationship are revealed in the sketch by Bernini, as are subtle line changes in the cartoon by Pontormo. In each it is possible to "read" the expression of purpose and a design process that involves constant evaluation.

As most artists of the Renaissance saw the cartoon as a means to an end, their value took on new meaning beyond a mode of replication. An especially fine cartoon could be reused in different context with minor alterations. In a dichotomy of the process in comparison to the final work, the significance of the cartoon reflected the prestige and ability of its maker.

The use of cartoons made it possible for a minor master to paint a picture from a more famous master's design. They were valuable possessions, much like copyrights; Girolamo di Romano (c. 1484 - after 1562), for instance, gave some to his son-in-law as a dowry."

CONCLUSIONS

In conclusion, it is necessary to reiterate the qualities of these two "sketches." The ability of the Renaissance cartoon to be reused and thus increase its value denotes simplicity as a distinct characteristic. The "outline" quality of the Renaissance cartoon, as preliminary to

a finished work of art, evokes the future. The pin-pricks as implied lines, outline the images, similar to a "parti." These cartoons describe the tenor of the work and transfer minimal detail. Although this outline is abbreviated it contains a precision that makes the final image possible. The dichotomy of precision and imprecision represents the strength of the cartoon. Although acting as a template to transfer concepts and images from the sketch to cartoon, and cartoon to fresco, it also becomes a manipulative media for process in the artist's thinking. The cartoon additionally, ensures that crucial aspects of the initial design are continually reinforced. Each stage can be translated and altered as necessary to insure a handsome final product. For the artist, the cartoon was a trusted mode of conveyance.

Architects' sketches take on some characteristics similar to the Renaissance cartoon. Architects' rely on sketches throughout the design process to help them think through a design, from beginning thoughts to design decisions. The sketch can portray an important mode of comprehension, as Maurice Merleau-Ponty expresses when discussing Klee and Matisse; "the line no longer imitates the visible; it "renders visible": it is the blueprint of a genesis of things.""

The sketch transfers concepts to other stages of the process at the same time it represents a medium for change. This seemingly paradoxical position is reminiscent of the Renaissance cartoon. Sketches as 'preliminary to something else' inform the final project as does the cartoon. They often consist of simple outlines to guide the work. Ultimately manipulative, they are quick in terms of time and materials. Sketches convey conceptual communication, reflecting both precise and imprecise allusions. They can be brief and ambiguous but convey complex concepts and assist architects in recording thought and communicating with others in a process. Although they are not valuable in and of themselves, their value lies in the process of design. Although most are destroyed, some sketches, depending upon the fame of the architect who produced them, are carefully retained and exhibited. It is through a discussion of and comparison to Renaissance cartoons, that architectural sketches become more understandable as part of the complex process of design.

NOTES

- 1 Eco, Umberto, *A Theory of Semiotics* (Bloomington: Indiana University Press, 1979).
- 2 We are reminded of ideas of replication and reproduction in Walter Benjamin's essay "The Work of Art in the Age of Mechanical Reproduction," *Illuminations* (New York: Schocken Books, 1968) 217-251.
- 3 Aristotle, trans. Butcher, S.H., *Aristotle's Theory of Poetry and Fine Art* (New York: Dover Publications, 1951), p. 121.
- 4 Ibid.
- 5 Aristotle, op. cit. 122. Butcher's translation of Aristotle's "Poetics" XXV.I. "The actual world therefor stands nearer to the idea than the artistic imitation, and fine art is a copy of a copy, twice removed from the truth. It is conversant with the outward shows and semblances of things, and produces its effects by illusions of form and color which dupe the senses. The imitative artist does not need more than a surface acquaintance with the thing he represents. He is on a level below the skilled craftsman whose art is intelligent and based on rational principles, and who alone has a title to be called a 'maker' or creator." 159.
- 6 Aristotle, op. cit. p. 124.
- 7 co, op. cit. p. 200.
- 8 *The Compact Edition of the Oxford English Dictionary*
- 9 I am thinking about examples such as the *Carceri* etchings by Piranesi or the framed sketches on paper napkins for various shows. Frank Gehry being one.
- 10 See Kris, Ernst and Otto Kurz, *Legend, Myth, and Magic in the Image of the Artist* (New Haven and London: Yale University Press, 1979).
- 11 See Gordon, D.J., *The Renaissance Imagination* (Berkeley, Los Angeles and London: University of California Press, 1975).

- ¹² Barasch, Moshe, *Theories of Art from Plato to Winckelmann* (New York: New York University Press, 1985), pp. 298-299.
- ¹³ See Saint Hubert and R. La Montagne, *The Art of Fresco Painting* (New York: F.F. Sherman, 1924), James Ward, *Fresco Painting: Its Art and Technique* (New York: D. Appleton and Company, 1909) and James S. Ackerman. Sumner McKnight Crosby, Horst W. Janson and Robert Rosenblum, *The Garland Library of the History of Art* (New York and London: Garland Publishing, Inc., 1976), for details on fresco painting.
- ¹⁴ Merrifield, [Mrs.], *The Art of Fresco Painting* (London: Alec Tiranti, LTD, 1952, original printing 1846), p. 36.
- ¹⁵ Osborne, Harold, editor. *The Oxford Companion to Art* (Oxford: Clarendon Press, 1970), p. 209.
- ¹⁶ Ibid.
- ¹⁷ Ibid., and as described by Giorgio Vasari, translated by Louisa S. Macle hose. *Vasari on Technique* (London: J.M. Dent and Company. 1907), pp. 213-214.
- ¹⁸ For a discussion of similarity and sign production see, Umberto Eco, *A Theory of Semiotics* (Bloomington, Indiana: Indiana University Press, 1979). pp. 200-217.
- ¹⁹ Merrifield, op. cit. 36, tint implies the application of pigment to the surface of the fresco.
- ²⁰ Osborne, op. cit. p. 209.
- ²¹ Vasari. op. cit. p. 213.
- ²² Merrifield, op. cit. pp. 36, 38.
- ²³ Merrifield, op. cit. p. 30.
- ²⁴ E.H.Gombrich, *Art and Illusion* (Princeton: Princeton University Press, 1984), p. 29.
- ²⁵ The question of literalness is an ambiguous one, a value judgment of how much or how little.
- ²⁶ Italo Calvino, *Six Memos for the Next Millennium* (Cambridge: Harvard University Press, 1988), writes a chapter on the traits of quickness.
- ²⁷ Oechslin, Werner, "The Well-Tempered Sketch," *Daidalos* 5, The First Sketch, (15 September 1982): 103.
- ²⁸ *Daidalos* 5, op. cit., "Questioned About First Sketches; Johann Peter Holzinger, Al Mansfold, Mario Botta, Hermann Fehling/ Daniel Gogel, Alvaro Siza Vieira, James Stirling, Gottfried Bohm, Richard Meier, Helmut Striffler, Karljosef Schattner, Frank O. Gehry, Gustav Piechl, Walter M. Forderer, Gerd Neumann" : 37.
- ²⁹ Merrifield, op. cit. pp. 36-37.
- ³⁰ Meiss, Millard, *The Great Age of Fresco: Giotto to Pontormo* (Italy: The Metropolitan Museum of Art, 1968), p. 16, *Sinopie* is the preparatory drawing in red earth, a technique of underlay before a fresco was painted. This technique was abandoned in later years replaced by the cartoon.
- ³¹ Vasari, op. cit. p. 213.
- ³² Merrifield, op. cit. p. 38.
- ³³ Ames-Lewis, Francis and Joanne Wright, *Drawing in the Italian Renaissance Workshop* (London: Victoria and Albert Museum, 1983), p. 322.
- ³⁴ Merrifield, op. cit. p. 40.
- ³⁵ Ibid.
- ³⁶ I have seen the use of a more direct mode of transfer in Santiago Calatrava's sketches, where the image was dimensioned and seemed ready for transfer to a project. This observation might indicate that sketches are used at many points during the design process and we should accept their individuality for the architect.
- ³⁷ Likeness is relative. It can be as literal as copy, replica, facsimile, or clone, or it could be as abstract as allusion, reference, analogy or metaphor, or it could be somewhere in between as similar, resemblance or "like."
- ³⁸ Osborne, op. cit. p. 210.
- ³⁹ Maurice Merleau-Ponty, *Primacy of Perception: and other Essays on Phenomenological Psychology, the Philosophy of Art, History and Politics* (Chicago: Northwestern University Press, 1964), p. 183.