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Conceptual innovation in art. Three case studies on Leonardo da Vinci, William Turner, and Henry Moore

## 1. Semiotic innovation in the art of Leonardo da Vinci

In his "Trattato della pittura" Leonardo states that the painter has as his primary aim the representation of two things: man and his mind ("l'uomo e la mente"; Pedretti, 1995: § 180). The nature of man becomes visible and, therefore, accessible to the eye in the different "accidents" and movements and in the proportions of his body parts (cf. Pedretti, 1995: Terza Parte). In order to represent man and his mind the artist must first create a pictorial space, the stage for the topic of the painting. Second he must consider light and shadow in human bodies, the gestures of the hands, the postures of the head and facial expression before he distributes the topics of the painting on the surface. Finally landscape, sky, objects, animals, persons accompanying the topic of the painting (mostly individuals or groups of individuals) must be arranged in space, relative to light and shadow. Leonardo's art goes beyond mimesis of nature; it divulges the internal meaning of space, of light and shadows to the viewer. The beauty of a scene is the recovered meaning in the mind of the viewer.

With the fore-grounding of movement and accident Leonardo requires interpretative activity of the viewer, who, based on his experience, must extrapolate movement and action from an instantaneous picture to a process which has caused it and which will bring it to a proper end later. In bodily movement, any movement of one body-part has a counterpoise in another body-part. The terms balance, weight and counterpoise have the following meaning in the context of painting: A single body is in balance if the weight of the movement of one part of the body, e.g., the head, has a counterpoise in another, e.g., in the movement of the shoulders or the trunk. The balance could be easily realized if all bodies were static. But this would make them "wooden", i.e., unanimated. The painter who wants to show the mind of the persons in the scene must show them in movement and the balance of a person or group of persons has to be a *dynamic* balance.

In the following I shall analyze these semiotic aspects with reference to two groups of Leonardo's paintings: "The Last Supper" and "St. Anne with the virgin and the child".

The painting of the Last Supper produces the illusion of a deep hall with rectangular tapestry on the sides and three openings going into a landscape in the background. The linear perspective has its origin in the head (the right ear) of Christ. The central point, Jesus' ear, is significantly related to the narrative content. Jesus has just uttered the prophecy that one of his disciples will betray him and in the tense moment captured by the painting he is listening to their answers.[1] His head is slightly displaced from the center in relation to the open door in the background, which puts his face into relief against the landscape. The upper border of the landscape defines a line on which the eyes of Christ are placed. Thus the position of the central person in space is exactly calculated in order to match the geometrical and the semantic centrality of the figure.

The geometrical arrangement of the thirteen actors in the scene has a basic symmetry. Christ versus twelve apostles, six of them are sitting to his left, six to his right. The linear arrangement, which includes Judas, the traitor, is new. In most paintings, which treated the same topic before, Judas is sitting on the other side of the table and turns his back to the viewer.
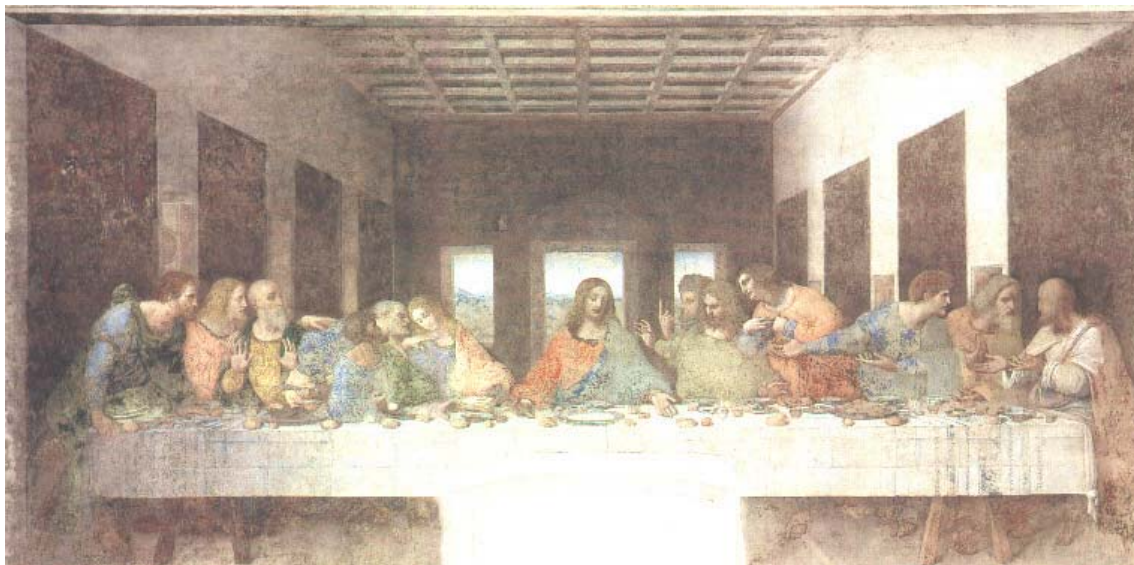
Figure 1:   The whole painting.

In one of the preliminary sketches with John resting his head on the table, the grouping of the remaining apostles on Christ's left is two plus three. At his right it is one (Peter) plus two plus two. Leonardo restructures this scene to obtain geometrical symmetry, which may be expressed arithmetically: $13 = 3 + 3 + 1$ (Christ) $+ 3 + 3$. In comparison with this order we may observe

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[1]   Luca Pacioli, the friend of Leonardo, gave the interpretation that Christ has just said: "Unus vostrum me traditurus est" and that Christ in this moment accepts the beginning of his martyrdom.

that Giotto (1266-1336) painted his "Last Super" with a central non-homogenous group of three: Christ, John, and Judas on the opposite side of the table plus two groups of five apostles. The arithmetic order is: $13 = 5 + 3 + 5$. Ghirlandajo (1449–1494) also adopts the central group of three persons, but he further subdivides the five persons to the left. Leonardo's proportions are new in relation to the tradition and they define a new cognitive or image-schematic model, which is able to restructure the reading of the biblical story. In an indirect way relevant for the broader public, the story of the Last Supper is a prototype of the interpretation of society and the relation in a human group (a family, a group of friends, a group of professionals, a political party with its leader, etc.). Therefore, the innovative organization of the topic in the painting creates a new frame of interpretation not only applicable to spiritual life but also to political and everyday affairs. In this sense, it has the role of a discourse orientation and is able to serve as background knowledge for innumerable situations of communication. This is responsible for the human and social relevance of a piece of art beyond its esthetic function. Such a semiotic view on art is, however, still in its beginning and I cannot elaborate on it in this context.

The narrative function of the painting is expressed by its dynamics. The utterance of Christ: "One of you will betray me", is a force, the effect of which makes a visible and emotional impact on the apostles. Like a shock-wave it hits most strongly the two groups sitting directly to the right and left of Christ and to a lesser degree the exterior groups. If we consider the nearer groups, James is pushed back, whereas John, although displaced relatively to Christ, stays calm, and Judas seems to stick in the moment as he is grasping at the bread. These two groups are more agitated than the calmer outer groups. Thus the dynamic effect of the words of Christ is represented as a wave with repercussions and vortices. This is also true for the single groups of apostles. If we analyze their postures and gestures, we can further decompose all four groups of apostles into two plus one (center). The central person neutralizes, stops the movement issued from Jesus and thus brings it to rest, the natural locus of movements in Aristotle's physics. It is as if the blow of the utterance had dynamically shaped the four groups and their subgroups. As a result of the impact, the grouping could be a natural consequence of the underlying dynamics. Dynamically, Judas is clearly separated from the other apostles, he seems to be lost for any positive effect, holds his money in his right hand, stops grasping for a moment at the bread. He shows a closed, sinister face which is in full contrast to the face of John illuminated by the light from the left.

In relation to the geometry of the painting, we can say that Leonardo tries to organize his composition as an instant in a process which shows the origin of the force, the immediate effects and the multiple structures created by the percussions of the force, which is in and comes from Jesus. As the emotional and intellectual effects of the central force are the main topic of the

painting, Leonardo reorganizes the geometry of the scene, in order to arrive at an optimal representation of the percussions in body-postures, gestures and facial expressions.

The semiotic revolution in Leonardo's painting prefigures the scientific revolution announced in Copernicus' *De revolutionibus orbium* (1543) and brought to the summit in the work of Galileo and Kepler. Together with other intellectual and religious changes they remodel the common knowledge, the world-view of educated people in the sixteenth century and of Western civilization in the centuries which follow. The second example also refers to the work of Leonardo, but it is closer to linguistic semantics, mainly sentence frames and verbal valence: The thematic composition in Leonardo's paintings of St. Anne.

Figure 2 Leonardo da Vinci: St. Anne with Mary, Jesus and the lamb (Paris)

In the painting of Leonardo three persons: St. Anne, Mary and Jesus (of different ages and sexes) are easily identifiable as the major topics. From the Bible we know that there is a kinship relation: Anne — *mother o*f — Mary —*mother of* — Jesus (by transitivity we know that Anne is the grandmother of Jesus, by inversion that Jesus is the son of Mary and Mary the daughter of Anne). This knowledge level already constitutes a second space related to the (first) visual space that we construe immediately as we look at the painting:

Anne — background to — Mary — background to — Jesus

Anne's head — *above* — Mary's head — *above* — Jesus' head

Anne — looks older than — Mary — looks older than — Jesus

Anne — *supports* — Mary — *supports* — Jesus

Anne and Mary form one group (by proximity), Jesus and the lamb an other.[2]

The painting contains a rich geometric and dynamic structure (weights, bar centers, force-lines, gaze-directions, etc.) which is used in many of Leonardo's works. A purely static representation would be insufficient for both the pictorial and the narrative aims of the painting. Furthermore, this piece is typical for Leonardo's art which consistently exemplifies the concept of *dynamic valence*.[3]

In the case of this painting, we have on the surface a quaternary constellation: Anne — Mary — Jesus — lamb. If one considers the force fields and actions, one notices that a basic interaction links: Mary — Jesus —the lamb.

- Mary *pulls on* Jesus
- Jesus *pulls on* the lamb
- The lamb *resists*
- Jesus resists being pulled away from the lamb

There is a conflict between Mary who tries to prevent Jesus from seizing the lamb and Jesus who notices this (he looks back to her) but resists against her action. This triad constitutes a force field, which dominates the message of the painting. A first schematic representation introduces two vector-fields with attractors:

Mary	←●	Jesus	●→	lamb
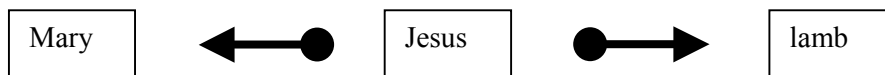
Jesus is in the metastable position between two attractors; the narrative (biblical) content of these attractors is:

- Mary: His mother; she cares for her baby.
- Jesus: He feels the duty to sacrifice and to leave Mary behind.

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[2]   The knowledge space is richer as the colors help to complete the visual map. In Leonardo's painting both mother and daughter have a green mantle and Mary can be seen to wear a red robe; both are subsumed under the color-opposition: red-green. The lamb is a symbol of the sacrifice of Jesus and an attribute of John (Baptist).

[3]   Peirce was the first to propose a general scheme on this level of abstraction. His monads, dyads and triads are considered as dynamical wholes (in Leibniz' sense) not reducible by simple composition. However, they may be and often are degenerated. i.e., not complete, non saturated, with defects.

The cognitive dynamics lying at the heart of the two paintings by Leonardo may be described in the context of dynamical semiotics (cf. Wildgen, 1994: 68-72). The constellation of forces between Mary – Christ – the lamb correspond to the basic archetype of transfer in Figure 3
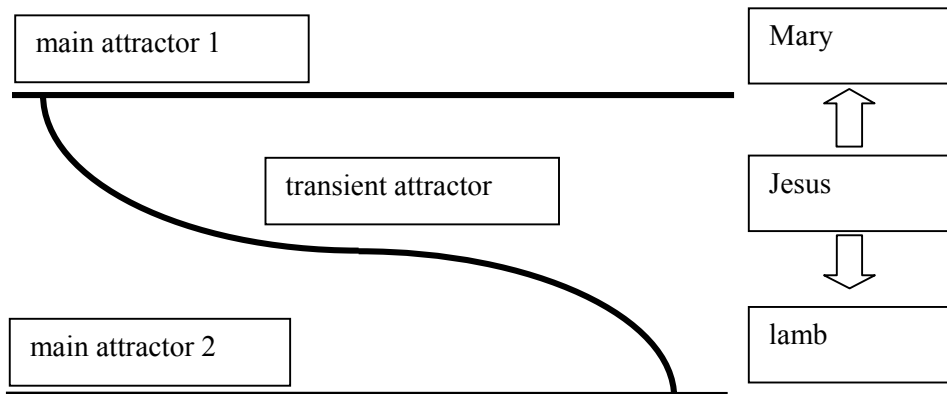

Figure 3:   The dynamical archetype of transfer (giving) and a fiber on it (with attributed contents).

As the archetype does not describe all the interactions in the pictorial composition one has to add two complications:

- Anne supports/anchors the whole event (physically and genealogically), she is a fourth attractor which sustains the event happening on her knees.
- The manner of "transfer" is further elaborated in the painting and could be described in a sentence like: *Mary tries to prevent Jesus from seizing the lamb.* This complex sentence goes beyond the elementary schema shown in Figure 3.

In the painting one sees Mary's hands seizing Jesus and the hands (and feet) of Jesus seizing the lamb and we see that Jesus has a stronger grip on the lamb than Mary has on him. The turning of his head creates an opposition to the force-direction of Mary's hands.

One could further distinguish two levels of content interpretation:

- An interpretation based on everyday experience with human interaction.
- An Interpretation linked to the Bible.

The distinction of two levels of analysis is natural because in real-life situations, i.e., when one observes a mother interacting with her child, the first interpretation/blend occurs. In cultural traditions that have elaborated a collective visual or linguistic memory (e.g., of major biblical contents) the second interpretation is superimposed on the routines of the first one. It is typical of art to presuppose cultural knowledge and special "reading" skills.

2. The semiotics of landscape painting (William Turner)

Natural scenes and even actors may fade from sight, e.g., a landscape in fog or in the transition to darkness, a person under similar conditions, or if the viewer is only allowed a short glimpse,

as when passing by in a train. Reduced visual cues for an object or person portrayed in such a way are therefore not necessarily *abstract* but may be *real*. Another example of *abstract* perception occurring in *real* vision my be found in cases in which people half-perceive or only implicitly perceive objects which appear in a repetitive or monotonous context, such as the telephone poles at the side of the road on a long car trip, the contents of a room which one passes through everyday, and so on. Although they have the physical ability to perceive the whole situation in a precise manner, people largely ignore the multitude of details and pick up one or two specific features. In such situations our memory is doing something one may call "abstraction". In the same way, the artist may prefer to represent the mental (mnemonic) construal of such scenes out of the selected features and to neglect all foreseeable and general features. I shall analyze this process in some paintings by William Turner.

William Turner (1775-1851) stands in the tradition of British landscape painting. Starting in 1729 there was a tradition among aristocratic families of sending their young men on a "Grand Tour" visiting Europe and especially Italy. Paintings of scenes encountered on the tour, mostly in the dominant Italian style, were brought home as souvenirs. In the course of the 18th century painters like Wilson, Gainsborough, Wright of Derby, Cotman, Gertin, a.o., departed from this tradition and Turner radicalized the move against topographical preciseness (cf. Meyer, 1993).

The loss of referential distinctiveness, the neglect of an identification of specific objects, cities, and landscapes may have been motivated by Turner's preference for vague surfaces under specific (natural) conditions and by his feeling uncomfortable working very long with his materials in the open, i.e., he preferred a more economic or even minimalist method. In a painting of the Castle of Chillon at the lake of Geneva from 1809 (British Museum) a precise representation with persons in the foreground, buildings, the lakeshore and mountains is given; it is shown in Figure 4 .

Figure 4 Castle of Chillon at the lake of Geneva from 1809 (British Museum)

In an watercolor painting from 1841 the same lake of Geneva in depicted in a very vague fashion.
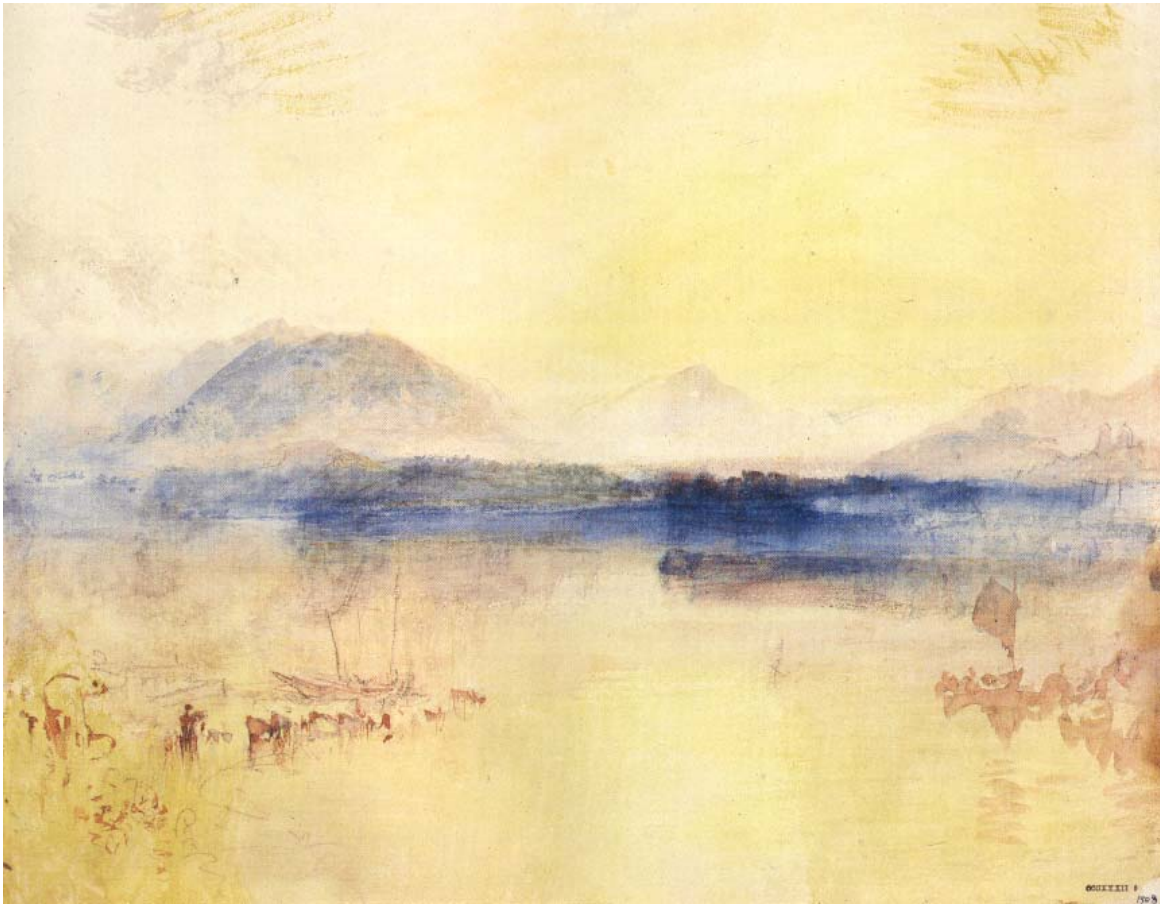
Figure 5:   Geneva: The mole, the lake and the Savoy Hills, 1841 (cf. Wilton, 1982: 63, Nr. 89).

In the second painting (cf. above) one can still recognize mountains, the shore of the lake, the water surface (blue), ships, and possibly people, but the symphony of colors, the transitions between surfaces and indirectly the emotional values become dominant.

Some of the later paintings reflect very specific, rare and traditionally not represented phenomena like the

> "Snow storm – Steam boat off a harbor's mouth making signals in shallow water,
> and going by the lead."

Turner gave this precise description to avoid an interpretation of the picture as fantasy or caprice. In a certain sense, some of these paintings are even more realistic than those by Leonardo because they refer to concrete, personal perceptions of the painter. Their objects refer to geographically and historically precise entities which can be identified as parts of the context of the painter's life, episodes of his journey, situations observed and remembered by the painter himself. This subjectivity, which refers to the life, the body of the author is probably the new

message which made Turner a precursor of the impressionistic style in the eyes of later generations.

The next section will follow this line, which became dominant in the artistic directions of expressionism and cubism. The work of Picasso could be a good example but I choose the sculptures (and sketches for sculptures) of Henry Moore.

3. Abstract analysis of human body postures in Henry Moore's sculptures

In order to restrict the scope of my analysis, I shall only consider the topic of the "Reclining Figure", which is frequent in Moore's oeuvre. In a crayon drawing ("Reclining Nude", red and black crayon, ca. 1923; cf. Moore, 1989: 96) Moore shows a realistic picture of a "Reclining Nude"; cf. Figure 6 .
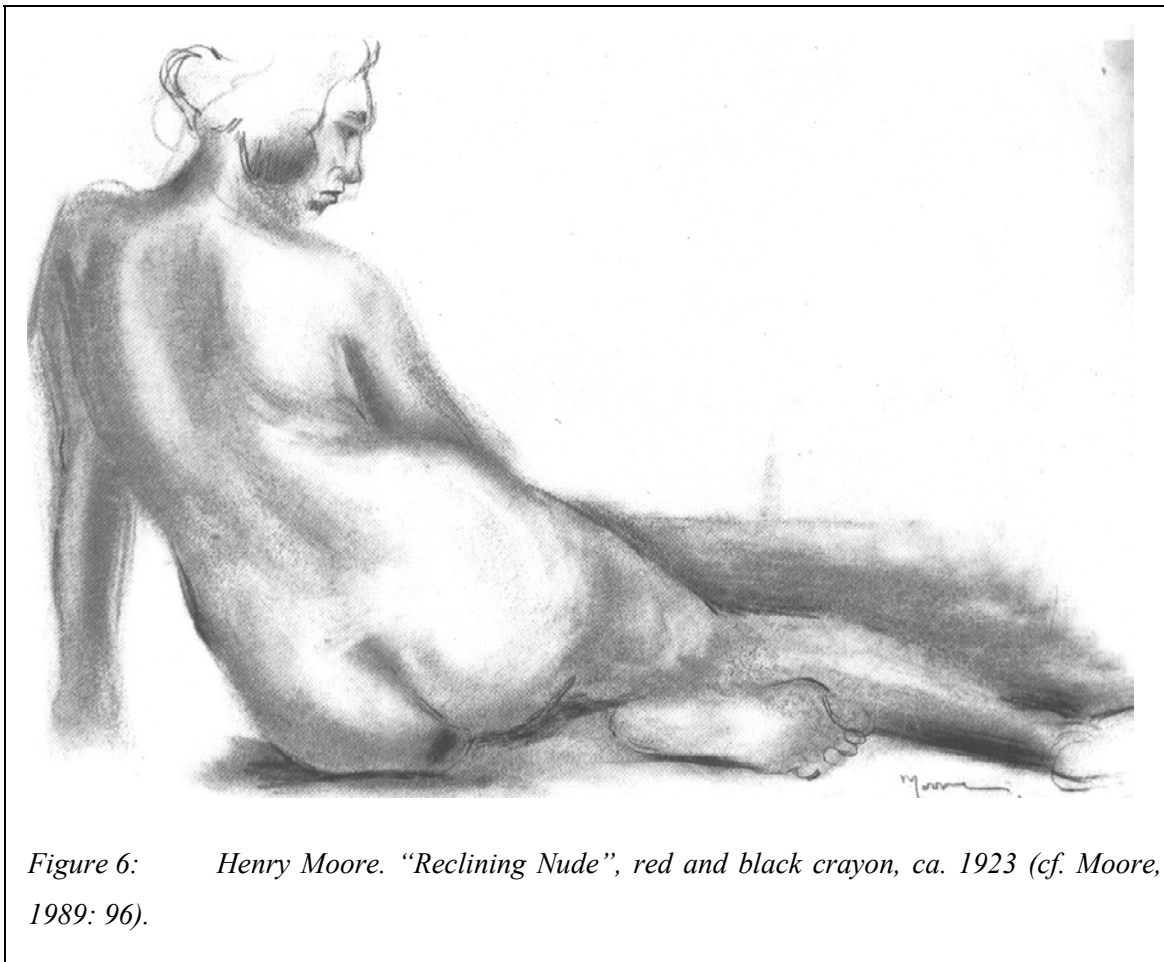

Figure 6:   Henry Moore. "Reclining Nude", red and black crayon, ca. 1923 (cf. Moore, 1989: 96).

A drawing from 1933 shows a series of projected sculptures on the same topic. Even if single parts of the sculptures may be recognized as belonging to a human body in a reclining position, these figures are like an exercise for variable shapes of persons in the given pose. What is left is

the horizontality, the partial suspension (and support) of the body typical for a reclining pose (cf. Moore, 1989: 112)

Henry Moore became famous for his large sculptures, many of which resemble human bodies, but some of which lack any referential support. In Figure 7 one of many variants of Henry Moore's treatment of the topic in sculptures is presented and used for further analyses

Figure 7:   Henry Moore. "Reclining Figure, Hand", 1979, Bronze (cf. Moore, 1989: 265).

The head is a mass in the normal position of a head (above the shoulders) and the direction in which the head is facing, (i.e., front, sides, back of the head), is distinguishable. Everything else: hair, ears, eyes, mouth is absent. The sharp frontal line on the "head" could be a generalization of the nose. The big extremities (feet) may be associated with the shape of covered knees in a reclining figure and the large mass at the end could be a long cloth covering the legs which are open (cf. the drawings from 1948 in Moore's Sketchbook; Moore, 1989: 151). The result of this "abstraction" can be explained by a series of transformations, which are visually reconstructed by the viewer as soon as he knows the topic of the sculpture.

What is the prototype of a draped lying woman? The simplest scheme is one of two masses:

mass 1: (head, trunk, arms) — mass 2: (legs) — transitory zone: back

The transition zone is the most difficult part for the composition, it can be a sphere (maximally curved) — a bent cylinder (moderately curved) — a regular solid, e.g., a pyramid, a cube, etc. All these solutions are at least implied in Moore's sculptures. Figure 7 gives an idea of possible compositions.

Figure 8:   *Reducing the "Reclining Figure" to cylinder, sphere and (curved) pyramid.*
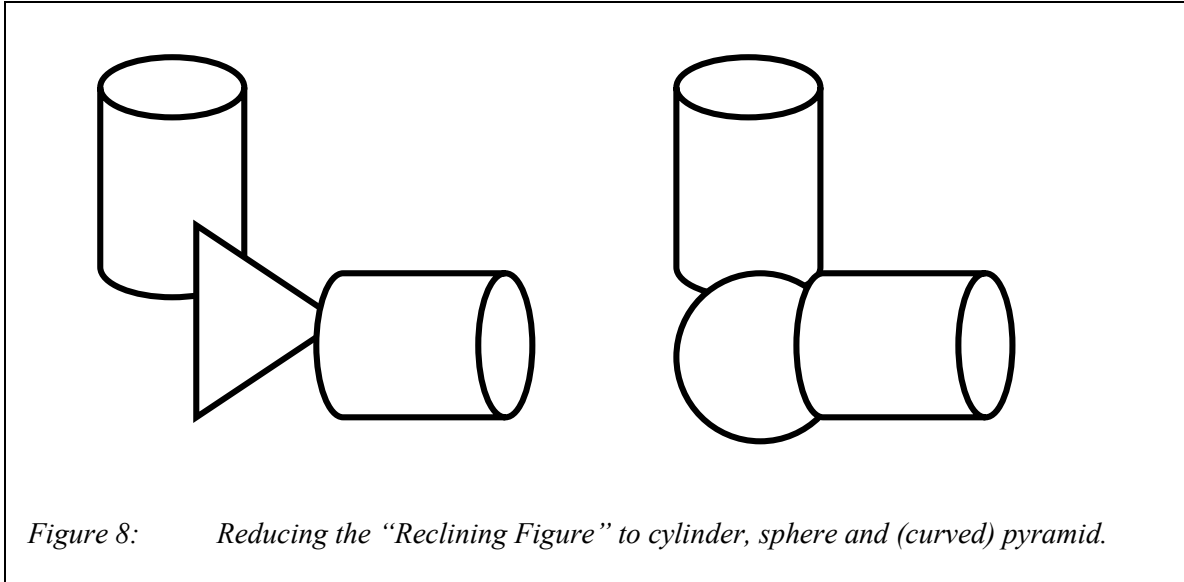
The narrative content of a "Reclining Figure" is concentrated in the verb: to lie, with its lexical neighbors: lie down, sit down, and stand up, rise. The viewer of the sculpture may mentally add in masses for the head, the shoulders, the arms, the elbows, the knees, each leg, feet, hair, eyes, nose, mouth, etc. He thus goes back on a path of abstraction analogue to that taken by the sculptor himself (or even engages in a longer "story" of artistic development). This "story" may be understood as the trajectory from a prototype (or a set of prototypes) to our visual representation of a particular human body. The sculpture is thus a representation of this cognitive itinerary (cf. Leyton, 1992).

A more radical visual analysis of the human body destroys its unitary gestalt, its topological coherence. Two trajectories may be observed in Moore's oeuvre:

- Instead of one body (from head to feet and hands) several sculptural entities which together "represent" the "Reclining Figure" are used. Moore distinguishes two piece, three piece, and four piece reclining figures.[4] The geometrical analysis shown in Figure 7 is not sufficient to cover all the variants of the topic; but if one adds curved (and conical) cylinders, spheres with excavations and bent cylinders most of the forms may be classified

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[4]   In Moore, 1968, examples are shown in Nr. 10 (one piece), Nr. 11 (two piece), Nr. 40/41 (three piece); the four piece composition (N. 86) is not called "reclining figure" but visibly belongs to the same family of sculptures.

on this basis. The bending of lines, the curves, the concave or convex surfaces refer more specifically to the realm of living, biological entities.

- Beyond convex and concave limbs and surfaces one can observe gaps. They may appear in a reclining figure, e.g., between arm and body, or arms and legs and the support. These gaps may show up naturally[5];

- In other sculptures the title of the sculpture abandons the reference to human bodies, as in: "Three rings, 1966-67" (Moore, 1968: Nr. 74).

Instead of continuous (differentiable) curves, sharp edges ("knife-edge"), pikes and strings attached to bodies appear. The combination of smooth surfaces, knife-edges and pikes is illustrated in the sculpture: Three points 1939-0 shown in Figure 9.

Figure 9:   Henry Moore, Three points 1939-0; cf. Moore, 1968: 45 (Nr. 37).

4. Conclusion

Innovations in art are more than temporary changes in taste or dominance shifts in the rivalry of schools. They contain at their heart a "problem" and its "solution" by the artist. This has been

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[5]   Cf. Moore, 1968: Nr. 68, 71 "Reclining figure 1939", Nr. 73 "Reclining figure (external form) 1953-54".

shown in the case of Leonardo, where the arrangement and the postures in the "Last Supper" contribute to the visualization of the dynamics inherent in the narrative episode represented in the fresco. In the series of works dedicated to the triad: St. Anne, Mary, Jesus, a dynamic configuration with attractors, repellors, forces, weights and counterpoises is visually organized together with a system of sight-vectors. The case studies on Turner and Moore showed the natural process of symbolic abstraction in landscape painting (Turner) and figural sculpture (Moore) and the directions of their gradual development in the oeuvre of the artists.[6]

Visual semiotics should in its future development concentrate on such "problems" of symbolic representation and the ways of their "solution". The treatment of dynamics seems to lie at the heart of such an endeavor.

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[6] Further semiotic aspects of the art of Leonardo da Vinci have treated in Wildgen (2004a: directions of gaze and gestures); the iconography of the Last Supper was the topic of a chapter in a book on the semiotics of art (in French; Wildgen 2004b). Innovation in art has been analyzed in the context of innovation in language and in science as a chapter of my book on the Evolution of human language (Wildgen, 2004c).

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