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The Grid: History, Use, and Meaning

This article grew out of the author's lecture at the Second Symposium on the History of Graphic Design (Rochester Institute of Technology, April 1985), entitled "The Iconology of the Grid: Past and Present Uses and Meanings." The author would also like to thank the editorial staff for many useful suggestions.

The grid[1] has played a central role in the development and consolidation of the modern movement in twentieth-century graphic design. Due to its ostensible use during this period as a compositional design matrix for controlling the placement of typography and imagery, the modernist grid was not visibly present in the finished design. Consequently, its symbolic aspect is not generally recognized or even suspected. Though equally obscure in significance, the contrasting decorative role of the grid as a prominent piece of visual iconography in postmodernist graphic design more readily admits to a possible symbolic function.

To understand these symbolic functions it will be necessary to first examine some key junctures in the pre-twentieth-century development of both the grid and, in some cases, its individual elements: the point (or coordinate), the axial line, and their mode of interaction. In terms of the impact the changing values of the grid's constructive elements have on the meaning of the grid itself, a structural typology of the grid reveals four basic grid subforms: coordinate-based, intersection-based, module-based, and line-based (figure 1). Although identical in appearance, the specific valuation of each element distinguishes in turn each of these subforms and is directly related to its symbolic content. Historically, these subforms are found to function in pairs and thus jointly to constitute two major forms. The first major form will be referred to as *point-based* and includes the coordinate- and intersection-based subforms. The second major form will be referred to as *field-based* and includes the module- and line-based subforms.

1) Here defined as a proportional system of coordinates intersected by vertical and horizontal axes.

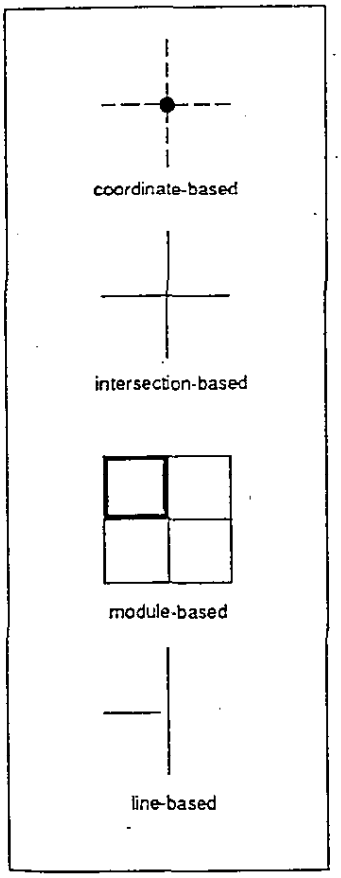


Fig. 1) Typology of the Grid: the four subforms.

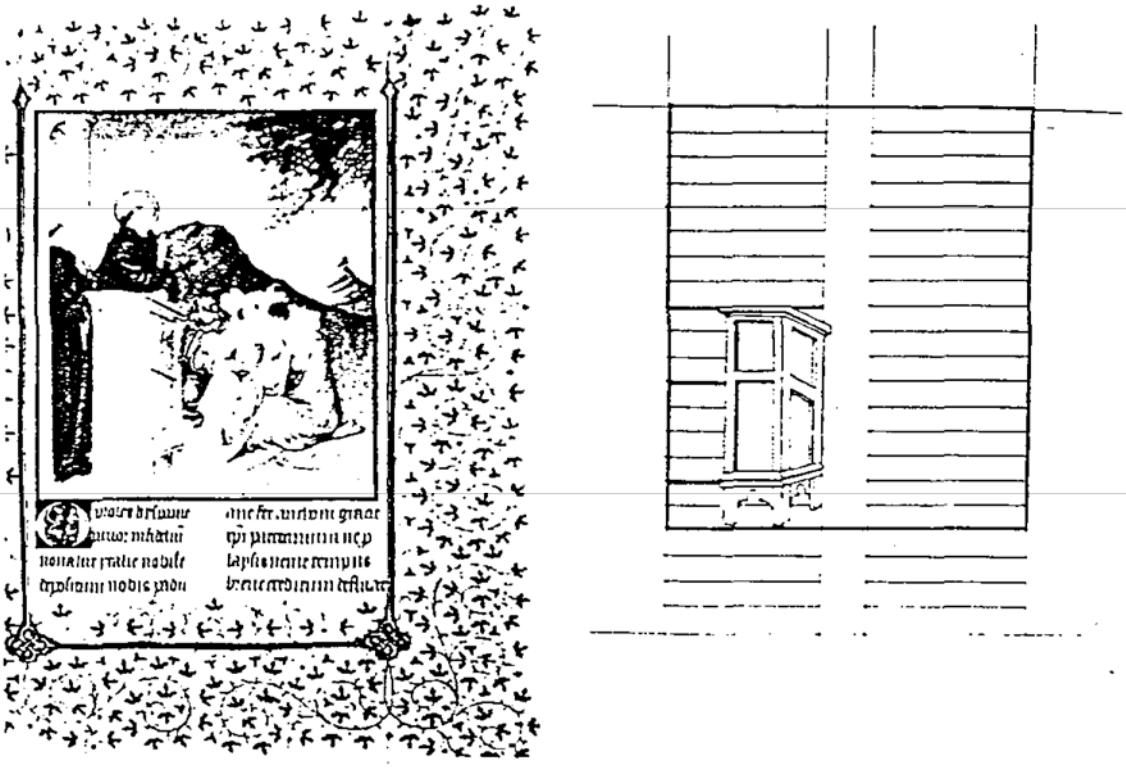
The late medieval grid

The point-based grid best characterizes the late medieval Christian world. Point-based grids were used to emphasize the focusing potential of the coordinate, either in and of itself or as the conjunction of two axes. This constructive logic supported the late medieval grid's symbolic status as a set of qualitative *vertical relations* between the superphysical above and material reality below, which were divinely generated by means of point coordinates conceived as "thresholds." Other grid forms were nonetheless present as well. For example, a simple, line-based grid is visible in Guten-

berg's 42-line Bible of 1455, in the form of lines used to position the double columns of text, the folios and headings, and the margins. These lines were derived from the guidelines that served a similar function in inscribed Gothic manuscripts.[2] In addition to vertical guidelines that helped establish the placement and width of columns and margins, illuminated Gothic manuscripts featured horizontal rules to guide the hand of the scribe who wrote the text. In some instances, these vertical and horizontal lines have been found to control both the placement and the pictorial composition of the painted miniatures. This function is evident in the diagram of an illuminated page (figure 2) from an early fifteenth-century *Book of Hours*, in which the left edge of the lectern from which St.

2) Allen Hurlburt, *Grid: A Modular System for the Production of Newspapers, Magazines, and Books* (New York: Van Nostrand Reinhold Co., 1978).

Fig. 2) Diagram showing the relationship between the page rulings and the pictorial composition of the painted miniature in a manuscript page from an early fifteenth-century *Book of Hours*.



Anthony preaches coincides with the inner-columnar margin for the text. This integration of text and image strongly suggests that both the layout of the page and the pictorial composition were planned and executed by the miniaturist himself. Such use of vertical and horizontal lines to position text and image does not greatly differ in principle from the twentieth-century modernist grid that acts as an understructure to control the layout of the page. However, the shared identity of the designer and painter, coupled with the fact that guidelines also regulated pictorial composition, opens up the possibility that grid-lines may have also been used for representational or symbolic ends.[3]

Such is the case with the illuminated manuscript page of the fif-

3) Donald Byrne, "Manuscript Ruling and Pictorial Design in the Work of the Limbourgs, the Bedford Master, and the Boucicault Master," *Art Bulletin* LXVI, No. 1 (March 1984): 115-36. Byrne's proposal that the designer and miniaturist were the same person was even more strongly supported in one instance by the presence of prick marks at page top and bottom to vertically establish the placement not only of text and margins, but of the painted illumination as well.

a

b

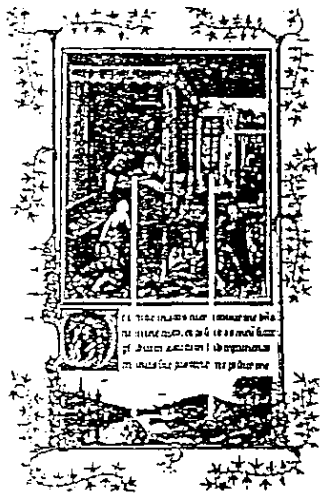


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Fig. 3) *Birth of John the Baptist* manuscript page from the *Tres Belles Heures de Notre Dame*. Turin-Milan *Book of Hours*. fifteenth century.

teenth-century *Tres Belles Heures de Notre Dame*, which depicts the birth of John the Baptist above and John's baptism of Christ below (figures 3a & 3b). Not only are rule lines visible beneath the lines of the page's text, but the exact spacing of those lines continues the length of the page and corresponds either to the edges of represented objects or to the placement of key symbolic objects in the pictorial program. Vertical spacings of the same width also correspond to a like positioning of edges and objects, resulting in a grid of uniform spacing based on the ruled line of text, which underlies and regulates the entire page composition. Visual analysis of the pictorial composition reveals that these lines have a representational and symbolic purpose superseding alignment for mere esthetic effect. For example, the newborn baby John in the scene of an interior above is in perfect vertical alignment with the adult John the Baptist in the landscape below (figure 3c). Also, the tight, round form of Christ and John at the river bank is perfectly echoed on their right by a large boulder, itself sited on a vertical grid-line shared with a sashwork cross in the window of the room above (figure 3d). These two vertical grid-lines thus serve to reveal a unique correspondence between the two scenes: The birth of John above is linked to the baptismal birth of Christ below and follows a downward motion echoed by the descent of the baptismal dove sent by God, who is seated in a zone between (and quite separate from) the temporal realities of two pictures. This

descending motion is also emphasized by the V of the hills seen above the Baptizer's head. Conversely, if we follow the peak of the hill to the right, the right grid-line leads the eye back up from the rock to the cross and symbolizes the death and resurrection of Christ after the rock was removed from His tomb. Taken together, the two grid-lines become part of a dynamic, counterclockwise schema of incarnation, death, and rebirth. The grid establishes a visual relationship between depicted objects and events, removed from one another in space and time but spiritu-

ally linked by God, who acts behind outer historical events to bring about world redemption through Christ's incarnation, death, and resurrection.[4]

The grid in the *Tres Belles Heures* manuscript page is therefore much more than a mere compositional device. It symbolizes God's design plan for the redemption of world and man because the coordinates – the junctures where special symbols and events are sited (birth of John, baptism of Christ, rock and cross) – signify those points where God's plan or will has asserted itself upon physical reality and historical time. These coordinates thus represent crossing points, or *thresholds between the qualitatively distinct* levels of spiritual and physical reality. Furthermore, these coordinate points lead both ways, from God's will into the physical world, or, for the prepared reader, anagogically to God. This movement between qualitatively different worlds is fundamental to the Christian drama and demonstrates that the grid is point-based. Axis lines play a secondary role.[5]

By extension, this concept of the point is also present in the emphasis given to a certain intersection of the horizontal and vertical axes in the same manuscript illumination. These grid axes correspond to the beams of the window's sashwork cross, which is the only place in the composition where the underlying grid is visually revealed.[6] Likewise it was in the cross itself, symbol of Christ's death and resurrection, that God's design plan for world redemption became outwardly revealed. The true basis of the grid (and of God's design plan which it symbolizes) is in fact the cross itself. This conclusion is fully consistent with the standard medieval interpretation of the cross in which the horizontal and vertical beams are seen to represent – as is Christ Himself – the conjunction of heaven and earth respectively.[7] It is the *point* of heavenly and earthly conjunction that is of fundamental importance here (i.e., of God becoming flesh), rather than the perpendicular bypass of two axes. The combined emphasis on coordinate and intersection was thus indissolubly linked in the symbolism of the point-based grid of the later Middle Ages.

Renaissance and Cartesian grids

Beginning with the Renaissance, however, there occurs a transition from a sacred to an increasingly secular world conception. This is accompanied by a corresponding shift from a grid based on value-loaded coordinates and intersections to one conceived of as a *field* comprised of points and axes possessing either neutral or numerical (quantitative) value.[8] Field-based grids were used to emphasize the expansive potential of the repeated module or individual axis-line in continuous or near continuous extension. These elements in turn defined a set of *horizontal relations occurring on* a physical plane. (It will be noted that this definition is in essential accordance with the previously cited Gutenberg Bible page grid.)[9]

4) In designing this page, the artist innovated a visual counterpart to the practice of scriptural exegesis, a method of critically reading and comparing Biblical passages to discover hidden patterns of correspondence planted there by God. The discovery of these patterns could be accompanied by various forms of spiritual illumination, as was consistent with the anagogical principle holding that certain physical events or objects (in *addition to scripture) contained the* impress of the divine. When properly understood through contemplation, one's consciousness would be led from the object to its transcendent source in God.

5) The use of the point as a focus for contemplative consciousness, or the concept that it could be a threshold between physical and spiritual realities, was a standard feature of spiritual education in the Middle Ages. For example, in the twelfth-century treatise on Noah's mystical ark by Hugh of St. Victor, a mandala-like diagram guides the Christian meditator in the construction of a sequence of mental images until, arriving at the centerpoint of the figure, a concentration and transformation of consciousness occurs with an attendant passing into the Godhead (see Grover A. Zinn, Jr., "Mandala Symbolism and Use in the Mysticism of Hugh of St. Victor," *History of Religions*, May 1973). The allusion to Noah's ark in the title of the treatise may help to explain the unique psychotechnics of this meditation. On a metaphorical level, the Biblical account of the flood represents a plant-like process of world death and rebirth: the contraction of life to a seed-point (into the ark), the passage and survival of that point through the obliteration of the surrounding senseworld (the flood), and the subsequent re-expansion or blossoming of that point on the "other" side.

6) Robert Campin's triptych, *The Merode Altarpiece* (c.1426), which is contemporary with the birth of St. John, uses the same devices to the same ends. The altarpiece is based on an underlying grid with key symbols and dramatic points of action sited at strategic coordinates and intersections, and a sashwork cross in a window represents the only place in the pictorial program where the grid is revealed to the viewer (see the author's master's thesis, *The Meaning of the Merode Altarpiece*, Ann Arbor: University Microfilms, 1982, 350pp).

7) The cross was but one of a host of symbols that represented Christ as the conjunction of the heaven and earth. Another such symbol, also popular in Christian religious art, was the almond-shaped *mandorla* in which was placed the seated or standing figure of Christ. The shape was formed by overlapping two circles that represented the spheres of heaven and earth. As the link between both, Christ occupies the area of their conjunction.

8) The coordinate's shift from a spiritual to a physical meaning is well exemplified in the radical alteration of environmental space which occurred in Lyon, France, when the city passed from Catholic to Protestant rule in the sixteenth century. The widespread iconoclasm which accompanied the takeover eliminated numerous sacred grottoes, churches, and similar spiritual "hotspots" through which the divine was felt to vertically penetrate the space of the mundane world from above. Once destroyed, a more horizontally-oriented environmental network of secular and commercial activities took its place. A homogeneous cityscape thus displaced one that was qualitatively differentiated. Natalie Zemon Davis, "The Sacred and the Political in Sixteenth Century Lyon," *Past and Present* 90 (February 1981): 40-70.

The gain in priority status of axes and horizontal relations which characterizes the *field-based grid* is accompanied, in the same century, by history's greatest expansion of global exploration and discovery. To aid this process, the Flemish mathematician and cartographer Gerardus Mercator revolutionized navigation by developing a grid with mathematically determined coordinates and straight axes of longitude and latitude to accurately represent relative physical distances on the spherical plane of the globe.[10] This grid's individual squares (like the axes) conveniently framed specific places. As a result, the grid functioned equally well as a field of either modules or axes. The infatuation with the world of nature and sense experience that characterized this age of physical discovery was perhaps best expressed in the rise of mathematical pictorial perspective in the fifteenth century, and its subsequent immense popularity in sixteenth- and seventeenth-century painting. Like Mercator's cartographic grid, mathematical perspective construction employed a field-based grid either to simulate or to document spatial relationships between physical points on a plane. This particular form of grid was tilted to create the illusion of spatial recession in three dimensions through the implied convergence of parallel lines. Unlike the late medieval grid, the intention was not normally to lead the viewer of perspective from the material world into the sphere of the superphysical. Rather, the depicted space was conceived of as an extension of the viewer's own space. Leon Battista Alberti, a painter and early propagator of the technique of perspective construction, wrote that the intended effect was similar to the experience of looking through a window.

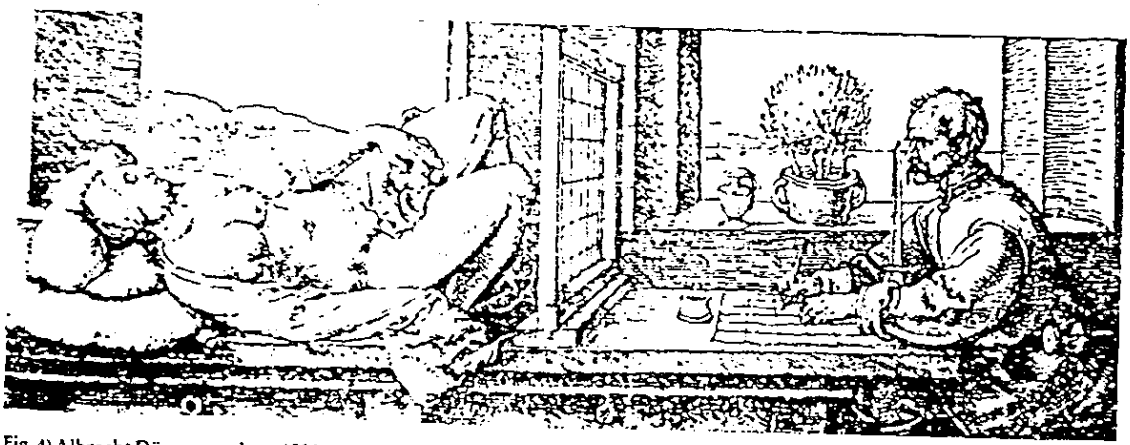


Fig. 4) Albrecht Dürer, woodcut, 1538.

The instructional woodcut by the sixteenth-century graphic artist Albrecht Dürer (figure 4) demonstrates the use of a grid for a similar recording of visual reality. In this instance, the grid visually breaks down the three-dimensional image into a set of modules for the purpose of transferring and reconstructing it on another surface with a corresponding grid.[11] Also in this example, three paradigmatic themes of this period, each of which finds

9) In major respects, the page grid undergoes few significant alterations in its development during the five-hundred-year period between Gutenberg and modernist graphic design. As with Gutenberg, the modernist grid is a field defined by either large zones created by perpendicular axes and/or by small zones in the form of individual typographic modules. In the interest of historical accuracy, it must be conceded that it is perhaps unlikely that the character-based typographic grid which typifies high-modernist graphics was consciously correlated by Gutenberg with his simple guidelines grid. Nonetheless, Gutenberg's grid *was* based on the rule which, like the entire printed field of the page itself, was undoubtedly conceived in terms of the individual typographic unit. That these two field conceptions of the page may not have overlapped in Gutenberg's mind did not, however, prevent the fact of their being grasped and utilized by his successors.

10) Earlier world maps treating spiritual in addition to physical geography often featured Jerusalem at the center. Operating as the *axis mundi*, a concept derived from earlier "world tree" mythologies that posited a spiritual connection (trunk) between heaven (branches) and earth (roots), Jerusalem was highest in qualitative status, other geographical locations being measured in value by their proximity to it. Considered alternately as a "world navel," a similar umbilical-like connection between earth and heaven was implied.

11) The use of the grid as a device for transferring drawings from one surface to another, and from one scale to another, dates back to ancient Egypt and seems to have been in fairly continuous use by artists ever since (see James W. Davis, "Unified Drawing Through the Use of Hybrid Pictorial Elements and Grids," *Leonardo* 5 (1972): 1-9, especially the section on "Grid Structures in Western Art").

12) That this combination was both unique and representative of a new concern entering Western culture at that time is suggested, using the example of perspective painting, by the many artists using perspective to achieve a novel effect versus the few who used it chiefly as a method not of representation, but of investigation.

expression in the grid, may be observed. First, there is the intense fascination with surface appearance and its description. This is coupled, in leading individuals, with the quite different interest in the invisible laws and structural principles that underlie external appearance.[12] And third, there is the increased status of the rational mind itself, seeking to discover structure through critical observation.

As one moves from the Renaissance toward the twentieth century, there is a gradual shift in emphasis from appearance to structure accompanying the ever rapid growth of natural science (called natural philosophy).[13] With the writings of the seventeenth-century French philosopher and mathematician René Descartes, underlying structure and rationality achieve their most powerful expression. Descartes's *Discourse on Method* (1637) was to serve as a principle stimulus informing not only the use and meaning of the grid in this period, but also problem solving in later twentieth-century design.[14] With Descartes, knowledge is achieved by action of human reason, not divine revelation. Furthermore, the goal of knowledge is the physical world and its laws, not God and the supersensible world, as had earlier been the case. The grid's identification with material reality and laws is evident in his treatise *Geometry*, also of 1637. There, Descartes lays the foundation for an analytical geometry which defines the position of coordinates and axes – conceived as numerical quantities – on a plane in space. Yet with Descartes's stress on abstraction, the grid's association with the world of outer appearances loosens. As the rules elaborated in the *Discourse* made clear, appearances are suspect, and a problem (or, in visual terms, a field) is to be divided into its smallest component parts. This geometric, reductive operation is, of course, a mental process. The grid thus comes to represent not only the structural laws and principles behind physical appearance, but the *process* of rational thinking itself. So timely is this conception that, by the late seventeenth and early eighteenth century, the concepts of Nature and Reason achieved the status of leading ideas and came to be used interchangeably.[15] Signs of this reciprocity are evident, for example, in the application of the Cartesian grid to the exterior landscape, as in the case of the great French geometrical gardens.

Yet it is at the end of the eighteenth century that we find one of the best examples of the Cartesian grid bearing such symbolism. The intellectual climate at this time was characterized by deism, a movement which was a well-established by-product of rationalism. The latter is a theory that rejected formal religion and the concept of supernatural revelation but argued that the logic of nature demonstrated God's existence. Conceived as the Great Clockmaker, God had designed the world as a machine run by natural laws and then had abandoned it to run by itself. This mechanistic determinism informed the use of the grid by the

13) Early examples include, at the turn of the seventeenth century, Leonardo da Vinci's dissection of cadavers in order to understand the nature of bone, muscle, and tissue and the effect of these on external bodily form and movement. Also, at century's end, the first compound microscope was developed, thus opening a window onto material phenomena lying below the threshold of the unaided physical senses.

14) In the *Discourse*, Descartes presents four rules for acquiring knowledge, which may be paraphrased as follows: (1) doubt all that is not clearly evident to be true and do not accept surface appearance, (2) always begin by dividing each problem into its smallest component parts, (3) always conduct thoughts in logical order proceeding from that which is most simple to that which is most complex, and (4) reason rigorously and geometrically and never skip a logical step. Robert Nisbet, *The History of the Idea of Progress* (New York: Basic Books, 1980), 116.

15) John Herman Randall, Jr., *The Making of the Modern Mind* (New York: Columbia University Press, 1926/1976), 255.

16) Jean Clay, *Romanticism* (New Jersey: Chartwell Books, Inc., 1981), 35.

Fig. 5) Jacques Louis David, charcoal study for the painting *The Death of Socrates*, 1787.

French neoclassicist painter Jacques Louis David in his painting *The Death of Socrates* of 1787. In the charcoal study of this painting (figure 5), David used the grid not merely as an illusionistic tool for transferring the drawn figure of Socrates from paper to canvas; rather, the rigid network of horizontals and verticals, evident in the wall behind Socrates, is represented in the finished painting as well.[16] The grid, which invades and integrates itself into the figure's very gestures, signifies the rational, impersonal, and inevitable character of natural law, which deterministically controls the structure of the material world and of events within that world. Indeed, the main theme of David's painting is the syllogistic inevitability of Socrates's death by his own hand as a consequence of his rigid adherence to the laws of rational thought and logically determined behavior.

The modern grid

By the second decade of the twentieth century, the full development of the Cartesian grid was realized. The dual emphasis on appearance and structure that had characterized the symbolism of the grid during the Renaissance, scientific revolution, and Enlightenment now moved strongly toward structure and away *from appearance and the illusionistic depiction of external* phenomena. The architectonic and constructive values so central to the early twentieth-century modernist canon were inherited from the preceding century. Viollet-le-Duc's or Joseph Paxton's promotion of exposed iron structure in buildings, Christopher Dresser's functional Arts and Crafts design of teapot handles based on bird and fish skeletons, or art nouveau's rejection of the applied surface decoration of Victorian design were all nineteenth-century expressions of this exodus from a belief in surface appearance as an esthetic end in itself.

The Cartesian tradition in France continued to act as the major stimulus for the grid as it assumed its modernist embodiment. For practical purposes, the process may be said to begin with Paul Cézanne's initial move away from Renaissance illusionism toward the abstraction and geometricization of nature and an emphasis on the flat field of the picture plane. This impulse continues through the faceting of the picture plane by synthetic cubism to produce an overall effect, and it peaks when Piet Mondrian takes up the pictorial grid of synthetic cubism to explore and purify it in virtual isolation from other pictorial elements. Under cubism's influence, Mondrian's naturalistic subject matter became progressively abstracted until, in 1915, he could paint a circular field of short horizontal and vertical bars and title it *Pier and Ocean*. His paintings in the years immediately following continued to employ vertical and horizontal bars, sometimes colored and usually not touching, on a white field. Often these bars appear to continue off the edge of the canvas, suggesting that the field extends infinitely

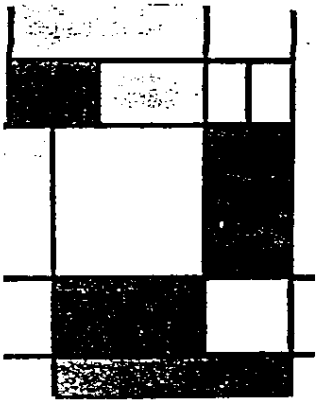


Fig. 6) Piet Mondrian, *Composition with Red, Yellow and Blue*, 1920.

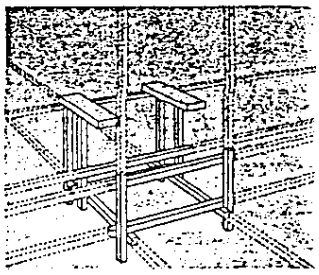


Fig. 7) Dynamic spatial projection of the axes of Gerrit Rietveld's *Red and Blue Chair* of 1917.

in all directions although the viewer sees only that portion visible within the "window" of the canvas. By 1920, Mondrian's pictorial vocabulary is established and consists of a white field through which travel continuous black horizontal and vertical bars that bound intermittently occurring rectangular zones of primary color (figure 6). The composition still implicitly extends beyond the borders of the canvas, and (according to Mondrian) the bars cross one another and overlap, but do not actually intersect. The resulting grid is of the *line-based* type and is thoroughly Cartesian in its presentation of an unchanging regular and isotropic universal field, ruled by logic and by the mathematical law that underlies the world of external appearance. The same conception is expressed in three dimensions in the *Red and Blue Chair* of 1917 by Gerrit Rietveld, who, like Mondrian, was associated with the Dutch de Stijl movement. Each axial structural member of the chair bypassed rather than abutted its neighbor and was painted black, with the exception of the exposed yellow end which signified it as an arbitrary terminus for an otherwise infinitely extending axis (figure 7).

This concept of an axially-defined field in infinite extension brings the symbolism of the Cartesian grid to its highest stage of development by linking it with the concept of a universal continuum drawn from contemporary physics.[17] The de Stijl grid visualized this physical spatial continuum not so much in material terms, but rather in terms of the mathematical laws that rule matter, space, and time. Mondrian's two-dimensional composition and Rietveld's chair were thus subsets of a larger universal field described by the grid. Also, because the modern grid was synonymous with the continuum itself, it may be defined equally well as a set of continuous axes or as a never-ending series of modules. The modern grid thus continued to be a field-based matrix predicated on the line and module.

The modernist principle of continuousness was applied as much to space as to material. The exploded form of Rietveld's chair partially dematerialized the object by dispersing it into the spatial field; space was thus allowed to circulate uninterrupted through the chair. This field-centered approach, which sought to oppose the object- or possession-centered ideals of the Victorian bourgeoisie (as expressed in their dark, massive, and closed furniture forms) was also to become the ideal of modernist interior space. Examples of this are the flowing spaciousness of Mies van der Rohe's interiors and the "free plan" of Le Corbusier, as are the reductive furniture forms they developed based on skeletal line and supporting plane, which subordinated the piece of furniture to the greater realities of streaming space and light.

But although the concept of the modern grid as a representation of the ubiquitous and invisible field of universal physical law was not too different in general meaning from that of the Cartesian

17) In his influential "Special Theory of Relativity" of 1905, Einstein had defined the infinite as merely the finite in extension. The medieval concept of a qualitatively differentiated, two-tiered universe consisting of physical and superphysical dimensions was thus collapsed into a nonhierarchic, physical universe conceived of as being in continuous extension. In terms of Mondrian's work, the reference to the sea in his early use of the grid in *Pier and Ocean* (1915) suggests that the continuum paradigm was established well before his mature works of the 1920s.

grid of the eighteenth century, its specific meanings were closely tied to early twentieth-century events and ideas which informed the modern grid and, later on, the postmodern grid. A basic characteristic of twentieth-century conceptions of the field is the de-emphasis of the point coordinate or individual unit (not unlike the de-valuation of the point which occurred in the shift from the late medieval to the Renaissance grid). This de-emphasis was an implicit feature, for example, of the homogeneous continuum of Einstein or of the anti-object paradigm of the Rietveld chair's exploded form. The pro-field, anti- or neutralized-point paradigm also characterized leading conceptions of the *person-environment relationship* during this period. For example, in the fields of sociology and psychology, Durkheim, Freud, and Watson described human behavior as environmentally or statistically determined. In the sociopolitical realm, socialist, communist, and collectivist writings and experiments placed great emphasis on groups and on relationships between groups, thereby de-emphasizing the importance of the autonomous individual. And in the sphere of design, the artists and designers affiliated with de Stijl and the Bauhaus felt that the passionate individualism at the root of the competing nationalisms which had caused World War I must be countered by an international impulse in architecture and design that would transcend national styles and differences.[18]

It is therefore not surprising that an anti-individualist vision expressed itself in the entire spectrum of innovations which accompanied the use of the Cartesian grid in European graphic design in the late 1920s. The underlying, invisible matrix of the grid guided the placement not of manually produced letterforms or expressive gestures, but of clean and geometric sans serif typography. Horizontal and vertical bars and rules were also used to subdivide the page space and corresponded to certain axes of the underlying grid. The leading innovators to employ this family of elements included El Lissitzky (*The Isms of Art*, 1925), Herbert Bayer, and László Moholy-Nagy (Bauhaus publications), culminating in the formulaic expression of the philosophy and method of this approach by Jan Tschichold in his 1928 book, *The New Typography* (figure 8). The field axiom behind this form of graphic communication was also evident in factors beyond the use of the grid and of copy that was factual and impersonal. For example, the asymmetric distribution of typographic elements on the page created an overall visual tension that converted the negative white space from a passive to an active value. The entire visual field was thus dynamically brought into play. The tension of this field was due as well to the use of sans serif typography, which *decreased* visual interaction between different letterforms and between letters and white space.[19] This lack of interaction between the individual letter and its neighbors was another example of the element of the impersonal. In addition, the preference

13) The most representative design example of this is the Weissenhof Housing Project, done for the Deutscher Werkbund exhibition of 1927 and directed by Mies van der Rohe, and generally regarded as the first official expression of the International Style in European architecture. The project sought, through the rational standardization of building forms and materials, to achieve a uniformity of vision and expression.

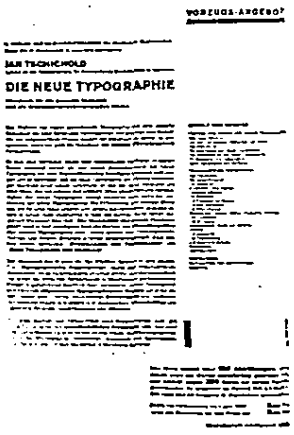


Fig. 8) Jan Tschichold, Prospectus for *Die Neue Typographie*, 1928.

19) Frances Butler, "Modern Typography," *Design Book Review* no.3, 96. The organic letterforms of art nouveau, on the other hand, carried on an intimate

visual conversation with the surrounding white space. Open, sinuous, or seemingly undulating art nouveau letters often sent the surrounding space swirling in eddies in and around themselves and one another. This expressive relationship between letter and page was a carryover from art nouveau's sculptural treatment of wall or surface planes in the design of interiors and domestic artifacts. In such instances the surface was conceived of as a mobile, living membrane with an inner being out of which expressive forms would manifest themselves in low sculptural relief. Thus, in the case of extremely organic art nouveau letterforms (e.g., Henri Van de Velde's initials for *Van Nu en Straks* of 1893, or Otto Eckmann's *Fette Eckmann* typeface of c.1902), the white of the page was seen as a generative surface out of which grew (as with the surface of nature upon which this surface was modeled) living forms. Naturally, these living forms were closely tied to the *environmental field* of nature from which they sprang. The geometric and thus inorganic sans serif letterform understandably lacked this living relationship to its environmental context: the empty white space of the Cartesian plane. More precisely, the white space of the Cartesian field signified the deserted spatial field of the deists made final in the continuum of Einstein. The estrangement of the sans serif letterform from its field was in truth a symptomatic expression of the increasing alienation of modern rational man from the world (as reflected in the profield, anti-individual paradigm already discussed). It was therefore not coincidental that, during the decade of the 1920s in which this visual language of modernist graphics was being articulated, the same message was being verbally expressed in the existentialism of the German philosopher Martin Heidegger, (professor at Marburg 1923-28, Berlin 1928-33) in his 1927 book, *Being and Nothingness*.

20) Leading examples of this include Bayer's "universal" lowercase alphabet of 1925 and Tschichold's "single case" alphabet of 1929.

for principally lowercase letters – even to the point of occasionally refusing to use uppercase initials for proper names or sentence beginnings[20] – reveals an antihierarchic disposition that disdained the elevation in status of the individual (be it a person's name or other proper noun) above an otherwise *homogeneous* field.

The subsequent generation of Swiss graphic designers expanded the applications of the mathematically drawn grid and brought it to a level of perfection and elegance, without, however, altering its basic use as a tool for rationally structuring and delivering factual information. Representative designers of the Swiss school included Theo Ballmer, Emil Ruder, and Joseph Müller-Brockmann, who acted as the movement's chief theorist and spokesman. The movement proved to have much international influence in the 1950s and 1960s, although the grid itself retained the same meaning it had in the 1920s; that is, as the continuous field of rational law which underlay the physical universe much the way the grid itself remained invisible "beneath" the final design composition. As Müller-Brockmann's own book, *Grid Systems*, made clear, the modern Swiss grid retained all the Cartesian symbolism it had possessed during the early modernist era and remained a rational, universally valid, objective, and future-oriented design tool.[21]

The postmodern grid

The modern Swiss grid enjoyed its heyday during the decade of the 1960s. But during the 1970s a number of graphic designers began to overthrow the conventions of modernist graphics and use the grid to new ends. The representative work of Yale graphics instructor Dan Friedman (figure 9), or that of former Emil Ruder student and Basel School of Art graphic design professor Wolfgang Weingart (figure 10, 11), illustrate the changed use and features of the grid within postmodernist graphic design. The postmodernist grid no longer acted as the invisible logic "behind"

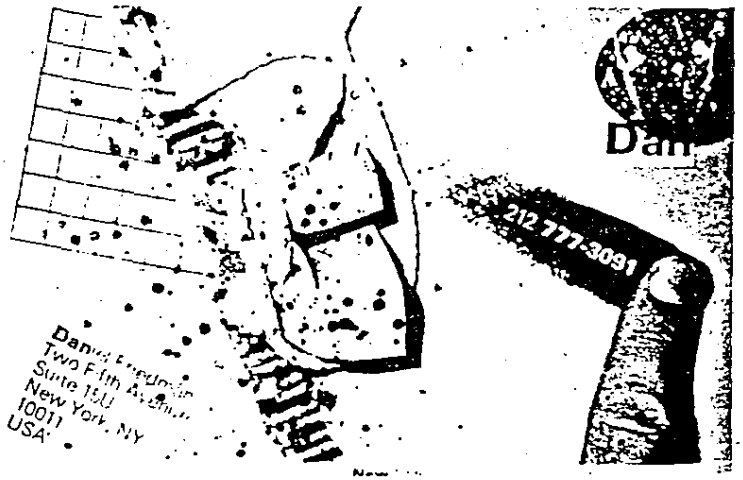
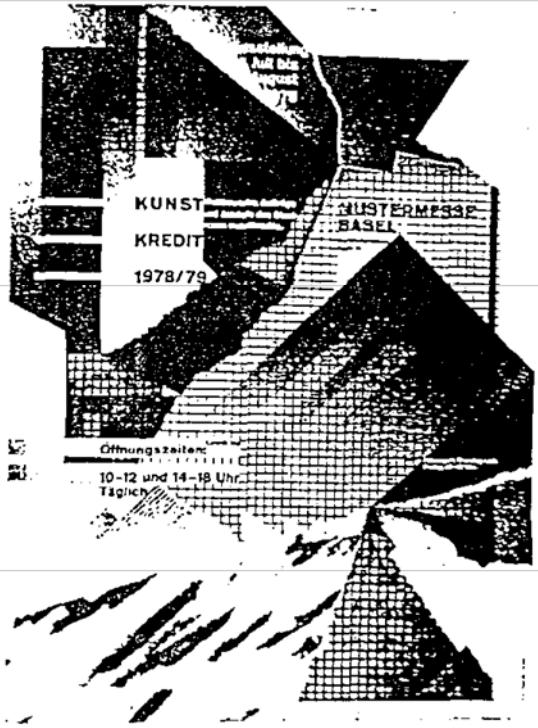


Fig. 9) Dan Friedman, change of address card, 1976.

the composition, but was often visually exposed and used as a subordinate decorative element. The grid was sometimes tilted and made to express antirationality and randomness. It was often coupled with other seemingly accidental marks or manually applied gestural (signature) elements, in stark contrast to the impersonal and overly rational compositions of Swiss modernism. Usually the grid was established and then violated (ignored) or fractured along with the surface plane it defined. Both grid and composition departed radically from modernism's functionalist ethic, sometimes to the point of sacrificing the clarity, legibility, and readability of the typographic message itself by disrupting the alignment of type or by in some way obscuring the individual words and letters.[22]

Like other manifestations of postmodern culture, the grid expresses the general theme, in opposition to modernism, of antirationality and even irrationality. The most common variations on this theme (many of which, when expressed visually as in architecture or graphic design, utilize a common iconography) include the



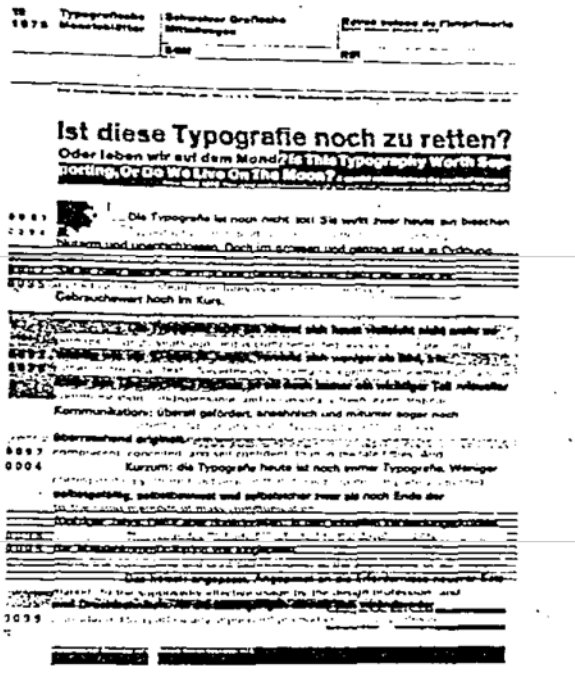


Fig. 10) Wolfgang Weingart, *State Art Aid* poster,

Fig. 11) Wolfgang Weingart, magazine cover combining rational clarity typical of Swiss graphic modernism with a contradictory use of rules which cut into the lines of type to produce various levels of illegibility, 1979.

celebration of irrational or violent phenomena, often depicted as occurring behind the veil of surface appearance, or the representation of surfaces or facades as blatantly false, sometimes with the suggestion of some unknown quantity or realm concealed behind them. In contrast to the modernist tendency to openly reveal structure and purpose via functional form, these surface planes are

21) In the chapter entitled "Grid and Design Philosophy," Müller-Brockmann states, "The use of the grid as an ordering system is the expression of a certain mental attitude inasmuch as it shows that the designer conceives his work in terms that are constructive and oriented to the future. This is the expression of a professional ethos: the designer's work should have the clearly intelligible, objective, functional, and esthetic quality of mathematical thinking. . . . Working with the grid system means submitting to laws of universal validity." And finally ". . . [The grid] fosters analytical thinking and gives the solution of the problem a logical and material basis." Josef Müller-Brockmann, *Grid Systems* (New York: Hastings House, 1981)

22) Weingart's cover designs for the 1974 spring and summer issues of the journal *Visible Language* offer extreme instances of over- and underexposed typography in which recognition of words and individual letters is often impossible.

perforated or fractured to suggest that they are thresholds at the border of a mysterious, often nonmaterial dimension. To understand the significance of the postmodern theme of arationality or irrationality as it is reflected in the recent iconography of popular culture and design (of which the grid is part), an examination of its sources is necessary. The first major source is the antirationalist undercurrent of twentieth-century modernism. The second, more immediate, source is the movement that begins in the 1960s and continues into the present as a conscious reaction to modernism.

In addition to the early twentieth-century concept of the field as a rational network of predictable mechanistic laws regulating physical reality (e.g., the *universal field* of de Stijl), there was a notion of the field as a far less determinate set of forces. The original notion of a "field" was put forth in the mid-nineteenth century by the English scientist Michael Faraday. Faraday explained how atoms and molecules, with so much space surrounding them, were held in spatial extension by an electrically charged, tentacle-like network that spread invisibly through the earth's matter and the space surrounding the earth (since identified as earth's electromagnetic field). The components of this network Faraday called "lines-of-force," and these helped explain why changes in one part of a field occurred at the same time as changes in far distant parts of the same field even though no connecting physical action between the two was evident.

Faraday's concept of electrical lines-of-force was later absorbed into the Italian futurists' revolutionary philosophy of dynamic speed and change. Drawing on the pictorial innovations of cubism, futurist painters used a similarly gridded picture plane to represent not only outer movement but the inner forces of electricity and will which interpenetrate and incite both muscular and mechanical action.[23] Impulsive, impassioned action, usually of a destructive kind, not cool calculation or rational passivity, was the hallmark of the futurist credo. The movement's manifesto, written in 1909 by Filippo Tommaso Marinetti, poet and founder of futurism, centers on an account of a reckless, high-speed auto race through the streets of Milan at night. The account is characterized by an intoxication with death and destruction and presents the reader with a theme common to most later futurist work: that volcanic forces beneath the calm surface of outer physical and social reality can erupt forth at any given moment.

A similar message was presented in 1927 by physicist Werner Heisenberg, the same year the Weissenhof Housing Project signaled a triumph for modern architecture's clean rational geometries and functional layouts. Heisenberg's discovery, known in physics as the "indeterminacy principle," revealed that beneath the predictable mechanistic laws that rule the visible world in which we live, another set of laws with no apparent order operated at the atomic level upon which, it was assumed, the world was

23) Representative examples of futurism's infatuation with electrical phenomena include Umberto Boccioni's painting *Forces of a Street* (1911), an early example of the "lines-of-force" theory (also associated with "atmospheric electricity" or lightning); his painting *Matter* (1912), in which material reality becomes transparent to reveal a ubiquitous field of powerful forces which overwhelm both the woman in the picture and the viewer (Boccioni wrote about some people's clairvoyant ability to visually penetrate the opacity of material bodies, in the manner of X-rays); and the futuristic cities of the movement's architect, Sant' Elia, in which electrical generating complexes and powerhouses were the favored building type.

built. This interpretation of the world is the complete opposite of that symbolized by the Cartesian grid, which pictures the substructure of the world as rational, predictable, and deterministic.

The notion that reality may appear rational outside while being irrational inside had been persuasively argued even earlier by Sigmund Freud, who posited a libidinal reservoir of powerful drives and impulses operating beneath the level of a person's conscious awareness and behavior. With Freud, the contingent twentieth-century theme of the *freeing* of forces that are arational or irrational and that are located beneath the normal world of outer appearance and *bringing them up into* the outer world, finds dramatic expression. Freud's original use of hypnotism to release the repressed memories of traumatic episodes was superseded by his well-known technique of "free [word] association," which accomplished a similar end without hypnosis. This technique was appropriated (and renamed "psychic automatism") by the nihilistic Dadaist art movement which arose in response to the devastation and inhumanity of World War I. In both its methods and its products, Dadaism satirically celebrated the irrational in man. Surrealism, Dada's main descendant, likewise externalized psychic events occurring below the surface of consciousness in the form of hallucinogenic dreamscape paintings or other artforms designed to engage not the viewer's conscious self, but his or her subrational side.

The theme of releasing powerful "subphysical" forces (i.e., forces below the level of external physical reality) is again expressed in the year 1919. In the modernist calendar of key historical events that year marks the founding of the Weimar Bauhaus, the major force in the institutionalization of rationalist design theory and practice. For the history of irrationality, however, 1919 marks the date when the first atom was successfully smashed. The fruit of this event was the ability to tamper with atomic structure and so release huge amounts of explosive force and deadly radiation from the level of atomic events into the world of plants, animals, and human beings, as manifest by the dropping of two atomic bombs on Japan in 1945. The subject of the destructive release of irrational, subphysical forces onto the physical plane became a key theme in the iconography of postwar popular culture and came to inform postmodern architectural, graphic design, and advertising iconography as well. For example, the films of Japanese director Ishiro Honda (e.g., *Godzilla* 1954, *Rodin* 1956) featured a beast accidentally released from a state of subterranean hibernation by a careless atomic explosion. The beast, equipped with either radioactive breath or vision, would then proceed to destroy Japan's major urban centers.[24] Prior to 1960, therefore, antirationalist tendencies and traditions in twentieth-century art, scientific thought, and popular culture existed side by side with the stream of modernist rationality.

24) The sense of an unseen, hidden menace also characterized an important aspect of the 1950s in American society. The "red scare" of the cold war years, the profusion of 1950s science fiction monster films, and the post-Sputnik rash of backyard fallout shelters all expressed the anxious sense that an unseen menace lurked at the edges of the familiar world accessible to the rational mind.

It was out of the antirationalist stream which coalesced in the 1960s and early 1970s that postmodernism was to arise. During this period two concerns were expressed which played a central symbolic role in later postmodernist iconography in general and in that of the grid in particular. First, there was a conviction that surfaces were false and superficial. Second, there was an interest in and exploration of that which lay behind such surfaces. As the baby boom generation became disillusioned with the Vietnam war, big business, corrupt governmental leaders, and the capitalist value system in general, all *surface* phenomena (norms and conventions) were questioned, mocked, and satirized. Pop art satirized the hollow commercialized images of consumer advertising by adopting the techniques and presentational scale of magazine and billboard advertising imagery. Robert Venturi's 1966 postmodernist manifesto, *Learning from Las Vegas*, gloried in the falseness of the commercial facades of the Las Vegas strip and promoted the false surface as a model for a new movement in architecture. No longer did the outside have to be functionally related to the inside. Rather, superficial decoration was allowed, and the resulting contradiction or discontinuity between inside and out was itself a strong critique of the clean, rational exterior of modernist architecture.

This love of parodying the falseness of surface appearances in art and architecture had its counterpart in the structuralist movement in French linguistics. Strongly colored by Marxist determinism, structuralism exercised a major influence in American universities during the 1970s, accompanying the demoralization of America and the expansion of Soviet power. Unlike modernism, structuralism held that surface appearances were false and that rationality was itself a surface phenomenon under which lurked a subrational self unknown to us.[25] The structuralist attempt to demonstrate that rationality, the conscious self, and conscious speech were false fronts for irrationality was represented in postmodernist graphic design as well. For example, Weingart's fracturing of the gridded surface (figure 10) represented the destruction of the field of the rational mind.[26] The ubiquitous use of the tilted grid, evident in magazine ads, posters, television graphics, and other popular media over the last several years, also represents the arational or irrational, because the grid – as a symbol of the field of consciousness – has become disoriented in its detachment from the world, as indicated by its lack of gravitational orientation.[27] Furthermore, the defilement of the typographic message by Weingart (figure 11) and other postmodernist graphic designers was analogous to the structuralist's belief that language did not represent the conscious, rational self, but the "other," subrational self. April Greiman, a student of Weingart, took the destruction of the surface plane further by depicting planar fragments exploding forth in a field of deep illusionistic space.

25) Freudian and structuralist Jacques Lacan asserted that a person's speech, far from expressing the thoughts of the conscious self, was the medium through which the "Other" self expressed itself. This "Other" was a being prior to and more real than a person's conscious self. Lacan maintained that rationality, like the conscious self, was also surface illusion. Following Lacan, structuralist Michel Foucault extended the concept of the subrational "Other" still further in 1966 with his "end of man" doctrine. See Peter Caws, s.v. "Structuralism," *Dictionary of the History of Ideas* 4 (New York: Charles Scribner & Sons, 1973), 329.

26) The drug culture which arose to assist the flight from the unpleasant realities of this period likewise represented a quite forcible destruction of rational consciousness, and the substitution of a consciousness of or by some "other" self.

27) The tilted, floating grid represents free-floating or disembodied consciousness. Although it may signify human consciousness loosed from rational or "earthly" applications, the tilted grid has been most commonly used in association with computers and high-tech advertising. This is appropriate inasmuch as the computer is the ultimate externalization (disembodiment) of human rationality.

The theme of "otherness," of what lay behind the plane, was now becoming more important than the defilement of the plane itself. One common compositional feature of Greiman's work during the late 1970s and early 1980s was an empty exploding core, with planar shards moving toward the periphery of the layout (her *TV awards poster* of 1981 featured a trapezoidal black "window" of infinitely deep space near composition center, out of which exploded numerous objects).[28]

The representation of an exploded surface plane was a favored subject in television advertising during these years as well. A popular Shell Oil Company advertisement filled the television screen with a flat white field upon which was printed the Shell logo. Through this would burst a car, thus creating the illusion that it was entering the space of one's living room. The first Shell ad of this type was aired in 1964, and the company has continued to use this format, extending it to magazines in the 1980s (figure 12). Schlitz Malt Liquor's television commercials in the late 1970s similarly featured a bull bursting through the wall of a room in which beer drinkers sat. Beyond the specific subtextual meaning that alcohol could release the subrational, animal side of a person, this ad joined with the large number of similar commercials and cinematic images of powerful, often menacing entities bursting into the viewer's space[29] in indicating that the destruction of the plane of surface reality and the rational world of predictable events was due to the eruption of irrational forces from a world behind or below the plane of outer reality. The surface plane was thus not to be trusted and was in fact a threshold to a nonrational realm on the other side of normal reality. The modernist vision of a logically constructed physical reality underlaid by an equally logical set of predictable mechanistic laws was thus replaced by a postmodernist vision of outer reality as a sham underlaid by a more real but nonrational set of unpredictable forces.

Yet, side by side with the postmodern iconographical drama of subterranean forces exploding through the surface plane into the viewer's space was the reverse scenario of diving into and through the surface plane from the physical into a subphysical, nonmaterial realm. Simulating a microscope with a zoom lens, the opening credits of the 1980 computer-animated film *Tron* carried the viewer into a letter of the word "Tron," down through a microgrid composing the larger letter, and through that grid into a nonmaterial world of micro-electrical phenomena. The same "transfer" was repeated in the story itself when the main character was "digitized" as he sat before a computer terminal. He was then absorbed through the computer screen and reconstituted "below" in a nonmaterial realm defined by electronic grids and menacing, computer-generated beings.[30] A similar "descent" was the subject of a 1984 television commercial in which the viewer accompanied a Camaro driving through a car-sized black Chevrolet logo that

28) The result of this collection of fragmented planes was that the "picture space" abounded with a profusion of edges. The same abundance of edges characterizes much of postmodern architecture as well. Take, for example, Charles Moore's *Piazza d' Italia* of 1975-79, in which layers upon layers of false facades stand on the periphery of an open circle of space. The theme of the vacated center, of attention focused on the periphery and on the edges of things, is typical of postmodernism in general. Architecture, graphics, furniture, and interiors abound with color-differentiated planes continually "popping away" from another. Postmodernist scholarship is characterized by a dilettantish love of peripheral or fringe topics rather than mainstream issues, a looking at phenomena from odd angles, and the rejection of sustained and centered treatment of material in favor of eccentric digressions. This search for "otherness" in the freakish and bizarre within postmodernist writings is criticized in Robert Darnton, "Pop Foucaultism," *The New York Review of Books* (October 9, 1986): 15ff. In popular culture, the Steve Martin and "Nerd" films about social misfits are similar expressions of postmodernism's "off-center" interest. This off-center theme of the late twentieth century was prophesied by W.B. Yeats in his poem *The Second Coming*: ". . . Things fall apart; the centre cannot hold;/Mere anarchy is loosed upon the world. . . ." The poem was composed in 1919, the first year the atom was smashed.

29) The 1975 movie *Jaws*, which spawned a rash of similar movies, featured a mammoth killer shark which lurked beneath the placid water surfaces of swimming beaches, etc., only to burst upward and pull someone back down at unexpected moments.

30) Michael Bonifer, *The Art of Tron* (New York: Simon and Schuster, 1982).

Fig. 12) Magazine advertisement for Shell Oil. The ambiguous juxtaposition of dark road and gridded surface plane suggests that the gas pump is exploding *upward through a deep fissure in the* grid.

31) A series of books were written in the late nineteenth century that dealt with descending to the center of the earth, such as *Alice's Adventures Underground* (later titled *Alice in Wonderland*), *Journey to the Center of the Earth*, and *20,000 Leagues Under the Sea*, many of which were turned into American movies in the 1950s. French filmmaker Jean Cocteau's films *Blood of a Poet* (1930) and *Orpheus* (1950) represented similar descents – now into the irrational underworld of the self – by having the main character pass through the threshold of a mirror.

32) This is well exemplified in the anthropomorphic symbolism which abounds in the bureaus, shelving units, and lamps of the Italian Memphis group. The staccato angularity of these figures refers to electrical phenomena (see, for example, Ettore Sottsass's *Ashoka Table Lamp*, figure 6, page 13, *Design Issues* II/1 (Spring 1985), and may draw from the earlier Italian futurist conception of the human being based on subphysical electrical forces.

stood on a test track, which in turn led to a red, subterranean landscape wherein dwelt a large, reptilian monster. The threshold to the superphysical of the late medieval grid has thus been completely reversed in postmodernism. In postmodernism, the fractured surface plane acts instead as a threshold to the subphysical and subrational.

The descent of rational consciousness beneath the surface of matter has always been a central activity of modern science in its study of material phenomenon. Because of this, the descent of consciousness into and "beneath" matter became a common theme in popular art and literature from the late nineteenth century to the present.[31] For example, in the 1967 Charles and Ray Eames film for IBM, entitled *Powers of Ten*, the Einsteinian concept of the infinite as the finite in extension was given physical expression as the camera first zoomed into the universe and then returned to microscopically descend – through a man's hand – to the molecular, atomic, and then subatomic level. Modernist rationality inevitably led, as Heisenberg experienced, from a fixation on the surface of material phenomena to its subsequent penetration and the arrival of rational consciousness to an alien, nonrational sphere. Because modern science had rejected the concept of a nonmaterial, superphysical dimension, it was inevitable that the probe of rational consciousness must confine itself to material reality and to the nonmaterial, subsensible reality beneath it.

Despite the positive accomplishments of postmodernism – a throwing off of a severe rationalism which denied more intuitive faculties, an exploration of symbolic and decorative values, and a recognition and utilization of the past – the movement is at base limited by an insufficient image of the human being, an interpretation that generally admits of only rational and subrational faculties.[32] Postmodernism may thus be considered a form of *late modernism*, inasmuch as it reveals rather than surpasses the key limitations of modernism's conception of the human being.

The foregoing survey has tried to show that, with few apparent alterations to the basic form itself, the grid has shifted in its meaning from a threshold between physical and superphysical worlds, to a representation of the surface of the physical world and the rational cognition which beholds it, to a threshold to the submaterial world and irrationality. In each period, the grid has thus expressed a leading conception of man and world prevalent at that time.