The Symbolism of Centric and Linear Composition

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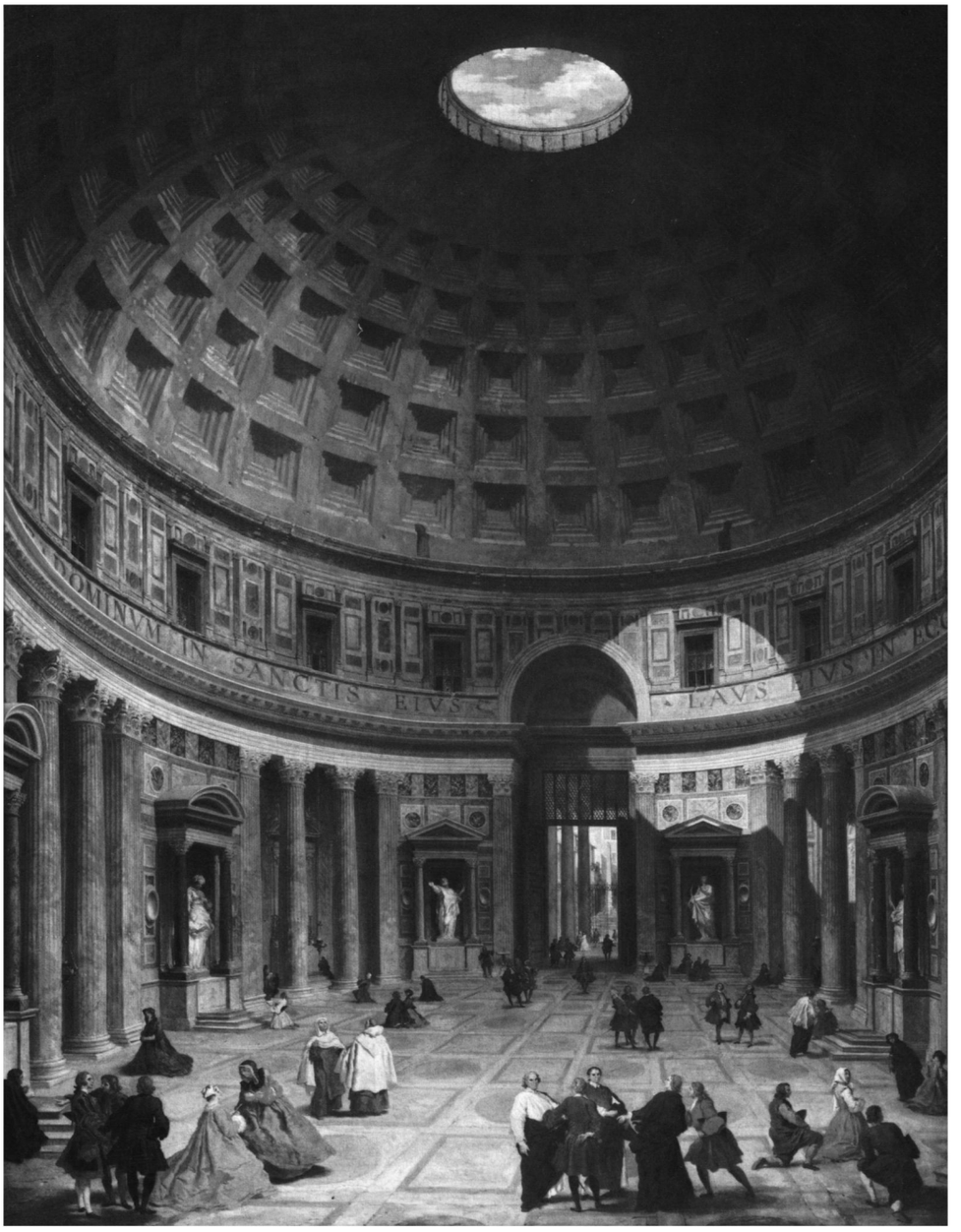

Giovanni Paolo Panini, "The Interior of the Pantheon", Samuel H. Kress Collection, National Gallery of Art, Washington.

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to Gyorgy Kepes

The following investigation belongs to a recent attempt of mine to derive the compositional pattern of works of visual art from the interaction of two spatial systems. Since the theory concerns the very foundation of visual form, it must apply universally to all modes of visual expression or else be invalid. In a recent book, *The Power of the Center*,[1] I have tried to show mainly that the theory holds for painting and sculpture. The present essay applies it more explicitly to architecture.

The two compositional systems in question may be called the centric, or cosmic, and the Cartesian or grid system. Centric systems come about in the physical world and also in psychological experience when a field of forces is left free to organize around an internal center. Planetary systems and the atomic model offer examples, and so do blossoms, snowflakes, or, in the arts, circular ornaments such as Gothic rose windows. The other system takes its geometrical shape from a Cartesian grid of parallels crossing one another at right angles. This second system, like the first, must be conceived beyond the mere geometry as a pattern of forces. Viewed dynamically, the grids consist of vectors oriented not toward internal but toward external centers, by which they are attracted or for which they strive. In the physical world, the relation of terrestrial objects to gravity can serve as an example: towers, columns, tree trunks, and upright human figures conform to this frame of reference.

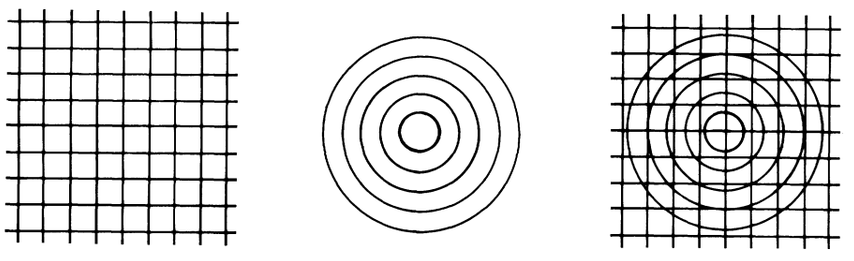
The interaction of the two systems yields the compositional pattern here under discussion (figure 1). Its universal validity will have to be established in two quite different ways. First, it must be shown much more explicitly than I can do now, that this particular dynamic configuration comes about by necessity when the forces constituting a physical and eventually a physiological field respond to dynamic centers placed at particular positions. An example taken from the work of Pier Luigi Nervi will be given at the end of this paper. Second, the compositional pattern will be valid aesthetically only if it symbolizes the human condition in a sufficiently universal manner. My contention is that the centric system stands for the concern of any entity, be it physical or mental, individual or collective, with its own intrinsic nature and goals, whereas the grid system illustrates the relation to external power centers to which such an entity must respond. I refer to this coping with external powers as the "tragic" element of the human condition.

In painting, the compositional scheme refers mainly to the upright projection of the picture plane. Works of sculpture, on the other hand, are truly three-dimensional, and so are buildings. Correspondingly, the compositional pattern fit for such works must also be three-dimensional. To facilitate the analysis, this spatial model is decomposed into vertical and horizontal projections, elevation and groundplan.

In architecture, therefore, our compositional pattern must apply to both spatial dimensions, the vertical and the horizontal. Dynamic action in the vertical is dominated by the building's response to the force of gravity. The visual action I am discussing here reflects the physical relation of the building material to the terrestrial power of attraction but is not identical with that relation. Building material resists the force of gravity only passively, namely when some support holds it in place and prevents it from dropping to the ground. Architecture as a configuration of visual shapes, however, is animated by the antagonistic interplay between forces surrendering to the power in the ground and counterforces overcoming that power by striving toward the sky. This visual tug-of-war is embodied mostly along the verticals and horizontals of the upright dimension, i.e., in the network of the Cartesian grid.

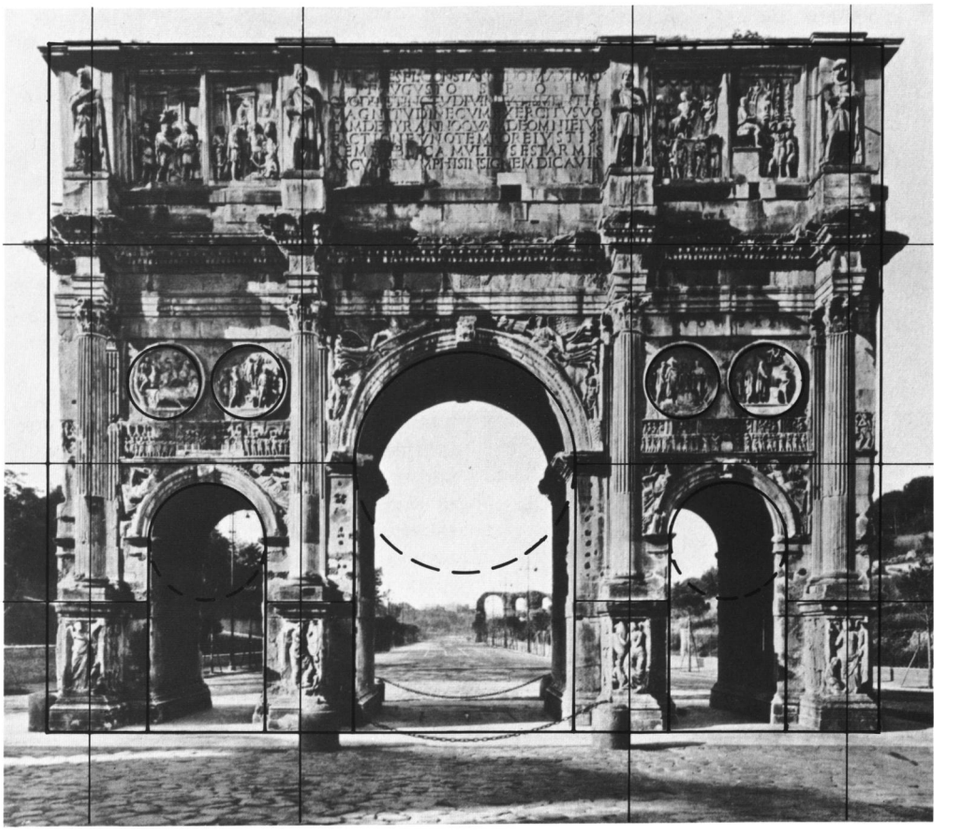
Except for the facility of staircases and elevators, human beings are excluded

1
Rudolf Arnheim, *The Power of the Center: A Study of Composition in the Visual Arts* (Berkeley and Los Angeles: University of California Press, 1982).



1
The interaction of centric and linear compositional patterns.

2
Villa Grimani-Morosini,
Martellage, 16th century.

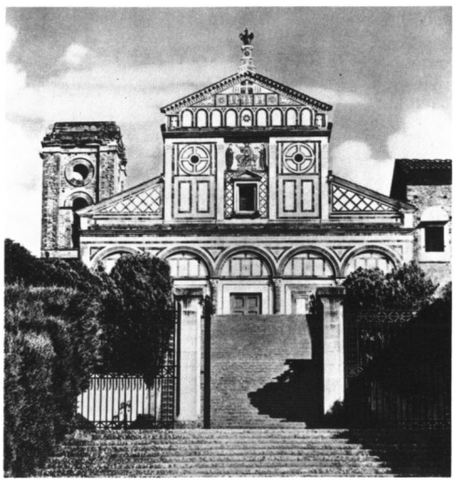


3
Arch of Constantine, Rome,
312 A.D.

from the upright dimension. As observers, however, we watch the architectural struggle with gravity as one of the most impressive symbols of spiritual striving for liberation in defiance of inertia and weight. Even so, the dominance of the Cartesian grid is not uncontested. A building cannot meet its obligation by being a mere linear channel for the action of upward and downward. Even an elevator must be a container, a massive box, organized around an internal center of its own. So must the building as a whole. Therefore, the presence of the centric system must be apparent, explicitly or not, even in a building's façade.

Façades, wherever they exist, are often convenient projections of the building's total structure in that upright dimension. They reflect the interaction of our two compositional systems by presenting the building as an object rooted in the ground and thereby responsive to an external center but also as self-contained, independently complete, and thus organized around its own internal center. When in a Venetian villa of the Renaissance a covered balcony with three arched windows protrudes from the center of the façade on the middle floor, it provides an explicit hub, around which the building gathers its mass (figure 2). This centric symmetry can never be complete, except in a spherical building, and more often centricity is limited to lateral symmetry. Lateral symmetry of a façade gathers the frontal mass of a building around a central vertical. (Compare this with a building devoid of a façade, such as Le Corbusier's Villa Savoye, in which the outer walls are not closed but fold at the corners to form a cubic object, centered around an internal axis.)

Consider the Arch of Constantine (figure 3). Every partial roundness, such as the top of an arched opening, is a compromise between our two systems: a centric closure interrupted to pay its tribute to an external power, in this case the linear attraction of the force of gravity. Yet by virtue of its roundness the semicircular top of the gate gives a partial presence to the center around which the frontal mass of the Roman monument is organized. The four medallions, halfway up the façade, remind us of completed roundness, and



4
Church of San Miniato al Monte, near Florence.

the total design, although related to the attraction of the ground by the grid of columns and cornices, maintains its cubic compactness. Visually, the structure could be lifted off the ground without damage.

There are other ways of insisting on the centricity of a façade. At San Miniato al Monte in Florence, the visual weight of top and bottom is halved by a broad ribbon (figure 4). This central division offsets the asymmetry between the roof structure and the bottom arcade. When such a horizontal division lies clearly above the visual center, as does the separation between columns and architrave in a Greek temple, the center, although not marked, serves as the level of reference in relation to which the architrave appears proudly raised. Just as in tonal music the dynamic expression of pitch is defined perceptually by a tone's position above or below the keynote even when that base is not explicitly given, so the center of every balanced visual pattern is active as a point or axis of reference, whether it is marked or not. When in a design the center is underplayed, this very neglect serves to emphasize the dominance of the Cartesian grid. In the extreme case, when the pattern no longer identifies the center at all, as on the curtain walls of our skyscrapers, the eye loses its framework and roams rudderless across an unstructured surface of arbitrary size.

In the upright dimension, then, a building must display its twofold allegiance to its own inherent center and to the powerful external center of attraction in the ground. It thereby expresses its character as a self-contained object dependent on its roots in the earth; but it also symbolizes the human mind's struggle for maintaining its own centered integrity against the interference by outer powers.

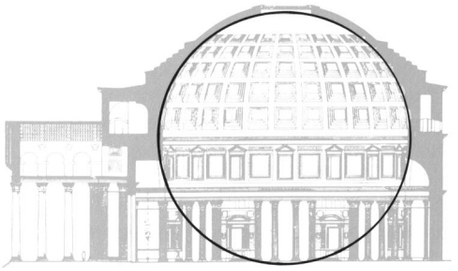
While this visual spectacle in the upright dimension is, as I said, essentially spiritual, the corresponding symbolism in the horizontal is essentially social. The level plane is the arena of human action. When our compositional pattern is applied to it, the external forces to which the vectors of the grid respond are no longer monopolized by one dominant direction. The elevation is controlled by the effect of gravitational attraction and the opposite goal of liberation from weight to which the vertical counterforces aspire. In the horizontal plane the dynamics of the grid has no such inbuilt dominant direction. Its orientation is determined by the axes prevailing in the particular design and by the external targets or centers that happen to exert their influence upon the given work of architecture.

In the world of the ground level, every architectural setting involves the interaction between compact centralized objects and the connecting linear channels of communication. On first approach, therefore, our two systems of centricity and linearity seem to be separately embodied in the two components of the architectural setting. But a closer look reminds us that every architectural object is shaped not only by its own centricity but also by its response to the coming and going of its users, and that conversely every channel is also an object and therefore in need of a centricity of its own. The intertwining of our two systems characterizes every unit of the architectural setting.

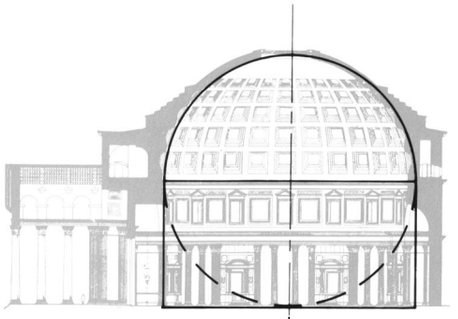
When one looks over the city of Rome from the hills of the Janiculum, one sees the various circular monuments—the Pantheon, the Castel Sant'Angelo, the Colosseum—detach themselves from the fabric of the streets as self-contained units. They mark high spots of their setting but refuse to conform to it.

In round buildings the centric system of composition rules supreme. Such buildings are only one step removed from the total dominance of centricity in spherical structures. In architectural practice, of course, examples of spherical buildings are rare—we remember Boullée's Newton Memorial or the geodesic structures at the New York and Montreal world fairs. Nevertheless, spherical shape is fundamentally important in the psychology of creative invention as the germ cell of every conception of "thingness." It is the shape of origin, prior to all more specific characteristics of objects, and can be expected therefore to be the typical start of architectural design as well. In the beginning there is an object of undifferentiated compactness, the absolute container. Architects accustomed to thinking in terms of buildable structure remember the primitive hut of Laugier's *Essay* when they speculate on the origin of their trade. It pays, however, to consider also its psychological root, the primordial image of the spherical capsule, in which the dominion of self-contained centricity is not yet modified by any interaction with the outer world.

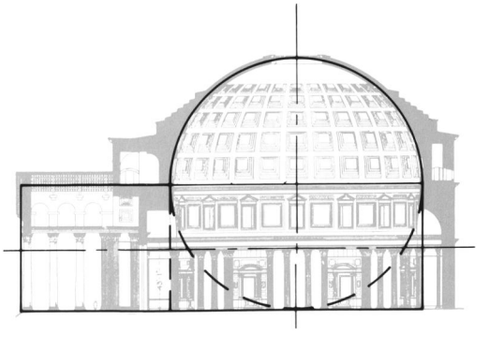
Viewed in this psychological fashion, the



Sphere.



Sphere and cylinder.



Sphere and cylinder with porch entrance.

5
Pantheon, Rome, 120 A.D.

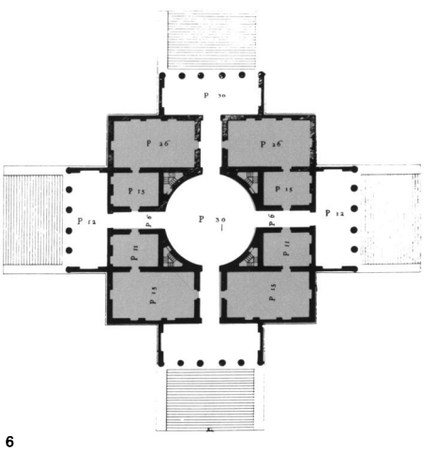
linearity of the grid system would be a secondary imposition upon the original centricity of the architectural object. It would mark the acknowledgment of the outer centers to whose power the design must respond. In such terms it might be permissible, for example, to think of the conception of the Roman Pantheon as coming about in three stages (figure 5). First, there is the original sphere, not yet a building really, but a floating bubble. At the second stage, the sphere, in deference to the force of gravity, opens into a cylinder, which roots the building in the ground. Yet the diameter and the height of the interior space of the Pantheon are still equal—a powerful remainder of primordial centricity. A further concession to linear communication comes about at the third stage when the building invites entrance by the addition of a porch.

In traditional church design, the two archetypal patterns of the centralized church and the linear channel of the basilica are clearly combined in such examples as the cathedral of Florence, where visitors are led through the nave to the focus of the sanctuary. The transformation of the Greek cross in Bramante's original plan for St. Peter's into the final Latin cross is, of course, the textbook example of such a development.

In every such instance the architect is faced with the question of how much weight should be given to the linear aspect of approach and withdrawal in relation to the concentration around the building's core. The traffic in the nave and aisles partakes in the dimension of temporal sequence, whereas the central space can be called timeless in two ways—perceptually by the exclusion of linearity from the centric area and symbolically by the attitude of the worshiper, whom meditation removes from action. In a traditional church, a crossing, for example, can be a mere superposition of two linear passages meeting at right angles. In that case, the weight of the center is reduced to a minimum. But the center can also receive an emphasis and closure of its own, as in St. Peter's, where Michelangelo's powerful piers blunt the corners of the crossing by creating four façades that face the center with its imposing baldachin.

The central block of Palladio's Villa Capra is a cubic structure surrounding a domed rotunda. Its static symmetry reposes on four identical pairs of corner rooms, which are separated by narrow corridors. This almost stolid centric plan receives its essential animation from the four entrance porches, which transform the massive block into a crossing (figure 6). The four narrow corridors become the avenues of access from the entrances to the central hall; perceptually speaking, they are changed from "ground" into "figure" and are made the carriers of the linear grid, which emphasizes the communicative coming and going between outside and inside (figure 7). The seclusive little fortress is opened thereby to the flow of a gay hospitality.

Thus, in the horizontal plane the interaction between the centric and the Cartesian system is essentially a symbol of social behavior. Consider, in this connection, Bernini's square for St. Peter's. The two half-circles of the colonnades mold the crowd around the obelisk of the center by pressing it inward. This stable gathering is traversed, as a river flows through a lake, by the linear axis of approach to the cathedral. The twofold dynamics is reflected in the ratio between centric and longitudinal features, expressed by the



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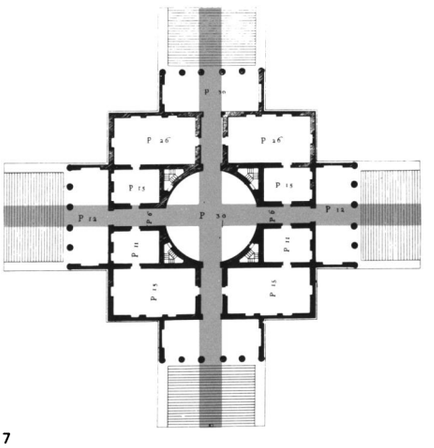

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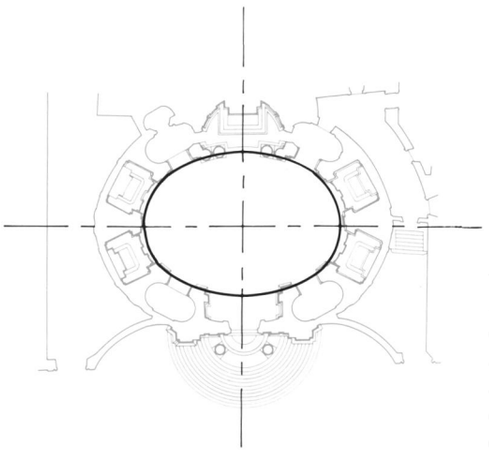
6
Palladio, Villa Capra, now Valmarana or "Rotunda", Vicenza, 1552, symmetry of corner rooms forms centric plan with crossing.

7
Villa Capra, figural corridors emphasizes linear paths of communication.



8
Bernini, San Andrea al Quirinale, Rome, 1658-70.

designer through the relations within and between the architectural elements. The crowd, after having congregated in its own centric compacted shape, transforms itself into a linear progression, in response to the attractive power of the sanctuary.

Bernini's colonnades bring to mind what I observed earlier about arches. Every partial round, be it half of a circle, cylinder, sphere, or combination of these, offers a centric enclosure curtailed by the axis of approach and captures the vector of that axis in its embrace. Just as in the vertical dimension an arch or cupola stops the ascent and collects the rising flow of visual dynamics around an elevated center, so an apse or chapel takes hold of the approaching visitors in the horizontal dimension and anchors them to a focus of tranquility. When centricity prevails, as under a dome or cupola, the visitors are arrested and spellbound. A cylindrical tunnel vault, on the other hand, guides them by its linearity while holding them at the same time to their course by the roundness of its section.

An ellipse combines the centric with the linear tendency. When the elliptic plan of a church coincides with the main axis of the building, as in Borromini's San Carlo alle Quattro Fontane, it strengthens the linear path from the entrance to the altar and, in turn, is confirmed in its own distention by the building. When, however, the ellipse is placed at right angles to the sagittal axis of the building, as in Bernini's S. Andrea al Quirinale, it counteracts the path from the entrance to the altar (figure 8). A kind of Greek cross, formed by the two axes, emphasizes the center and approaches the effect of a centralized church.

The problem of how best to combine the demands of the two compositional systems is sometimes dramatically evident in the history of an architectural design. Le Corbusier's Carpenter Center for the Visual Arts at Harvard, so fully documented in the recent publication by Eduard F. Sekler and William Curtis, offers an example.[2] The completed building presents itself as a compact, roughly cylindrical mass, traversed on the third floor by an S-shaped ramp (figure 9). In the earliest sketch by the architect, the role of the linear ramp was much more pronounced (figure 10). Almost like a street, it separated two blocks of studios that faced each other in opposition. This early vision of the art center as an avenue of transit on campus had to contend with the even more elementary task of how to provide the building with enough centric unity and particularly how to accommodate the central trunk of staircase, elevator, etc.

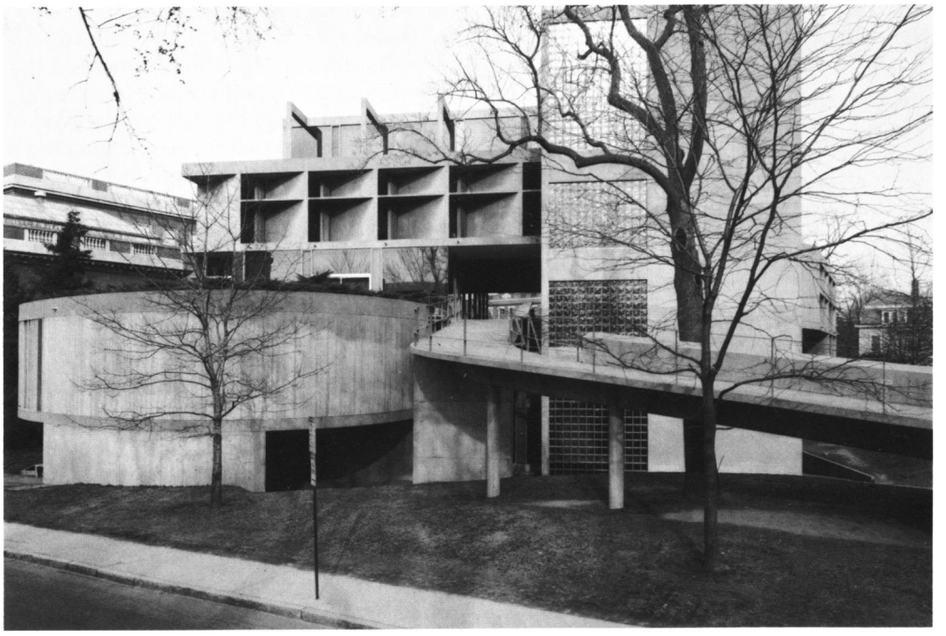
The insistent difficulty encountered by the architectural team in trying to reconcile the freight elevator with the crossing ramp is most illuminating. Beyond the technical problem of how to get the two means of transportation out of each other's way, one senses the architect's endeavor to find the appropriate balance between the self-containedness of the art school and its social interrelation with the rest of the university. In the finally executed design, the lateral wings of the studios are integrated with the central vertical core to create a kind of pinwheel effect (figure 11). The ramp, by piercing the building, still serves to strengthen some of the intended subdivisions, but without upsetting the unity of the whole.

When the relations of buildings to their surroundings are considered, it is relevant to remember that both our compositional patterns are boundless. The concentric rings, or spherical shells, of the centric system converge to a point in the middle but continue outwardly as far as the power of the center reaches. Similarly, the vectors constituting the grid are not limited in length and number. The field of forces to which the composition conforms its structure spreads beyond the actual boundaries of the building.[3] Thus, the ramp of the Carpenter Center continues visually somewhat beyond its actual endings and the convexities of the cylindrical studio areas invade the adjoining space. Of course, each building or complex of buildings has a structural pattern of its own. Complex interferences between the various fields of forces result, therefore, in the open spaces between the buildings.

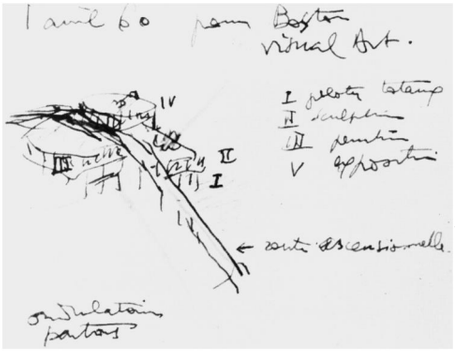
I have left some of the trickier issues for the end of my presentation. One of them concerns the location of the compositional center in a three-dimensional object. Thus far, my discussion has been limited to the customary projections, the elevation and the plan. In either dimension the internal center of the centric system can be indicated without difficulty. But, of course, the building as a three-dimensional whole must also balance around its visual center, just as physically every object has a center of gravity. It is not always easy to determine the set of

3
Rudolf Arnheim, *The Dynamics of Architectural Form* (Berkeley and Los Angeles: University of California Press, 1977), p. 28.

2
Eduard Sekler and William Curtis, *Le Corbusier at Work: The Genesis of the Carpenter Center for the Visual Arts* (Cambridge: Harvard University Press, 1978).



9
Le Corbusier, Carpenter Center for the Visual Arts, Cambridge, Mass., 1965, West Facade.



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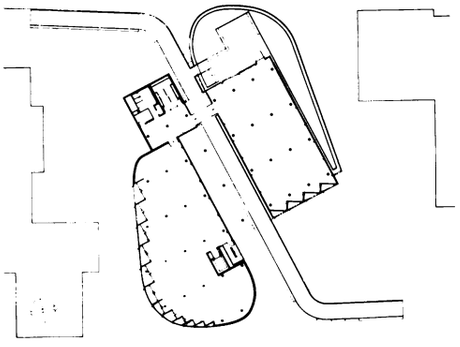
Carpenter Center for the Visual Arts, initial sketch, April 1960.



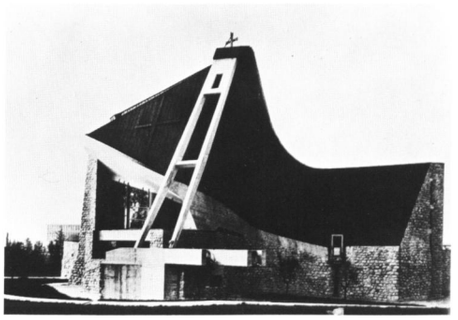
11
Carpenter Center for the Visual Arts, plan.

forces upon which the visual center depends. Look at Pannini's familiar painting of the Pantheon's interior. It places the viewer considerably above the heads of the fashionable ladies and gentlemen who populate the floor of the rotunda. If that viewer, suspended in space, were to locate the balancing center of the interior, he might place it somewhere halfway up the central vertical, perhaps at the level of the cornice between the cupola and the drum of the colonnade. A person looking into a small model of the Pantheon might do the same. But would this also be true for the visitors on the floor? A viewer's perspective contributes an influential vector to the play of forces that balances the composition, and this vector may be strong enough to place the perceptual center of the interior lower down, possibly at the viewer's own eye level. Is the architect, then, to determine the balancing center of his design for the three-dimensional volume as such or in relation to the perspective of the viewer? Or must he consider both views and balance them against each other?

Few buildings are composed so simply of one piece as the Roman Pantheon. Therefore the balancing center of the whole, although indispensable for a check on the ultimate order of the design, is generally less conspicuous than the centers of the subwholes of which the building is put together. Furthermore, only centric shapes, such as disks or spheres, clearly organize around a point-sized center. Elongated shapes are controlled mainly by their central axis. A traditional nave, such as that of the cathedral of Florence, has a horizontal spine, whereas the cylindrical space of the crossing below the cupola is controlled by a central vertical. The relation between the two axes is influential when the two principal units of the building are being balanced against each other.

Rarely, of course, is the principal interior of a building one continuous whole. When it consists of separate enclosed units, each room has its own centricity, but each room must also be seen in the context of the building as a whole. On the part of the architect, this requires a vision that transcends the limited views available to an actual visitor at any particular location.

A problem of method arises when one applies a compositional scheme, such as my present one, to a variety of examples. The conditions of visual composition to which the scheme refers are so basic that, as I said in the beginning, it holds either for all instances or for none at all. An architect's actual invention may stretch the deviation from the compositional skeleton quite daringly; but our premise would have to be that unless his design is visually relatable to that skeleton, it would lose the very base of its validity. Think



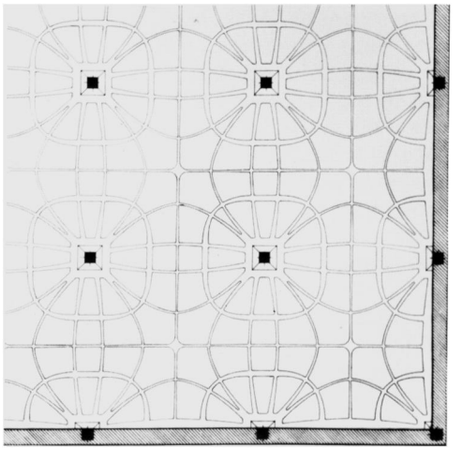
12
Giovanni Michelucci, Church of the Autostrada de Sole, Florence, 1960.

of an unorthodox structure such as Michelucci's church of the Autostrada del Sole (figure 10). If we do not succeed in relating such a design to our underlying schema, we are in the delicate position of having to assert either that the building is visually a failure or that our principle does not hold, at least not universally. If we have established a general rule, violations will be as fatal as a builder's infraction of the laws of statics. Therefore, although we may be accused of trying to save a pet theory, we shall have to insist that it offers a necessary criterion for the design's success.

This raises the final question: From where does our compositional scheme derive its claim to general validity? If it were nothing but the codification of a stylistic preference, the claim would be absurd. The history of compositional theory is strewn with the corpses of aesthetic norms that were believed to unlock the secrets of beauty. Our own claim, however, goes beyond aesthetics. It refers back, as I suggested in the beginning, to the laws of physical nature that control the balancing of forces in their interrelation. Therefore I would expect it also to be valid for the physiological conditions in the nervous system that are reflected in visual perception. But what exactly is the condition that meets our case, and how do we demonstrate its general validity?

I will limit myself to one striking analogy. Figure 11 shows the plan of the floor slabs that Pier Luigi Nervi designed for the Gatti Wool Factory in Rome, "with ribs following the isostatic lines of the principal bending moments." The diagram reproduces some of the centric systems brought about by the resistance of the supporting columns to the weight of the ceiling. The radial vectors issuing from the centers are crossed and complemented by the grid of horizontals and verticals that comes about because the centric systems are not alone but related to one another (figure 12). Here, then, the condition that underlies our compositional scheme is spelled out in terms of physical statics. It is a gratifying confirmation, which makes its generality plausible—plausible, however, only in the sense of suggesting why we can expect it to apply also physiologically; that is, to compositional patterns judged by the eye.

What is needed in addition is that the resulting configuration of forces be perceived as a compelling reflection of a human condition so basic as to be acceptable as the underlying theme of all statements in the visual arts, with architecture among them. I am confident that this requirement, too, is met. We are being shown that every mental or physical system organizes around the center of its own being while coping with the powers of other similarly centric systems. Together, these systems form the world of self-contained entities interacting by aiding, completing, attracting, repelling, or disturbing one another—the world whose manifestations reverberate in what we experience as the human fate.



13
Pier Lugi Nervi, Gatti Wool Factory, Rome, 1953, ceiling plan.

14
Gatti Wool Factory, interior.