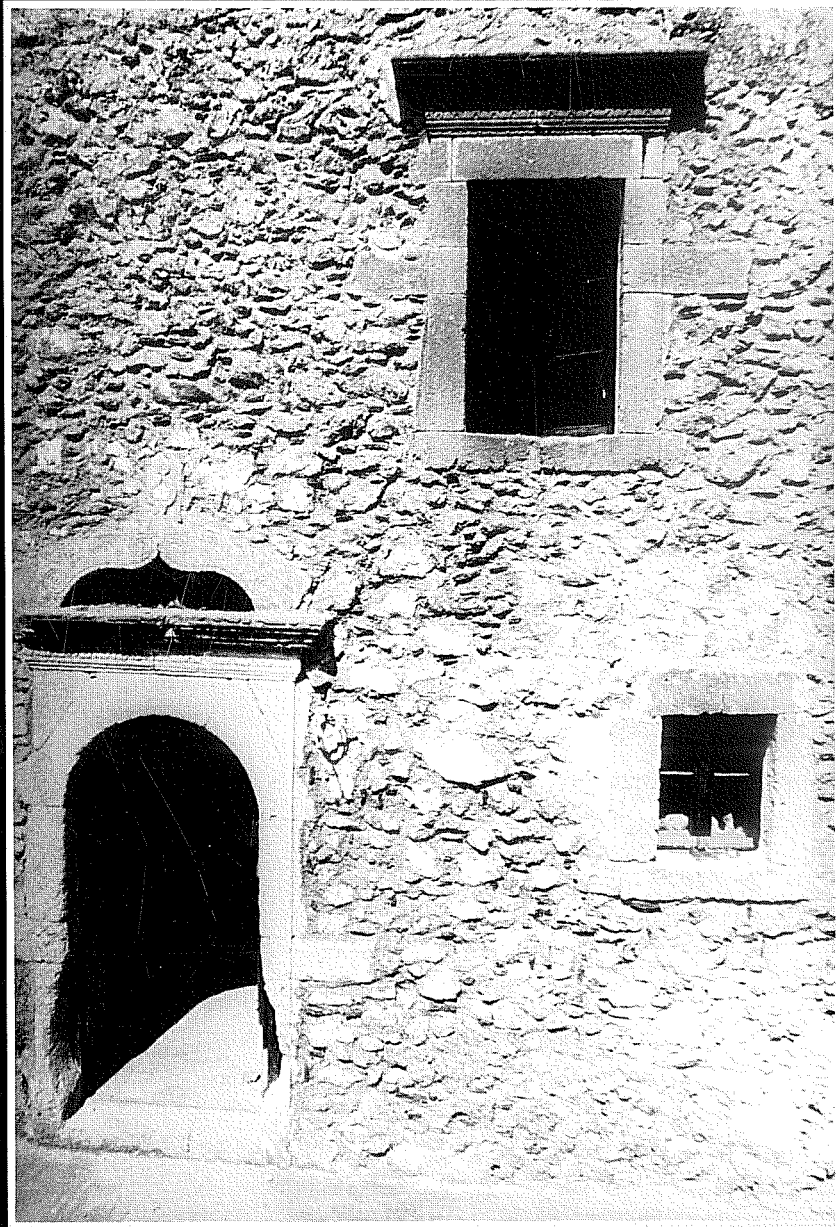


3

ORDER AND DISORDER



Overleaf
Random order. Monemvassia.

3.1 Inevitable order

We are not talking here about classical 'order' in the sense of a code for architectural composition in antiquity or from the sixteenth to the nineteenth centuries. The Doric, Corinthian, Ionic, Tuscan orders, if we sometimes refer to them, do not interest us for their value as a cultural code, but for the geometrical structure. Fundamental and permanent rules seem to govern the interdependence of the elements of architectural form. Buildings and urban groupings are always more or less structured. What is this order?

Order only has meaning in relation to disorder and chaos. It has no value in itself except at its limits. Perfect order and total chaos are equally difficult situations to bear for a long period. The works we construct are situated somewhere between the two.⁴⁶

Order in building

Nature: order or disorder? And then again, what nature? Wild untouched nature, because it is too vast, does not give an impression of chaos. Cycles, tides and waves give visible order. Rocks, rivers, plants or insects allow their structure to be observed. But, taken together, they represent an order which, at the visual level with which we are concerned, becomes unmeasurable. We accept the variety. We also admire it and yet man has traditionally imposed the measurable, the city, upon nature.

We have to live 'against nature' and therefore we build by ordering. 'In order that nature can be considered as landscape, it must cease to be too wild; because to be a specta-

tor, one must not feel threatened. The world is more beautiful since it has been explored' (Hellpach). Man imposes the mark of his control on the earth, water and the vegetable kingdom to the furthest corners of the world. He must assume the enormous responsibility that such a desire involves.

To build we must use fairly simple geometry. It is first of all *a necessity for design and above all for building*. Thus, to design and lay out roads, construct houses, prepare the site, cut the stones, mould or press the bricks and concrete panels, make the structural frame, and finally fit it all together, we have always sought to economize our efforts by using *the repetition of elements that can be assembled*. Regularity is thus the very essence of building. Heinrich Tessenow said: 'Order is always more or less miserable ... but you have to take the world as it is, and for that a certain inelegance is required. The construction of our streets, bridges, houses and furniture is always somewhat makeshift and it is for that reason that we particularly need order.'⁴⁷

Repetition, alignment and juxtaposition of identical elements and similar methods of construction impose order on our buildings and our towns. A colonial town on a grid layout, such as Turin or Manhattan, a Gothic cathedral, a building by Louis Kahn or a bridge by Robert Maillart celebrate order from structure or from technical necessities. The order which arises from construction finally educates the eye and influences our sense of the beautiful. This taste for regularity, once it has been established, acts on architectural design by transcending, on this occasion, purely constructional requirements. Order acquires its own autonomy. That does

not mean that one ignores the demands of construction, but that one superimposes other criteria. Each period and, to a certain extent, each architect, establishes its or his own ethics relative to the degree of autonomy permitted (Chapter 8).

Our search for order is not simply that of knowing in what way things have been made, what purpose they serve or what they represent. Objects also act on our senses as forms having their own intrinsic and geometric logic.

The sense of order

The discussion of perceptive phenomena in the previous chapter gave a glimpse of the fact that regularity is *necessary* to man. The more complex the environment, the more we need to simplify and summarize to understand and get our bearings. Since we operate by making analogies to perfect our knowledge of the environment, we do not want order to change completely from one day to the next. We need to accustom ourselves. Gombrich reverses this idea by saying: 'The power of habit comes from our sense of order. It comes from our resistance to change and from our search for continuity.'⁴⁸ Just as the sense of balance is innate, developing from the inner ear, it seems possible that our sense of order runs very deep. Even if it is not entirely innate, this sense of order has already developed by early childhood.

Without wishing to make an analogy with what happens in the animal kingdom, the example of the cuckoo is disconcerting. Born in a strange nest, raised by a sparrow and having never seen its parents, it is a confident migrant. It spends the winter in tropical forests. It travels

alone and at night without following the example set by other birds. It seems that man, too, has an innate sense of order. Genetic psychology, which deals with these problems, will perhaps give us an explanation one day.

On this innate sense of order is superimposed a learning process varying according to the environment and culture, which helps us to orientate ourselves. There will, therefore, never be just one order, one measure or one ideal balance. However we can, by taking discoveries of psychology and the history of architecture, clarify the principal means at our disposal. We work with them implicitly every day. We still need to make them more explicit in order to be able to teach and develop criticism.

3.2 Factors of coherence

We have seen that the eye selects and combines elements, that it seeks the simplest and most synoptic form and that it tries to integrate the various parts. Architecture, once again, is at the crossroads between the arts and the sciences: the coherence of a work of art can have its internal logic, that is recognized neither by the natural sciences nor by construction. A figure, even if it is abstract, has other characteristics than its edges. We can compose it from parts which, together, give the effect of a grouping. This principle of grouping is reinforced by repetition, similarity, proximity, common enclosure, symmetry and orientation of the parts. It is not our aim to discuss the relationship between form and content, but it is important to point out that semantic unity can reinforce and sometimes even replace formal coherence. The construction of a church begun in the Romanesque period, continued in the Gothic and completed in the Renaissance can appear unified in spite of stylistic disparities. It is the 'idea' of 'church' which predominates and unites the whole.

Factors of formal coherence are omnipresent and fundamental to architecture and urban design. Their principles are illustrated here by a series of pictures from one small town. Part of the pleasures and difficulties we experience with the built environment can be explained by our ease or difficulty in mentally grouping different elements from the visual field into synoptic units. When one studies integration in an existing grouping, these phenomena require the closest attention. Architecture is an art which acts on the dependence between elements to establish coherence.

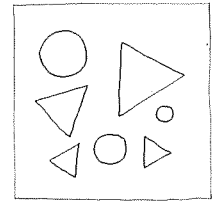


Figure 26 Group of triangles, group of circles and groups of triangles and circles.

Repetition and similarity

The eye tends to group together things of the same type (Figure 26). Even when the elements taken in pairs are somewhat different, we find that the structural resemblance dominates these differences (Figure 27). Repetition in the form of rhythm, as much in music as in architecture, is an extremely simple principle of composition which tends to give a sense of coherence. All forms of repetition can, moreover, be the result of addition, or of division of a whole, or simply constitute a series without a clearly identifiable overall form. On the scale of architecture and urban design, the absence of a limit, of a beginning or an obvious end, easily becomes disruptive; there is coherence of detail 'without aim' or without the coherence of the whole.

When the elements are heterogeneous, a grouping effect can in any case be obtained because of the partially common characteristics, as for example the proportions of the windows, their position in the wall and their relationship with the solid areas. Unity of materials and texture is another example of partial characteristics which reinforce the tendency towards coherence in spite of the individuality of each building (Figures 28 and 29).

Figures 26 to 40 The illustration of each phenomenon is accompanied by a series of photographs of the little town of Hydra, 12 km east of the Péloponèse. Its sea front, developed in the eighteenth century, provides an exemplary case demonstrating the interaction of forces that establish great coherence, in spite of the absence of identical repetition.

Figure 27 The plan suggests a relative equivalence of the facade module. All the same, it varies from single to triple, but this irregularity is offset by other factors which we shall talk about later. The four-sided roof is the norm, but exceptions do exist without causing disruption. Similarity is therefore not simply a question of the form of the roof. There is approximate repetition, but never identical.

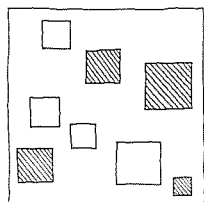
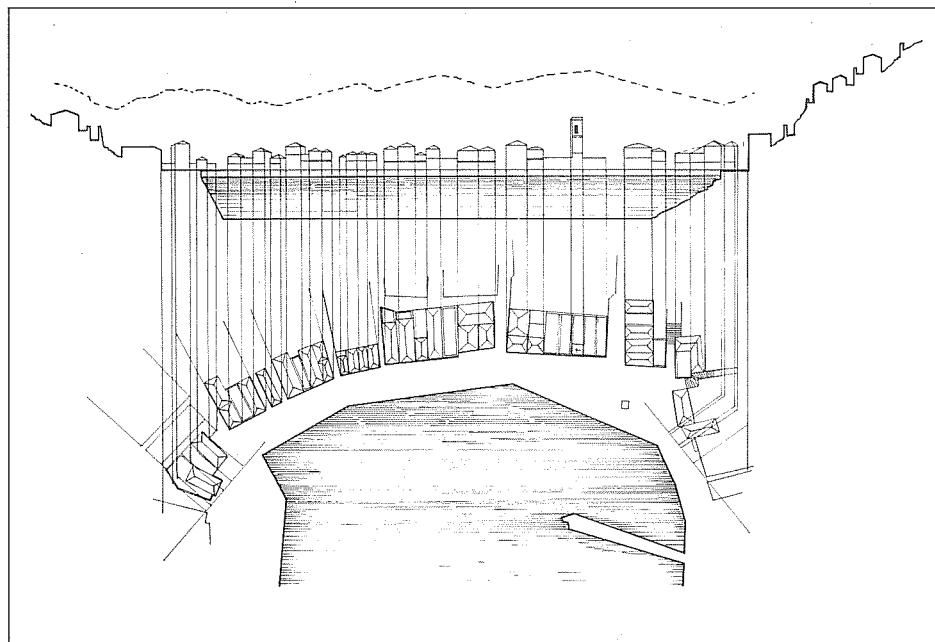


Figure 28 Group of hatched squares; group of plain squares.

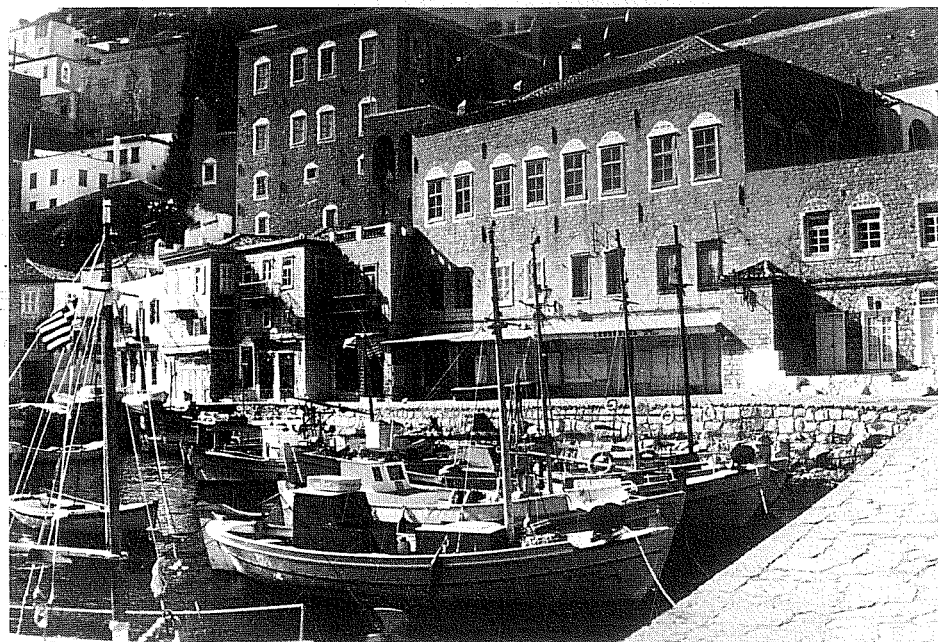


Figure 29 Similarity of details – the construction and dimension of the walls, corners, cornices, windows and doors – vigorously counterbalances individual differences of size and proportion of the houses.

Common scale, indeed even the comparative size of elements, is an effective factor in grouping by similarity (Figures 30 and 31). It must be emphasized that this would not be sufficient if it were the *only* common characteristic. When the objects differ in other ways, such as materials, texture, openings or roofs, the unity is destroyed in spite of the similarity of scale.

Figure 30 Group of large elements and group of small elements.

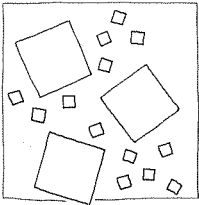


Figure 31 The waterfront of the harbour at Hydra, owing to the topography, is not formed only by the houses in the first row. The stone-faced 'giants', houses of ships' masters, captains and privateers, should disrupt the urban coherence. In fact, by their scale, they form a subgroup apart, without breaking up the urban fabric.



Proximity

The eye tends to group elements which are close together and to distinguish them from those which are further apart (Figure 32).

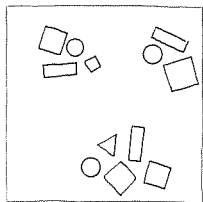


Figure 32 Dissimilarity is counteracted by proximity.

This grouping principle is very powerful. It makes it possible to join together that which is different by using small gaps to create an articulation between elements (Figure 33). There is no established size for these gaps, because the cohesion depends on the relative size of the elements and on the context. When the distance is greater than the size of the smallest element, one often resorts to other means (similarity, orientation, etc), to reinforce coherence.

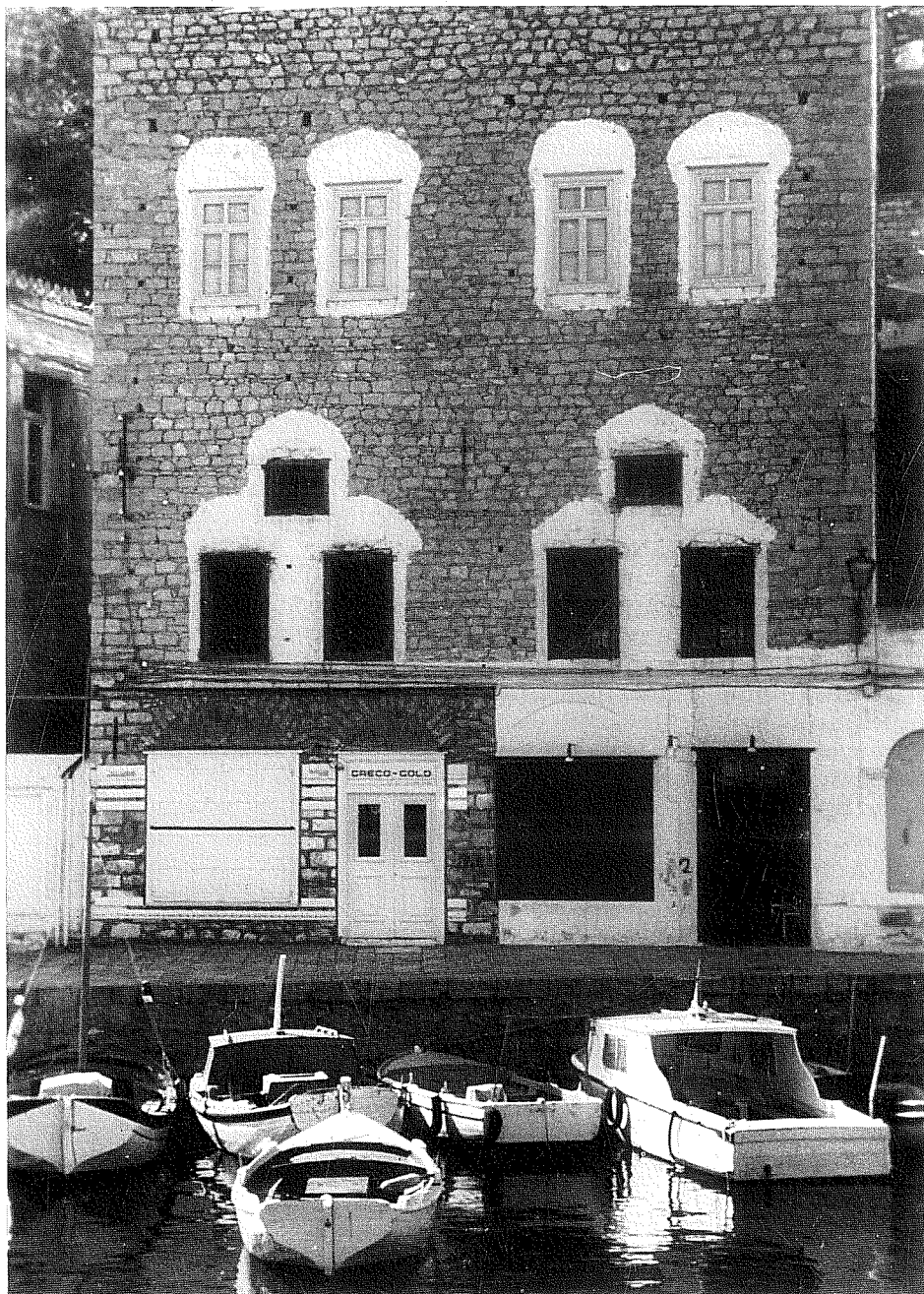


Figure 33 Two groups of three windows, not just large and small windows. Similarity has become less powerful than proximity, common white background and symmetry.

Common enclosure and common ground

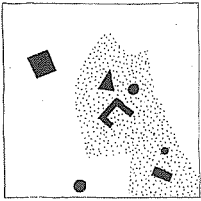


Figure 34 Group of figures on a 'carpet' and a group of exterior figures.

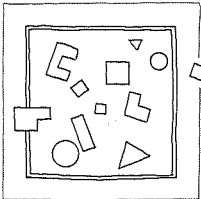


Figure 35 Group of figures inside an enclosure figure overlapping enclosure and figure outside.

An enclosure, a ground, even a carpet, define a field. What is included within the field is distinguished from what is outside it, even if the elements within are heterogeneous (Figures 34 and 35).

This is a very effective method of unification which we frequently use. Moreover, the elements which define the enclosure form a separate sub-group (Figure 36).

Conversely, the absence of clear limits to most of the recent extensions to our towns and villages prevents us from forming an image of the city (see also section 7.2).

Orientation of elements: parallelism or convergence towards a void or a solid

The eye also tends to group elements which have the same position: vertical, horizontal, parallel elements ... (Figures 37 and 38).

Heterogeneous figures form a group by the position that the elements take in relation to a street, square or building (Figures 39 and 40). The same phenomenon is sometimes used to organize a façade by grouping, for example, the windows in relation to the front door. The door acquires an importance which is hierarchically superior to the other elements.

Symmetry is a particular example of this principle. It can even contribute to the unification of such fundamentally different elements as building and nature. These acquire a common belonging by their relation to an axis which may be either real

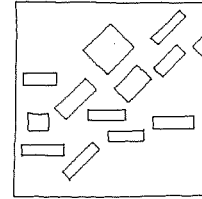


Figure 37 Group of horizontal figures and a group of oblique figures.

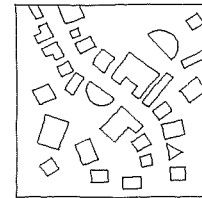


Figure 38 Group of figures which belong to the 'street' and a group of other figures.

or virtual. Trees set along a common axis with a building detach themselves from the surrounding nature and become part of the building complex. We shall come back to symmetry in the following chapter.

Figure 36 Homogeneity of the whole town in front of the mountain backdrop. The string of houses on the waterfront constitutes the sub-group of the enclosure.

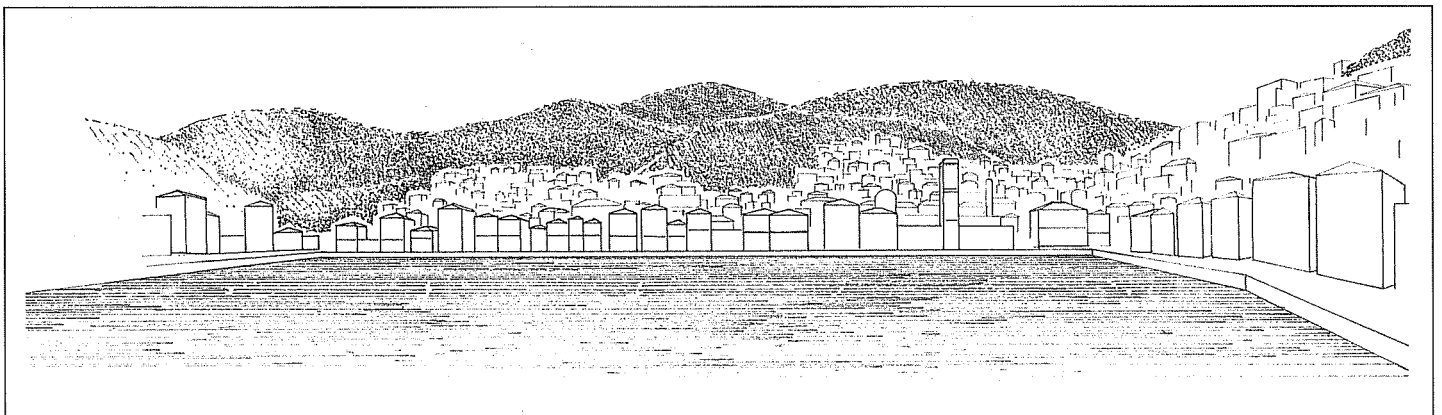


Figure 39 Convergence of alleyways and façades towards a theoretical focus in the natural harbour.

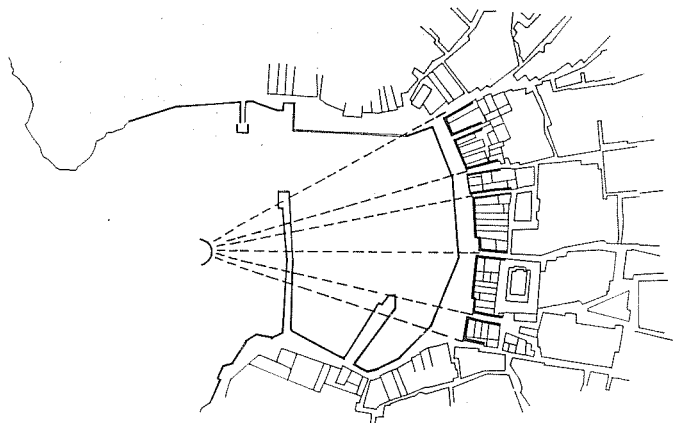


Figure 40 Parallelism and orientation: the space of the quay is one entity owing to the alignment of the façades in a broken curving line. No projecting building breaks this regularity. The line of the quay widens at the point where the activities or importance of the buildings so demand (businesses, main church, etc.).



Interaction of factors

In most organizations several factors come into play simultaneously. Reality is complex and pure situations are rare. Sometimes one factor dominates the others.

The example of the harbour at Hydra shows the power of a strong *redundancy* of factors of coherence. Owing to the simultaneous action of four factors (similarity, proximity, enclosure, orientation) which act on different scales, this 'ensemble', though still heterogeneous and not even symmetrical, is welded into one indissoluble whole. Once these principles of coherence are well established, one discovers that there is room for enormous variation. Of course, Rietveld's Schroeder house would be difficult to insert into it, rejecting the principle of frontality and the wall with openings. But the coherence of the whole would not be jeopardized by the insertion of Loos's Moller house, or Le Corbusier's Cook house. On the contrary, it would be enriched and we could have had fun doing a photo-montage as a demonstration.

These observations demonstrate the extreme theoretic fragility of planning rules which claim to preserve the town and its historic centre from the 'arbitrariness' of some contemporary architecture. The attempt, perhaps praiseworthy in itself, uses means that are too crude. It addresses only the symptoms. Strict alignments, colour and facing materials, storey height and cornice line, preservation of existing façades, type and colour of the roof, type of tiles, etc. – none of that is respected in Hydra ... and yet, what formal coherence!

3.3 From order to chaos

The study of the town of Hydra shows an example of interaction between repetition, similarity, proximity, enclosure and orientation. We use these methods to organize our environment. According to the choices which we make, we end up with groupings which can be grasped at a glance, or, on the contrary, which are complex, more difficult to understand and which require investigation. *The elements* and above all the *relationships* between the elements can be more or less organized starting from the use of a uniform texture, through hierarchy and complexity to a collection of elements without identifiable relationships - chaos (Figure 41).

The fewer links there are in the visual information the observer receives, the greater the effort he has to make. The architect, then, introduces structures which make it possible to group the elements by strengthening their relationships.

Most towns and architectural works are characterized by several superimposed levels of organization in a hierarchy specific to the composition. The level of interest of a work does not lie so much in the use of one or other of these methods or organization, but the knowledge of these methods increases our consciousness of the design resources available and our skill in handling them.

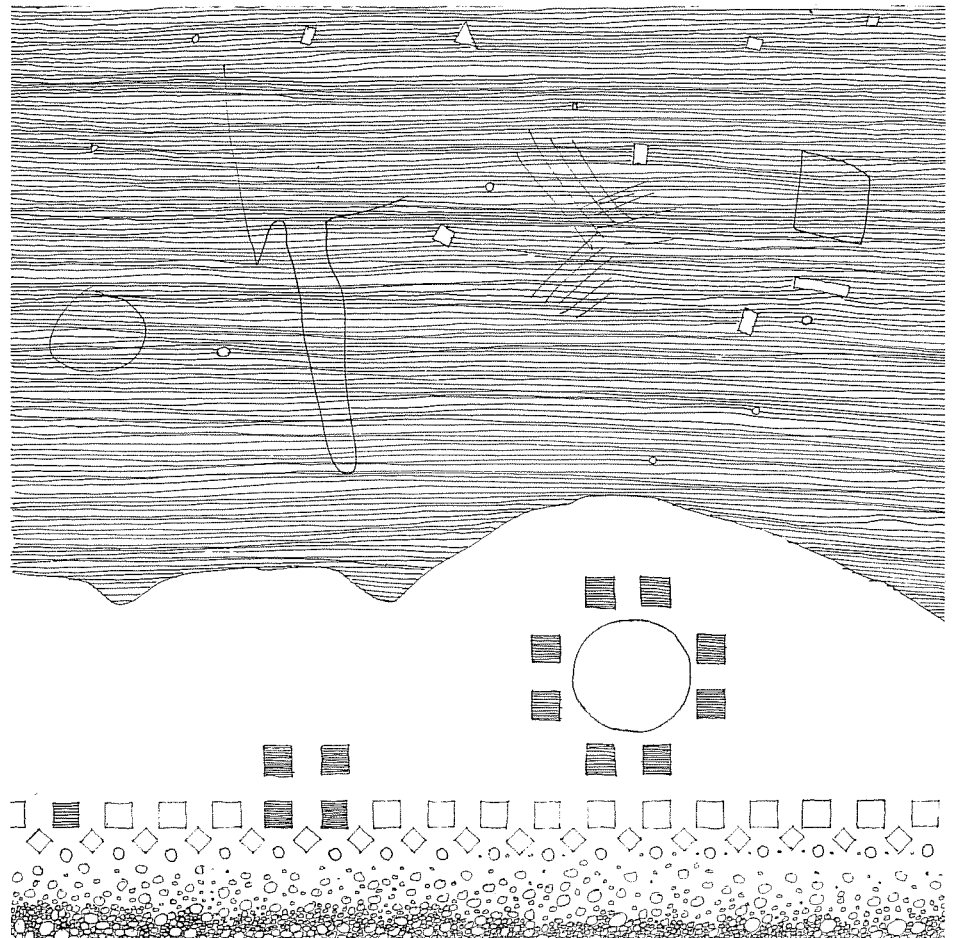


Figure 41 Texture - series - hierarchy - contrast - complexity (drawing by Larry Mitnick).

Homogeneity and texture

The eye perceives texture when the parts of a surface are sufficiently close, similar and numerous that they are no longer seen individually as figures. By analogy we can talk about a homogeneous structure when the same principle is applied to objects or buildings in space (for example a forest, a medina in North Africa, etc.).

The most elementary structure is thus created simply by *proximity*, *repetition*, *similarity* and, sometimes, by the orientation of the elements.

Textures are of two types. The forest, the gravel on a path or certain clusters of buildings in southern Europe form an order which we could call random (Figures 42 and 43). Other groupings reflect an explicit or underlying system of coordinates, 'a web' (Figure 44). The threads of this web are often non-physical. They are suggested by the positions of the solids, organizing the space between elements, as, for example, the streets between houses. The mixture of random orders and webs characterizes the aerial view of Hydra (Figure 45). The urban structure often appears to be more random in places where topography asserts itself, whereas it is 'web-like' where flat land is available to accommodate the will of man. On a smaller scale, in the streets of Hydra we again find a homogeneity of nearby elements (forms and sizes of houses, doors, staircases, facings, colours, scales). The bird's eye view presents a generalization of reality and extent of the variations within an urban system, which must be qualified as experiences by walking through them. Texture is the significant order of collectivity, an easy and reassuring order by its similari-

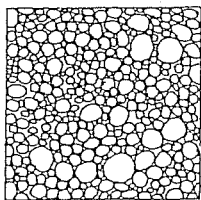


Figure 42

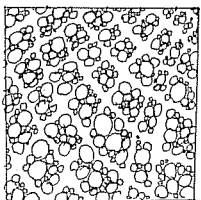


Figure 44

Figure 43 Skyros, Greece.



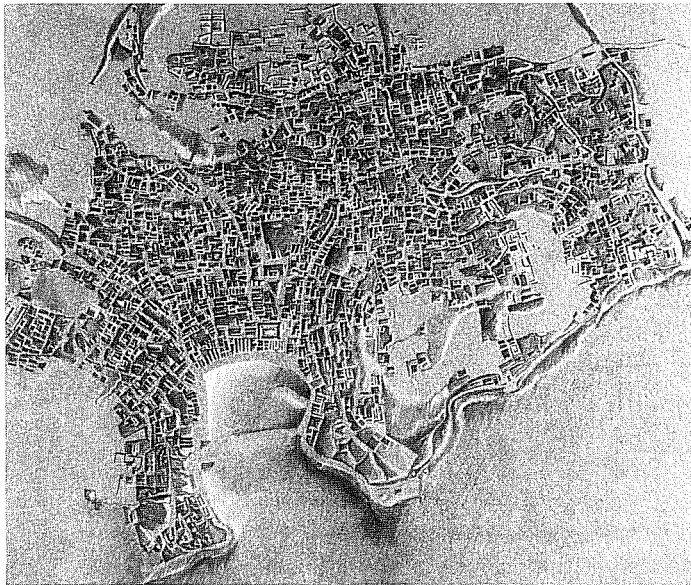


Figure 45 Co-ordinated texture; Hydra.



Figure 46 Fragmentary texture; Pully (on the same scale as Figure 45!).

ties in structure and scale, whilst at the same time allowing individual differences. Certain textures are in danger of disintegrating because they contain too many breaks and irregularities (Figure 46). The introduction of roads and buildings on the random alignment of previous agricultural subdivisions is often the root cause of the confusion of our modern suburbs. No sooner is a rule established than it is broken. The fabric does not get its chance to be woven.

We have based our argument on aerial views because they are comparable documents. We could just as well have observed the texture of façades or of fragments of façades.

Alignments and series

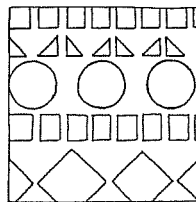


Figure 47

There is a particular configuration of texture in which order is obtained by repetition of aligned elements. All the parts are of similar or equivalent importance but, contrary to the homogeneous structure, there is a preferred direction through alignment (Figure 47).

Think of the example of a necklace or arcade. When the necklace is in double or triple strands, transverse

relationships are established. When these become too important, we return to the web texture.

All the factors of coherence can come into play in the series, but similarity and proximity of the elements are the pre-condition for it.

The basis of this type of structure is *linearity and rhythm*. All series are rhythmical with beats and intervals. What at first sight appears to be nothing more than a simple, pleasant repetition when looking at the ensemble of the square at Telč (Figures 48 and 49) is, in fact, a complex combination which ensures that the ensemble is more than one house simply tacked onto another: the rhythm of arcades... A - A - A... and windows... B - B - B - C - B - B - B - C... is only slightly disrupted towards the base by the house units, while the rhythm of the gables... D - D - D

... and d - d - d ... re-establishes the unity of each house. Could these horizontal strands therefore be split into two or three: the uniform rhythm of the arcades, the ambiguous one of the windows and that of the gables? A second examination shows that the rhythm of the gables is subtly extended down to ground level. The series are vertically co-ordinated: the individuality of the houses continues to exist, although diminished, as far down as the arcades, owing to a slight difference in proportion and colour. *Three* archways and *three* windows are slightly different from neighbouring ones. The figure three has a 'centre', therefore a symmetry. The symmetry is explicit at the gable and implicit at ground level.

The over-all view, which is no doubt fascinating for most of us, is not simply the result of skilful control of form. Order is linked here to urban realities; it integrates facts of life. The aligned façades and the homogeneous arcade at ground level accentuate the collective role of the square. Towards the top, each floor progressively affirms the relative individuality of the builders/financiers/inhabitants.

What we can learn from this example is that a series need not all be based on an identical rhythm, but that one can join together several beats into larger units on condition that these groupings are not arbitrary. When these beats correspond to a reality of life, they are even more satisfying.

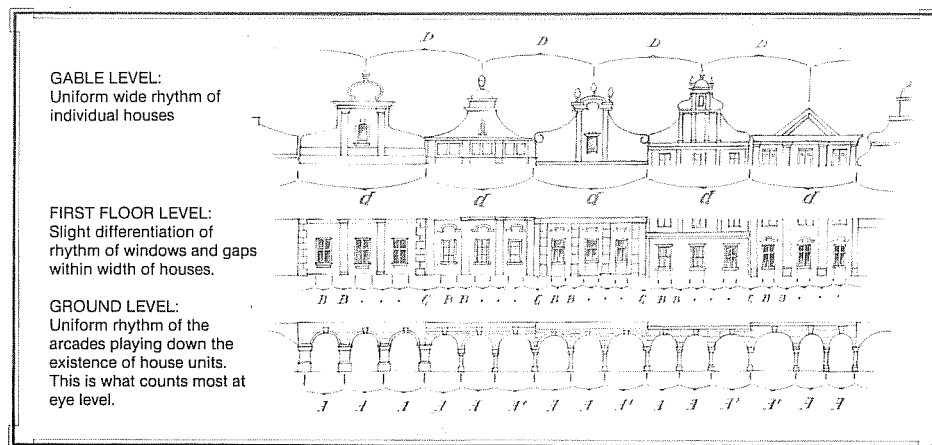


Figure 48 Co-ordination of series, Telč, Czechoslovakia.



Figure 49 Telč, Czechoslovakia.

Gradation

In a repetitive structure like texture or series, the intervals or elements may gradually change their form, size or orientation. Gradation thus combines two contradictory characteristics: relationship and difference without a pronounced hierarchy (Figures 50 and 51). Gradation is found everywhere in our environment. Many of the elements of nature are structured in this way (Chapter 5). Without attaching too much importance to an analogy between the human body and the façade of the Convent of La Tourette (Figure 52), one must admit that the analogy incorporates the idea of

crescendo and de-crescendo in time and distance, apparently without repetition. Frequently found in nature, gradation is, however, little used in architecture. More regular rhythms are generally preferred, for obvious reasons of economy of building methods. Other constructions, more demanding as regards function and structure/weight relationship do, however, resort to it, as for example the wings of a glider, whose very sensuality is breathtaking.

There exists one particular form of gradation which is used more often in plan and section than in façades: *progression* (Figure 53). In a progression there is a beginning and an end or an aim, which, for this

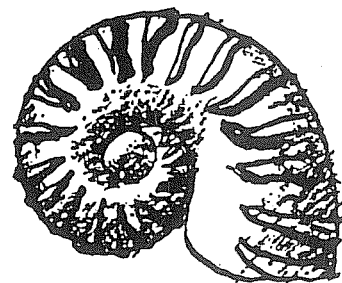


Figure 53

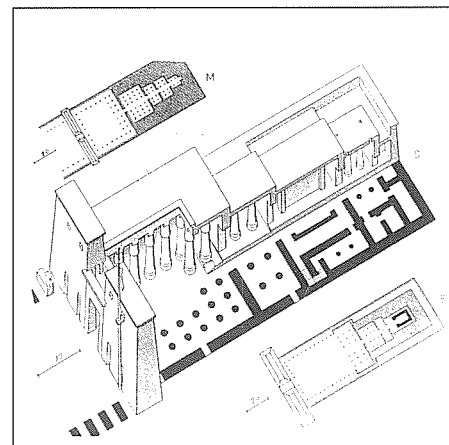


Figure 54 Southern temple of Thebes (according to Choisy).

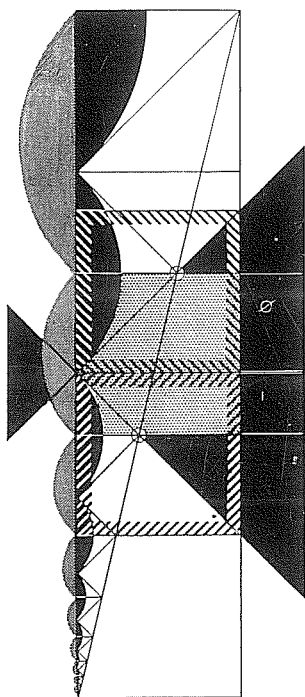


Figure 51 Le Corbusier, The Modulor, definitive diagram. 1950.

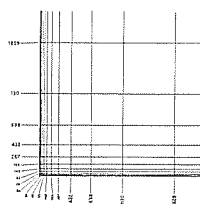


Figure 50

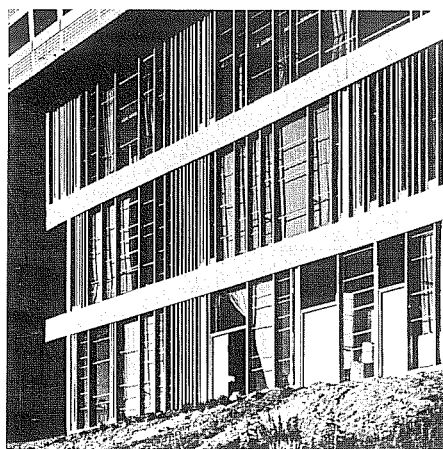


Figure 52 Gradation of glazing; Le Corbusier, Convent of La Tourette.

reason, assumes a dominant position. It is a continuous gradation of crescendo without cyclical variation. Thus a hierarchy is established as can clearly be seen in the drawings of the southern temple at Thebes by Auguste Choisy (Figure 54) where the progression towards the heart of the sanctuary can be read not only in the plan but also in section. It is not the highest and the largest which is the most important, but the opposite. Hierarchy is not a question of size but of the relative position of an element in its context.

Hierarchy

Hierarchy is a more complex order because of the combination of elements in relation to a scale of importance. There is not necessarily an affinity between the elements. To create a hierarchy we can resort not only to the means of variation of relative *sizes*, but also to that of *disposition* and *singularity of form* in relation to a context (for example: centrality, axuality, orientation, geometric opposition, etc.) (Figure 55).

It is important for the architect to know the implicit hierarchy of certain geometric configurations. Thus the different loci of a space with a square, rectangular or circular plan are not of identical value since the centre, corners or circumference adopt a particular value in each case (Figure 20).

A hierarchy implies primary and secondary elements. There is a dependent relationship between these elements; one or several of them dominate the others. Within these elements the same phenomenon can take place: by concentrating attention on one element, this one can become primary and we then discover secondary elements. In diversity, hierarchy is a powerful unifying factor. It makes it possible to combine elements in bigger, simpler and more recognizable entities.

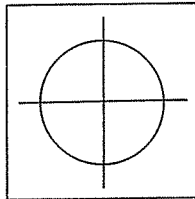
The discovery of dominant and subordinate elements in a group of buildings is applicable not only to solids (for example to a mass or a façade) but equally so to architectural space (Figure 56).

Whoever talks about 'hierarchy' in the built environment thinks only too readily of 'axis', 'symmetry', 'centrality', etc. It would be pointless to enumerate all the means which can contribute to *the dominance* of an element in its context. In any

case, symmetry is not the only means of achieving it. Even the simple changing of the orientation of a building in relation to others is sufficient, by being an exception, to establish an unambiguous hierarchy (Figure 57).

Hierarchy thus implies a dominance of spaces or objects. We use hierarchies every day in the organization of our thoughts. We need

Figure 55 Hierarchy of the centre.



these references to facilitate our orientation in complex space. When there are too many hierarchies of equal value, the clarity of the hierarchy breaks down.

Figure 57 The mere rotation of a building in relation to others at once introduces a hierarchy. Le Corbusier, Carpenter Centre, Cambridge, Massachusetts, 1961-64.

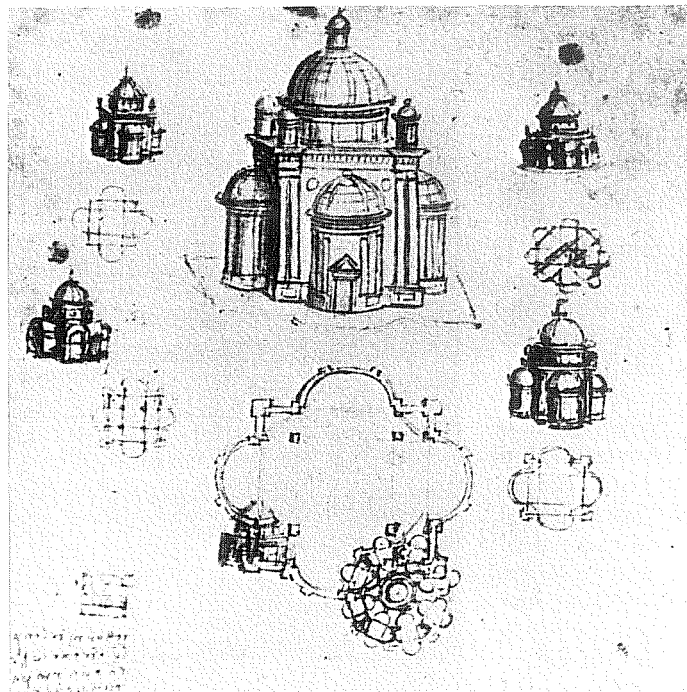
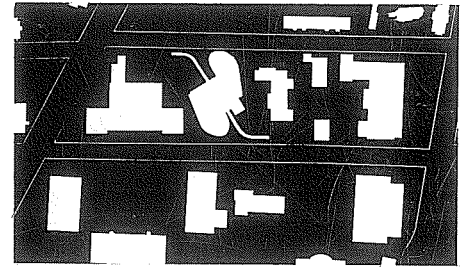


Figure 56 Study of buildings with centralized plans. Leonardo da Vinci.

Contrast

Contrast serves to give an immediate and unambiguous identity to two formal systems. It leads to mutual reinforcement without necessarily resorting to explicit hierarchy. The interdependence of the elements is achieved by tension resulting from their opposing characteristics (Figure 58). There can be many expressions of opposition, but in order that there be a dialogue, a certain proximity, even superimposition, must be respected:

- *positive and negative*
solid/void (Figure 59), convex/concave (Figure 59), curved/straight (Figure 60).
- *light and dark*
light/shade, reflective/absorbent
- *large and small*
wide/narrow, high/low
- *horizontal and vertical*
- *natural and artificial*
rough/smooth, vegetable/mineral
- *etc.*

Contrast enables us to establish differences: we have seen it with the figure/ground phenomenon. Moreover, two opposites placed in a contrasting situation establish a 'dialogue' between them. With three, four or more, that becomes difficult, or even impossible. Contrast is a principle for ordering our environment. The meaning of a form is accentuated by its opposite. When Slutzky says that, with Le Corbusier, '... the negative spaces (voids) are invested with a formal value equivalent to that of the objects which generate them'⁴⁹ he is referring to the primary requirement of composition by contrast: to inflect a form by the action of another, the space itself being able to serve as an expression of opposition. In order that the opposites enter into a 'dia-

logue', the differences must, however, be sufficiently pronounced. There are virtually no known rules for achieving this, the nature of oppositions taking so many different forms. The eye remains the principal judge.

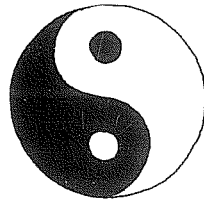


Figure 58

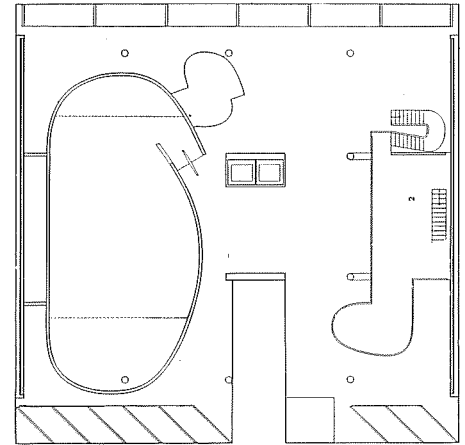


Figure 60 'Curved-straight': Le Corbusier, headquarters of the Association of Spinners, plan of level 4, Ahmedabad, 1954.

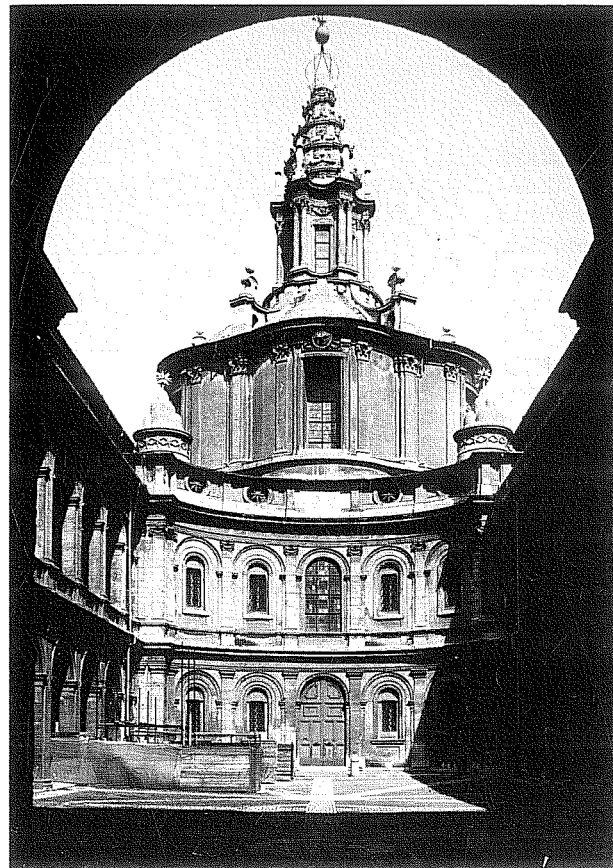


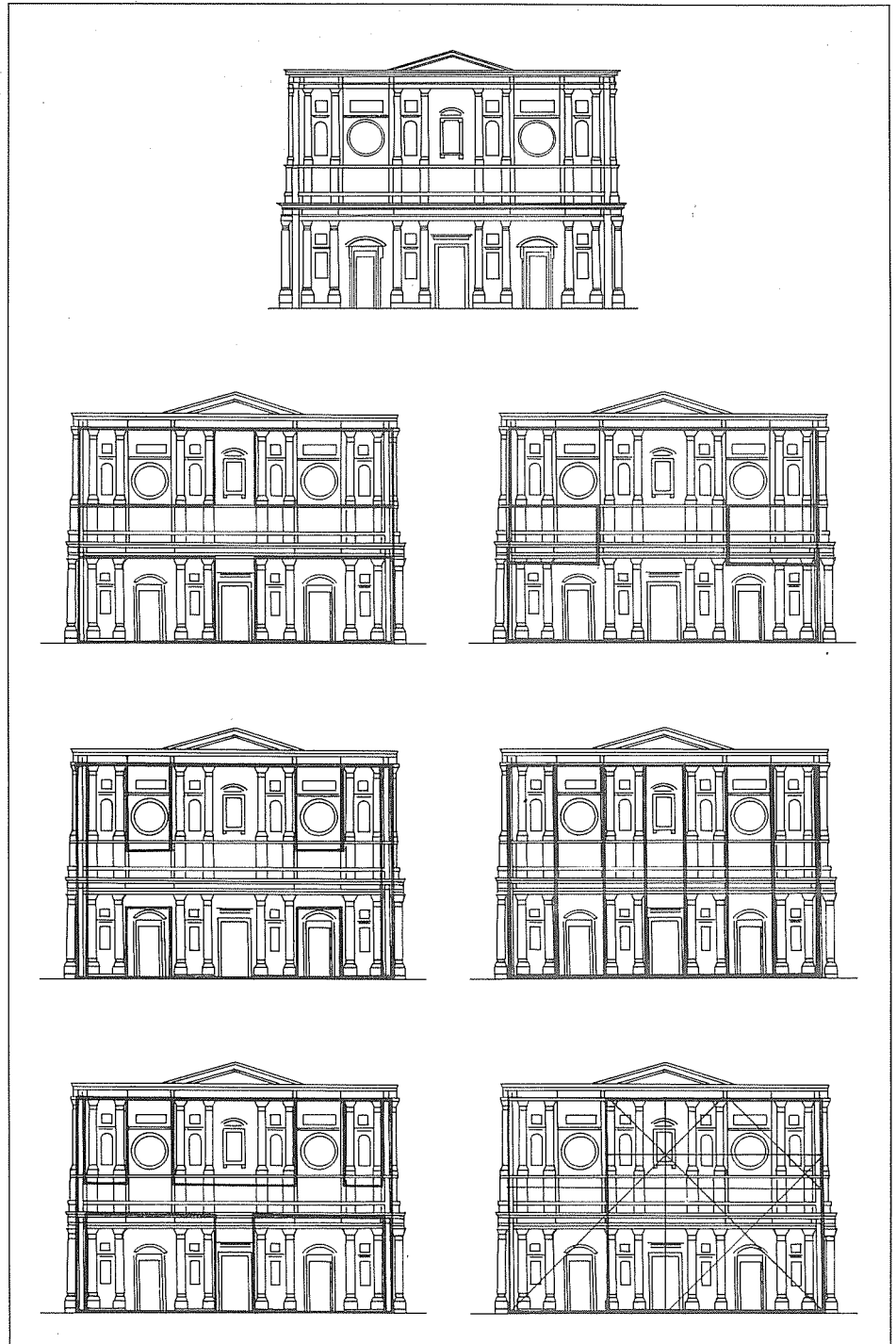
Figure 59 'Concave-convex': Francesco Borromini, Sant' Ivo della Sapienza, Rome 1642-60.

Complexity



The concept of complexity in architecture can be defined by its opposition to simplicity, indeed to what is clear and elementary (Figure 61). Looking at the Parthenon from an oblique angle, we can guess at the sides hidden from view. All its elements, base, columns, capitals, architraves, etc., blend to create a unity, preventing all ambiguity of interpretation. Whilst being infinitely refined, this temple remains, at the same time, of utmost simplicity. *The eye is invited to accept it more than to explore it.* It is quite a different matter with Michelangelo's façade of San Lorenzo. In spite of the symmetry, which is a powerful unifying factor, we find ourselves in the presence of several co-ordinated and superimposed similar formal structures. The elements are grouped in such a way as to present more than

Figure 62 Michelangelo, façade for the funerary chapel of San Lorenzo in Florence, 1516–34; one of the first sketches still shows symmetry without much complexity (see Figure 102). That is the case for the majority of symmetrical buildings. Michelangelo was not satisfied with it; the final design plays down the preponderance of the axis. Numerous interpretations are possible and almost equivalent, as can be seen from this selection from a series of analyses carried out by Colin Rowe and Robert Slutzky, published in *Perspecta* No. 13/14, Yale, 1971.



one interpretation to the observer – that is what we call *complexity*.

Supposing the façade were built and we gradually approached it – although the same holds true from a fixed viewpoint – the façade alternates among several formal organizations which dominate in turn. It becomes a *façade to explore* (Figure 62). Colin Rowe and Robert Slutzky have introduced the concept of *transparency* from which they develop an interesting, critical tool for analysing and composing with these phenomena of superimposition.⁵⁰

We meet, however, many involuntary and clumsy complexities (and simplicities) in architecture. The exceptional quality of San Lorenzo lies in the control of the dependency between the elements and the geometries. The balance between them makes the façade complex *without being complicated*, in the same way that the Parthenon is simple without being banal. The mastery of complexity in architecture, as with simplicity, can only be the fruit of assiduous labour. It is not simply a question of talent, as Bernhard

Hoesli⁵¹ shows very clearly when he lines up the preliminary sketches of Michelangelo. The first design is still ‘clumsy’: the geometric subsystems do not yet intersect to form a whole; they are juxtaposed (Figure 110).

Other methods also exist for working with complexity, as for example, *deviation from a norm*. It can result from the introduction of divergences from an established symmetry, or even from an anomaly in a regular pattern, or simply from the distortion of a familiar figure.

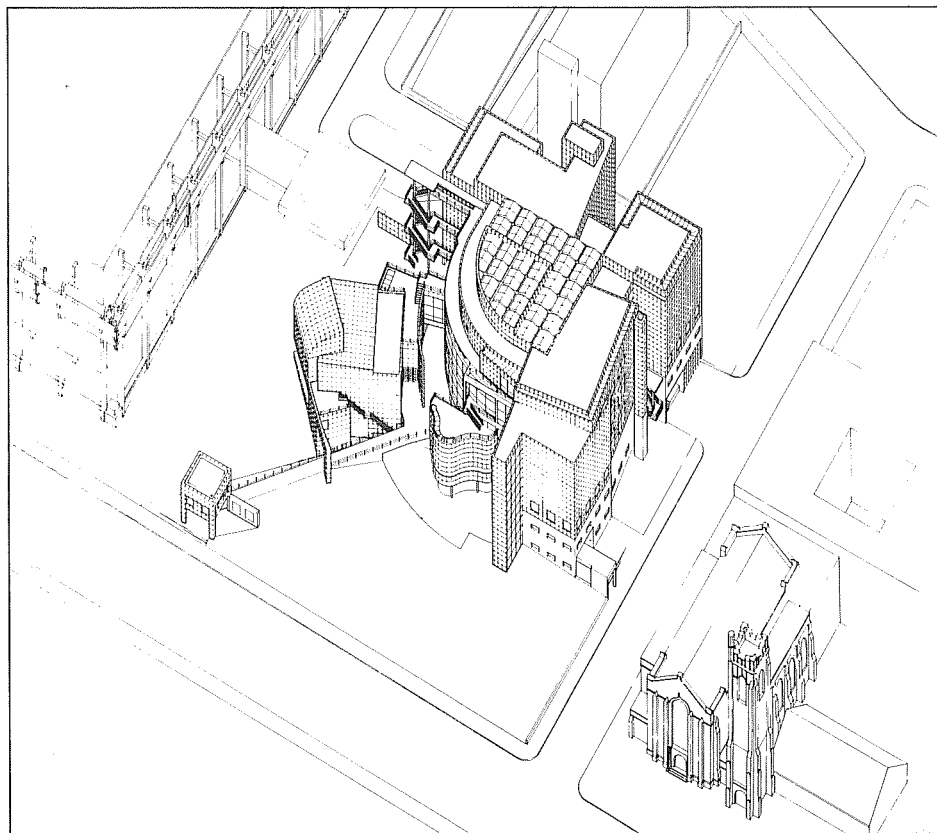
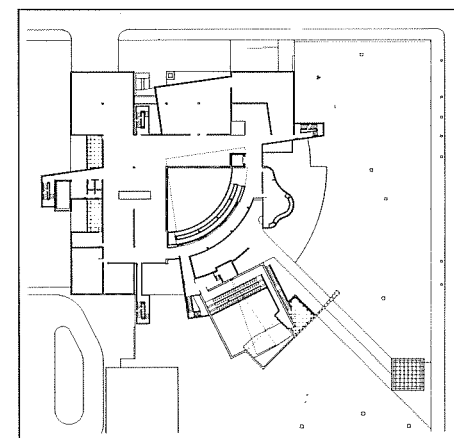
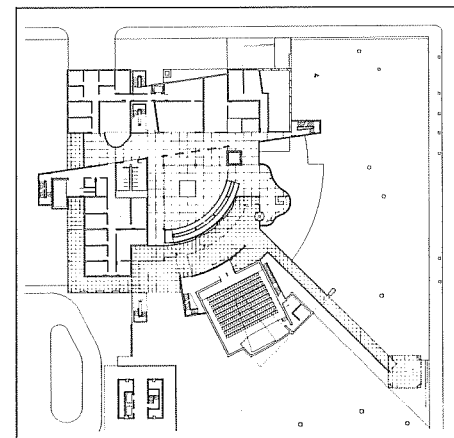


Figure 63 Spatial complexity: Richard Meier, High Museum, Atlanta, Texas, 1983.



Let us examine, as an example, Richard Meier's High Museum in Atlanta (Figure 63). Where does the cohesion come from in this geometric complexity and multitude of volumes and spatial situations? Here the 'controlled complexity' is no longer restricted just to the façades. On the exterior, a great unity of materials comes from the cladding of square, metallic panels which form a homogeneous texture independent of the geometry and function of the individual volumes. This *continuity of texture* is essential to combine the irregularities into one unit identifiable by the layman. In the organization of the internal space, the deformations are particularly numerous. The initial orthogonality is broken from one change of angle to another, so insistently that there is a risk of total disorder. Three features of the layout prevent such fragmentation:

- the changes of angle in the end create, at least partially, a new orthogonality between them;
- they almost always relate back to the exterior by transversals;
- the large central space, in the form of a quadrant, acts as a reference throughout the main stages of the architectural promenade.

The cohesion is precarious, intriguing and provocative. It is not certain that this is the best place for displaying works of art, but Meier insists on the ability of the architecture itself to be 'art'.

This balancing act between obvious order, hidden order and disorder is fragile. This is what fascinates the minds, when such a work reflects not only poetic inspiration, but also skill combined with knowledge of the means for achieving it, as these two examples, several centuries removed, demonstrate.

Contradiction

We can distinguish two types of contradiction in groupings of urban and architectural forms: one accidental and the product of a contradictory origin, the other measured and meaningful, dependent on the process of composition:

- (1) *Discordant collision* of two or several formal systems where one diminishes the meaning of the other (Figure 64): it involves a high degree of complexity in which contradictory visual information causes the observer to hesitate between two or more situations which do not add up to form a whole. The lack of co-ordination and the collision of forces and divergent interests then appear to be accidental. We find numerous examples in the everyday architecture of our towns. They are a manifestation of the story of more or less 'egocentric' social and economic impulses.
- (2) Contradiction used as an *intellectual game*, as provocation: in this case it is a question of throwing expectations of architectural meaning into confusion by the expression of ironic conflicts (Figure 65). This method plays on dialectic effects; 'formal theses and anti-theses' can be seen in the same work. For example a column is placed in the middle of a vault. Between a constructional necessity chosen to solve a given problem (bridging a space without a lintel), and its contradiction (the column), an attempt is made to increase the active and critical role that an architectonic image can produce.

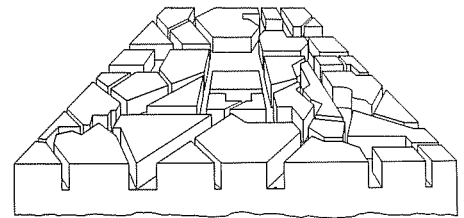
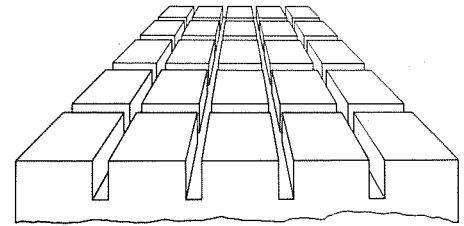


Figure 64 'Order is endangered when the deviations (from a norm or from a rule) are strong enough to upset the pattern of the whole.' (Arnheim)
Two drawings by Dieter Schaal.

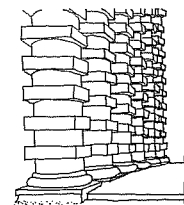


Figure 65 Pillar or column: square or round? Les Salines de Chaux, house of the director, Claude Nicolas Ledoux.

Italian Mannerism, which followed the Renaissance, marked the beginning of a poetry of the improbable, the magic game. It reacted against the established rules. Palladio, if he was interested in it, remained none the less 'conservative':

... The violation which in my opinion is the most excessive of them all is that of placing above the doors, on the windows and on the loggias, broken pediments that are open in the middle, since their greatest effect must be to protect the parts of the building subject to rain, our ancient architects having

learnt by necessity that these must be vaulted and made in the form of a ridge ...⁵²

The purity of the Renaissance was then rejected in favour of an expressive and sarcastic freedom, allowing the caprice of functional discord by the modification of codified elements (Figure 66). We also find traces of Mannerism in the architecture of the nineteenth and early twentieth centuries, aimed at freeing architecture from academic rationalism. We can perhaps agree with Serlio who said, already in the sixteenth century, that novelty is pleasing in so far as it does not erase all the rules.

In contemporary architecture it is Robert Venturi who has set his hand to a re-establishment of the notions of contradiction and ambiguity with a view to freeing himself from the sometimes dogmatic simplicity of modern architecture. He expresses himself through his schemes (Figure 67) and his writings: 'I am for richness of meaning rather than clarity of meaning'.⁵³ He sets the hybrid against the 'pure', the compromising against the 'clean', the

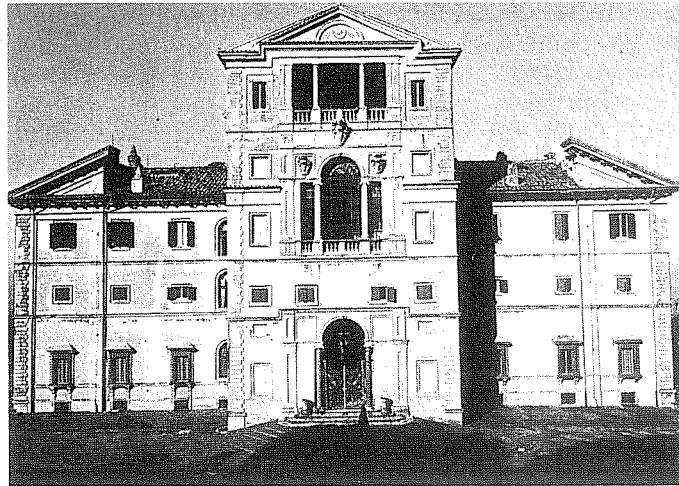


Figure 66 Broken pediment, Carlo Maderno, Villa Aldobrandini, Frascati, 1601-1606.

ambiguous against the 'articulated'. Whether architecture is at the same time large and small, continuous and articulated, open and closed, structure and decoration, relates to the links between the parts and the whole. These double choices express a commitment to questioning the simplicity of modern architecture by using a deliberate selection of historical precedents.

Arnheim expresses his scepticism regarding this strategy in the fol-

lowing words:

Venturi invokes contradiction to defend disorder, confusion, the vulgar agglomeration of incompatibles.... An object may be ambiguous in the sense of an alternation between two versions.... But if you say about a thing that it is this and also that and the two are mutually exclusive,... then what is said is nonsense.⁵⁴

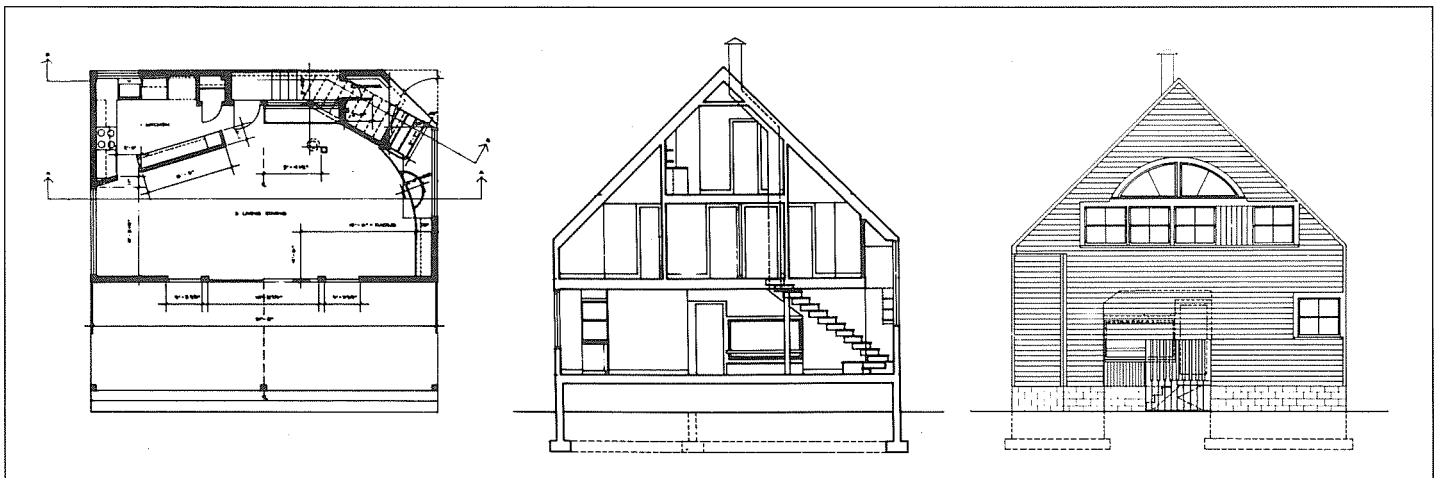


Figure 67 Robert Venturi and John Rauch, Trubeck House, Nantucket Island, Massachusetts, 1970.

Chaos

In chaos, no factor of coherence at all is at work. If any subsist they cancel each other out, because no structure, no formal or semantic theme is any more dominant, neither in the individual parts, nor in the whole. There is a conflict or absence of rules. The number of conflicting elements is high. As Arnheim points out, disorder is not homogeneity, even if the latter is at a very simple level, but a disorder between partial orders. 'An orderly arrangement is governed by an overall principle; a disorderly one is not.'⁵⁵

Certain neighbourhoods of our cities have gradually taken on a chao-

tic form in the course of this century (Figure 68). This disorder reflects their recent transformation into an accumulation of transportation systems, objects and buildings which take only their own utility into consideration, without any common objective of creating a city. Friedrich Schinkel was already warning in 1840: 'No single need produces beauty, circumstantial utility cannot determine form without engendering chaos.'⁵⁶

Could chaos itself become a source of creation and life? Nietzsche said that chaos was needed for a star to be born. If that is really the case, we can expect to see a very beautiful star. Unless society has completely

crumbled away, forgotten its past, been uprooted and lost all capacity for *hope*, its architects and its planners do not have the right to be the accomplices of chaos.

Urban chaos is a state of instability. On one hand, it tends to become organized by signs of occupation. On the other, being accustomed to a city helps us to learn about its more secret order. The inhabitant of the homogeneous kasbah has an *organized centre* - his house - from where he constructs a complex network of relationships which make the apparent confusion intelligible.

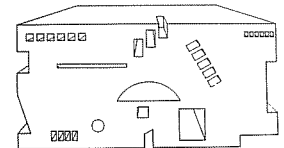


Figure 68 Drawing by Dieter Schaal and photo by Rolf Keller.

3.4 Regularity and irregularity

Regular geometric order sometimes has a bad reputation. One complains about uniformity, rigidity, *monotony*, inhumanity. In a contribution to the journal of *Diados*, devoted to the theme 'order and disorder'. Ulrich Conrads declares war on order by saying:

... If, up to now, disorder has been inimical to architecture - and vice versa - it now acts as a stimulant. And, furthermore, architecture might draw renewed commitment and strength from those special features of disorder which we recognize as the structure of life itself and which, in most cases, cannot be brought into line and into symmetry. Networks and labyrinths would be the appropriate descriptions of this kind of architecture from disorder. And we recall that we have already identified these same architectural structures as the truly habitable ones.

This thesis is based on the concept that the life of man and the organization of nature are much more complex than a regular, geometrical order, implying that a town or building should be a more immediate reflection of this complexity. The argument nevertheless ignores three major issues.

First of all, to orientate ourselves in this world, we need to simplify its complexity mentally and visually to obtain images that we can commit to memory. Without the repetition of leaves that are practically identical, ordered according to the structure of the branches, it would not be possible for us to remember the tree as an entity. We need to be able to join the parts together in larger and simpler units, without having to decipher the detail. The same prin-

ciple is valid for the town, its neighbourhoods, squares, streets, its buildings and their windows.

Let us remember, then, that in order to build rationally from a large number of constructive elements, a certain degree of regularity is a technical necessity.

And finally, building is also an activity of the mind which will often try to surpass imitation of nature or social fact. Simple geometric figures and patterns lend themselves to it particularly well. Life is complex, but the form which contains life is regular (as in ecosystems, the processes of growth and the life of plants, etc.). To manage to respect the complexity of society, while at the same time making use of regularity, is intellectually rewarding.

But what kind and what degree of regularity? On what scale? There is no certainty that a town will imprint itself on our memory if it is perfectly square or circular. The degree of geometric abstraction remains a question which each culture answers in its own manner. This is more or less the ground on which the quarrel between rationalism and the picturesque takes place.

Simplicity

The fascination which simple forms, line, circle, sphere, cube, pyramid, etc., exert on us has lasted for thousands of years - judging by important as well as the most modest accomplishments of architecture and the decorative arts. Looking at the disc of the sun, we hardly question the complexity of its physical reality. Its form and its radiance inevitably evoke the ideas of light and heat.

Lines, surfaces and volumes with simple geometric outlines have for

us - as much as anthropomorphic forms - the power to subsume a complex reality, indeed even to sublimate it, without the distraction of an abundance of variations of detail. We enjoy a moment of satisfaction, of peace and admiration, when at certain times or from certain angles complex structures blend into simplicity. Manhattan - complex in spite of its simple grid plan - resolves itself when seen from afar at nightfall, or in the mist, into a silhouette. San Lorenzo, finally, is nothing but a 'common' rectangle.

The silhouette is merely an example; simplicity, not banality, is a quality to which we aspire just as much in plan as in space. Gombrich thinks that simplicity is intimately linked to Western classical culture. With the Greeks it became a virtue, a proof of theoretical skill without the need to resort to seductive devices.⁵⁸ In the East as well, from the King's Mosque in Isfahan to Zen art, we again find this quest for simple encapsulating forms, despite richness of decoration or detail.

The mental satisfaction of simplicity is probably linked to physiological and perceptual preferences rooted within us. In an architectural scheme, both in plan and section, this simplicity will not come to us from the brief. It is the product of patient research which leads to integrating the confused and contradictory elements of reality in the abstraction of a recognizable whole.

The dividing line between banality and simplicity is blurred. The enormous difference lies in *elegance*! Simplicity in architecture and in urban design is only obtained by an elegant solution; one which carries the complexity of elements through to just one image with extreme economy of means and without compromising nuances. 'Elegance



Figure 69 Fragmentary, but legible none the less, regularity resists the ravages of time: Olympia, lid of a sarcophagus.

always appears easy, everything that is easy is not always elegant' (Voltaire). In the same way, in mathematics or in physics, the elegant proof is also frequently the most succinct.

Regularity

Regularity is omnipresent. Our heartbeats, rate of breathing, drips from a tap, a clock, days and nights, the rhythm of the seasons ... we cannot escape it. It is only when the pulse changes that we measure it because continuity is then at risk. Regularity is within us. Hidden rhythms regulate our life.

Monotony? certainly, even torture, if it is the only perception allowed or if perfect repetitive regularity remains the only centre of interest. 'The most effective system of order is uniformity. It is valuable, because it forces us to notice subtle

differences. We need to have wide experience in order to recognize small differences. That is where we find the limits of regularity,' says Heinrich Tessenow.⁵⁹

The regular rhythm of Ravel's 'Bolero' is a system of insistent order, but it is there to make the crescendo of the two melodic themes possible. There is no modulation, no development except the conclusion, but each time the themes return there is a new and more intense colouring. In the decorative arts and in architecture it is very similar. From this underlying regularity comes the continuity which guides and reassures us. The measure of the rhythm is not necessarily uniform: it can be ordered by groupings into larger units (Figures 70 and 71).

Where is the dividing line between an accompanying rhythm and a dominant repetition, between order and monotony? It is a question of appreciation in which many factors

come into play: place, scale, field of vision, significance of the object, habit, etc. It seems that in large-scale groupings, in which rhythm predominates, and where there is little hierarchy or grouping into larger units, there is, in fact, a risk of monotony.

The regularity of mass production of industrial objects - our chairs, radiators, wash-basins, door handles, nuts and bolts - does not cause any problems of monotony in itself. It is their situation and their context which must, in fact, be questioned. The town, if it were produced as mechanically, without regard for place and use, would no longer be orderly, but schematic.

Regularity does not need to be based on a repetition of absolutely identical elements, or on a perfectly geometric grid in order to be monotonous. A morphological affinity is sufficient, as can be seen in the numerous suburban sprawls of large



Figure 70 On the left the spacings in the rhythm of the windows are purely repetitive; on the right these spacings are altered and grouped under the influence of the edges of the façade (the false and true façade of the Zacherl-Haus by Josef Plecnik in Vienna, 1903-1905).

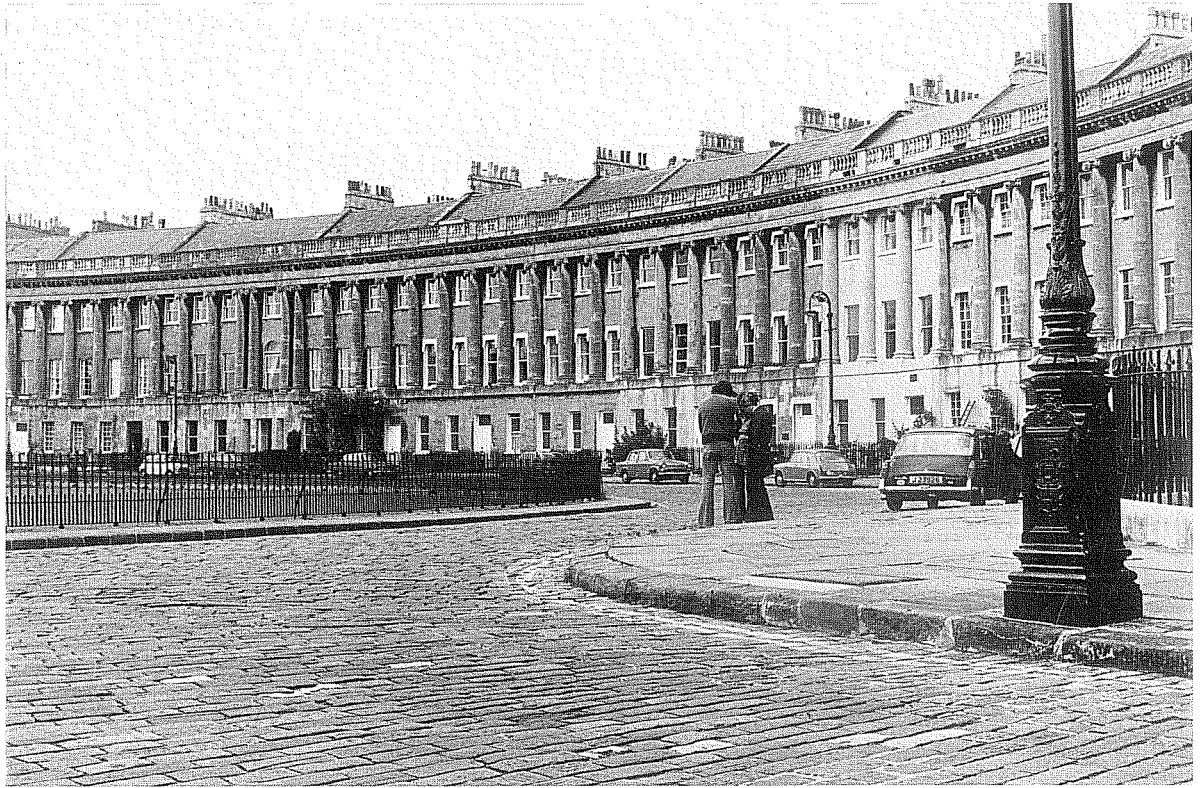


Figure 71 'The multitude which cannot be reduced to unity is confusion; unity which is not dependent on multitude is tyranny' (Blaise Pascal in Pensées); Royal Crescent, Bath 1767.

cities. Regularity is necessary for our orientation in the town and even in the universe and time, but if it has no perceptible limit, no variation, no hierarchical structure introducing a scale other than that which comes from simple addition, then our pleasure is diminished and we are disoriented.

A repetitive structure can, at certain moments, change rhythm, direction or density. These varia-

tions, which do not detract too much from the established order, are somewhat like 'a change of mood' which reveals character rather than alters it. These differences question the rules and thus reawaken interest. But we should be suspicious of superficial variety: introducing 'zig-zags' in plan to 'animate' a space or a façade, changing the grid or orientation without reason, sticking on symbols according to taste or fashion,

are not acceptable. This sort of fantasy more often destroys than enhances the established order. Interruption or variation of a rhythm, the change of the orientation of a grid, etc., must appear as a *necessity*, an event responding to the site and/or the brief, or even a major articulation among elements of construction.

Exception to the rule

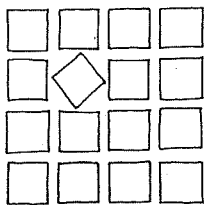


Figure 72 Exception to the rule.

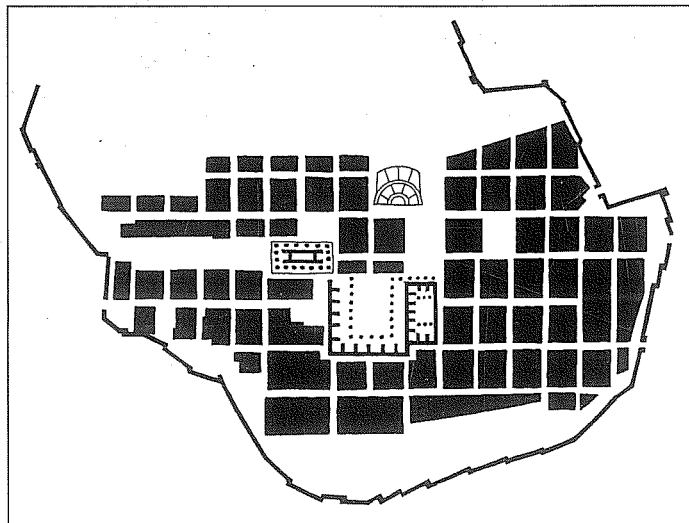


Figure 73 Priene, colonial town of Greek antiquity on the Black Sea. Regular fabric interrupted by public spaces and buildings.

Well-established regularity offers itself as a background to exceptions which will then assume a dominant importance (Figure 72). Our recent warning remains valid: an exception with meaning is better than an exclusively formal game. The door handle is an exception in the regularity of the door, the door is an exception to the façade, the fountain or the law courts to the town, the monastery to the countryside (Chapter 5). In the regular grid layout of Priene, a colonial town of antiquity, the status of exception is reserved for the agora, the sanctuary and the theatre (Figure 73). History has created exceptions in the strict Roman grid plan of the city of Turin simply by varying the width of streets and squares which indicate special places for the most important buildings, without disturbing the pattern. In order to become an exception, 'acrobatics' such as turn-

ing a building at 45 degrees are unnecessary.

To justify an exception the meaning does not always need to be related to content. The exception may refer to topographical irregularities, historical remains, the construction and even the form of the object itself. Handled sensitively irregularity offers the observer an awareness and enjoyment of the rule through the intermediary of its exception. Zen and more generally Japanese art and handicrafts exploit this possibility with subtlety. Japanese basket work is not only a highly skilled product but becomes more than that thanks to an intentional and measured imperfection.

When we can make this exception coincide with the meaning of the content, the exception is most successful, because it becomes legitimate.

4

MEASURE AND BALANCE

