

VISUAL STUDIES IN THE TRAINING OF ARCHITECTS

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Architecture is an intricate web of economic, industrial and cultural components developing along the social and cultural progress of its age. The demands facing the architect are manifold, and such are the architectural studies. Rather than a simple codification, dynamic analysis of architectural disciplines in particular and in their interaction is needed, from the aspect of achieving the common goal, education of architects.

The very substance of a building is its function. As to form, a building is perceived visually as an organized mass of structures and spaces, but it is appreciated in a more complex way than by mere vision. A work of architecture is grasped by visual experience closely linked to the interplay of motion and time. A building is set in space divided into spaces, thus it can be perambulated and circumambulated, its impression is due to a cinematic sequence of pictures, involving the time factor.

The picture generated by motion inside or outside the building offers a spatial impression enhanced by the physical reality, palpability of the building, by acoustic effects and an instinctive comparison between human and building scale. Space perception may be the source of a most intensive experience, as space includes man.

A building gives home to man, with his various activities. The town as an architectural complex acts by certain composite influences on a large group of human beings — “a town has an atmosphere”. Nobody escapes the impact of complex influences from an architectural environment accommodating man. The creation by the architect greatly impresses human consciousness. This involves the necessity of aesthetic formation and the distinction of architecture from other products of human work. The designing architect and the builder are, of course, aware of the intensive effect of the building as a source of non-functional experience. Society will, however, always lay claim, beyond meeting material demands, on formulating its own culture, considering architecture as one of its most efficient means [1]. This claim may manifest itself to a degree that certain buildings of practical function are raised, besides, or even in spite of, their usefulness, to the rank of a work of art.

Thus, architecture is essentially double-faced, and this must always be remembered. Its substance is function, its form is spatial structure. Both substantial and formal features are supported by the same material reality, amalgamating the elements of reality in a different way than the other, primarily artistic genres [2]. In architecture, structure is considered as a physical and mechanical construction and at the same time an aesthetic structure or composition, becoming, in this way, a special kind of the "Gestalt" concept.

The substantial and formal heterogeneity that may be called the fundamental contradiction of architecture has been a fact of decisive importance in its appreciation. By the time of craftsmanship, it was considered as a branch of fine arts from the aspect of form. With the advent of industrialization, architecture became a very important branch of industry, of great economic value and was approached from the point of view of function. Many denied architecture as a form of art at all, others argued that only an ideal group of buildings could be regarded as works of art. These opinions arise from the fact that architecture may involve different levels of creativity, while only top-grade creations can be considered as works of art.

Nevertheless, due to the specificity of fundamental contradiction and particular relation of substance and form, architecture represents a special field of human creative activity [3]. Thus, architecture, if considered as an art — whether in a general sense or because a given building shows the qualities of a work of art — can only be qualified as an autonomous genre of art.

The work of the designing architect is the most creative one among all architectural activities, thus it serves as a starting point of our studies. The raw material of the designer's activity is manifold and heterogenous. An architect has to take decisions in numerous problems to meet specifications and site conditions, even in case of simple tasks. A comprehensive understanding of the given complex of conditions requires considerable openmindedness, i. e. high *intelligence*. The architect must synthetize his knowledge of different fields related to building into an original entity of function and form. This work requires the creative application of information from various sources, by means of a high *combinative ability*. Intensity of sensorial experience and intellectual perception, an active and ingenious apperception of realities is a prerequisite both in recognizing one's task and in gathering preliminary information.

An architect needs active knowledge, imposing an attitude of continuous estimation, especially while accumulating visual experience. The designing architect cuts space out of space to be redivided and moulded like a handful of clay [4]. His work of mental construction in space requires a way of thinking other than by verbal formulation. His way of recollection is evidently both visual and associative, preserving the relationship between, rather

than the substance of, its units [5]. His mentality is both rational and — in a sense — irrational, since he strives to synthetizing units: some defined, and others free to shape and mould.

From the analysis of architectural design it is obvious that creativity is the only feature imperative for a designing architect, involving intelligence, combinative talent and, last but not least, moulding ability leading to the final achievement. So far, no exact distinction has been made between identities and differences of creative processes in sciences and arts, only the creative orientations have been distinguished, equally related to branches of both. Thus, our concept of creative process can also be applied to high-level architectural creation [6], featuring in addition increased visuality, simultaneous divergency and convergency in thinking, as it aims at finding a wide range of totally different solutions rather than the only possible one. Also, the architect's intellect depends on ease, flexibility and ingenuity [5]. In the crucial, hardly traceable moments of decision, the architect's creative work is also subject to non-logical forms of thinking, a so-called intuitive-associative way of combinative activity.

The architect cannot be supposed to need some kind of special talent besides the generally recognized criteria and factors of creative ability. An attempt of closer determination points to the diversity of thinking and to visual-spatial approach devoid of verbal expression. No doubt, the architect's abilities are inside this sphere, still large enough to accommodate the widest range of scientific and artistic creativities. However inseparable visual thinking may be from architecture, it is general in science, too, because sight is an important means of cognizance, while in the field of arts, it is not confined to fine arts. The non-logical way of thinking involving a particular interaction of instinctive and conscious elements is a feature of both scientific and artistic cognizance. As a matter of fact, the complexity of architecture does not suppose the existence of an exactly definable architectural mind. Else it would hardly been possible for artists — painters or sculptors — to excel as architects as well [7], as exemplified by personalities from *Leonardo* to *Le Corbusier*. Besides of teaching the necessary professional knowledge, the training of architects is expected to develop creative abilities or — in case of less creative subjects — at least to keep them alert.

The creative process in architectural design has the same essential features as those in other fields. The preliminary stage consists of getting acquainted with the involved problems; the latent period is the time of hidden ripening when the creative mind seems to withdraw from his work; the enlightening heuristically flashes the right solution through the mind — the less known stage of the creative process, the least accessible to research — and finally, the opposite period of execution and verification, commanded by logical thinking, bringing the work to perfection.

The fundamental identity of creative processes in various sciences and arts does not mean exclusivity of identical mechanisms to function throughout the process of creation. To say this would mean to consider division of labour in highly intellectual activity as inexistent. And by denying any special ability peculiar to architecture is by no means to deny the development of certain exclusive mechanisms of consciousness in course of design practice. Though relevant concrete notions are missing, their existence can be presumed on the basis of the role of work in the development of man.

The knowledge of professionally determined internal moments of creation would be of use in the educational practice. Still it would be of interest to survey the process of architectural creation from the professional point of view, though — short of the necessary knowledge — no intensive dynamic analysis of the evolution of creative work is possible. Tracing this process from the outside may allow to discover some inside interrelations. It is not necessary, however, to deal with psychological types as that of the extrovert or introvert, because they will always find their individuality within the objective determinants. Our aim is to find the general characteristics of the architectural creative process. Throughout this study, the designing architect's activity will be considered as a working process; to state the requirements for an architect will be attempted by analyzing the components of this activity, i. e. by examining the "raw material" of the creative process.

Conditions of the architect's creative process

The designing architect's work is concentrated on a concrete task, a commission. He must take into account different factors: specifications, the funds available, the site, etc. These limitations both set bounds to, and determine the sphere of his creative imagination. Throughout his work, the architect will have recourse to his wide-range knowledge of materials, structures, statics, technology, finishing work, i. e. to his universal competency in building, just as for the skill of the craftsman, always at his disposal. A further requirement is practical knowledge of functional patterns of building types. An architect cannot dispense with spatial imagination, because the synthesis leading to the optimum comes about mainly by visual imagination in space. Sense of proportion is an integral part of spatial sense; it lends harmony to the division of a plane. Architecture is centred upon man, therefore the instinctive knowledge of human proportions is essential to the architect. A deep feeling of human scale must be inherent in everything within the range of design; it permeates the architect's knowledge of building, his spatial intui-

tion etc. The total of instinctive and conscious experience include also emotional elements as they are, consciously or unconsciously, the bases of our likes and dislikes.

By studying the given conditions and circumstances, the architect collects information on the function of the building. Gradually he conceives an image felt to approach the final solution. In the meantime he draws sketches to formulate his thoughts, he "thinks by drawing" though he may have quite suddenly an isolated idea serving as a starting point and worth developing. All his ideas are experiments, hypotheses [8]. Abortive experiments exclude certain varieties, turning the architect's attention in the right direction in this roundabout way. The right solution is found sometimes by way of sudden recognition, or as a development by modifications or even by combining several varieties. The percentage of these ways of finding solution may be characteristic of the creative method of a given constitutional type but they alternate in the same person's activity.

It is a much debated problem in architecture whether to tackle to the project from the side of form (structure) or function. Well, the way of approach means no anticipated position taken up in the question of primacy of substance or form, in principle both may result in harmony, perfect adequacy of function and form. If, however, the architect's program is determined by prejudice, the relation of substance and form may be distorted. The objective factors deciding over the priority of substance or form are external features such as the function of the building, its site and period of construction, affected in their interaction by the personality of the architect. As concerns the creative process, accomplishment of dialectical unity between substance and form is absolutely the most critical and least accessible stage of the creation. Namely, creative work has originality as criterion. Just by virtue of its originality, a new, individual achievement is superior to its constituents. Aspects met separately are impossible to integrate into an organic unity of a building. The architect must find the right solution as to substance and form simultaneously, with a slight phase shift at the worse.

The duality of function and substance, appearance and form in architecture requires a further study of the character and meaning of form. Their divergency prevents them from being as closely related as for a poem or a picture. There is no such transubstantiation of material as causing to consider a picture else than a synthesis of vehicle, pigment and canvas.

In a poem the words are linked with the musicality of the verses, and their peculiarly widened meaning reacts on the message of the poem. The entity of expression contains all the factors in correlation, as in a perpetual circulation. On the other hand, in architecture the substantial, that is, the functional elements preserve their materiality imposed upon form. Function

is sensed in the unchanged materiality of the physical properties of a wall. Stairs can be considered simply as structural members, means of access to storeys, irrespective of their visual impression. At the same time a structure imposes a spatial sensation, in some cases — beside functional — of a high-grade aesthetical value. Thus the palpable object belongs to two systems at the same time, those of function and of form, and both are manifest *directly*, unchanged. The unity of form and of function, though belonging to the architect's vocabulary, have a different meaning, as there is no such amalgamation of substantial and formal elements of a building as in the essentially artistic works without any practical use. In spite of the correlation of the functional and the formal-aesthetical systems, architecture preserves a kind of duality, an accessibility from both aspects through the visual form. The distinction between substance and form is, necessarily, source of duality of form. (In industrial design, coherence between function and form is either less strict as e. g. for a typewriter, or entirely practical, e. g. a tool handle; in other cases it goes the traditional way of refinement of form as in industrial art. Just because of the scale effect, their products cannot be compared to those of architecture, creating human environment and determining our way of living.)

The aesthetical quality of a building depends primarily on space effect: on the layout and rhythmic proportioning of masses, on the relation of totality and parts. In case of plain surfaces, these are perceived, of course, in their relation to space. Rhythm is an essential factor of the relation both between space elements and between adjacent spaces. Inside and outside, architecture accommodates human activity, thus it applies rhythm in two ways, first, by animating static surfaces like paintings do, second, by making a dynamic rhythm felt (space-time experience), preferring geometrical ornamentation expressing advance and motion. Rather than to represent anything, architecture is featured by all the artistic means: proportions, composition and rhythm, constituting the organizing principles of other arts. It is as if it were a kind of immaterial art needing no words or musical instruments, not even marble — sometimes mud will do. This is, however, not irregular from the viewpoint of aesthetical theory: "Artistic creation consists in organizing extra-aesthetic values into a particular unity to impart aesthetic value to extra-aesthetic elements." [9] This statement about literature is true for architecture as well.

The designing architect has to keep in mind that any kind of building is an environment affecting human condition rather than to be aesthetically neutral. Moreover, due to the dialectics of three-dimensional space, the same wall enters into the external proportions of a building, and connects it to its surrounding, as a means of harmonic interrelation; at the same time it may be determinant of the interior layout. Strictly parallel development of function and form is, therefore, indispensable. A functional scheme will not

obtain architectural form without creative intervention, it becomes no building in the proper sense, on the other hand it fits no preconceived ideal image without distortion.

In applying his various professional skills, dialectics of architectural space, and in trying to solve the complex problem of function and form, the architect is required much foresight and consciousness as well as permanent critical deliberation. This attitude is far from being in disagreement with creative spirit. Creative work is a set of permanent decisions. In the course of practice, the system of requirements involved in a given creative process causes certain mental mechanisms to become innervate, almost instinctive. Enhanced, many-sided control will become part of the architectural creative process. Neither in other fields of creation is the critical factor at a constant level but as an instinctive component during the mental creation process, it acts independently as a definite critical disposition in the intervals of the effective work. Also pauses of rest and deliberation belong to the creative process. Architecture is, however, inconceivable without an increased consciousness and self-criticism. Architectural design has real, material goals, although little has to be relied upon but professional knowledge, of help in achieving but not containing the desired new quality [10]. Previous practice, routine provide some security in estimating one's sketches; models may be made, but judged only intuitively. The architect must see more in these sketches and models than they really demonstrate. Two-dimensional plan and reduced model fail to offer real space effect and materiality. It is a dialectical contradiction that the architectural creative process requires maximum consciousness yet it much relies on intuition by designing more or less "blindly". Also intellectual control acts by intuition supported by imagination.

Architectural creative process is featured by not to derive from a sensation or direct inspiration. The artist is mostly induced to work by inner experience while the scientist often finds a fertile source of ideas in his own work, sometimes in chance events. Commission as an external factor renders architectural creation an indirect process, having else than the creative mind itself as the starting point. Rather than to construct the "work" itself as a writer or a painter, he is reduced to document it in two-dimensional design for — or as a — model. Emphasizing the hardships, the need of increased consciousness, the indirect character and other limitations of the architect's task is not to prove it to be too difficult to do. All these characteristic conditions and circumstances facing the architect modulate general rules valid to any creative process. As soon as an original value is produced by creative synthesis of the substantial components, the creative process is essentially finished, all of the main questions being decided.

Conscious control approves of the result and the elaboration of details can start. The tectonic structure of the building, sometimes the construction

itself may help to decide over details. Human proportions safely govern function and form.

Multitude of wonderful buildings confirm the possibility to solve the complex problems facing the architect in course of the creative process.

It is an open question, however, whether the architect must rely exclusively on his professional knowledge, on his sense of human proportions, on his visual memory storing a variety of functional, aesthetic and structural aspects of buildings or on his analyses following the commission he is given. Whether these are the only factors synthesized into a higher unity by his specific sense of space, and, above all, his creative abilities? It is unlikely that his work can meet expectations without further contributions. In case of important buildings, due reservation has to be made to the role of architectural prototypes. Although no building or other work originates detached from any kind of material or cultural matrix, the best architects of our days emphasize the necessity to reject prototypes and to take the concrete conditions of the given task as keypoint in order to achieve a result of merit. Since all non-routine tasks involve peculiar conditions, possibilities and aims, we cannot help agreeing with them. It is to be noted, however, that even in this case, prototypes act hidden as transformed components — characteristic of the very creative process. How the architect is able to e. g. fit his building to the landscape? What is the source of his “knowledge” of proportioning the building, of his taste to find an aesthetic solution? There are no architectural-aesthetical laws in our days* and even by the time they existed, their application alone made nobody a great architect. Sense of proportion, of spatiality, aesthetical insight can be developed to a great extent but they cannot be learned or taught as a system of knowledge. Once formulated, their substance vanishes, leaving but mere prescriptions and dogmas inefficient for the culture of form badly needed by the architect. This special kind of culture can though be acquired systematically but rather by way of self-education and not as a strict discipline.

The personal character of the individual's culture emphasizes cognition by subjective experience. Direct experience has no immediate part in architectural design, which does not mean that to collect multiple and intensive impressions is unimportant. The architectural approach synthesizing space, form, structure, surface, colours and environment is evidently based on the infinite wealth of subjective experience, on the acquaintance with human life, on a receptivity to nature and space effects, on a sensitivity to the harmony of colours, sounds, materials, to the various manifestations of aesthetic quality.

* The golden section, the knowledge of the inner lines of force of the square and the rectangle cannot be considered as such laws as they are independent of age. They are like a spontaneous natural phenomenon; golden section is, indeed, one of them as seen by its natural occurrences.

The resulting experience is the "knowledge" of the architect, activated in creation as the entity of experience about the world. Subjectivity is, however, characteristic not of experiences helping architectural creation alone, but of the achievement. A high-grade architectural expression of the culture of a given society often bears the imprint of an outstanding personality; the author can be recognized by his work [11]. Since this is a characteristic of art alone, as against science or industry, the art as substance of architecture has to be recognized. Rather than to detect some impersonal, single-solution, scientific truth, architecture tends to a work of art even if not primarily, in virtue of the special relation of function and form. A building is function as well as form, resulting from artistic means, proportions, rhythm and the like. Its visuality and spatiality make it to belong — according to the traditional definition — to the sphere of fine arts. The affinity of architecture to painting and sculpture is also obvious from analyzing the parallel and contrastive elements of the respective creative processes, but such a study would be outside the scope of this paper.

A standard prefab building is by no means an individual work but an industrial product of our time. Nevertheless it comes about by architectural design performed as teamwork just because of its industrial character. In fact, recently architecture has embraced many aspects of science (mathematics, materials, structural engineering, sociology), only to become more exact. All this has been included in the collective notion of building science applied in analyzing the conditions of creative process. In architectural design, science has penetrated arts; sciences and arts converge. Experience about the world is exchanged, impulses are communicated where the initiative is likely to belong to science by the moment. From this point of view, architecture can be regarded as typical of, or modelling this process [1, 11].

A particular high-grade experience involved in the creative process — referred to as "architectural experience" so far — arises when the architect looking at the finished building compares it with his original ideas. This real architectural study, not to be replaced by anything else, is most efficient in helping the architect to take subsequent critical design decisions. It is an organic connection between work and its author, related to both the person and to the profession of architect, his exclusive experience. Its outcome may be called practical experience as it also includes the exact control of the materialized creative process. It is a deficiency of our training to give an architect's diploma to a person who has never "built" anything, i. e. no design of his has ever been executed.

Relevant conditions vary in dependence of scientific-technical and cultural development, social progress of the given period, and so do requirements facing architects, creative method of architecture being subject to modifications of circumstances and aims. Architecture is directly affected by

economic and scientific-technical factors, as the commission is of economic nature, its accomplishment involving technical means. Recent technical and scientific development has been imposing exact scientific methods upon architectural creation. Since actually the aesthetic quality of architecture arises from the structural system, technical aspects govern aesthetics [10]. Spontaneity, characteristic of ancient architecture based on craftsmanship, was manifest both in single buildings and in architectural complexes. Even in the Renaissance, no exact design method as understood in later centuries could be spoken of. At early times, creative work was centered on what would be called now "works management". Architectural methods were long dependent on craftsmanly empirism, a close connection with practice. Thus, even if creative process started from a commission making it an indirect process, its effective development was much more direct and personal than it is now. The architect worked, like the painter, directly at his own composition though not so much like painting an easel picture but like making sketches and cartoons for a fresco.

Large ensembles like Versailles or St. Petersburg were conceived the other way round: the designing architects were forced to abstract ideas. Design separated from building becomes an autonomous "profession". In the subculture of popular architecture, the direct relation nevertheless subsists, unity of design and construction being able to important performance.

The regular indirectness of creative methods in today's architectural design leaves the substance of building activity unaffected. Designing and building — as mentioned before — are essentially different operations, their separation is a sound consequence of the actual trend of differentiation, increasingly exhibiting their features. The indirect method of design seems to be superior in completeness and truth to the previous "painter-like" one, mixed with spontaneous elements. Today the aesthetic — and other — factors of architecture are on the designer's desk. Construction is one of them. Once, aesthetic quality depended on the craftsman's tools. Now construction methods may inspire the architect to create e. g. an exposed concrete facade.

Visual education of architects

It is common truth that an architect must know how to draw, but no doubt, the requirements concerning this knowledge are also subject to change. Compared with eclectic or secessionist architecture, evidently, requirements for the architect's culture of form and abilities of drawing changed radically, in a very short historical period. The *Bauhaus* approach involved a new method of training, striving to reject all inherited prototypes. Rather than to design and copy ornamentation, Bauhaus architects searched for an up-to-date expression defined by material and construction. A new notion was born,

that of form which is beautiful by being practical. Architects roamed about the fields of furniture and even of industrial design; they strove to new and right by opposing truth to convention. Nowadays, seemingly little stress is laid on drawing and visual training of architects. This is connected with the industrialization of building, emphasizing the technical to the cost of artistic side. The application of "Letraset" and letter patterns, of the photomontage on perspective views have minimized the importance of free-hand drawing in architectural design. All these changes hint to the need of reconsidering the drawing and visual education of architects. At a difference from education in other professions or arts, the training of architects is indirect. A painter learns his art by painting, a writer by writing etc. Before being admitted to a job, an apprentice is given theoretical instruction and opportunity of practicing at school. Well, architects mostly graduate without ever having designed a building that was really built; designs made in the course of studies offer little practical experience. Surprising as it is, such a method of training may be questionable, all the same it is characteristic of architecture. It is economically impossible to construct buildings designed for study as they cannot be thrown away in case of failure like a drawing. Education completed by practice is exceptional in architecture and never can become general like in many other fields. Curiously, training without real practice does not disagree with the indirect architectural creative process involving labour division to design and construction. The training of architects is centered logically upon design where the acquired knowledge can be applied in "practice". Though, the auxiliary sciences containing concrete knowledge — building sciences — are inefficient in developing the ability to design, which is nothing less than creative ability manifest in a special field. By analogy to that stated earlier, an architect learns design by practicing design in the same way as a painter learns his art by painting. This is more or less true and still a partly incorrect simplification. It is a peculiarity of architectural creation to involve realities of structure and function, requiring professional consciousness and specialization — facing their artistic synthesis. Objective, exact elements are contrasted by demanding intuitive conception — beyond the usual contradiction of function and form — by virtue of the separate phenomena of function (substance) and form — visuality in architecture. This contrast in the designer's creative process means the fight between two different kinds of consciousness.

Creative work is preceded by objective, impersonal, scientific analysis of the possible solutions. Still the designer must identify himself with the task already during preparation, in order to create an aesthetic entity obeying the inherent laws of the work, as specified from the data bulk, and the selected structure, applying his professional knowledge. The architect's creative work is focussed on the elimination of the contradiction between scientific coupled to intuitive consciousness crucial in this creative process. Because of the

outlined problems, however, to exercise design becomes a long and weary study, especially in realistic circumstances. It is neither the only, nor the best means of a rapid development of creative abilities, at least during the first, inductive period. The masters of Bauhaus realized the need of peculiar, overall studies of architectural thinking and moulding. The indirect, many-sided creative method of architecture can only be acquired from peculiar studies, but even these are merely indirect access means by allowing to exercise the essential and most critical stage of the creative process of design picked out of all the weary activities of preparation and drawing. To exercise the entity of creative process — to apply the direct method — to teach design by exercising design — is obviously of primary importance because it is here that the inherent contradiction of architecture is concentrated: the transformation of exact scientific knowledge into antropomorph, spatial forms.

Visual education of architects shows, by necessity, an indirect, applied character even without exercising the creative process by analogy. It is never self-contained but offers concrete help in a determined field. The importance of drawing, painting, moulding lessons etc. in the training of architects, and the most appropriate tasks need a careful analysis that must not be superficial, simply stating e. g. that an architect needs drawing abilities, but indirect merits of certain studies or test sets have to be evaluated. It is a wrong assumption that visual studies are meant only to develop visuality, optical cognition and visual memory or ability to reproduce a sight. Namely by reacting upon consciousness and upon the process of conscious motion, even a simple task of drawing is lifted above the level of direct visual impulses and after-images, and through the associative ability of consciousness it becomes synthetized, connected with a considerable part of the purport of consciousness. Thus, drawing will result in more than to develop visual and reproducing abilities; it will have as concomitants, vision in a wider sense and understanding, the so-called inner vision, and by extension, the development of visual association, strengthening the specific logic of visual thinking. The architect's visual studies need to be revised in view of these complex influences.

No person who wants to become an architect has to become a painter or a sculptor as well. Knowledge of the creative method of one art does not lead to that of the other since they are not subordinated to each other. All of them being preconditioned by visual culture and sense of form, they may enter as partial studies into the range of the other art but with a limit set by their differences. Under favourable circumstances, many-sided talents may create works of art in different fields but this is no contradiction in itself. Architecture is featured by manysidedness, rather than to require a special endowment. In practice, no drawing abilities exceeding a degree of designing adequate sketches for own use are needed, of help in finding the right proportions for one's ideas.

The design itself being a kind of industrial drawing it requires no real freehand drawing skill. The perspective showing the setting of the building can be made by mere construction and montage, often by an assistant. It may be surprising but the architect hardly needs any drawing. Sketching requires little accomplished drawing ability; what is needed is essentially a sense of proportion developed in making industrial drawings to scale. Many of the sketches are plans, others are space sketches drawn in perspective where accuracy can be checked almost mechanically.

In the training of architects, drawing studies double as imitative drawing, of importance for developing the sense of proportion, form and space, experience of nature, basis of visual culture — and as composition involving abstracter, programmed tasks as gradual access to architectural creative methods. Elements in these two kinds can, of course, not be separated: actively or passively, composition, visual thinking are present in both. Several elements of drawing are shared by architecture: horizontal and vertical division, the correlation between proportions, masses, patches (colours) and hues, shaping and forming, connection of forms, composition. In drawing one recognizes the manifold dialectical interrelations of certain elements of the sight, positive and negative forms, light and shadow, the meaning of "picture" as an organized unity. The recognition of the interrelations of the visible world may reveal his latent abilities. The intensity of sensation and perception — concomitant to creative ability — is greatly emphasized in drawing from nature. During the preparatory period of priming studies, drawing may be the only means of maintaining the creative spirit, and the easiest way of developing the sense of space. In modelling, making maquettes, the reduced dimensions can never act as real space, drawing is the only means to resolve the tension caused by reduced scale, reproducing the original space effect, however small its size. Space is scanned while drawing and correcting mistakes; the sense of space evolves through sensory experience transformed to concept. Drawing from nature is based on direct experience, sensitizes vision and helps to store up visual memory and visual judgment to develop.

Combinative abilities are developed by drawing requiring original compositional conception akin to design, rather than by that of receptive, depicting character. Drawing from nature is directed inwards, to the subject's consciousness, suiting the creative method of the painter, while free composition drawings with a set objective, arising from human consciousness, are nearer to architectural design. It is justified to include the elements of space forming and original composition already in imitative drawings. For example, a cluster of geometric bodies should also be drawn by the student from another viewpoint than his. Or, after having drawn from nature a complex of rectangular bodies, some planes should be picked out according to certain viewpoints: rhythm of horizontal or vertical surfaces or opposition of primary

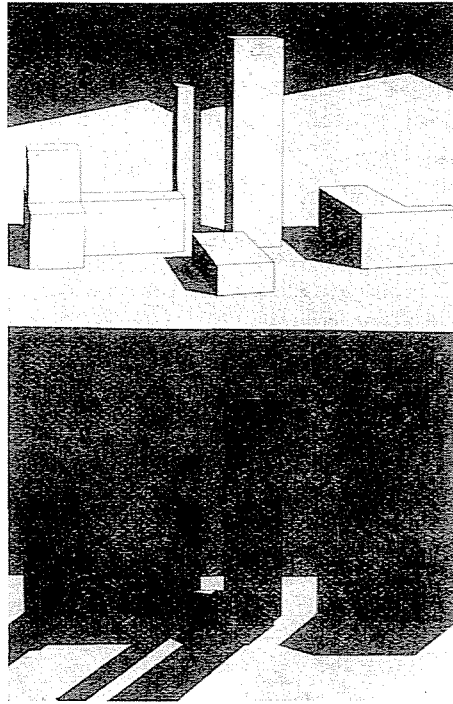


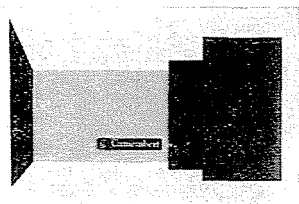
Fig. 1. Planes picked out according to certain view-points. Students' works

expressions of the contrast between horizontals and verticals, by means of different implements: chalk, montage. A ready-made drawing may be transformed or recomposed according to given aspects. It is the well-known task of division of a given space or plane (e. g. an area or a wall of exhibiton).

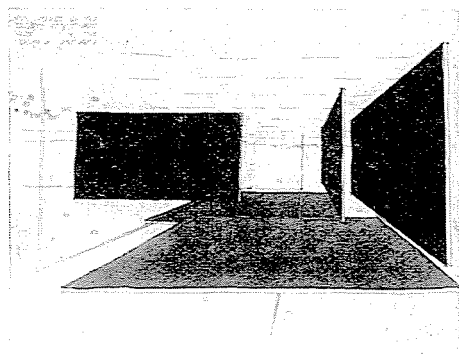
With the beginning of designing exercises, drawing related to architectural creative process and helping its preparation on a lower level is not justified any more. But a more demanding imitative drawing or painting will always be useful for the architect on account of its complementary character. Returning to our previous statement that drawing studies are of a limited practical importance for architectural work, the majority of architects have a drawing skill because architectural studies much rely on drawing lessons, providing, by necessity, good abilities in drawing.

Modelling in its three-dimension reality allows a direct perception of mass and space relations, analysis of interrelations between positive and negative forms; essentially a more complex understanding of anything transferred but indirectly, in two dimensions, by drawing. Considering the fact that the architect conceives his three-dimensional idea in plane, at a reduced scale, and — except for façade and perspective — as horizontal and vertical section — utmost

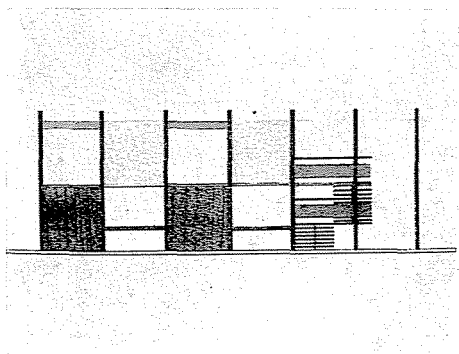
importance of moulding studies becomes obvious. In course of modelling lessons, the student exercises creative activity of architectural character (space and mass relations) but — this time — by the direct method, irrespective of the reduced scale, of decisive importance in view of the multiply indirect factors of architecture. The finished work offers the student an experience



a)



b)



c)

Fig. 2. Division of a) inner and b) free space — c) outer wall. Students' works

similar to that of architectural practice. Only modelling can provide the experience of tangibility, a hidden property of architecture. Remind that the indirect architectural creative work should be backed up by direct visual sensation, emotional experience, having no more straightforward foundation than modelling — except for the sense of space transmissible by small-scale drawing. Even if imitative in character, modelling may help the architect in intensifying his sense of form by its very directness.

From the aspect of applied visual studies, moulding and drawing are in a peculiar relation; while drawing reduced to two dimensions is more abstract in character and therefore seems to be more refined, the complete three dimensions of plastic art appear to be superior to drawing. The architect begins by making sketches of his mass composition and models are made subsequently. Of course, these two different means of visual conception cannot be classified, but in pedagogical didactics this question arises in connection with concrete lessons.

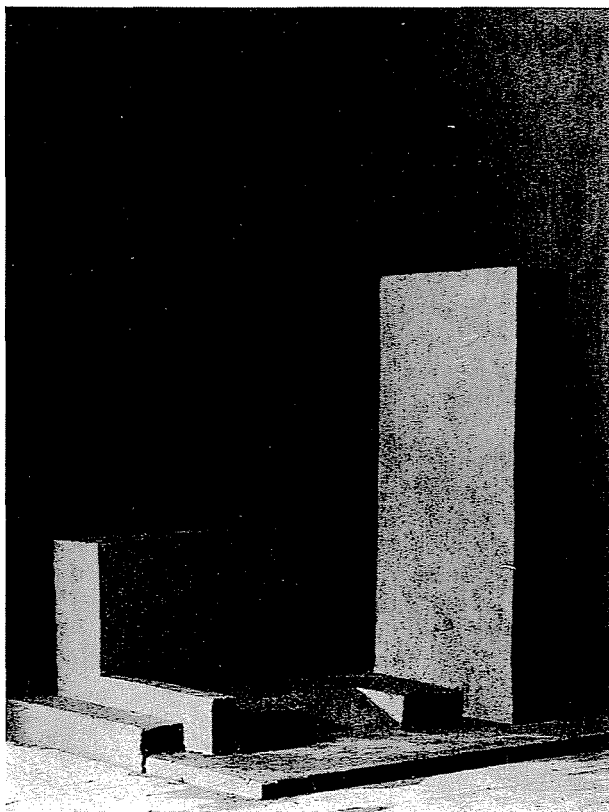


Fig. 3. A clay model in space — play with masses. Students' works

The study of spatial composition issuing from Bauhaus is of basic importance for exercising architectural creative methods and as an introduction to design. As it was mentioned above, this study, ignoring scientific and economic constraints of architecture, offers the pure joy of modelling by emphasizing the inventive and emotional factors of composition. In the architectural creation proper, these factors act hidden but mightily. Objectives set to drawing and moulding studies should be so as to promote architectural thinking and to avoid wanton aesthetizing. An adequate program starts mental activities essential in the mechanism of the architect's creative process.

There are, of course, many other means to endow architects with visual culture like visiting art exhibitions and galleries, studying the history of architecture, going for study tours etc. Special mention is to be made of photography, likely to develop compositional abilities and to strengthen visual thinking by grasping the subject, picking it out of the overall sight.

Visual studies in architecture are efficient in several ways. In considering each task, primary function of imitative drawing, painting and modelling for recognizing the world has to be kept in mind. The majority of our information is acquired through eyes. Conscious observation of space, proportions and interrelated forms required by reproduction increases visual sensitivity. Directly or indirectly, it is a contribution to the latent visual experience of

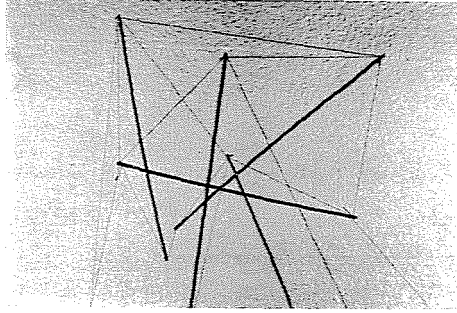


Fig. 4. A spatial construction of skewers and yarn. Students' works

the architect activated later in his practice of design. Secondary function consists in developing the formal associative faculty, the visual thinking. Primary and secondary functions are of course interlaced, each of the practical tasks will affect both. Also secondary functions of priming lessons proper must be kept in mind. A more demanding, better solved work has more of secondary contents, involving also subjective factors.

The applied character of the visual studies in architecture cannot be overemphasized: too simple tasks fail to develop the architectural approach. Architecture is fundamentally complex; over-conditioned tasks act sterilizing, paralyze creative imagination, they are stiff by being isolated, prevent divergent ways of thinking from being manifest, the solution from being creatively sought in various directions. Tasks to be accomplished by a creative process similar to that of the architect have to be considered as of secondary character, and so is drawing a freehand perspective of a building from plans given, to be regarded as a lower-level preparatory task.

On a higher level, such is plastic formation of a spatial construction or of a model to find harmonious relations between masses. These latter works may give a feeling of success related to visual thinking, similar to the experience provided by realized designs of architects. Thus, the architectural creative process is followed to the end, beyond a point achieved by classwork designs never to be carried out.

Summary

The increasingly industrial and scientific character of architecture has modified the aim of visual studies, requiring to reconsider their importance under the changed circumstances, and to settle principles based on the analysis of the creative process. In architecture, function as substance and form as "visual concept" are in contradiction. The indirect architectural creative process relies on inner experience only as a basis collected prior to work. The complex architectural work needs no special creative talent but a keen sense of space and proportion.

Visual studies help to develop architectural approach, with little direct use actually. Certain tasks offer visual experience by intensifying the students' sense of proportion and form, and help assimilation at the same time as associative visual thinking. Forming spatial constructions and moulding masses in clay act by conditioning the mechanisms of architectural creative thinking.

References

1. GIEDION, S.: *Space, Time and Architecture*. Harvard University Press, Cambridge (USA) 1947.
2. LUKÁCS, Gy.: *Specificity as an Aesthetic Category*.* Akadémiai K. Budapest, 1957. pp. 223—224.
3. MAJOR, M.: *The Specificity of Architecture*.* Manuscript. Budapest, 1968.
4. GAULDIE, S.: *Architecture*. Oxford, University Press, 1972. pp. 66, 68
5. GUILFORD, J. P.: *Creative Abilities in the Arts*. *Research in Personality*. Psychological Review XIV. pp. 110—118.
6. BRONOWSKI, J.: *The Creative Process*. *Creativity*. A discussion at the Nobel Conference. North-Holland Publishing Co. Amsterdam—London. 1973.
7. RÉVÉSZ, G.: *Die spezifischen Begabungen*. *Talent und Genie*. Francke, Bern, 1952. pp. 53—70.
8. ALEXANDER, CHR.: *Notes on the Synthesis of Form*. Harvard University Press, Cambridge, USA 1964.
9. HALÁSZ, L.: *Contribution to the Psychological Research on Understanding Art*.* Akadémiai K. Budapest, 1972.
10. NERVI, P. L.: *On the Design Process*. *Structure in Art and Science*. Ed. by Gyorgy Kepes, George Braziller, New York, 1965.
11. MACKINNON, D.: *Creativity: A Multifaceted Phenomenon*. *Creativity*. A discussion at the Nobel Conference. North-Holland Publishing Co. Amsterdam—London. 1973.

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