RELATIONS BETWEEN THE DEVELOPMENT OF SPACE AND MASS ART IN THE ARCHITECTURE OF ANCIENT EGYPT

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«Hence, in defining the nature of a house, those who describe it as stones, bricks and wood, describe the potential house, since these things are its matter; those who describe it as "a receptacle for containing goods and bodies", or something else to the same effect, describe its actuality: but those who combine these two definitions describe the third kind of substance, that which is composed of matter and form.» Aristotle. Metaphysics, VIII. II. 8.

Space theory investigations of architecture range Egypt among other cultures or consider her an independent stage. To illustrate this, some theories, considered important and characteristic, are cited.

ALOIS RIEGL who recognized architecture to be a space art and created the historical application of this perception, established three stages in his space theory, interpreted as steps of historical development of ancient cultures. The first stage comprises tactile works perceptible from a palpable proximity, their creation involving an aversion to spatiality in a strive to in-plane and mass-like presentation, such as monuments and buildings of ancient Asia Minor and Egypt. [1]

In his works published some years ago, SIEGFRIED GIEDION examined creations of the prehistoric and early societies and summed up his statements by the category of space conception. "Man takes cognizance of the emptiness which girds him round and gives it a psychic form and expression. The effect of this transfiguration, which lifts space into the realm of the emotions, is space conception." (515 p. in [2].) Based on the diversities of space conception, he defines three periods in the entire history of development of architecture, among them: "The first stage embraced both the archaic high civilizations and also the Greek development. Sculptural objects — volumes — were placed in limitless space. The second stage of architectural development opened in the midst of the Roman period . . ." (521 p. in [3].) Giedion thus — though giving a wide definition to the idea of space conception itself — characterizes the architecture of ancient Egypt still more unambiguously as to be oriented to mass.

An author, critically evaluating his works, raises the following objections, especially to the method:

1. The duality of space and mass in architecture exists from the beginning and neither of them has a chronological priority.

2. A test method, which judges space characteristics etc. of a period by distinctive features of individual buildings has to be considered as inadequate. [4]

The same author defines significant features of different periods of the ancient architecture alongside with a far-reaching analysis of settlements, secular and sacred buildings, structures and details as well as other cultural achievements of the period, as follows: Architecture of ancient Mesopotamia was characterized by space concentration, that of Egypt

by linear unidirectional space, the architecture of Hellas by a U-shaped transition between exterior and interior space and that of Rome by the interwovenness of space concentration and linearity. [5]

Another paper, examining the history of architecture as a whole from space theory aspects, recapitulates its statements in an ingenious category system. On other pages of this publication the following statement can be read about Egypt: "Egyptian architecture is fundamentally oriented to mass", and according to this category system, the space organization is a topographic-eschatologic one. The creative method is reproductive, composition being featured by addition. [6]

Thus, the theories referred to consider massiveness, linear space organization, a rather marked stagnation, the reproductive method and readiness to addition as characteristics of the architectural aspects of Egypt.

Considering, however, the almost boundlessly long history of Egypt, the question may arise, whether these characteristics really show such a uniform picture separately and in their interaction, and what relations, viz. determining factors are causing the eventual deviations. It is no secret that the possible answer to these questions was inspired by the quoted idea of Aristotle and that also the "third substance" is to be found by following up the "united", thus, ramified relations.

Architecture — as a very general and complex human activity — becomes realized through the universal system of relations, such as nature, society, material and spiritual needs and possibilities, etc. [7]

The *creative man*, object of his activity i.e. *demands* and *functions*, and its result, the *creation*, all of them moulded *partly by natural and partly by social factors*, can be connected by a relationship.

The natural environment defines both man, e.g. his mental features, and human needs, through climate, geographical etc. conditions. The situation of man as a social "product" is also determined by social conditions, whereas his mind, as part of the social consciousness is adjusted to the norms of latter. Needs, or more exactly, human needs and functions get determined by social relations. Man determined in this way is similarly influenced by natural and social relations in his activity to satisfy the determined needs and functions. Natural environment exerts its stimulating or restricting influence through e.g. available natural building materials or raw materials, and society through social conditions of production and creation. Simultaneously with practising the activity, the intellect, the human mind are developing. Cogitation, creative logic, exclusive and unmaterial part of the creation is, however, not always complying — by the standards of modern man — with the postulates of its objects, of the creation, especially not in the earliest societies. In the architecture of Egypt solutions to the problems are seen to unfold generally by a gradual approach. Thus, different stages of evolution of the creative consciousness are evident from the creations, demonstrating how much the *cogitating apparatus* determined or restricted the creative process.

These relations form in reality an unseparable unity, though if character-
istics of Egyptian architecture are to be interpreted, they have to be separate-
ly treated. The discussion below will follow the usual division of Egyptian
history, statements will concern the construction types of dwelling place.
shrine or temple, tomb and settlement, in this order.

I.

The earliest man of the Nile-valley, reporting on his settlement in Fayum
merely by remnants of his fireplace and grain storage, probably did leave no
traces of his dwelling place because he had none, or used so primitive facilities
provided by nature as shelter of which no traces remained. Among others this
was due to the *exteriorized* mode of life: hunting and fishing, necessitating
frequent changes of place. This open relation between man and nature — ex-
teriorization — is particularly characteristic for archaic times and in subtropic
areas, as Egypt retained its importance even beside the later urbanization.

The Egyptian of prehistoric times, who built himself a dwelling place,
lived in tribal organization and in society, *family* was the least unit. This cir-
cumstance involved the construction of simple huts with a single cell as seen
by the primitive sheds and huts of oval ground plan (at Merimde beni Salame,
El Omari and Mahasna, Ma'adi and other). [8]

Among the characteristics of consciousness, manifest in the creative
process, prehistoric *amorphism* is evident from the shapeless oval constructions.
Apparition of amorphous wall structures may be explained by the fact that
in the mind of prehistoric man the conception of straight line, plane, rectangle
is at its dawn (519 p. in [2]). Even later, after discovering straight and rectan-
gular forms, the atavism of formation is still long recognizable by rounded-off
corners.

The phenomenon, called *technological fixation* in experimental psychology,
has to be mentioned as a characteristic of creative logic. It is applied as an
infantile psychology test, when the tested individuum has to carry out unfamil-
iar operations with more or less known objects. In general cases, this is accom-
plished by reproducing, imiting operations proper to the known object. It can
be considered as an analogous phenomenon that in the building activity of the
prehistoric Nile-valley, technical solutions are first appearing on buildings
for collecting, preparing and storing food, and they are incorporated only later
into the technology of house building. Bricklaying (Abydos), rubble and mud
block wall (Ma'adi), wattle and daub technique (Merimde) or wattle work
(Fayum) appeared always earlier in ancillary constructions (granary, silo,
oven, magazine, cattle enclosure, etc.) than in house building.

Human needs are seen to show a hierarchic trend, demands proper to
the existence (e.g. food storage) precede needs less important for self-preser-

vation (e.g. dwelling) and the degrees of development of a given technical solution always follows this hierarchy of needs.

Thus, building practice of prehistoric times borrowed from matting and basket weaving, ceramics laying, dam building or just from ship building and, of course, the technological fixation of ideas resulted in identity of shapes.

Beside the mentioned factors the late appearance and primitive form of the dwelling place also results from the fortunate climate, requiring to be sheltered only against the sunshine and maybe the wind. The most ancient boat representations known from the painted vessels of the Gerza-culture show cabin superstructures; some of them show a roofed, airy and shady structure, closed on one side, as a rather simple shelter to heat. The ground plan of the closed hut found in the excavations of Ma'adi is identical with the later hieroglyph for "castle", namely it had a maze-like entrance generally considered to shelter against wind. [8]

With the development of collective consciousness of the tribal organization, also the primitive wants featuring an idea of spiritual function became manifest. The mentioned boat representations exhibit poles or standards probably as tribe symbols, and one variety of these became later the hieroglyph for "god".

The phenomenon of the mentioned amorphism cannot be attributed to conceptual features alone but also to the easily available, flexible vegetal material, suitable to satisfy primitive needs. In particular, as long as simple means suited to satisfy primitive needs, no conception of definite forms (straight, rectangular etc.) appeared. Later, however, when the wants had to be satisfied by more solid, linear materials (Ma'adi, hut) or functions required parallel outlines (hull of a boat) or even the space had to be divided (El Amra, tombs), these forms appeared in practice as a structural must. Among the technical possibilities, brick masonry was the most advanced one. The first artificial building unit, the brick with the possibility and compulsion of ordered ranging and with the unambiguousity of rectangular joints, led man even in his simple tasks to apply oblong forms (El Amra, dwelling house model, tombs, granaries of Abydos).

Of course, social conditions of production and creation had no role as yet, as the simple structures could be created by means of generally known technical facilities and without joining forces.

Examining the primitive settlements of the prehistoric Nile-valley from the point of view of space organization, it is found that the first dwelling places were *single-cell, undivided spaces* and that *separate types of buildings* developed for different functions. Later, — but only tombs hint at that (El Amra), — a primitive form of *simple divided space* might have evolved. Circumstances of creation following the amorphous forming developed and matured linear, plane and rectangular forms.

Our quoted method, based on determinant relations manifest in the creation process, is thus easy to survey also for so simple and primitive a type of construction as the prehistoric dwelling places. Below, however, only those relations are referred to, which are considered as important and typical for the given subject.

The cultic or tribal symbol of existing natural people appears on the skin of the believer, on his weapon or on a prominent point of his dwelling place, that is, publicly. Such kind of publicity might have been similar in the prehistoric times in the Nile-valley, religious consciousness being a totemic one there too. The boat representations included tribal symbols mounted on mast-like poles and in the construction of the earliest shrines on a prominent spot, a similar view-point might prevail. Namely the earlier square, stepped podium with rounded corners, excavated in the middle of the archaic temple of Hierakonopolis, leads to the assumption — also supported by the hieroglyph for Hierakonopolis — that it formed the stepped substructure of a shrine. Similar podiums were found in Heliopolis and in Tell el Yahudia. Comparing these factors, both the *publicity of the rite* and the principle of *raising on a platform* are perceived. Former is a phenomenon corresponding to the form of religious consciousness, whereas the latter is an architectural form resulting of the former as a *functional need*.

The tombs in Merimde are but oval pits, in El Omari they are already covered by a stone tumulus, in Deir Tasa they are separated cemetery-like from the dwelling place, and in the cemetery of El Amra stages gradually approaching the tomb architecture of the dynastic era are to be found: tombs of oval, circular or square ground plan; subsequently once or twice divided square tombs appear (the compartments containing the funerary equipment), while stone pile *tumuli* above the tomb are nuclei of the later *mastaba*.

Man begins to bury his deads on the level of developing collective consciousness, namely with the intention to hide the corpse of his companions from the enemy but above all from the carrion-eating animals. [9] This *functional care* for the dead takes later a pious form, as conscious enforcement of belonging together, the superstructure of the tomb rises of piled-up stones.

According to our suppositions, the massive structures of the early societies of Egypt may be retraced to two resultants such as the *podium* for setting off, and the *tumulus*, its formal equivalent though opposed of content.

The settlement form is still something worth mentioning of the prehistoric era of the Nile-valley. The Merimde settlement shows an irregular but linear form along a canal and according to Badawy "this is, very likely, the earliest attempt yet known in town planning" (13 p. in [8]). The earliest settlement at El Kab was surrounded by nearly circular walls and the protodynastic palettes show square encircling walls with rounded corners divided outside by bastions; the hieroglyph for "town" is a meshed disc.

In connection with the Merimde settlement it has to be stated that in seemingly purposefully planned prehistoric settlements, supposition of a conscious town planning is an absurdity since the level of creative consciousness is still far from imagining a useful form or anticipating the realization by an ideal plan. Here the canal as a *field circumstance* forcibly determines the form of the settlement. A sloping ground, a river or a road might constitute similar compulsory circumstances. On a plane and undivided ground, enclosure of some territory compels the builder to strive to the *smallest surface*. This relation may explain for the central form of the enclosed predynastic settlements.

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In the early archaic era revolutionary changes took place in the societies of the Nile-valley. Social classes have formed, power conditions united various, hitherto separated communities, and the event of political organization created the enormous social stratification of hierarchy. The situation, characteristic throughout the history of Egypt, developed and settled that the lower classes lived on the economic level of prehistoric times while stages of the further development were only reflected by the standard of life of the ruling classes. Thus, *social conditions come to prevalence* as determinant to the building activity. In course of the socialized activity, a wealth of empirical knowledge gathered, and technics rising to the rank of craftmanship, — especially bricklaying, — produced generally characteristic types of buildings.

According to EMERY, the dwelling house of Lower Egypt of this period "has a series of doors on all four sides. The principal entrance appears to have been in the shorter walls at each end. Lighting was obtained from small windows above the doors. The form of this building probably originated in Lower Egypt and it was reproduced in the design of the superstructure of northern tombs throughout the Archaic Period" (176 p. in [10]). Others consider the narrow form with futed piers and many doors to be merely the multiplication of the ceremonial double gate, the "sherekh" for the *ka* of the deceased, to enable him to go out and partake of the offerings" (8—32 p.).

Comparing the archaic hieroglyph for "house" and "courtyard" with models of the portico-like dwelling house of the later Sixth Dynasty period, development of another type may be supposed where the house consists of an airy room, open on the longitudinal side, arranged at the end of the courtyard with a maze-like entrance. From the substructure of the tomb "P" in Abydos a more developed, richer variety of this type can be guessed: the portico is joined at its midlength by an oblong living space, while a row of rooms of inferior importance join the "T" shaped ground plan behind the portico to obtain the quadratic form. This supposition is not irrealistic because it points to the more advanced Kahun and Amarna types.

The partly open buildings are justified generally by the climate, and certainly serve a double purpose in Egypt. They provide protection against sunshine, and they capture the agreeable breezes if suitably oriented. Thus,

the ancient form of the cabin, the Heb Sed throne, the portico, the pavilion or the *mulqaf*, ventilation superstructure of the actual fellah houses, all result from *climatic needs*.

The primitive, prehistoric dwelling places were replaced by various alternatives of space connections while the *simple space division and space arrangement, together with the method of space widening* — similarly as for prototypes of the megaron of *in antis* system for northern and Hellenic peoples, of the bit-hilani for the Hurrits and of the *atrium Patroni* — give rise to the peculiar *"T" shaped space form*. The structural facilities of the "palace façade" building with a column system in Lower Egypt prove already the ability to create *integer hall spaces* and the model estate found near the Hor Aha tomb exhibits linear arrangement of this variety.

Few data are available about archaic cult places. Representation of the skeleton-wickerwork building, imitating a *jackal* (the desert-hound of Anubis) of the national shrine in Upper Egypt, proves that the *formal reproductions* characteristic for Egypt might have taken originally their models from the kingdom of the fauna (totem animal). The arrangement of the shrine reproduces exactly the longitudinal system of ship deck superstructures. The Khentiamentiw temple in Abydos copies the dwelling house with more developed means: the small shrine with three cells is situated deep in the courtyard with maze entrance. It has to be noted here that after the publicity of the totemistic times, the cult has become aristocratically mystic, "The shaping of the interior space had become meaningless from a ritualistic point of view and thus an architecture developing from the formation of interior space dwindled away." (176 p. in [3].)

It might be seen from the above that at this stage the idea of axiality had developed. However, the archaic *maze-like entrance* is encountered both in shrines and in houses and so the *architectural axis* can be considered so far merely as a hidden possibility of *structural and space arrangement*. In these latter cases the function of the maze entrance is not the defence any more — as it is still unambiguously in the fortress architecture of the era (Hierakonopolis, Shunet el Zebib) — but the exclusivity of the life of the ruling classes (residences), of the political life (chapel-like administrative buildings) or cult (temples).

Tomb architecture advanced in two different ways, through particular stages of development, toward synthesis. When comparing tombs of the poorer classes to those of the ruling classes in Upper Egypt, it is apparent that the protodynastic tumuli thank their development into the classic mastaba to that of the bricklaying technique. From the beginnings, archaic tombs of Lower Egypt were built with the mentioned superstructure, their development being characterized by the more and more varied arrangement of the burial chamber and the adjacent spaces serving to house the tomb accessories, which were

gradually sunk under ground level. It is noteworthy that the chambers i.e. the spaces and the massive superstructure differ regionally both in form and dimensions.

In Upper Egypt the two factors — space and mass form — are though more or less in harmony, but a striking feature is the *stratified, gradually evolved construction of immense masses.* Here the phenomenon of the technological fixation may explain for the mentioned interwoven technical-technological processes. Brick masonry probably was an earlier system of constructing simple, relatively thin enclosure walls, before being utilized in the monumental tomb architecture. Thereby, the new application kept up the operations practiced before, and instead of the monolithic conception of the masonry mass, interpreted it as a product of several adjacent walls. This method of construction may also have been inspired by the first operation: the careful immuration of the burial chamber, an independent building constructed initially of vegetal materials. This procedure is conspicuous even in the construction of stone pyramids, up to the end of the Old Kingdom.

The picture of the architecture of early societies — formal and functional correspondence of house, temple and tomb, — inspired the literature to define the law of formal and functional *undifferentiation.* [11] Within this phenomenon, the tomb architecture of the archaic era produced a very interesting contradiction. Namely the builder had to create a tomb assuring for the soul, the *ka,* the same conditions of existence as he preferred in his earthly existence. The archaic tumulus tomb and the *dwelling* lent themselves as model or as basic formula of shaping. Thus, the substructure of the tomb is defined *functionally* by *spaces judged necessary and characteristic* of the living place or *dwelling* and its surroundings, whereas its necessary *superstructure* is defined *formally* by the mass-form of the house and its post-formation, the *mummification of the household.*

As mentioned above, in the tombs of Lower Egypt a striking difference between space and mass-form, a separate interpretation of the two was encountered. This contradiction cannot be explained by the essence of formal and functional undifferentiation, namely that on a level near concrete perceptive cogitation, the conscious apparatus can involve only formal identities, according to the method of *substitution.* Infantile psychology tests prove, however, that the primitive logical ability is still unable to separate logical classes and conditions [12]. This means also that such coupled notions as content and form, space and mass etc. intermingle, replace each other, or even are interpreted separately. This stage of logical thinking may be accepted with more or less certainty as typical to the consciousness of the archaic man, especially when — as in this case — they help to understand contradictions peculiar to the remnants of the material culture. Separate interpretation of *space and mass* may have been rather general in the archaic societies, as this phenomenon

is found also e.g. on Malta. In the neolithic temple of Tarscien the shrine consisted of crescent-like (amorphous, hut-like) spaces aligned along an arch, then the mass-form was obtained by encircling it with a (similarly irregular) enormous enveloping wall, simultaneously or subsequently filling in the gap between the two forms. Hence, a completely identical attitude, though of a more primitive level, is found as in the mentioned mastabas of archaic Lower Egypt.

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The tomb district of Zoser, Sakkara, is the prelude of stone architecture. The formulation of the task is still archaic, though the tomb ensemble to be *mummified in eternal stone* has more than a single building, namely the capital — worthy to the standing of the monarch — as prototype. The new technology, to build with stone blocks, leads to a new contradiction, adoption of operational and formal features of brick masonry, even of timber floors, lightweight skeleton structures and form details. At the same time, stone permits to carve ornamental elements, — impossible for brick building, — outlining the subsequent possibilities of architectural details. It is characteristic for the structural attitude that when copying a uniform mass form — the Heb Sed chapels — consisting of aligned individual buildings, not only the prominent façade walls were built, but also the walls seperating the buildings, excluded from function by subsequent filling. In the funeral temple even such real spaces were built which, as functionally useless, were eliminated from the interior by filling. This latter fact is a proof that formal and functional transformations for funeral purposes involved only the necessary spaces, whereas other elements of the space system had been neglected. The contradiction of separate interpretation of space and mass deepened with the complexity of the task.

Builders of pyramids for the Fourth and Fifth Dynasties introduced some important innovations to the technique in its early age. First of all, they discarded the possibility of rich forms and the use of small size building stones, constituting a heavy burden in the era of stone and soft metal tools. They developed a megalithic technology, but already with the severity of brains trained in geometry problems. In the interpretation of space and mass, however, neither they were more advanced than their ancestors and even added a further contradiction.

To make up new functional demands in or around the tomb (funeral chapels, funeral temples) they constructed the shrines of "T" ground plan — derived from the dwelling house and considered necessary — also the Nut portals, the courtyard, perhaps the long spaces of the purifying huts parallel to the riverside, then enveloped the whole by a unified oblong mass form. The funeral or valley temples in Gizeh were, however, just constructed in the reversed technological order than in Sakkara. First the "filling" i.e. the dead mass

was piled of huge limestone blocks, then, so to say as an envelope, the limiting walls of granite were erected. This solution, though a contradiction in the contradiction, was a step towards the development of the real stone masonry less in thickness, exposed both sides. To the end of this period this process is complete (Neferkare, Pepi II). It is well known how the most characteristic mass-like structure of this period, the pyramid developed of the mastaba and the main motive of the sun-temple. With the terminology of our deductions, let it be pointed out here only that its definitive form was created by the synthesis of the archaic tumulus (mastaba) and the elevation of the pyramidion, according to the platform principle, determining finally both the form and the construction process of the pyramid.

The composition system of the pyramid — valley temple, causeway, funeral temple, pyramid — is apparently an axial ensemble. Examination of the functions makes though evident the prevalence of the archaic maze principle — now in a ritual context. In the monumental ensemble, however, the *topographic axis* is a fact and the feature most admired by posterity is the axiality oriented to the points of the compass. By the end of the Old Kingdom the notions of architectural axis and symmetry has got definitely established with the reduction of the topographic axis in the rock tombs of the nobles and in the primitive cult temples.

With this the first great period of the history of Egyptian architecture ends.

The sequence of mass-like buildings begins with two functional structures, the podium and the tumulus, and leads from the mummy of a building, the mastaba, characteristic for the religious form of consciousness and the logic abilities, to the pyramid. Initially detached and simple interior spaces were transformed by developing needs and knowledge of construction into composite, divided, amplified and aligned space forms, creating the structural conditions of the architectural axis. The maze principle, however, aiming at defence, intimacy, etc., hinders for a long time the actual appearance of the axis. The phantasy of the creating man — especially at the beginning of history — is unable to function without patterns, therefore the creative process is necessarily reproductive. This is manifest by the technological fixation on operational level, and in the field of formation by the application of once developed forms for new functions, as an internal relation system.

II.

For the further development of Egyptian architecture, it is sufficient to follow the sacral projects, reflecting modifications of conditions. Let us premise that the architecture is characterized first by pure structural and

constructional objects, addition being the method of forming an ensemble. The next stage is that of architectural synthesis, the principal determinant relations having an ideological bearing. Finally, decomposition and structural agglomeration of the space and mass elements leads to a new rule, and the determining conditions branch out.

The architectural projects of the Middle Kingdom were rather moderate ones, also the known archeological material is scarce, nevertheless the architecture seems to have developed the self-contained system of simple space layout, design methods and technologies just in that period.

The system of dwelling houses, residential districts and street net of the pyramid town El Lahun was an economical composition of earlier achievements in related fields. The divided function system of the dwelling house has established as an almost definite solution.

Synthesis of the independent chapel and the wall-like, post-and-lintel system with narrow openings, or of the column system resulted in the "peripteros" as an individual new building form. The requirement for multi-spatiality of the monarch's funeral temple was met by a nearly infinite row of similar individual buildings (Hawara, Amenemhat III) and the shrines were put in the central axis of the courtyard, surrounded by cells or a corridor with columns (Amon temple, Karnak). The wall and the load-bearing structures built of stone obtained such a perfect tectonic interpretation and formation, examples of which are to be seen neither earlier nor later (!) (Medinet Ma'adi, Beni Hassan, mortuary temple of Mentu Hotep, etc.).

And when the old monumental problem had to be solved with the already ancient technology (pyramids of the Middle Kingdom), the rational knowledge of construction found a witty solution — building brick walls normal to the sides along the diagonals and abuting to them as a structural frame, instead of the layered cladding-like procedure.

Thus, in the field of architectural creation, the additive composition of simple, individual basic forms comprising no more than three or four elements (podium, single cell, post-and-lintel half-space) prevails.

The period of the Eighteenth Dynasty, though meaning historically the beginning of the New Kingdom, re-uses the results in architecture and fine arts of the Middle Kingdom. The simpler space forms appear in the same way as in the Middle Kingdom, then from their simple addition, ensembles are forming, arranged by axes. The axis is enhanced by the terrace system, born out of the rock tomb, later the row of pylons, heavy masses, pointing to the decomposition of the infinite continuity by man, as well as the sphinx alley. Arrangement along an axis is no more the organizing principle of a single building, but of an ensemble, possibly into regional unities. The axis is accentuated almost cosmically, not only by the alignment of mass elements, but by the horizontal and vertical stratification of the space (Deir el-Bahari). An indi-

vidual and one-time example of the monumental interior arises (festival hall of Tuthmosis III). The example, however, does not fertilize the architecture of the period, namely the basilica-like space form develops of the possibility offered by the alley of sculptures, during the period of the next dynasty. The Luxor temple of Amenophis III means the greatest step towards the development of the festival temple. The monumental project demands a complex composition and the logic of design can exactly be followed also on the ground plan. The "T" ground plan of houses comes again to prevalence with the transverse hall and the main room in depth, enriched by the post-and-lintel system. Of these there are even two, one follows the other to enhance the principal axis and the mysterious atmosphere of the shrines. These are surrounded by the row of cells and faced by the multinave hypostyle hall, then by the peristyle. The post-and-lintel system dominates the aspect of the whole ensemble and the additive method of design using few, detached elements is obvious also here. In the sun temple of Amarna, the reformer pharaoh Akhenaten rejects the mysticism of the interior spaces of the festival temple just beginning to develop. His architects arrange the outdoor space along the axis, into subsequent strata, with pylons considered a new achievement. In the design, however, of the spacious covered hypostyle hall, the organizing role of the axis is omitted.

This period is thus featured by enrichment of the architectural means, development of existing individual forms, which are attempted to fit into an architectural system by the *additive method*. Obviously, the builder is not misguided any more by surprises of new needs and new technologies as were his predecessors. In Egypt, the same analysing *rationalism of practical skill* is manifest in architecture, as in practical knowledge as a rule. This development level of consciousness, peculiar to thinking, does not change till the decline of the ancient Egyptian culture. [13]

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The period of restauration enriched the world of architecture partly by developing the festival temple, becoming now canonical, partly by the great volume of constructions. An interesting attitude is manifest by the insistence on floral design on details (papyrus columns) and by the hiding of tectonic forms (Osiris pillars). Namely earlier — with some exceptions — geometrical forms prevailed to structural pattern or structural interpretation (bundled lotus columns) or purely tectonic forms (square and protodoric columns).

Stone columns imitating an alley, erected bilaterally of the road to the temple, inspire the design of interiors which remind of grandious Nature (Luxor), and the parallel linear arrangement — serving polytheism — gives rise to the two-way but anyhow directed form of the hall space (Abydos,

temple of Sety I). Synthesis of these two results, namely the parallel pylons and the practical solution for the hypethral lighting of the accentuated central room of houses resulted in the hypostyle hall (Karnak) and subsequently in its reduced form. This is the complete magazine of rich architectural means of which to realize the functional and formal system of the festival temple. Earlier, the complex problems were solved using only a few elements. With the new possibilities, however, the new canon may develop with quite many of elements known till then as individual forms: pylon, portico, terrace, vestibule, hypostyle hall, the station chapel as barque room, the archaic shrine cells as holy of holies, etc. The whole composition is characterized by the definite synthesis of design (the coronation cornices applied so far in the interior without purpose betray no longer the originally individual forms in the relation between space and mass elements); on the other hand this is a structurally retrograde architecture, striking by its *imitation of nature* and the heavy, massive formation to *demonstrate power*.

Thus, the architecture of the restauration period creates a perfect *architectural synthesis* of earlier achievements, and this synthesis serves *ideological purposes* with its organic, theorizing aspirations.

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After the achievements profiting of the many possibilities offered by the grandious prehistory, the late antique architecture of Egypt cannot but draw on them. In the design of details, all the previous form variants are involved, also composite forms are created. The microcosm of architecture lives a splendid late golden age.

The architectural space and mass art obtains, however, a quite different formulation. Instead of the synthetizing attitude of the restauration period, the new festival temple is decomposed into elements, and then reagglomerated, starting from the "peripteros" of the Middle Kingdom, and interlocking the two individual elements.

The pylon, the encircling walls, the colonnades skirting the courtyard, the portico, the screen walls blocking up the intercolumnia, the unique mass comprising the interior spaces, the shrine placed in it and the usually monolithic chapel set up within the shrine, are interpreted all as *separate building units* housed one in the other or arranged as separate forms either one in the other or separately side by side (Edfu, Kom Ombo, Denderah). This procedure characterized also the reconstruction of earlier temples in this period, the shrines *forming an individual building* in the core of the ensembles (Luxor, Karnak).

Such *excentric arrangement of interwoven space and mass elements* diminished also the importance of *the axis* within the building, while in its fore-

ground, the secularized space formed at the meeting of mammisi or stoa-like halls in the transverse axis reduced the role of the axis to an internal one.

This unusual phenomenon of the creative attitude can be explained in many ways. The foreign, especially Greek architectural concept, preferring buildings individual in outside effect, a speculative formulation leaning on the far past, or a new sort of rite organized in the immediate vicinity of the temple, etc. may all provide some explanation. But it is to be particularly stressed that in this period the architect arrived at the design by *structural analysis*.

This kind of creative attitude was first manifest in the Horus temple of Edfu and here also the name of the architect is known: Imhotep. A curious symbol of the Egyptian stone building history is that the tomb district Zoser of Sakkara constructed with logical slips and the last great creation designed with a creative attitude doing credit even to a modern architect, are hall-marked by two men of the same name.

Summary

The Egyptian architecture is characterized by massiveness, linearity, reproductive creative process and additive method. These characteristics are, however, diverse in the different periods, because also the determining conditions differ.

Initially, the mass-like constructions of tumulus and platform have functional motives, subsequently the postformation need of the religious consciousness develops the mastaba and the primitiveness of the creative logic leads to massiveness even in real buildings. Finally, the construction of the pyramid represents the peak of mass-like formation, with the synthesis of the pyramidion, elevated on the tumulus-mastaba as a podium.

In the second stage, mass-like constructions become atrophyzed, the mass-mindedness can be considered at most as the handling of individual building forms as if they were massive units. In the restauration period, the need for power demonstration leads to favouring clumsy massive forms, finally, the already synthetized space and mass elements of the ensemble are decomposed by structural thinking into basic units.

Linearity was due initially to settlement conditions. Subsequently it remained hidden in the symmetrical structure of individual space formations or in their alignment as tending toward a mathematical progression. The architectural axis developing finally from the reduction of the topographical axis as a composition resultant became the most important means of space layout while by the end of the development it was replaced by the eccentric agglomeration.

Initially, the reproductive creative process is explained by the technological fixation, in the funeral tasks by the postformation and in actual buildings by the formal and functional un-differentiation, all phenomena being connected with consciousness characteristics. As concerns details, first the reproduction of structural prototypes, later the copies of the floral world, based on theoretical considerations, are found.

In the architecture of Egypt the addition can be traced throughout either as a structural, as a detail feature or as a space and mass composition characteristic. Beginning with few, later on more and variegated individual forms are ranged linearily, then in-plane, and finally spatially. This may be attributed to the analytical mechanism of thinking of the ancient man.

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