ARCHITECTURE VERSUS BUILDING INDUSTRY*

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This unique, solemn opportunity of a session in honour of Prof. László Gábor, academician, urged the Author to recall all his statements made on the theory of structures, often investigated and published in cooperation with the fêted, for over two decades. During this time, acute questions of architecture versus building industry did not leave the foreground of interest. It is worth scrutinizing the state of things, achievements, ways to follow or to abandon. This study has became thereby a kind of polemic likely to bear the bias from a contemporary discussant less concerned with the past than with the future.

Ladies and Gentlemen!

My subject as indicated in the title concerns the analysis of a typical complex of substructure and superstructure, namely in final account it is a problem of the confluence of building industry (as a technical-economical substructure) and architecture (as a mental-artistic superstructure). At present — at least in our profession — this analysis is of actual interest since architecture — composed from science, technique and arts — has no region left unaffected by sharp debates exactly around these fundamentals, all over the world, signalling the crossroads modern architecture and up-to-date building technologies have got to by the '80s. Thereby development of the conscious picture of the objective world of architecture, acquaintance with the laws of motion of building technologies, and analysis of relations between the two is a major problem also of our theory of architecture.

As a confirmation let me simply refer to the multiplicity of new theories arising and spreading mostly unchanged, on *architecture* hence on the side of *superstructure*, including some quite extremist ones. Some wonder if architecture as an art is of concern to the whole society or only to an elite; others would prefer to do away with architecture as a needless ballast. (These latter are concerned with the problem of human settlements in the developing rather

* Submitted at the Conference in honour of Prof. László Gábor, May 13, 1981.

than in the developed countries, a clue to their attitude to consider it as a vice to expect people still unlearned in building "self-expression", "architecture" at all. Even extreme hence other than typical cases irregarded, there are a lot of international publications on the decease of modern architecture, and, referring to the really more than discutable urbanistic outcomes of industrialized mass building, they simply doubt its reason of existence, reject the rational construction principle in modern architecture based on the primacy of function deriving the form from inside, replacing it by an anticipated *postmodern architecture postulating form imposed from the outside.*

Just as deplorable is the situation of the *fundamentals*, the domain of *building technologies, industrialized building.* Construction, a typically and exclusively *local* activity since millennia, has swollen to building industry, a peculiar worldwide problem in the recent decades. Building industry — boasting in developed countries hence nationally to exist hardly a problem raised by design that would be impossible for it at the actual stage of building technologies, — has so to say failed the examination in the subject of mass housing, or rather, of industrialized mass building:

— *internationally* and *quantitatively*, since its worldwide capacity hopelessly lags behind worldwide necessities, unable to cope with the challenge — unique to now in the world history — of spontaneous urbanization going in pair with demographic explosion entraining an unprecedented increase of housing needs impossible to master by the up-to-date building technology;

— *nationally* and *qualitatively*, by falling short of architectural expectations, namely architectural—urbanistic achievements of up-to-date system-building technologies generally are inferior to those of conventional building.

The well-known dichotomy of "architecture versus building industry" seems to be sufficiently outlined by the above statements. Obviously, mass housing needs of the society cannot be adequately met else than by coping with architectural requirements. Also, whatever architecture to come cannot boast up-to-dateness as an art if it attempts to satisfy social housing needs else than by industrial means. All these point to the single means of dissolving the dichotomy, namely *to subdue building industry as a tool to architecture as a goal* of full-valued satisfaction of mental-material needs of the society, reflecting the contemporary world concept and complete with an aesthetic meaning.

If it is so — and I believe it is — then all our future endeavours will start out from, and end in, the forwarding of building industry both nationally and internationally, to belie economists stating the building industry — "not less than survival of a really human society depends on" according to a UNO document — to be the bottleneck of the world industry, motivating the re-examination of substructure-superstructure relations between architecture and

building industry. This will be expounded below, from the side of technology, examining the essence and the features of construction to see where the building industry is and where it tends to, just as the architecture, and what are their fundamental relationships.

Technology is known to be systematic knowledge and action. Everyday wording connects the concept mainly with industrial processes, in a wider sense, however, technology may be considered any recurrent activity. The concept will be used in the latter meaning.

Every technology as systematic knowledge is at the same time a method permitting to translate a given knowledge into another. Thus, technology is explicit, and *translation* is essentially *spelling*.

Let me demonstrate it on the example of construction.

Construction as systematic knowledge and action is one among technologies, hence it is a method, that of translating natural or artificial materials or units made of them (one knowledge) by assembly (hence, addition) into space creation (the other knowledge). In traditional building, man uses his hands, but in industrialized building, the machines. Anyhow, nature gets reformulated insofar as the age-old natural tectonics is domesticated to a human, additive operation of superposing units; construction means to translate the language of artificial nature. In industrialized building, manufacture of precast units to realize the building is equivalent to spelling out the design, while assembly of the units into the building means to make the design explicit. In building technology, *additivity* — hence assembly — means *explicitness*, and *disintegration* — decomposition to units — corresponds to *spelling*.

Thus, principles of additivity and disintegration are essentially formulations of building technology axioms.

The multimillennial history of architecture — forever the alloy of arts, science and engineering — comprising a multiplicity of style periods, cannot, however, be divided to more than two fundamental technological eras, those of traditional and of industrialized building.

Traditional building is typically a two-phased activity of design and assembly (construction), based on the additivity of individually formable, workable units, its era still lasting so to say all over the world.

Industrialized building is typically a three-phased activity of design — manufacture — assembly (montage) relying on the additivity of plant precast units unfit to ulterior modifications, and it looks back to a few decades even in the highest developed countries.

Construction is an additive operation. Either traditional or industrialized, its technology is either concentrated on the site or in the plant; construction itself — that is, the phase of assembly — remains an operation with addition as mathematical equivalent. Additivity is the universal principle of assembly "building" as an operation relies on.

Building as an operation refers exclusively to construction, the way of assembly, it is inseparable from the site of realizing the design.

This is exactly the outstanding feature of the building activity from the aspect of technology, namely — irrespective of any future development — part of the building industry cannot help it but remains mobile. Thus, no industrialized building of 100% plant operations can be realized.

The building as a product is in fact a final result of the three-phased operation set of design—manufacture—assembly. Although in the age of industrialization the building is a manufactured product, it cannot be the direct object of manufacture (if not a quite small one).

Technologically, this is the most decisive feature of the product "building", equivalent to the impossibility of any future technical development to result in the prefabrication of complete buildings transported ready-made to the site; only units, parts, components of a building can be directly manufactured. Thus, the phase of manufacture will ever rely on the decomposition of the building to components. Disintegration is the universal principle of manufacture the product "building" relies on.

In building technology, principles of additivity and of disintegration are constant, but their ways may ever change, a peculiarity of the building activity, namely while in manufacturing technologies on the mechanical principle, ways of decomposition to units and assembly are invariable since the factory end product (tractor, motor car) remains the *same* for the given product type, on the contrary, manufacture in the building industry ends on the site rather than in the factory, and the end product is expected a high-grade *variability*. Thus, building is no technology on the mechanical principle, not analogous to mechanical industries.

With these premissae, let us see where is the building industry of our days?

During its 20 to 25 years of development in this country, industrialized building (a worldwide bottleneck as stated above) gradually altered fundamental building materials, building methods (technologies), tools (techniques), skills, labour organizational requirements. Under continuously varying social-economical conditions, building industry has got to a transitory level still featured by the quoted dichotomy. What this peculiar polarization, still undissolved opposition between architecture and building industry is rooted in?

The answer can be condensed in three items:

— first, the excessive building demands imposed to subdue the goal (satisfaction of needs) to the means, building industrialization, nearer, to a given industrial method still unfit to adapt itself to architecture peculiarities, having created mass production at building level. At a difference from building peculiarities, building industry has adopted the analogy of mechanical industries, although building is no purely mechanical principled technology;

— second, in the actual stade of building industrialization, an adequate set of technologies could not yet develop, some shades still are missing. Between the two extremities (settled plant prefabrication and in-situ technologies) complementary technologies combining both did not yet arise. Each technology in building industry involves some form of architectural possibility or restriction. Since, however, peculiarities of each technology qualify it to meet part requirements, to cover confined domains, neither can the building industry meet all social demands to, and requirements for, the architecture else than in possession of the entirety of technologies;
— third, in mass housing relying on repetition indispensable to building industry and likely to persist in the farthest future, object and method of the repetition proper to the peculiarity of building did not yet take firm outlines.

Buildings, multiply recurrent industrial mass products sited concentrated in high numbers unavoidably define the human macro- and micro-environment, eliciting thereby some undesirable urbanistic effects with direct social consequences. And since the laws of industrialization do not respect boundaries, international propagation, interaction and reaction of these consequences have to be reckoned with as mentioned introductorily.

This is what dichotomy is rooted in, and the future building industry has to get rid of. But then, where has the building industry to tend to, what is the desirable development trend?

Development and gradual integration of industrialized building are a process relying on the laws of motion of technology, hence the imperative to replace the actual building on mechanical principle by a qualitatively higher phase of building (architecture) based on automation. This imperative should be pointed out to be of technological character hence other than fatality. Technology is systematic knowledge and activity, including human beside technical factors, thus it means conscious human contribution to the historical process of raising mechanical principled building to the higher level of automation as required by social development. Without human activity, this imperative cannot prevail in spite of the already visible trend.

Early in this century, at the dawn of modern architecture still mostly relying on traditional building, the tendency of architecture was concisely formulated as FORM FOLLOWS FUNCTION, to become first the architectural and industrial target of, then for more than fifty years a self-intended reality for three generations, to become finally debated by the actual fourth generation of building specialists.

In building based on mechanization, functionality becomes a question of manufacture, thereby the already classic slogan of "plastic" (formable) architecture is changed to FORM FOLLOWS MANUFACTURE. Design and production are integrated, making the form dependent on manufacture.

Automation-based building relies on denying the mechanization principle of "form follows manufacture". It separates design from manufacture, forecasting thereby the architectural future of industrial-based "plastic" design, with the fundamental goal of detaching manufacture and form. Now, by the early '80s, at the dawn of automated building, the unanimous desire of the architecture to come could be formulated concisely as MANUFACTURE FOLLOWS FORM. Thus, the up-to-date building industry of the near future will offer variability based on the *convertibility of prefabricating machines*, rather than directly on the *additivity of units*.

These fundamentals of the development of the building industry are expected to satisfy the architects to come, namely by unravelling the inherent factors of technological development, industry provides for the technical fundamentals of "plastic" design prone to variability, equivalent to the freedom of architecture — the *par excellence* human side of the superstructure — to develop along the lines set out by its exclusive bearers, the architects. These are, however, still dreams of the future, leaving unanswered the question of present architects of how to disentangle the architecture on crossroads. The actual — delicate — problem is where architecture should develop today, to be answered by looking after, and finding pro's and con's for, each of the crossroads.

One of the roads, that of modern architecture, invariably relies on rationalism, where whatever architecture of the future cannot be else than product of the age of industrialized building; in the age of scientific-technical revolution, both annoyances discrediting post-war modern architecture, such as eclecticism of the recent past, and the actual economical-technological approach, are relatively easy to get rid of; industrial products suit creation of an up-to-date built environment not only meeting variable demands but also reflecting the actual world of changing society. Its architects — just recovered from romanticism — empirically learned assimilation in architecture not to be simply amoral but also a nonsense, and are no more afraid of "architectophiles" frightened by historical architecture to invite them to follow the ancient rules, to summon them before the architecture of the past, to be put to shame. At the same time they know forms and marks to exist, inherited — as if by descent — from ancient architecture, of a suggestivity making impossible but also undesirable to get rid of, a *sine qua non* of architecture. Relying on technical means, "the same in another way" is set as goal, by industrial rather that by conventional building, translation into modern architecture rather than copying. Modern architecture is asserted not to be dead, on the contrary, at present, in the age of scientific technics it approximates the perfection of its inherent possibilities based on industry.

The other way — *post-modern architecture* — relies on theorems of irrationalism, first, that the modern architecture has died (exactly on July 25th,

1972, at 3 h 32 p.m., in St. Louis, Missouri) after having succeeded, during his decades of career, in empoverishing the architectural means of expression by making a fetish from productive tools and from progress, this latter involving only changes in technology and materials. Post-modernism attempts to reconquer people to architecture, by embracing communication, semiotics: as against modern architecture having catastrophically stripped architecture from historical style forms, post-modernism re-calls the complete set of architectural expressions and restitutes connections with the past, discontinued by modern architecture. It rejects the urban chaos attributed to the CIAM dogma, curses the principle of "form follows function", and as against the poverty of functionalist-technicist buildings, it praises the beauty of symbolism, ornaments, formal associations. Opposite to the exaggerated simplification of modernism, complexity and contradictions of the architecture are adopted, involving ethnic and provincial symbols, historical reminiscences, urban relations, ornamentation etc. Thus an up to then unknown wide choice is wanted for architects, that spells eclecticism, even a rather radical one, having already a comprehensive theory.

These were briefly the crossroads, presented, I hope, in a rather objective manner. Their evaluation, always difficult to contemporaries, will be approached from the so-called "modernist" side, if one or the other has to be chosen.

Arise of "post-modernism" seems me to be regular, attributable to the serious mistakes of "modernism", but its conclusions cannot be but contradicted, and its scientific fundamentals are more than doubtful.

Instead of a detailed analysis, let me simply mention that — since about Marx — Europe witnessing several dethronizations of the reason has been allergic to irrationalism.

It is wrong to depreciate reason and intelligence, to appraise intuition without criticism, to aristocratically deny social-historical progress. It is something of transparent to take an air of mental superiority to promulgate a makeshift architectural freedom, and to bypass at the same time by far the world-wide problems of construction. I don't hesitate to acknowledge my fear of this eclecticism, my unease before this new pot-pourri of the fin de siècle. Compared to the eclecticism of "goode olde times", tolerant and univalent, untheorized, assigning style to function based on dubious affinities — e. g. kosher Gothic to a cathedral, faithful Moresque to a synagogue, creditable Doric to a bank, Renaissance to a town hall, ostentatious Baroque to a private villa, and — horribile dictu — progressive Classicism to a party seat, — the new eclecticism is quite different, it is aggressive and polyvalent, it can assign anything to anything, provided it handles the form itself in a disengaged manner. "It is a mysticism too deep to understand, if not by disembarking of the reason's command" as Heine's apologetic guardian monk put it; but it would be erro-

neous to mock post-modernism in this way. On the contrary, its preconditions are undeniably granted by technology.

And nevertheless, one may wonder if building industry, created at an enormous effort and continuously improved, cannot help but — as a modern hen — lay a post-modern egg. Let us hope not.

Summary

By the early '80s, both modern architecture and up-to-date building technologies entered a worldwide crisis. Contradictions arisen and still undissolved between architecture and building industry have to be eliminated by technological coordination. Analysis of the laws of motion of building technologies confirms that — rather than being stripped of its rights of existence, — modern architecture will fully expand its possibilities offered by industrialized building in the age of scientific-technical revolution.

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