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The Dichotomy Between Technology and Architecture

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Charles Croom is the senior Professor and for two years has been the Acting Dean of the School of Architecture at Syracuse University. For many years he has been teaching courses in Structural Design. His interests, however, are broad. Long a member of the Society of Architectural Historians, he travels widely and has built an outstanding collection of slides on architecture and urban design. Over the long period of his professional practice he has built many buildings and his understanding of architecture derives from extensive experience as well as from knowledge of theory.

"Form Follows Function" has had a long run as an architectural cliche: the general idea being that if you can determine the functions of a building, they will, when enclosed, form something that will indicate their nature.

This statement has been the subject of articles by Horatio Greenough in 1851, Louis Sullivan in 1896, Frank Lloyd Wright in various forms in his many publications, and Matthew Novicki in 1949. These are only a few of the many that I could list. Almost every writer in the fine arts has expressed himself on this subject.

Sullivan probably should get most of the credit for its endurance. He first expressed it in an article in *Lippincott's Magazine* of March 1896 and later it was included in one of his Kindergarten Chats. The original piece was called "The Tall Office Building Artistically Considered." It was a plea for a true architectural expression of the tall building as opposed to the then fashionable layers of classic orders piled story on story as in the old Telephone Building on lower Broadway.

Sullivan fortunately was a better architect than writer. He had good ideas but loved to embroider them. Of course some people think his architectural design exhibited the same tendencies. In the article mentioned he got pretty lyrical: "How to impart to this sterile pile the graciousness of those higher forms of sensibility and culture that rest on the lower and fiercer passisons." By this latter he meant the business world. In 1896 romantic style, Sullivan wrote:

> Whether it be the sweeping eagle in his flight or the open apple-blossom, the toiling work-horse, the blithe swan, the branching oak, the winding stream at its base, the drifting clouds, over all the coursing sun, form ever follows function, and this is the law. Where function does not change, form does not change. The granite rocks, the over-brooding hills, remain for ages; the lightning lives, comes into shape, and dies in a twinkling.
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> It is the pervading law of all things organic, and inorganic, of all things physical and metaphysical, of all things human and superhuman, of all manifestations of the head, of the heart, of the soul, that the life is recognizable in its expression, that form ever follows function. This is the law.

You see, he tried not to leave anything out. And a last quote:

> Shall we, then, daily violate this law in our art? Are we so decadent, so imbecile so utterly weak of eyesight, that we cannot perceive this truth so simple, so very simple? Is it indeed a truth so transparent that we see through it but do not see it? Is it really then, a very marvelous thing, or is it rather so commonplace, so

> everyday, so near a thing to us, that we cannot perceive that the shape, form, outward expression, design or whatever we may choose, of the tall office buildings, should in the very nature of things follow the function of the building, and that where the function does not change, the form is not to change?

We must keep in mind that at this time, 1896, the tall building was only recently possible because of Edison's and Westinghouse's electrical generating and distribution systems in the 1880's, making street railways, high rise elevators, lighting and power systems, telephones, all possible.

Without these the tall office building could not have existed. I mention these in addition to the availability of wrought iron and steel structural sections which were the more immediately noticeable means.

So where does the dichotomy come in? Here I am talking about Form Follows Function; remember that Wright said that "Form is Function"—or was it the other way around? I'm sure he could have argued it either way. I suppose that the split which first disturbed Sullivan was the problem of expressing the structure. In his tall buildings he went a long way toward a real indication of the metal modular skeleton. He was way ahead of his fellow architects, and as late as the 1920's he was one of the few that recognized Saarinen's Tribune Tower Competition drawings as the ultimate solution while at the same time angrily attacking the synthetic Gothic style of the winner.

Wright in his Larkin office building in Buffalo controlled the design to the fullest extent, designing the first wall-hung toilets, the lighting fixtures, the desks, chairs, and probably selected the stenographers. The dominating genius did everything. Dichotomy was for the other architects.

The office buildings grew taller, larger, and more numerous. American architects were hard-pressed to keep up with technology's demands. Lighting systems, ventilating systems, higher speed automatic elevators, escalators all were improved constantly and at the same time became more complex. The first architect's office that I worked in, in 1925, had about 150 engineers out of a total of 400 employees. One of these, a young electrical engineer, had just patented a system of automatic control for elevators that was so ingenious that he alone understood it. There was a Russian named Nicholai who sat in a haze of pipe smoke busily perfecting a system of electric power distribution that was instrumental in the office's securing commissions to design a whole series of gigantic steam power plants. One of Albert Kahn's brothers invented a whole reinforced concrete floor system that led, in turn, to Kahn's doing hundreds of industrial plants. (The same system was used in Slocum Hall at Syracuse University.)

All this progressed naturally to the Architect-Engineer groups specializing in large industrial and commercial work, in addition to the office building. It took persons of high executive ability along with technical skill to manage these large projects. Time was always of the essence and at their worst these jobs were full of unresolved conflicts of function and form. Only occasionally did somebody demand the time and the authority to integrate in a real way these multitudinous details.

Since the last war and largely as a result of work during it, the completely self-contained architect-engineer office has become highly developed. Preliminary designs and programs are carefully worked out, the result of many man-hours of client conferences, research and study, with the whole thing written up in a concise presentation à la Madison Avenue. A few voices have protested, "If this is the way architecture is practiced, include me out. I didn't come

here to shuffle memos." But there were always many young, talented, eager recruits waiting to fill the places left by the occasional defectors.

One of the most talented post-war architects was Mathew Novicki, unfortunately killed in a plane wreck just as he was about to reach the peak of his career. He, in an article in the *Magazine of Art*, March 1949, on the subject of Function and Form said, "We have to realize that in the overwhelming majority of modern designs, form follows form and not function, and even when a form results from a functional analysis, this analysis follows a pattern that leads to a discovery of the same function, whether in a factory or a museum. That if approached in a certain way, an answer to every architectural problem is a flexible space with no reason why one space should be different from another, and many practical reasons why they should be alike."

He is expressing the fact that technology had advanced to the point where we were completely free of any vestiges of 19th century building. Air-conditioning was the final touch. Look! No windows! In other words, arrange your functions in a sort of vast TV studio and light will be supplied where you want it in any intensity, quality and direction. Ventilation, temperature, humidity controlled precisely. Accoustic correction, sound, sound insulation will be as you desire and easily changed if you wish. This eliminated the traditional form givers. When Rockefeller Center was planned, a basic premise was that all corridor walls should be not more than 25 to 27 feet from an outside wall. It had been found that natural light and air would be provided in acceptable amounts if this rule was observed. And this of course virtually determined the external forms once a required floor area and a building envelope determined by the NYC Zoning requirements were also established. The advent of air-conditioning removed the depth of office space module and eventually the NYC zoning rules broke the set-back pattern, never an encouragement to progressive architects.

Now, of course, we really are in a pickle. As a character in a Shaw play, when asked, "Do you understand what you are saying?" answers, "Not unless I listen very closely."

Form becomes almost completely arbitrary at times. How do we tell one building from another with the ubiquitous panel wall or precast concrete smeared over all? I am still thinking primarily about office buildings although other types come to mind. The more you change it, the more it's the same thing.

I once attended a seminar of the ACSA devoted to this problem, this dichotomy that keeps sliding out of focus. We were particularly concerned with the position of the architectural schools and how they were teaching the technologies. Of course the technologists insist they are the real architects; that they are technically oriented and able to combine all this maze of technics, skills, psychoanalyses into a single effective solution to the client's problems.

At the seminar we were shown several new projects in complete form in all details. These buildings successfully combined the necessary mechanical equipment and distribution systems with carefully integrated structural system resulting in a distinctive and elegant form. The SCSD School System was the result.

In Sullivan's time he worried about structural expression. His structural frames may have cost 10 percent of the whole. Today it still does, but the mechanical services, heating, wiring, plumbing, elevators, etc., have gone up until they may cost 40 percent of the whole. Now of course cost is no way to rate the importance of these things. I give these figures to show how things have changed. What formerly were luxuries now are necessities. Air condition-

ing has made this switch and there are others in the process. We need some way of controlling the sunlight and glare that come through our walls of glass, other than the cumbersome sunshade and louvres. Glass walls have driven clients to lawsuits, but I know that sometimes they are exciting and beautiful. An architect will probably solve the problem one day, or an engineer will stumble on an obvious solution and the architects will take the credit.

Technology will solve the house problem by providing adequate space for a reasonable price. Large panels of foamed plastic may replace whole complicated collections of job-wrought assemblies. The Danes long have been producing precast concrete apartment houses and shipping them around Europe. The quality of these units was far superior to anything done here at this time. In this country I. M. Pei and Associates were responsible for some early high-rise apartment projects which suggested a whole new technique of building. The current publications are full of interesting and provocative buildings that show an awareness of today's problems in producing well designed, in the fullest sense of the word, structures.

In no way, however, have the forces of ignorance and prejudice been routed. It is our job in the schools to so instruct and inspire our students that they will not be content with the status-quo. Good architecture is being produced today by many hardworking, self-effacing groups of architects. Perhaps the day of the great egoists, "the form givers," is over.