

R. Buckminster Fuller's Theories of Design Science and Ephemeralization: Ethics or Aesthetics?

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INTRODUCTION

For several years I have taught basic construction technology courses, design/build courses, and various building technology related seminars from the architecture-as-art viewpoint. This viewpoint, one which is essentially art-historical, humanist-metaphysical, or phenomenologically-based, is called into question if any architect, author notwithstanding, assumes that it is relevant within the culture and practice of contemporary construction. At the same time, the question of ethics comes forward to question the allegiance to either an architecture-as-art viewpoint or its assumed opposite—the instrumentalist practice of maximizing economic opportunities and eliminating risk in construction. If the “cultures” of architecture and construction have been driven apart by aesthetics, can a reappraisal and recommitment to ethics bring them closer together?

Teaching construction technology in architecture schools today should not force one to choose between the polar extremes of vision and instrumentality, yet a conflict of cultures and perceptions exists. Reacting positively and creatively to change is important, although we do not wish to sacrifice our ethics in doing so. What are our ethics relative to design, architecture, construction, and environment? What are the ethics of our colleagues: the constructors, fabricators, suppliers and estimators? To what degree have we adopted an aesthetic viewpoint as essentially ethical, and in defense of the aesthetic viewpoint do we deny ourselves access to the very technological material which we wish to transform through aesthetics? It may be possible to approach the matter through the theories of R. Buckminster Fuller, whose life was an ethical project and not an aesthetic one.

ETHICS AND AESTHETICS

Ethics in architectural design and ethics in the realization of construction should hinge upon shared concepts of quality and the appropriateness of applied technique. Architecture strives to achieve qualities on the aesthetic level through available techniques, while the construction industry strives to ensure the performance and marketability of these techniques. The art-historical/metaphysical, viewpoint must always read something more than physical or economic performance into construction; something intellectually or aesthetically driven, a kind of ulterior performance. This viewpoint is taken commonly as an ethical one, i.e., that aesthetics should condition techniques and evaluate performance to ensure a higher level of value achieved through aesthetics. Needs are filled but also questioned, new images and sensations arise from filling the need, etc. Ideally this occurs through a close contact with conditions and materials. This contact allows the ethical/aesthetic differentiation between architecture and mere building to be made.

The insistence in architecture upon maintaining an aesthetic, art-historical/metaphysical viewpoint goes to the heart of architecture's disengagement from construction and from the technical culture that surrounds it. The technical culture of construction can be reactionary and inflexible, but no more so than the aesthetic culture of architecture. The author's recent experiences serving on Building Construction Program committees and discussing the curricular and interdisciplinary priorities of Building Construction faculty have made this matter of viewpoint seem unusually pressing. For many practicing and teaching architects today who sense frustration in defending the art-historical/metaphysical viewpoint, the issue of an “ethics transfer” is a difficult one. Likewise, the issue of a transfer of aesthetic priorities is hardly less difficult for those who wish to change their viewpoint.

There are exceptions to this simple dichotomy (aesthetic object vs. performative system) as it has been sketched out here. There exist other conceptual categories including ironic or accidental beauty, the “negative beauty” of the readymade object, the beauty of non-design, etc. These criteria can be applicable to architecture but could never influence the science of construction or its empirical foundations. If design science is the goal, art categories and criteria are suspect in forming a design ethics or evaluating procedure. When the constructor, architect and engineer work together, is it possible that if the aesthetic viewpoint is removed it can later re-emerge with a new rigor? Collaborative practices that achieve, through high-design engineering, the realization of projects thought to be purely conceptual are more celebrated now than ever. High quality architecture-as-art continues to set new standards for achievement despite the possibility that more significant gains were made toward establishing creative standards of design ethics.

FULLER, EPHEMERALITY AND ARCHITECTURE

For Richard Buckminster Fuller (1895-1983), the visionary thinker and legendary doer, the issue of “ethics or aesthetics?” would have been dismissed as either plainly misguided or patently absurd. The fact that architecture—international modern and functionalist architecture included, cultivated the aesthetic category was proof enough for him that the global technological forest was being missed in contemplation of the trees. He once dismissed the architecture, avantgarde and traditional alike, as “voodoo,” and referred to the most celebrated of practitioners as “witch doctors.” It must be noted that he took the industrialist patrons to task as well, calling them “pirates of industry” in place of the heroic term “captains of industry.” Fuller's indictment of the stewards of industry on ethical grounds and his renunciation of art-historical and aesthetic criteria

for "timelessness" in design went hand in hand. Everyone was missing the point.

Fuller's world-view and philosophy demanded that the world's problems, the great collective ethical dilemma, be solved through design. He thrilled architects, engineers and builders with his inventions and constructions, yet his dream of Synergy, the comprehensive intellectual and metaphysical application of resources, did not come to pass. Buckminster Fuller's ideas remain vital today, even as the dimensions of his idealism and ideological abstraction have become, for many, telling evidence of a suspect-if not sinister, techno-colonialism. Despite the political critiques and the position of his work at the art-historical periphery, Bucky still hangs around. An issue of ANY magazine (#17) entitled, "Forget Fuller?" put a thoroughly post-modern spin on Fuller through essays by theorists Beatriz Colomina, Mark Wigley, and Ove Arup engineer Guy Nordensen. He hangs around because we want him around.

I did not set out to design a house that hung from a pole, or to manufacture a new type of automobile, invent a new system of map projection, develop geodesic domes or Energetic Geometry. I started with the Universe—as an organization of regenerative principles manifest as energy systems of which all our experiences and possible experiences, are only local instances. I could have ended up with a pair of flying slippers.

- R. Buckminster Fuller

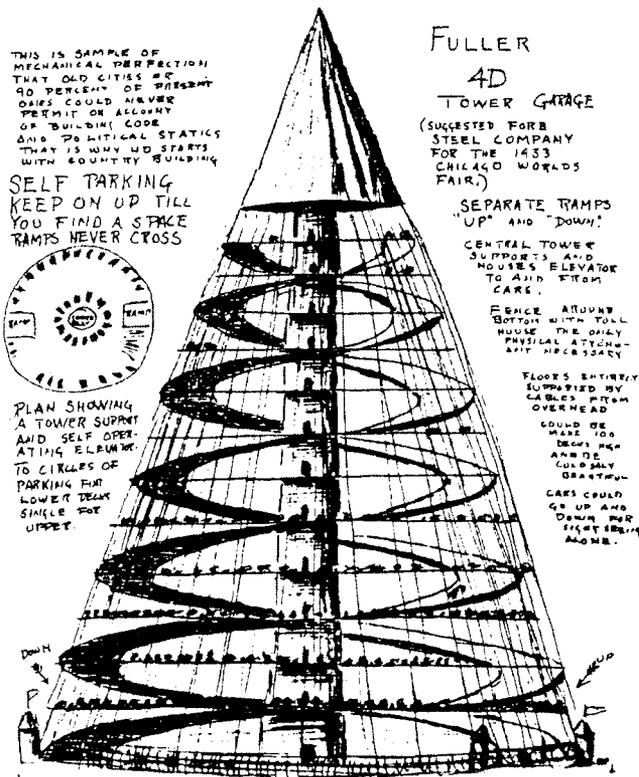


Figure 1

Arguably Buckminster Fuller's most important theories were those of design science and ephemerality, the means and the end of problem solving in the context of an evolving technological society. Today both of these revolutionary theories are being revisited, yet the disciplinary boundaries between construction, engineering and architecture continue to prevent a genuine re-exploration of Fuller's concepts and methods. Architects and engineers who have chosen a design science path primarily as specialists and researchers are developing enhanced design capabilities with advanced systems and software which Fuller could only anticipate. Architects who have seized on Fuller's principles of ephemeralization have done so largely to advance an aesthetic sensibility expressive of current philosophical readings of contemporary culture. Ephemeral architecture implies "lightness, primarily lightness of weight, but also lightness of visual appearance or sensation. The appeal of "lightness" is often pursued as a visual dematerialization of the building object through treatments of structure and surface. These visual effects have been made possible by engineering breakthroughs in glass, metals, and composites and the development of the inorganic coatings and sealants which must protect, bind, and seal them. Today, as in Fuller's time, the military and aerospace industries provide the necessary advances and prevision the technology. Today, as in Fuller's time, architectural culture bends more towards the aesthetics of a postmodern kunstwollen than an ethics of anticipatory design.

LIGHTNESS

It has become possible to realize aesthetic "lightness" in architecture in ways that accommodate the demands of proto-modernist and post-modernist sensibilities alike. Architectural concepts related to modernist culture first sought aesthetic lightness through the exploitation of materials which would allow new abstractions of form, composition and space. Contemporary concepts such as information flow, speed, hyper-reality and folded time seek more visually and technically sophisticated means of architectural expression. However, these avantgardist obsessions with the aesthetic effects of lightness, dematerialization, transportability or non-permanence do not correspond with Fuller's quest for true ephemerality. Ephemeralization is Fuller's term for a technological over-coming: A conquest of "Brain" over conditions which he viewed as "entropy producing." Fuller's ephemerality is the general condition which reflects the total effect of mental energies brought to bear upon solving any given problem, large or small. When a problem is solved, the servile technological apparatus—the invented system or form, need not be sustained. Fuller viewed the exigencies and economics of construction in terms of an ethics of ephemerality. Architects have historically explored the aesthetics of ephemerality, and will continue to do so. If solving problems is still an ethical issue, and architectural design a means of solving problems, regardless of the scope of problems being reduced, then the contemporary architect must deal with Fuller's theories in a different way.

The significance of the passage of time and the redundancy of people and things was printed right through Buckminster Fuller's world view. It extended from his interest in the ancient art of rhetoric—through which pre-industrial men had come to understand that the minimum number of words and gestures achieved the maximum effect—to his concern with the engineering challenge of designing the most with the least in a world of indiscriminate production. These apparently disparate matters, and the connections that he saw between them, were part of his most important theory—the theory of ephemeralization.

- Martin Pawley (from Design Heroes Series:
R. Buckminster Fuller, 1990)

DESIGN SCIENCE POTENTIAL

The concept of design science, which Fuller tirelessly championed, is a maximizing confluence of universal energies, harnessed by the thinker (in his case, always male), which results in overcoming environmental, social, political, and physical limits. Simply put, a sublime means to an end formula. When considered in relation to architecture, design science could be viewed as an opposing strategy to "design art." To what degree is Fuller's heady concept of design science being revisited today? Is it an ethical practice or an aesthetic practice, and what kinds of vision inspires the new design scientist?

The practice of design science views ephemeralization as a productive effect: not epistemological, not cultural, and decidedly not aesthetic or art historical. The design scientist must desire lightness or, the ability of technologies to efface themselves in perfection, as both an ethical and an aesthetic fulfillment. It has been argued here that, within architecture specifically, "lightness" is an aesthetic trope, an aestheticization of Fuller's principle of ephemerality. To pursue "ephemeral architecture" is inherently paradoxical. Ephemerality as a condition is metaphysical, it concerns the changing states of matter and the interconnected flow of time which animates the vision, or intuition, of a change of state, which for Fuller must be an anticipatory act resulting in an ephemeral artifact, living out only its useful duration. To regard ephemerality as an aesthetic phenomenon related to the aura of objects, or to their "return from history" is in conflict with Fuller's idealist notions of design science.

CONCLUSION

Building construction in all its component parts: management, financing, industrial fabrication, the resourcing of technological and human labor, strategies for delivery, etc. continues to become more fluid in response to the forces of economy, time and competition. The industry's adjustments to market trends, product development, legal changes and internal research and experimentation are difficult to monitor even as an inside professional, much less as an outside observer. Most architects, and certainly most architects working in the academies, are outsiders. Some could still be called observers, working within construction as practitioners, researchers or liaisons. For so many architects and academics, however, the construction world of today is a kind of bizarre and intimidating presence, like a relative whom you speak kindly of but hope never comes to call.

To speak of a cultural gap between the constructor and the architectural designer, particularly in the schools, is old news indeed. The recent trend of construction education, from the author's viewpoint (admittedly that of outsider), seems to be away from a discipline of applied building technology and toward more cross-disciplinary strategies which focus upon management, maintenance or marketing. The managing of technology, both hard and soft, and the marketing of management innovations as performance guarantees appears to be the road now taken. The study of materials science, mechanical and structural engineering, and methods of fabrication, once commonly a linkage between architecture and building construction programs, seems to drift increasingly toward the periphery in both. Remember the degree in "architectural engineering?" Innovation in building and product technology, the crux of design science as promoted by Fuller, should be of great concern to architectural and construction researchers, practitioners, teachers and students. Where will it be done and how can access to it be gained?

A new version, or cycle, of design science depends upon the architect, constructor and engineer as ethical partners and aesthetic partners. The art-historical/metaphysical viewpoint and the performative/systematic viewpoint must be changed through negotiation and learning. The technological tools and media must be shared and used creatively, to solve problems and to seek problems. The constructor and the engineer have access to the material which

the architect desires, and only by learning how this material serves present demands and sustains its existence will the architect learn to manipulate it creatively.

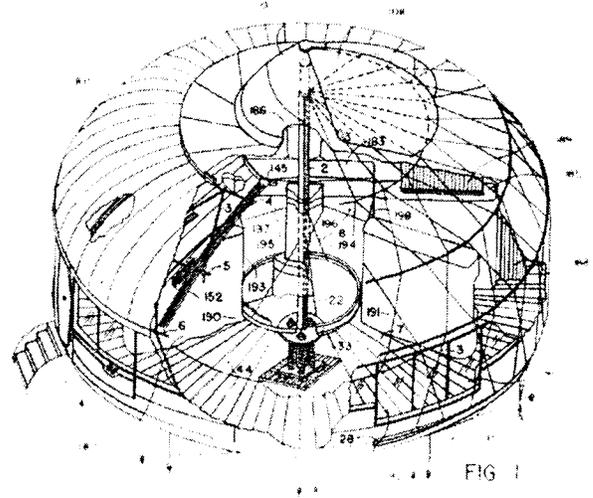


Figure 2

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