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Paradoxical Efficiencies

Efficiency and Exorbitance in Architecture

Introduction

"It is obvious that the utilitarian role of an object never completely justifies its form, ... that the object always exceeds its instrumentality. Thus is it possible to discover in every object an irrational residue..."

-Caillois

Efficiency regulates architecture in a multiplicity of forms – witness net to gross ratio's, fast track construction, the aesthetics of the minimal, net zero buildings, life cycle costing, and mass pre-fabrication to name just a few. There is structural efficiency, spatial efficiency, economic efficiency, energy efficiency, material efficiency, efficiency of construction and so on. Efficiency is seen as a moral imperative. Efficiency is a requisite precondition of good design. Efficiency is ingrained in the language of architectural discourse. Efficiency even defines production in the architectural studio – how much work in how little time.

More and more, instead of less is more, we want more from less. And perhaps this is as it should be in a world increasingly defined by a sustained crisis of scarcity – of economic, environmental, material and human resources. However, it is necessary to ask whether a positivist application of efficiency –more often driven by the ruthlessness of market forces than principles of enlightened stewardship –too often results in an unquestioned privileging of the quantitative over the qualitative. If efficiency is the overriding imperative in a contemporary culture predicated on the bottom line -on ever faster and cheaper- then what is lost and what is gained in the exchange? Whereas the Taylorization of labor and mass production –two of the formative innovations of industrial culture at the outset of the twentieth century- were once considered unambiguous advancements, they also reveal the double-edged nature of efficiency. The streamlining of workplace flows which promised to minimize drudgery often compounded it -necessitating new forms of control and surveillance and devaluing the skill of the individual worker. At the same time, the rise of industrialized production stimulated the consumption of a proliferating array of disposable goods, magnifying the depletion of resources and the generation of waste.

But what if efficiency itself was interpreted as a paradox? If efficiency entails the coupling of any maximum to any minimum, then how might a reconsideration of efficiency become conceptually generative rather than restrictive? This studio will be driven by a critical re-evaluation of notions of efficiency in architecture – recognizing that every efficiency paradoxically implies a corresponding excess, exorbitance or waste. Efficiency of movement implies a surplus of circulation, optimization of daylight might generate a superabundance of apertures, efficiency of structural footprint might create an extreme density of structural members and so forth. This coupling of efficiency to its opposite creates a fertile contradiction -an irrational residue- that can be used to hijack a narrow functionalist conception of efficiency. In an era of performance-driven optimization, we will pursue extreme, perverse, or satirical efficiencies as a means of generating new programmatic and spatial opportunities. If the value of architecture exists to the precise degree that it transcends the strictly utilitarian, then we will seek to turn efficiency against itself, to the point where it generates a productive exorbitance.

Background:

An early critique of efficiency can be found in William Stanley Jevons 'The Coal Question', published in 1865 as an evaluation of Britain's burgeoning coal-based iron industry. Jevons contended that, contrary to intuition, an increase in technological efficiency (of fuel consumption for example) results not in decreased use of resources but the exact opposite: as economy of use drives supply up and cost down, demand is stimulated, resulting in an increased depletion of resources and canceling out any savings achieved by the initial efficiency. The Jevons paradox, as it is now known to contemporary economists, can be found in a wide variety of disparate phenomenon. For example, over the course of the last 20 years the efficiency of air conditioning equipment in the United States has improved by nearly 30%. However, rather than reducing consumption, energy use for cooling has nearly doubled over that same time period. Today, despite ever more stringent energy codes we use more electricity to air condition our buildings than the sum total of all electrical use in 1955 before cheap, readily-available cooling became prevalent. At a minimum, such phenomena call into question a simplistic understanding of efficiency as an unalloyed virtue and point to the wider chain of relations that impact it's real effects.

At least since the emergence of modernism however, the valorization of efficiency within architecture has been pervasive: from Mies' famous dictum to Le Corbusier's *machines for living in*, from the aesthetics of structural optimization to the streamlining of transportation flows in the multi-layered networks of contemporary cities. Principles of efficiency gradually permeated every scale and facet of architectural production, encompassing both the standardization of the American building industry in the aftermath of World War II as well as the application of scientific management principles to the intimate of spaces of the home. Designed as part of a social housing complex in Weimar era Germany – the Frankfurt kitchen, to give one example, was not only pre-fabricated to speed production, but utilized time and motion studies to minimize wasted movement in the preparation of meals. As the architecture of efficiency infiltrated home and workplace alike, it also became emblematic of the alienating effects of an increasingly technocratic environment (and satirized in films like Tati's *Mon Oncle* and *Playtime* in which efficiency run amok generates a range of irrational effects and absurd situations). In architecture, a counter position to what Cedric Price termed the 'dreary Bauhaus logic' of doctrinaire modernism emerged in the work of groups like Archigram, who – without rejecting efficiency as a critical parameter- pushed it to radical extremes in projects like Plug-In City, the Auto Environments projects, and the Instant City. In stark contrast to dystopian images of mechanization, here technological efficiencies were deployed in the service of new urban pleasures and liberating social effects.

Today, we see a resurgence in ideas of efficiency as new forms of advanced computation promise the optimization of performance as a driver of architectural form. Mass customization and bespoke manufacturing processes seek to further speed and individualize production – potentially increasing temporal and material economies. Meanwhile, the focus on sustainability reasserts the ethical necessity of conserving resources and minimizing energy consumption – spawning an entire architectural sub-industry predicated on new standards of environmental efficiency. At the same time, the bulk of building is subject to the draconian demands of market driven economic formulas– generating a taxonomy of efficient building types – from micro-hotels to big box stores, from automated parking structures to just-in-time distribution centers – typically outside of the purview of architects. This studio will examine the multiple forms that efficiency takes in contemporary architecture, analyzing its role in current practices in order to generate alternative tactics and speculations. These speculations will take the form of precise architectural proposals. Manhattan, as a metropolis whose form is frequently credited to the demands of efficiency, will provide the physical site for these investigations.

Process:

An example of the unpredictable consequences of efficiency can be found in Invernizzi's Villa Girasole, built just outside of Verona in 1935. A simple imperative – to maximize the house's exposure to daylight – produces an intricate series of rational decisions resulting in an exorbitant, if not illogical whole. In order to maintain optimal solar orientation during the course of the day, the house rotates on a massive landscape turntable supported by fifteen train wheels and powered by a series of low horsepower motors. This mechanical contrivance – imminently logical given the initial premise – triggers a series of repurcussive effects: the house is split in two – a spinning machine-like top over a solid masonry base- connected by a revolving circular stair and elevator core which combines vertical ascent and rotational motion. In the rotating portion of the house, commonplace domestic features are distorted according to the demands of mobility – plumbing is connected to tanks slung from the underbelly of the house, while storage, furniture and cabinetry are built into the walls, and the mirrored plan needed to balance loading generates redundant, mirror-image rooms. Conventional distinctions between front, back and side yards no longer apply as the house continually changes it's relation to the surrounding landscape. Doors may open onto different locations at different times of day and the sun can rise and fall in the same window, freezing shadows and warping the perception of time. Beyond the explicit intent of its creators, Villa Girasole demonstrates the pursuit of rational trajectories extrapolated to the point that they render up a productive excess - a precipitate of paradoxical effects.

While taking seriously the conservation of economic and environmental resources that underwrite contemporary impulses toward efficiency – we will examine the potential latent in a more nuanced and problematized understanding of efficiency as paradox. Examining it's multiple forms: temporal, spatial, material, economic, etc. and drawing from a range of programmatic types (office, hotel, parking lot, library...)- the student will derive a logic which frames a proposal regarding the pairing of efficiency/inefficiency as a generative principal. In these speculations, efficiency will be shadowed by its opposite in the form of the excessive, the residual, the superfluous and the wasteful. Rather than seeking the elimination of these negative terms, we will attempt to leverage them as productive grounds for rethinking dominant narratives of optimization. Through the rigorous application of imagination, the underlying logics of the project will be both amplified and diverted, catalyzing unforeseen couplings of form and program, function and inhabitation. Operating opportunistically within the legislations and logics of efficiency, these tactics will open up new, imaginative potentials inside the rationalized spaces of contemporary systems.