A. Designed monotony versus natural variety

Natural and artificial environments reveal a range of mixed situations described by “monotony” and “variety” at either extreme. Nature certainly shows no monotony. This might appear surprising, since physical and biological generative mechanisms use the same basic tectonic forces and DNA to produce copies of objects and organisms. One would expect the products to be near identical, but they are not. Individuals of the same type of organism differ because nothing is ever truly copied. Each example of an object/organism is created from the same design template, yet the end result is slightly different each time. Form generation creates small variations. Everything in nature is “generated” and is never “copied”.

Now consider the built environment. Here, it is easy to distinguish two distinct classes of created objects: copied versus generated. Using a template or set of design rules that allow some looseness in their execution generates objects (but does not copy them). The process of designing and building in this generative mode involves many steps, each one of which can vary in individual situations, and this introduces variety (just like in nature). As emphasized by Christopher Alexander in “The Nature of Order” (2001-2005), traditional and vernacular architectures are of this generative type. We see enormous variety and hardly any monotony in self-built settlements, traditional urban fabric, and historical and vernacular buildings.

With industrialization, our design paradigm underwent a drastic shift: from generating, to copying a form. This was the whole point of early mass production. Identical copies became the norm as the primary objective of industrial design. But with this goal of copying a fixed template to produce identical copies of an object, monotony sets in. If production generates monotony, then design variety is looked down upon. Actually, the goal of early industrial design was identical copies, and monotony is our psychological reaction to repetition and mechanical alignment.

B. Ashby’s Law of Requisite Variety

The problem with monotony, however, is that human perception connects only to identifiable situations. Human beings need to know where they are. We react with alarm to informational monotony and prefer to be — and will linger in — a physical
place whose organized complexity identifies it uniquely. Our physiology never evolved to handle empty or monotonous environments, because those don’t arise naturally. Their unnaturalness can make us anxious, disengaged, and disoriented. All such examples that surround us today are man-made.

Variety is strictly necessary in complex adaptive systems. Monotony is unexpected from scientific principles, and has to be imposed on the environment. Creating and maintaining monotony is an artificial process that uses energy taken from working systems. Resources are transferred from one system to another to feed a geometrical goal that has no real function. To help us see this, consider the interaction of two complex systems: how they can relate to each other, how one can control the other, and how one can destroy the other. I recall the “Law of Requisite Variety” by Ross Ashby (1956), which can be stated as follows:

“A system governing another, larger complex system has to have a comparable degree of complexity as the system it is governing.”

This is a basic result in cybernetics and complex systems. It turns out that you cannot use simplistic controls to govern and direct (or assemble) a working complex system. The degrees of complexity of the physical system and that of its model (that serves to govern it) have to be comparable. Ashby originally presented as an illustrative example the ability of our immune system to formulate a wide variety of responses to infection. The mechanism for recognizing pathogens and directing the production of antibodies has to be at least as sophisticated, and as capable of variation, as the invading pathogens themselves.

In the built environment, buildings and cities define a geometrical framework that governs a separate system composed of human behavior and lives, from the level (i.e. spatio-temporal scale) of one individual, up to the level of the whole society. One system controls the other, since physical settings control our lives. Human society has to adjust and adapt to the physical morphology of its buildings and cities just as rigorously as it does to its civil laws and religious directives. People must live in the geometry they build, and it affects their lives for better or for worse.

A society of interacting human beings adds additional layers of complexity on top of the individual complexities of all the people. Traditional and vernacular settlements contain the organized complexity of the individuals and the society that built them, in a more equitable balance between the two systems. Throughout history, a reciprocal relationship has been in place: people and society govern their built environment, whereas the built environment governs individuals and society. The complexities of everyday life concerned with tasks of daily survival reflect the structural variety in traditional architecture and urbanism.

Profound differences in social structures and practices are directly reflected in the differences among the traditional architectures and urban fabrics of distinct societies. What is uncannily similar, however, is their high degree of organized complexity. According to the "Law of Requisite Variety", the built environment — which in our discussion is a principal governing system for society — has to
necessarily embody the same degree, and the same general type of variety, as the society that it governs through its geometry.

C. Geometrical fundamentalism and the Frankfurt School

Today, complex objects such as computers, aircraft, and scientific instruments are mass-produced. Therefore, there is no reason to create a monotonous built environment for any intrinsic reasons having to do with industrial production. We can mass-produce objects with tremendous variety. Even a century ago, Art Nouveau, Art Deco, and other architectural languages rich in ornamentation utilized complex prefabricated architectural units. An explanation for the ubiquitous design plainness that insists on monotony in our times lies elsewhere.

People all over the world have been socialized by their education and the media to accept monotony as a defining “scientific” characteristic of the built environment. How come? Why do human beings whose lives and interactions emerge as exquisitely complex and varied cultures allow the richness and variety of their environment to be suppressed, and happily go along with this? With the homogenization of the built environment due to global industrialization, design forces are wreaking havoc with the variety of the world’s cultural traditions. Each society’s uniqueness, corresponding to the uniqueness of its culture, has been and is being erased everywhere.

Michael Mehaffy and I offered an explanation of the phenomenon of design plainness as displaced religious belief (Salingaros, 2006: Chapter 9). Although a startling proposal, it does possess considerable explanatory value. We can find no technical or economic reasons to support excessive plainness — which verges on stubborn insistence against the facts — in architecture and urban planning. All indicators coming from scientific experiments, successful adaptive design employed in the past, and ordinary citizens’ own preferences unequivocally point towards a built environment that embodies adaptive complexity.

The driving force behind design monotony can be traced instead to an ideological hatred of the past: specifically, representative objects that are immediately recognizable through their organized complexity. A philosophical/political movement condemns such forms in the built environment, so that, ever since the 1920s, we witness a hatred of man-made forms that implement the generative properties of nature. Architectural education has for decades transmitted the unreasoned hatred of Theodor Adorno and the Frankfurt School against anything traditional, and in particular, adaptive architecture and urban design (Salingaros, 2013: Chapter 13). Architecture embodies this aversion in design guidelines that rigorously exclude organized complexity.

Monotony in design thus makes sense when interpreted as pseudo-religious conviction rather than a practical solution. This does not make it any less compelling, however: on the contrary, no logical argument can possibly displace religious beliefs. People are obeying the injunction to build overly plain objects and monotonous, unnatural forms. That is why, even after decades of complaining that
post-war architecture and urban planning are creating inhuman environments, the profession stubbornly rejects adaptive complexity. Yet common people naturally crave complexity that mimics nature in an essential manner, and so a younger generation of practitioners has finally started to produce it.

**D. Industrial simplification is dehumanizing**

The built environment was drastically simplified after European nations began applying a crude industrial model to reconstruct bombed-out cities following World-War II. This seemed economically expedient at the time. The philosophical drive for simplification — and concomitant monotonous repetition — came hand-in-hand with societal upheavals at the beginning of the 20th century: World War I, followed by the rise of Nazism and Communism. Political and social movements decided to forcibly re-form humanity so as to disconnect it from a past that was judged as deficient and failed.

The most visible common face of those utopian dreams (at least as understood by their supporters) is monotony in designing the built environment. Prejudices of their time, manifested as intolerance to traditional design, were presented as scientific truths. They were accepted without analysis, as part of the vanguard for a sweeping social agenda. Aside from being unscientific, what happened back then hides an even darker side.

Social engineering considers human beings as objects without variety, to be easily and collectively molded into anything the state desires. The complexity of society as it emerges from interactions among people simply has no place in this limited worldview. Humans are supposed to lead ordered lives governed by an ordered geometric setting. Of course, this inhumane objective is never stated explicitly, and perhaps not even recognized; instead, we get wonderful promises of a brighter and more just future, better and healthier living conditions, decent affordable shelter for the masses, etc. Its perpetrators present themselves as driven exclusively by progressive social concerns.

Ashby’s law still holds, however, and reveals a frightening truth. A repetitive, monotonous, overly simplistic built environment drastically simplifies human society. Mindlessly applying crude industrialization to re-shape the world makes it “efficient-looking”. One obvious example is the workers’ housing known as the Weissenhofsiedlung, from 1927 Germany. This architectural prototype established a Bauhaus typology to be repeated endlessly during the next century all over the world. But in using buildings originally designed to house industrial production for housing people, insufficient attention is paid to the dehumanization of human beings. It is perhaps no coincidence that Bauhaus graduate Fritz Ertl became the chief architect for Auschwitz-Birkenau.

**E. Monotony, intolerance, and control**
Our worldview has recently shifted so that recognizable variety is no longer seen as a threat to the rigor of industrial production. Monotony is in fact irrelevant to modern industry (even though some people still fervently believe in the ideology of “pure design for a new society”). Variety in design and utilitarian products is now indicative of design freedom, and is interpreted as basic resilience (Mehaffy & Salingaros, 2015). Even under the severe ideological sentence of the past century, design variety survived and prospered in those sectors of society outside the direct control of centralized power.

The freedom represented by variety in the built environment is an antidote to the dystopian objective of homogenization. Variety is “messy”, but at the same time liberating, and ruins the unmistakably clear “logic” of top-down control. What was until very recently misinterpreted as architectural and urban “disorder” is now studied to uncover solutions revealing how a healthy city stays alive. Yet many different governments embraced design monotony in their attempts to re-make their people into an “efficient” industrial society composed of simplistic, repeating, non-interacting units.

Bulldozing slums, to replace them with monotonously repeating blocks of “housing”, is a goal of states desperate to govern those regions frequently out of state control. This becomes an obsession in how the developing world treats its informal settlements. Distinguished academics — all hard-core bourgeois Marxists — and their former students now running the government planning office, together advise legislators to implement a crude industrial model for cities. Self-built organic urban fabric must be erased because it’s an affront to the industrial aesthetic! Those countries undertake massive replacement of older and informal building stock, in order to use up industrial materials.

Design monotony is also allied to deliberate destruction. Regimes obliterated surviving architectural variety from previous generations, including churches, mosques, synagogues, and temples, replacing them with monotonous industrial buildings. This occurred in Europe under the Nazi occupation, Cambodia under Pol Pot, China during the Cultural Revolution, and Romania under Ceaușescu. In a related vein, fundamentalist religious regimes exhibit intolerance towards architectural and artistic treasures. The past is a menace that must be effaced. Complex organic forms threaten blind obedience to abstract ideals. Guaranteed tourism revenues are not enough to counteract the fanatical desire to destroy variety as embodied in a country’s heritage.

In conclusion, design monotony imposed on the built environment has nothing to do with progress. It signals instead that damage was inflicted on the complex system that encompasses the lives of individuals who make up that society. Yet, paradoxically, some progressive thinkers from all around the world still enthusiastically embrace monotonous design as somehow representing “progress”. Even after all the failed examples, social damage, and countless ruined lives, ideologues continue to promote monotonous architectural and urban typologies as “liberating new ideals”. Our desire to apply adaptive design principles has to take this entrenched historical opposition into account.