# Humanistic Generative Design

Summary of Daniel Schwab's Senior Thesis at the Evergreen State College, 2009

Projected on the background of an old wall in Erfurt, which is easier on the eyes than a blank white screen.

All illustrations by Daniel Schwab, except where noted.

Humanistic Generative Urban Design is a method that has been used for thousands of years, and through a new understanding, promises to be an effective means to create sustainable settlements in the future. Christopher Alexander calls it "The Timeless Way of Building." Nikos Salingaros calls it "Algorithmic Sustainable Design."
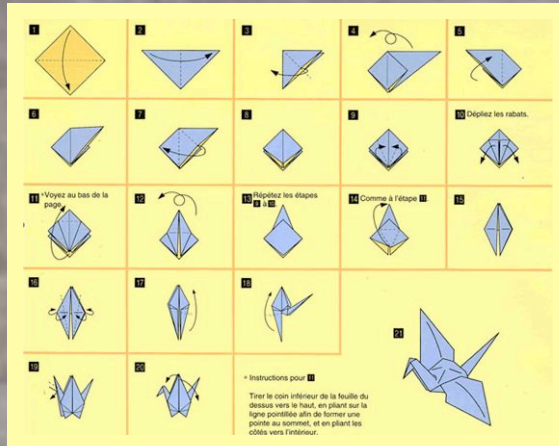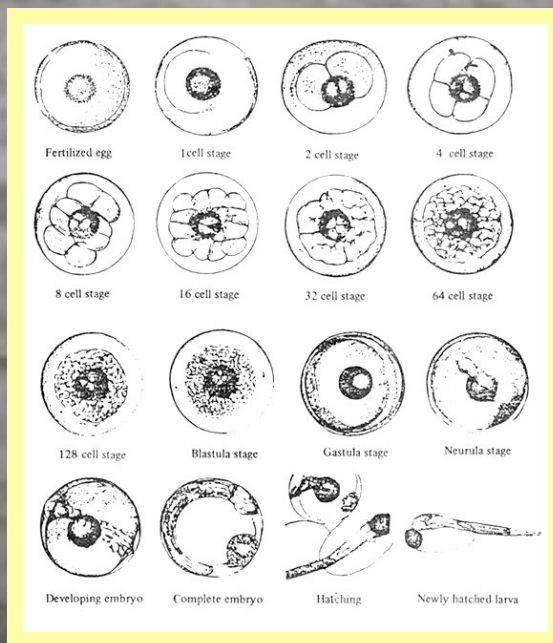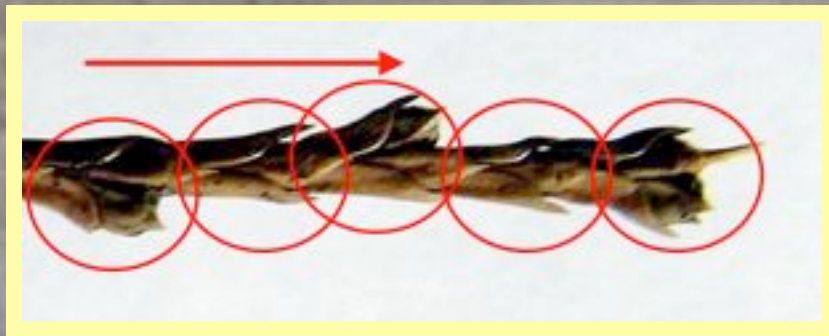
In a generative process, simple rules that dictate a sequence of steps are applied locally to produce complex global outcomes.
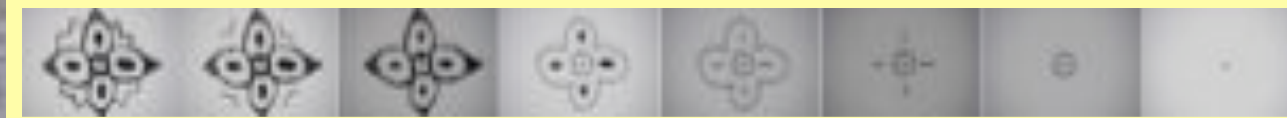
This is the way origami works...

....and also how a fetus acquires its form.

An organic generated form adds or modifies elements in a way that strengthens and grows out of the wholeness that already exists.

This is particularly visible in the growth of a branch, where each new bud grows literally *out of* the preceding one, in the illustration growing from left to right.

Likewise, an organically generated design adds elements to strengthen the coherence that already exists.
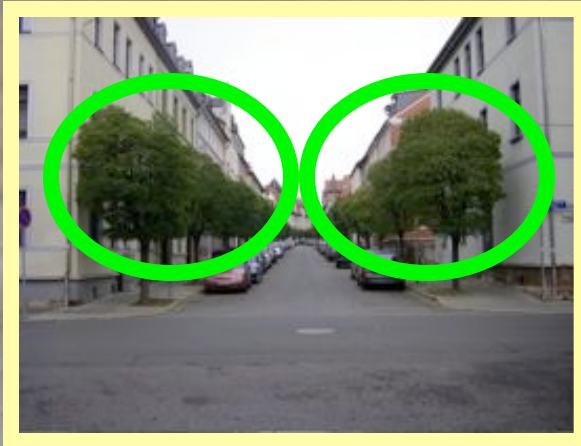
The generative process requires an algorithm, or a
decision-making procedure, in order to choose
the next step in the unfolding.

A humanistic approach draws on innate human
preferences for situations that also produce
health.

For instance, we are asked to select between a tree
design (top) or a no-tree design. Statistically,
presence of trees is more popular. Trees also
help to dampen noise and clean the air.
Furthermore, views of natural forms have also
shown to reduce blood pressure and improve
healing.

Natural or nature-like forms that benefit human well-
being are called *biophilic*.

Again, this is based on innate human knowledge. Human beings are instinctively able to tell what environments will or will not support their health. In an environment such as this, we feel alienated and uncomfortable. Often vandalism makes light of this fact.

People prefer man-made patterns with a coherent scaling hierarchy going down to the smallest perceivable scale.

This door lacks detail on the small scale, and so is perceived as drab. This lack of coherence creates strain on the human nervous system, and which can lead to stress.

This door has a complete scaling hierarchy, which is easier to read and is a pleasure to the eye.

A good generative process will pay attention to all scales and select adaptations that reflect a coherent scaling hierarchy.

This library façade in Weimar was designed, according to the architect, to be "provocatively empty." It has no details. Such unnatural facades provide a sort of a "thrilling" stimulus to the nervous system, which is actually an adaptive fight-or-flight response. On October 8, 2009, the architects "provocation" was answered: a vandal wrote the word "Thrillah" on the façade.

Level 1: The whole building, a rectangle with size X
Level 2: The Word "Thrillah", with size of approximately $Y = ½$ to $1/3$ X
Level 3: The individual letters, with height of $Z = ½$ to $1/3$ Y and width of approximately $1/8$ Y
Level 4: Ornaments that are part of each letter with size of approximately $¼ Z$.

Interestingly, this vandalism corrects the scaling incoherence of the design, producing details on at least four levels of scale. Unknowingly, the vandal did his natural part to improve the environment according to human evolutionary needs.

Humans have an evolved ability to read places. Innate human intelligence tells us that these signs are lies. They are needed to force us to do what we naturally would not...

...that is, to regard the narrow dangerous strip at the side of the road as a path....

...or to feel a sense of freedom under a deadly underpass. These could only be the result of "rational" design removed from the site.

Follow your exit number

"Rationally" planned places do not adapt properly to human nature. Their systems, meant to be used only by following a code of externally dictated rules, fail to work because we are unable to discern the rules by interacting with the environment.

Generated environments tell us what they are by their geometry, dictating appropriate behaviors, speed of travel, and social relations through textures of surfaces, levels of permeability, bollards, and natural elements. Our experience in these places tells us these things automatically.

A good building tells us plainly what it is, showing its strengths and weaknesses, which help us to interpret and maintain it. In this way, it presents itself as honest and straight-forward. This *authenticity* strengthens our desire to sustain it. This building is five-hundred years old.

This building has reduced the honesty of the timber-frame construction to a plaid "design." Its lack of authenticity is felt. People sense the dishonest behavior: this building will not be sustained as it is over the long term, but will have to adapt to become more authentic.
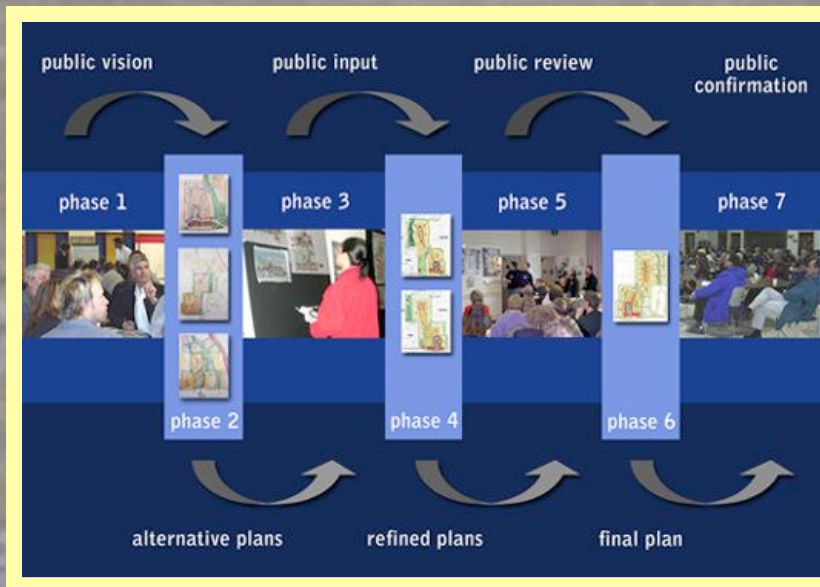
In environments that are good for us, we are able to experience a profound connection to our inner-most selves, and to a felt "Self" that is in the external environment. The wisdom traditions hold that these two "Selves" are one and the same.

A humanistic generative process makes use of this fact by employing a "mirror of the self test" which selects those forms that connect us most strongly to that Self that we share in common with the world. Self-mirroring forms are at the same time the most coherent and biophilic.
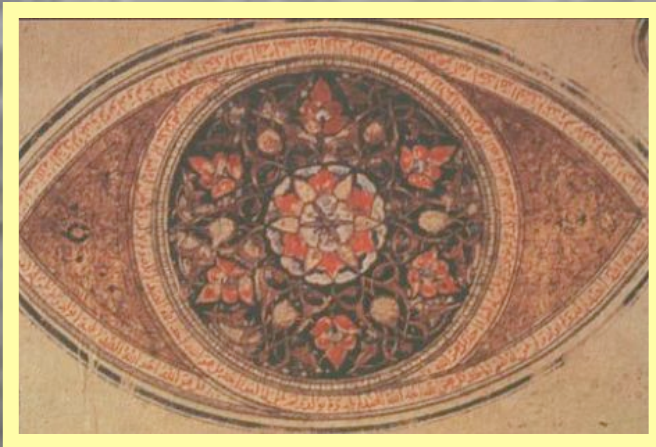
Feeling whole within ourselves, and in relation to the world, we know instinctively that this is a healthy and genuine environment.

public vision · public input · public review · public confirmation

phase 1 · phase 3 · phase 5 · phase 7

phase 2 · phase 4 · phase 6

alternative plans · refined plans · final plan

www.charretteinstitute.org

Therefore, a design process such as a Charrette that is done in isolation from the site, even if it involves "generative" aspects such as feedback-loops, limits people's ability to emotionally gather important information from the site. It is therefore vitally important that decision-making be made on the site itself, where environmental information can be emotionally gathered.

In the built environment, a humanistic generative process makes small, reversible local improvements that preserve and augment the whole. Here are pictured small interventions: repairing a single building in a row (above) and replacing a pipe in a street (below). In both cases the gestalt is not damaged, but improved.

After every step of the process, the gestalt is reassessed to determine a next step that will benefit the function of the whole.

Breaking a project up in to small steps allows mistakes to be noticed and reversed when necessary.

If this process is enacted countless times over many years, and at all levels of scale, a very rich and wholesome built environment will be the result, in which Space Left Over After Planning (SLOAP) is eliminated.

When thousands of people participate freely on a planning project, the amount of wisdom and intelligence embedded in it is much higher than if only one person is the "architect." This is the the logic behind the success of WIKI's and crowd-sourcing.

Because of its slow growth, this kind of environment will have the chance to adapt precisely to human and environmental factors. This is a cornerstone of true long-term sustainability

On the other hand, buildings and urban environments built according to a rational idea, drawing only on the intelligence of a single person, or a strictly hierarchic planning team, lack sufficient intelligence, have no ability to adapt, and eventually die.

http://www.dpz.com/

Building processes in which "bullet-proof" master-plans are designed all at once have no ability to adapt to local social and ecological variations.
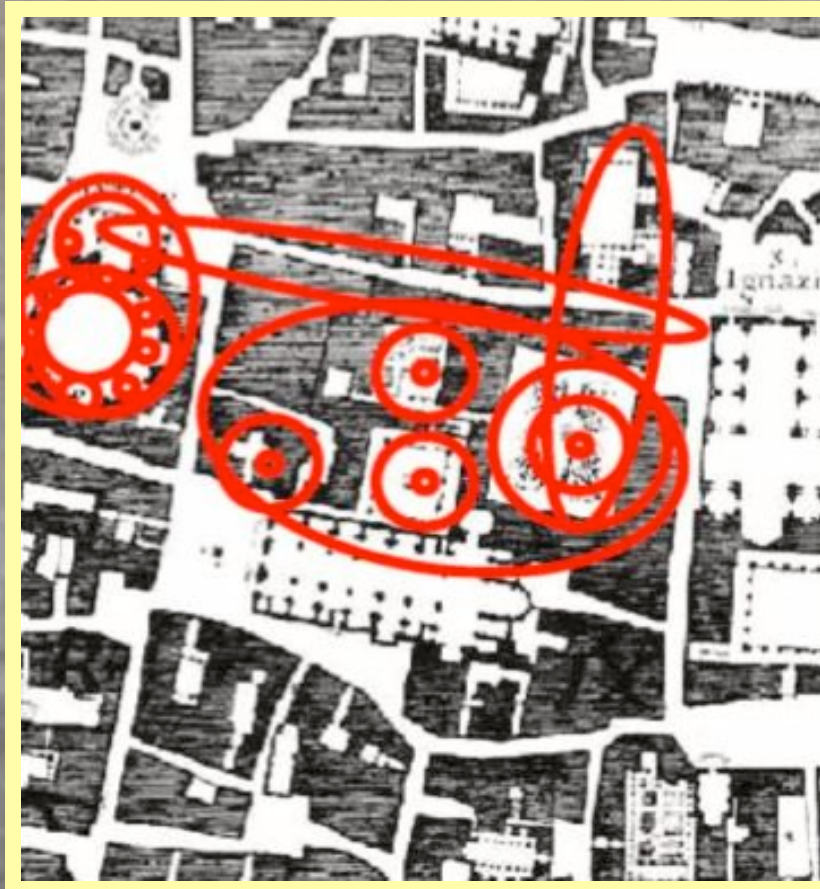
If one looks at the ground-plan of generated environments, one will see a dense urban form in which no space is wasted, and in which centers and uses interpenetrate.

Michael Mehaffy

Humanistically generated structures develop in a dynamic dialogue with natural forces, and seem to be part of nature itself.

Built environments that are allowed to grow in this way will self-correct, creating the appropriate services at the places that they are most needed.

This is a coffee-stand at the entrance to a train- station, where hurrying commuters get just what they need before work....

...and this is a more comfortable and direct way to walk.

This process produces spaces that are quasi-chaotic and self-organizing, like this traffic situation with no traffic lights or lanes, only a narrow street where many forces come together. People sort things out for themselves, responding to the needs of the moment.
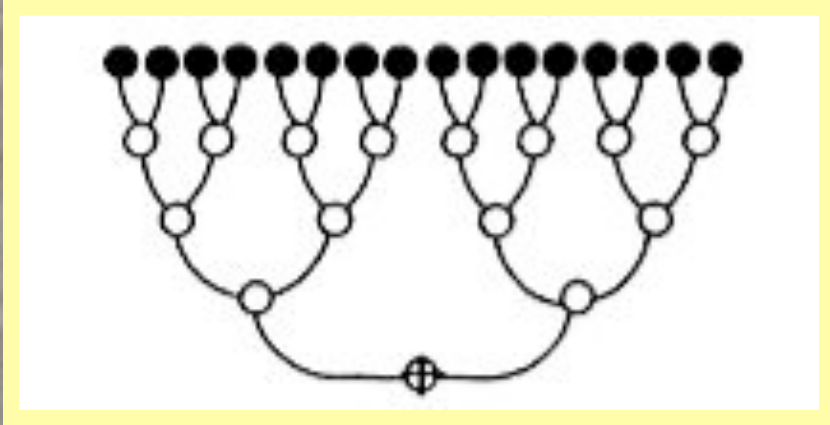
Bill Hillier

In modernist planned settlements, structurally "tree-like" urban structures are the norm.

These structures limit social interaction and hinder self-organization. This leads to fragmented communities, which in turn lessens the ability for a community care for their environment.

Single-use, non-integrated places become wasted spaces which no one cares for. These further weaken community sustainability.
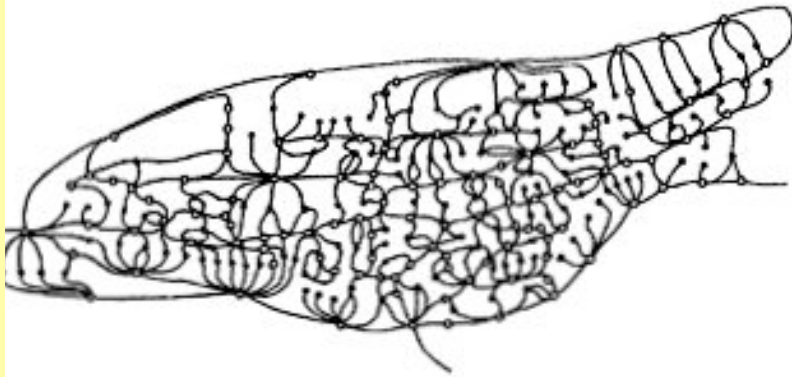
Alex Grey

But natural forms are not like this. Living beings and ecosystems are deeply interconnected.

This picture shows how the muscle, bone, nervous systems, as well as the energetic and spiritual systems interpenetrate.

Such complex structures in the built environment can only be created by a generative, or evolutionary, approach, just like in nature.

Generated urban forms, for instance medieval villages, exhibit the complexity of evolved forms. The European village form actually optimizes chances for social interaction by making sight-lines as long and as interpenetrating as possible.

This diagram shows how multiple possible routes lead to high connection between people.

Bill Hillier

When people live in this kind of environment, they automatically meet casually in the street.

This allows to have a sense of common ownership of the public realm. They are then more likely to organize to maintain the built environment, which will be sustained over long periods.

Thank You

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