Algorithmic Sustainable Design: The Future of Architectural Theory.

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Lecture 10
10.1. Generative codes and their application to building and urban morphology.
10.2. Secularization destroys public space.
10.3. Spiritual architects.
10.4. Legalizing codes.

10.1. Generative codes.

Urban genetics

- Rules that tell you how to build
- The codes evolve the form of what you build, as you are building it
- Specify the **process**, not final form
- Different from static (form-based) codes (good and bad) used today

Form-based codes

- **Form-based codes** do not specify a sequence of transformations
- Zoning ordinance specifies final form directly, but not the adaptive evolution of form
- Form-based codes need adaptivity built in (not usually done)

Two types of developer codes

- **Bad** form-based codes generate inhuman forms and urban regions
- Most of today's urban codes are bad
- **Good** form-based codes can generate healthy environments
- New Urbanist codes foster a wide range of human activity on all scales, protecting each from the others

This distinction is mathematical and biological, not ethical. A good form-based code has the potential to accommodate all sorts of different activities for a large variety of people: normal daily routines for healthy adults, pedestrian movement and play by children, an

environment friendly for older, infirm, and handicapped people, etc. Good form-based codes can accommodate bicycles and slow vehicles while protecting pedestrians, etc. All of these activities have different structural needs; nevertheless they must coexist in a healthy mix. Bad codes normally ignore or eliminate altogether most uses and users other than fast-moving vehicles.

Love and ownership

- People only care for what they love
- Deeper ownership than simply buying a place — love cannot be bought!
- We love something we have created
- Therefore, people must have a hand in creating and maintaining a place

Community comes from public space

- Urban community is a consequence of a successful public space
- THERE IS NO COMMUNITY OTHERWISE
- The 20th century has no community, because modernism destroyed the built environment's public spaces

Generative codes

- Start by intuitively sensing the possible configurations of what can be built on the land — Shinto method
- Proceed step-by-step to generate centers (in the sense of Alexander)
- Imbue land with structure that enhances and creates life there: adaptivity
- Do not destroy existing life on sites

Different paradigm for "life"

- No architect or planner talks about the "life of the site" nowadays
- Site is usually assumed to be lifeless, meant only to be cleared
- Act of building imposes human will
- **We are proposing the opposite method — building to enhance the life of sites**
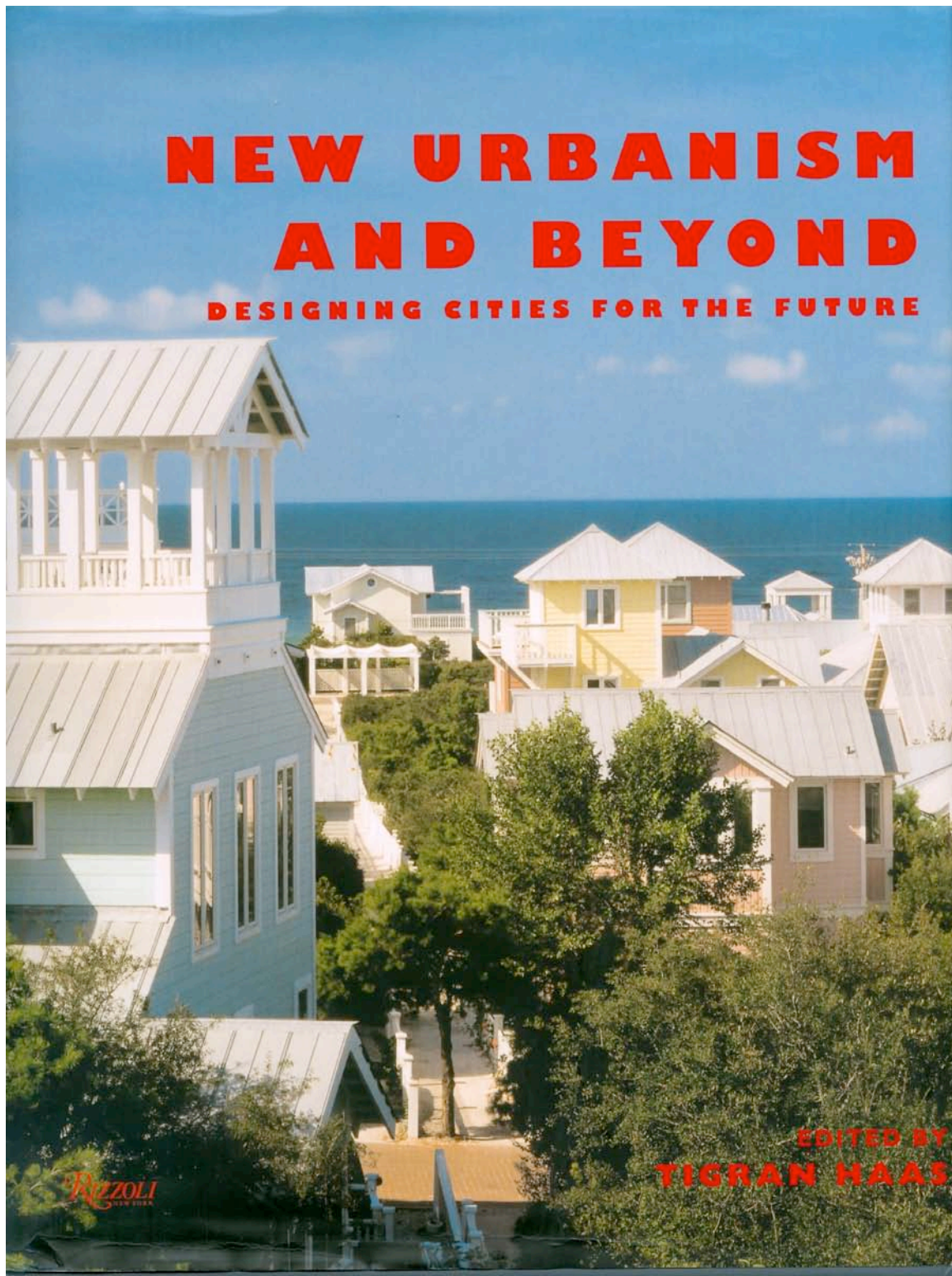
There is a "life" in the geometry, in the configuration of the site and what exists there before building anything new. This represents a fundamental philosophical difference between our method and current practice, which is rather insensitive to the "life" of the site. Only members of our group of architects and urbanists talk about this concept. Here is a summary of the methods for implementing design that respects the "life" of the site.

"New Urbanism and Beyond"

- Two chapters in the book edited by Tigran Haas, Rizzoli, New York, 2008
- Chapter 1.1. "Generative Codes", Christopher Alexander, Randy Schmidt, Brian

Hanson, Maggie Moore & Michael Mehaffy
- Chapter 10.2. "Growing Sustainable Suburbs", Lucien Steil, N.A.S. & Michael Mehaffy

"New Urbanism and Beyond"

Review of six steps from "New Urbanism and Beyond"

- 1. Any new structure must enhance existing adaptive life of the neighborhood
- 2. Not disconnected speculative building
- 3. Design done right on the physical site
- 4. Layout done by consensus with users
- 5. Using a pattern language
- 6. Transferred to paper only after complete

Public spaces

- Main pedestrian spaces are chosen by consensus with users
- Choose to save the most sacred areas by turning them into public spaces
- Life of surrounding region is rooted in its public spaces

Revolution in development

- Replace old paradigm where money takes absolute control of urban form
- Concentrated power corrupts the project's design — inhuman result
- Developer or government funding the project must share power
- We introduce a democratic solution

Three-way separation of powers

- Copy the US constitution
- **Legislative**, **judicial**, and **executive** branches of government
- All are independent — separation guarantees democratic government
- Safeguard against totalitarianism

The three branches of urbanism

- A. RULES: urbanists make up the proper rules for generating healthy urban fabric
- B. PROJECT MANAGER: oversees the application of those rules, acting within governmental regulations
- C. INSTITUTION: developers, builders, and architects who apply our rules to build new urban fabric and repair existing one

Democratic shift of power

- Humanistic urbanism requires a fundamental shift in power
- The developer/financier or government will NOT control entire process

- Power belongs with the current or future residents, and is exercised though their chosen **project manager**

Project manager

- Project manager has to be legally independent of profit motive
- Cannot be influenced by developer
- Works for (and is paid by) the community, not the builder
- Receives a fixed fee, no kickbacks
- **Maintains human quality of project**

Project manager (cont.)

- Has some direct control of subcontractors (who are working not strictly through overall contractor)
- Directs craftsmen to be more autonomous in their designs
- Supervises periodic adjustment of design to allow for spontaneity

New business plan

- Developer finances and profits from the project (and can make even more profit using our three-way model)
- BUT DOES NOT HAVE CONTROL OF THE DESIGN PROCESS
- That is the primary responsibility of the independent project manager

New business plan (cont.)

- New type of agreement signed between owner and architect
- Protect autonomy from legal liability
- **Different type of contract**, addendum to permit craftsmen to have expression
- Allows craftsmen to be involved in the process of design while building

It is extremely easy to get a contract addendum approved by the American Institute of Architects, and simply attach it to the overall contract. Thus, the legal issues concerning the new business plans are easily solved under the present operational framework. It is neither necessary nor desirable to prepare a contract that specifies everything in minute detail so that nothing is flexible. There is no room for creativity under the present type of contract. The idea of a new business plan was developed by Christopher Alexander and applied in many of his projects (see his recent books for details). It allowed a flexibility to create the best parts of the project by the redistribution of funds, which would have been impossible otherwise.

Quality control

- Project manager supervises craftsmen and holds periodic design reviews

- Control of quality through eyes on site, not by legal reference to paper design
- New type of contract protects all parties from litigation over innovation

Grameen model for repair

- Finance system for individual repairs modeled on the Grameen Bank
- Small loans to home-owners to undertake their own repairs
- NOT CONTROLLED BY DEVELOPER
- New code forbids profit from change orders (used to stop adaptation in buildings)

Bottom-up balance

- Small-scale funding introduces a bottom-up component of development to balance the usual top-down process
- Actually, this is the standard model in most of the developing world today
- Only smaller funding distribution can develop living urban spaces

Community budget

- Budget delegated to build and maintain public space (as used in gated communities)
- Outdoor walls, gardens, seats, paths, trees, fountains, maintained by community budget
- Drastically different from procurement process driving suburban sprawl today

In non-speculative application

- One approach: land owners finance their project, and hire a project manager to facilitate design
- Local government oversight checks that our urban rules are correctly applied to generate living geometry
- REWRITE CURRENT ZONING!

A project manager that can help to create a project with the required human qualities needs to be trained in our techniques, and to be familiar with the material that I have mentioned here. The three-way separation of powers introduced above must be strictly implemented in planning and building the project. There are distinct cases of development that follow slightly different rules, which are discussed below.

How does a developer or government build speculatively?

- Inevitable business model for today must also meet our three-way model
- Different cases require separate powers
- A. Developer works with project manager appointed by government
- B. Government must work with local NGO-appointed project manager

Finally get the geometry right!

- For one century, we have been building according to an inhuman geometry
- Blindly following the same anti-urban typologies year after year
- Wasting land and materials to create an unloved world fit only for cars

Our beloved suburbs are inhuman

- People buy into the utopian dream
- But suburban sprawl represents a toxic disconnectedness
- Isolated houses without community
- Useless front lawns and back yards
- Wrong geometry that "looks nice"

Stop massive land clearance

- Great deception: "**suburbia celebrates nature**" — no, it violates nature
- Nihilistic destruction of landscape
- Replaces nature with dead typologies
- Driven by the basest profit motive and by false images of utopian modernity
- We can make a profit, but not while killing the city or the land!

Present-day practice clears the land of native vegetation, especially in desert regions, and replaces it with lawn copied from romantic images of Scotland. It does look nice, in theory. We then waste valuable water resources to maintain all this lawn green, yet people hardly ever use the lawn for anything. Suburbia chases after an elusive image, but the reality is unsustainable. And this occurs at a time when drastic water shortages loom in the future, but reality is evidently not enough to change the images of utopian modernity reproducing like a virus.

Regenerating suburbs

- "Growing Sustainable Suburbs", Lucien Steil, N.A.S. & Michael Mehaffy, in: "New Urbanism and Beyond"
- Need massive reconstruction effort — comparable to post-war rebuilding
- Vast regions of unsustainable sprawl
- Either regenerate or abandon them!

Five steps for regeneration

- 1. Partition into pedestrian catchment regions; semi-permeable boundaries
- 2. Increase density towards centers

- 3. Create mixed-use urban centers
- 4. Mixed-use intermediate ring
- 5. Re-configure road structure for optimum pedestrian connectivity

Some practical ideas

- Abandon currently used but inhuman process of industrial development
- Adopt new guidelines for adaptive design and construction
- Among the new ideas for practical implementation is the **step-by-step decision sequence**

Efficiency strategy uses Pareto's 20/80 rule

- 20% of problems take up 80% of the time and effort
- Applied to a single complex process
- Bottlenecks in 20% or less of an algorithm cause 80% or more of the overall delays
- Focus on bottlenecks, one at a time

Prepare for drastic change

- Not necessary to run out of petroleum
- Brazil, China, and India will take most of it to maintain their oil-dependent industry and urbanization
- We need to survive an era without oil
- Only sustainable urban reconfiguration will prevent a third world war over oil

"Connecting the Fractal City"

- Chapter 6 of my book "Principles of Urban Structure", Techne Press, Amsterdam, 2005.
- Lays out theoretical framework of generating the form of living cities
- But today (in 2008) it is impossible to implement with existing zoning laws!

Codes used to create life

- DNA is coded information for all biological structure
- Creates life through genetic codes
- Same process as with urban codes
- Developing embryo uses both DNA information, and the existing geometry of the configuration at each step

Development of urban form

- Need a **good** set of codes

- Replace present modernist codes on the books with New Urbanist codes
- Further enhance design process by implementing generative codes
- Formation of healthy urban fabric will then occur naturally over time

Modernist urbanism grows inhuman forms

- Building setbacks
- Monofunctional zoning
- Separation of work from residence
- Monstrous grid street patterns
- Priority given to car geometry
- Industrial construction materials

Modernist urbanism (cont.)

- Impermeable sheer walls at street level — fundamentally hostile
- No place for pedestrian
- No shared urban space
- Garages for storing consumer junk
- Residential street as parking lot

The picture in a brochure selling model houses in a new suburban development is totally misleading. Lots of green lawn with children playing on the street looks pretty, but it is a deception. When all the garages of sprawl houses become filled with junk and boxes, cars park on the driveway and on the street. No more openness, just an ugly parking lot. Then, since the suburban street is built to the width of a highway, no child is safe on the street. Even though those streets are empty most of the day, you never know when someone will speed past and kill a child. The signs stating the speed limit are next to useless. Speed bumps all over are an admission that street design has failed, and the bumps have been added as a desperate measure after the fact. They only annoy drivers.

Even minimal "good" codes can make an enormous difference

- Begin today by implementing some sane urban codes
- For example, David Sucher's three rules for dense urban fabric
- Will solve many mistakes overnight
- Then, we can proceed with the major urban reconstruction proposed by us

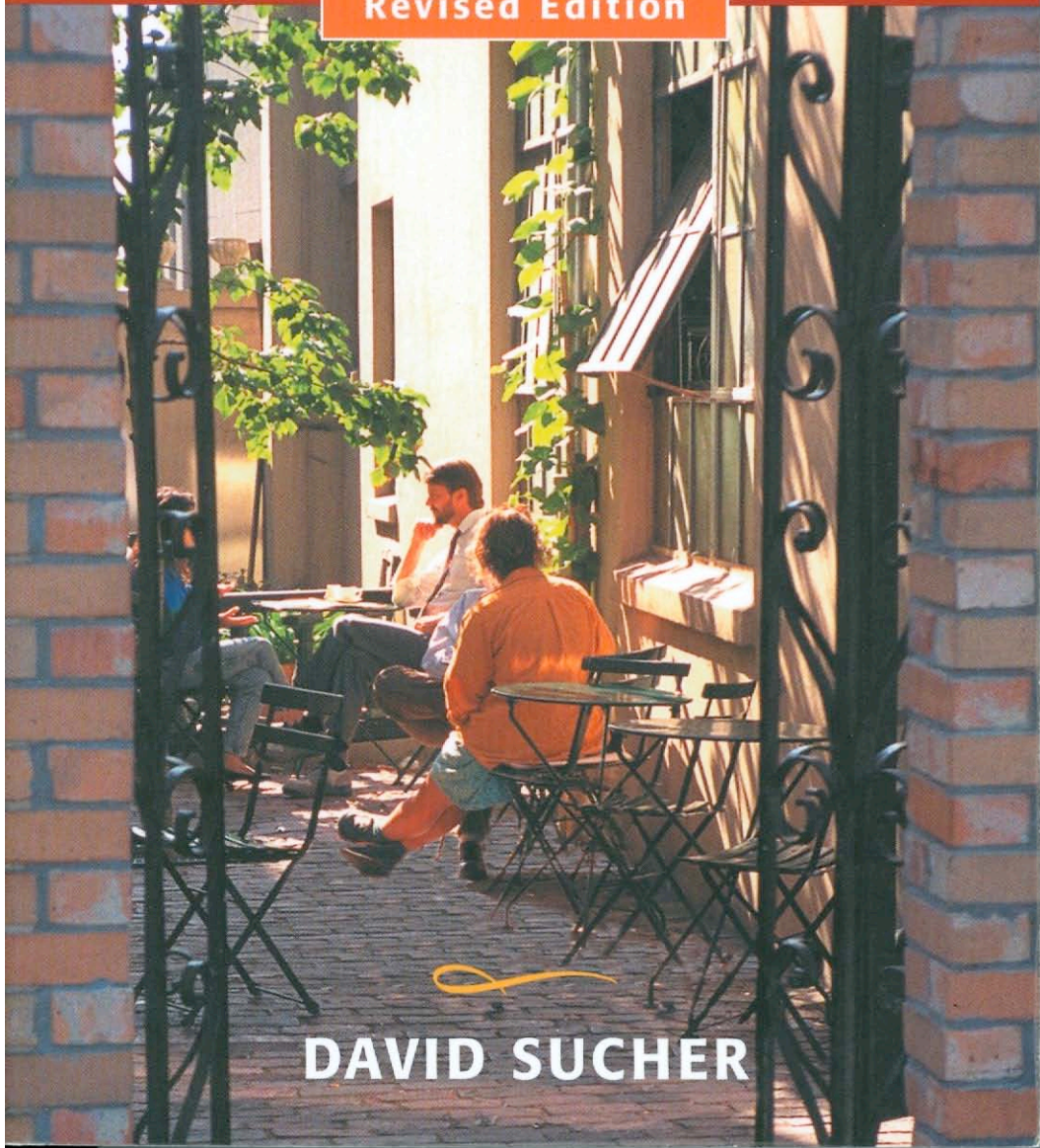David Sucher's three rules for central urban regions

- **1. Build to sidewalk (property line)**

- **2. Make building front permeable**
- **3. Prohibit parking lots in front of the building (only on-street parking)**
- From David Sucher's book: "City Comforts", Seattle, Washington, 2003

City Comforts

HOW TO BUILD AN URBAN VILLAGE

Revised Edition

DAVID SUCHER

"City Comforts"

Codes that build living fabric

- Generative codes, combined with patterns from "A Pattern Language" create living urban fabric
- For example, Pattern 167: "Six-foot balcony" — (2-meters deep)
- Would improve the lives of hundreds of millions of people around the world!

10.2. Secularization destroys public space.

Geometry creates society

- Urban space is common space
- Main function of a city
- Place of interaction between people
- Historically, public space always had a sacred quality
- Humanity relied on this space of interactions

Sacred spaces

- Spaces that are valued by the society
- Common spaces that people are willing to defend and maintain
- Sacred character of place
- Sometimes, entryway to sacred ground
- The "glue" that binds people to a place

Sacred spaces (cont.)

- Oftentimes very modest
- Can be private or public (shared)
- Are not supposed to exist today, following our secular philosophy
- In fact **they do exist**, only we are not supposed to see them!

Sacred spaces (cont.)

- Building community has to reverse the loss of spiritual values and human qualities from our society
- "Favelas and Social Housing: the Urbanism of Self-Organization", by N.A.S., David Brain, Andrés Duany, Michael Mehaffy & Ernesto Philibert-Petit, published in a separate book

Modernism erased sacred spaces

- Modernist architects turned with a vicious hatred against sacred spaces

- Their anti-religious credo: "There is no such thing as a sacred space!"
- Goes hand-in-hand with modernist replacement of religion with its own image-based dogma

Spaces that repel humans

- An urban geometry reinforced by structures that prohibit connection to the transcendental
- Fanatical insistence of machine, i.e. non-human aesthetic
- Geometry has no shared meaning
- Alien imposition on the environment

Sacred spaces today?

- We have few sacred spaces today
- Therefore, there is no "glue" to hold the contemporary city together
- Guaranteed absence by our planning codes, legislated deliberately
- They would be illegal to build now
- Have to fight against inhuman zoning

We have forgotten…

- All settlements in the past several millennia, were held together with sacred spaces
- Even in favelas today, there exist spontaneously created sacred spaces
- Minor or major urban spaces that are valued by nearby inhabitants

10.3. Spiritual architects

Rediscovering the sacred

- Many traditional architects continue to use timeless methods of building
- Ignored by the media and academia
- Some architects in the West have re-invented these methods
- Outgrowth of "new-age" spiritual movement of the past few decades

Spiritual western architecture

- Examples: Tom Bender (U.S.A.), Christopher Day (Britain), and many others around the world
- Their architecture is highly sensitive
- Those architects work on connectivity with human beings and the universe
- Successfully create life in buildings

Phenomenology

- Effects are perceived by human senses
- These architects are responding to REAL forces in the environment
- Since we don't know how to fully explain the connective process of design, it remains mystical

Premature explanations

- When we don't understand the mechanisms for something we observe, we usually invent a mythology for it
- To the scientific world, this makes the phenomenon itself doubtful
- But sometimes it takes centuries to gain a better understanding

Consensus design: socially inclusive processes

- Christopher Day practices architecture that connects us to the sacred
- He describes his process in: "Consensus Design", Architectural Press, Oxford, 2003
- Same process as our model uses to connect with the transcendental realm

"Consensus Design"

Design grows out of site

- Walk around with users to perceive positioning of forms and paths
- Sensitive to nature and site's geometry
- Trace plan on paper, then build clay or plasticine model of forms on top
- Use human feelings to judge form and adjust to find optimal possibilities

Conditions for connecting

- An important lesson from spiritual architects, especially for scientists!
- Human qualities help in connecting to a higher state of being, better urbanism
- Killed by industrialization and the blind worship of the machine culture

10.4. Legalizing codes.

A planning coup d'état

- After the Second World War, modernist urbanists quietly took control of the planning profession
- They changed the urban codes to guarantee that all cities evolved towards modernist typologies
- Tremendous victory for urbanicides

Planning codes

- Were written by lawyers into law after the Second World War
- Now those laws tie the hands of adaptive architects and urbanists
- Illegal to build humanistic structures
- No way for urbanists to change the codes, because of the state apparatus

Inhuman urban codes

- Killed the pedestrian street
- Made it illegal to mix urban functions
- Inhuman zoning is not reformable
- Will have to be ignored (which is illegal), or be totally rewritten to build or rebuild human environments

James Howard Kunstler believes that our suburban sprawl is unsustainable, and will have to be abandoned with the end of cheap oil. In his nightmare scenario of societal breakdown, there is no more state structure capable of maintaining law and order, let alone enforcing these stupid urban codes. Do we have to come to that point to substitute

the codes on the books today with city-regenerating codes? Illegal or not, people will eventually have to abandon those codes and replace them with New Urbanist codes.

1933 — a fateful year

- Le Corbusier largely wrote the "1933 Charter of Athens" on board the ship "Patris" cruising the Mediterranean from Marseilles to Athens

- Codified antisocial hatred of traditional city life into a set of geometric rules

- Implemented by many governments

"The New Charter of Athens"

- Recently, a group of my friends has written a new Charter of Athens

- — European Council of Town Planners, 2003

- Proposes a sustainable network urbanism oriented towards human-scale activities and wellbeing

Modernist zoning

- Modernist planners were invited to take over the world's urbanism

- Governments and corporations all swallowed the deception of "progress"

- Turned control of building over to a bunch of dangerous urbanicides

- Those, in turn, imposed their ideology

Modernist takeover

- When the modernists came to power they re-wrote all the planning laws

- They solidified their power by using the established legal system

- First priority of anti-humanist zoning laws was Le Corbusier's hysterical call to "kill the street!" (Lecture 8)

Modernist architects and planners commandeered the legal system to express their own narrow ideology. We need to change our planning laws. Architects and urbanists cannot achieve this: it has to be legislated. Every government has to replace their planning codes, and to do this as soon as possible. Andrés Duany offers his solution, the Smart Code (a form-based New Urbanist code) free on the internet. Christopher Alexander's results are available in his books. Our codes do not impose a form, they establish a process, which produces practical results that are uniquely adapted for each location.

Conclusion

- Urbanicides solidified their takeover of urbanism by co-opting the legal system

- Since then, no real change is possible

- We continue to reproduce inhuman urban typologies, BECAUSE IT IS ILLEGAL TO DO OTHERWISE