Facultad de Arquitectura, Universidad de San Carlos
GUATEMALA, September 2012
David Grierson “How do we begin again?”

Architecture & Ecology

New Masters Course (2013/14)

Partnership between the University of Strathclyde Glasgow & the Cosanti Foundation, Arizona, USA

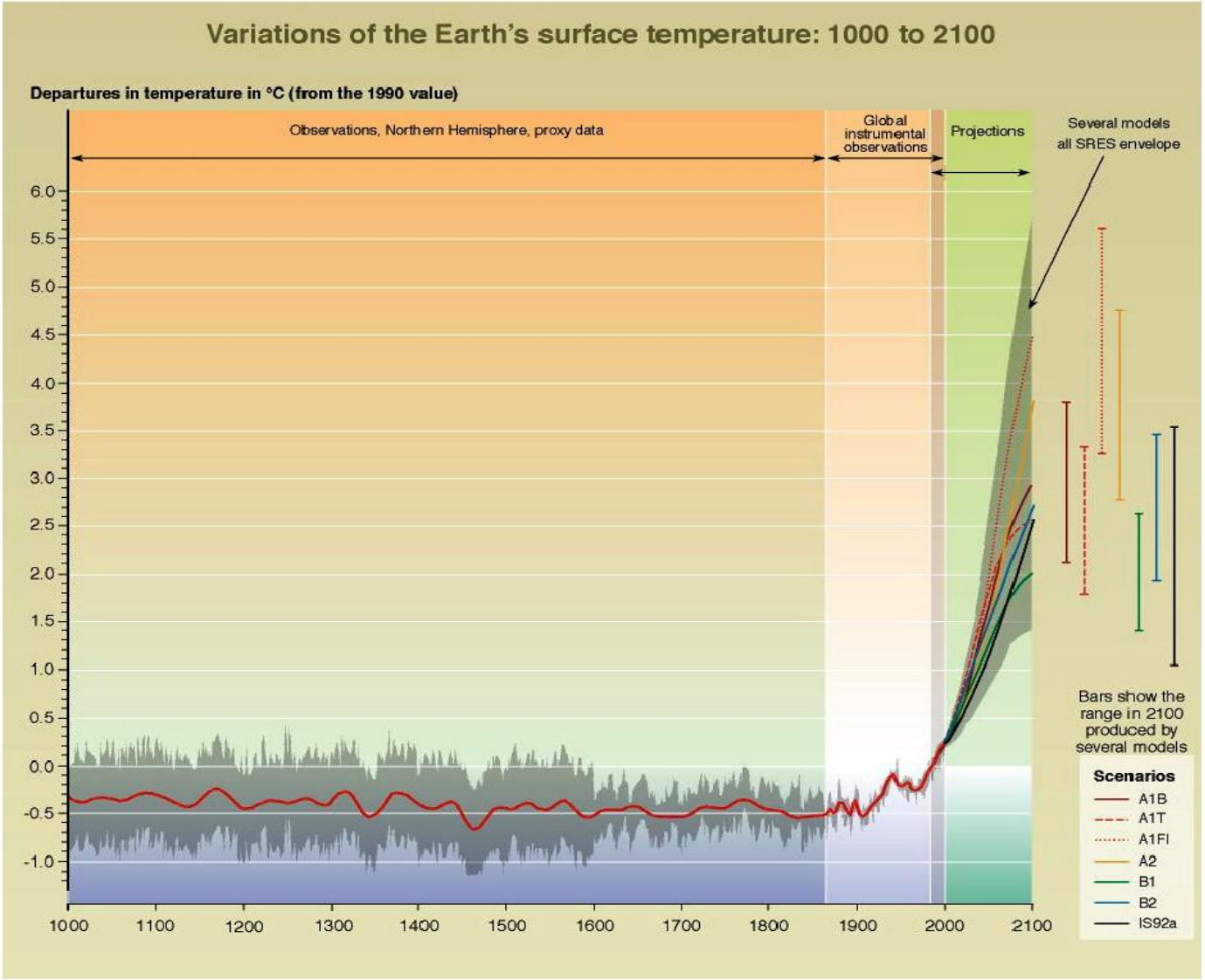
P = 7,000,000,000 + (2012)

P = 9,000,000,000 + (2030)

Numbers

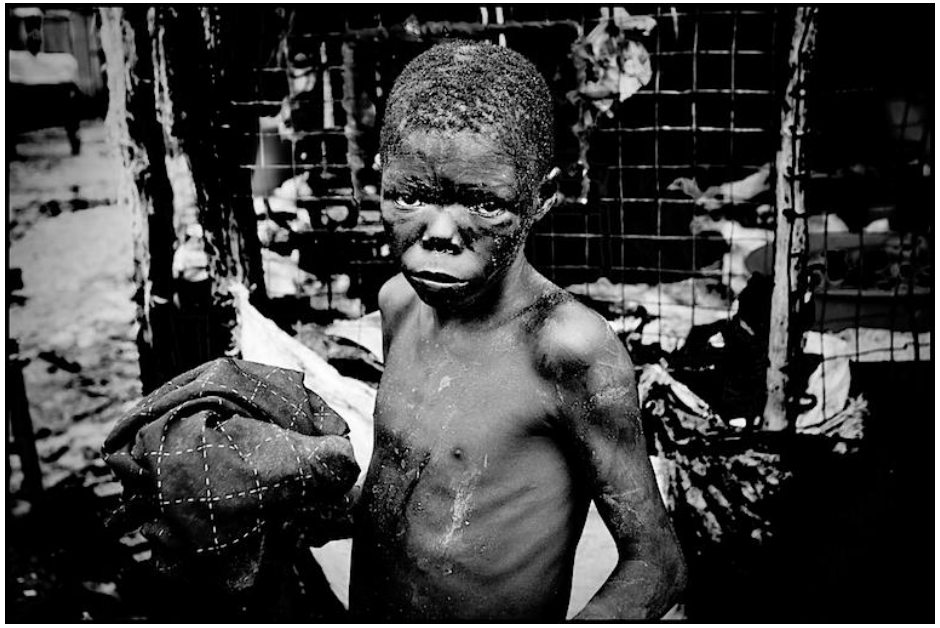
- 40 billion metric tonnes of CO2 (actual 36 in 2012)
- Estimated 27 billion tons (2030)
- USA t 5 billion (2012)/ per capita 19.78
- Guatemala t 11 million (2012)/per capita 0.9 (increase of 78% since 1996)
- Kenya t 11 million (2012)/per capita 0.3
- Target per capita by 2030 0.33
- My own is more than 8 metric tonnes per year

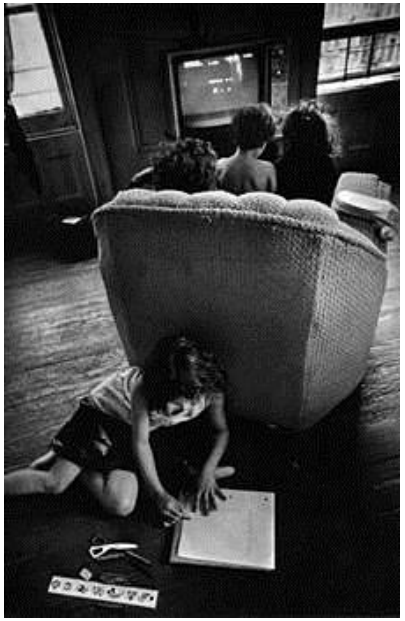
Why is this important?



Water Polo in Calcutta, 2007

Drought in India: a well in Gujarat, 2003

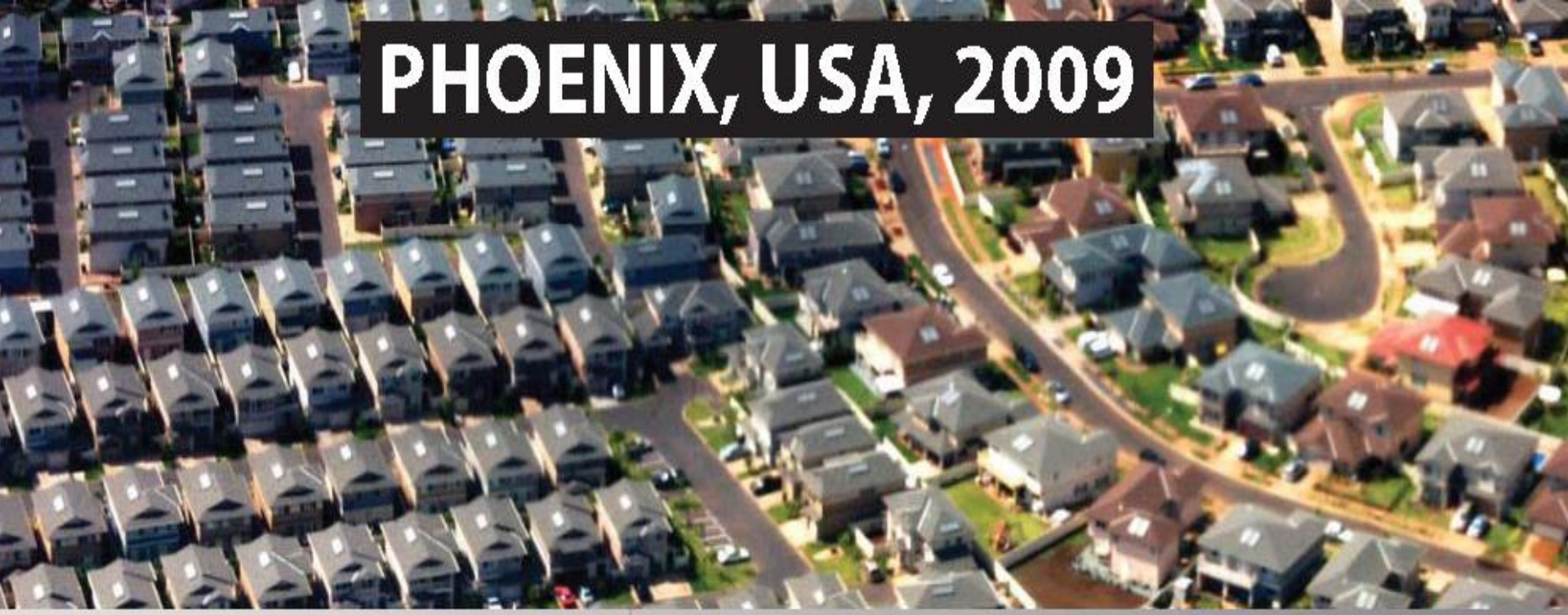




Child Poverty in Kenya, China and Scotland

Riots against Austerity Measures in Athens

In some parts of the world buildings account for 50% of all CO_2 emissions



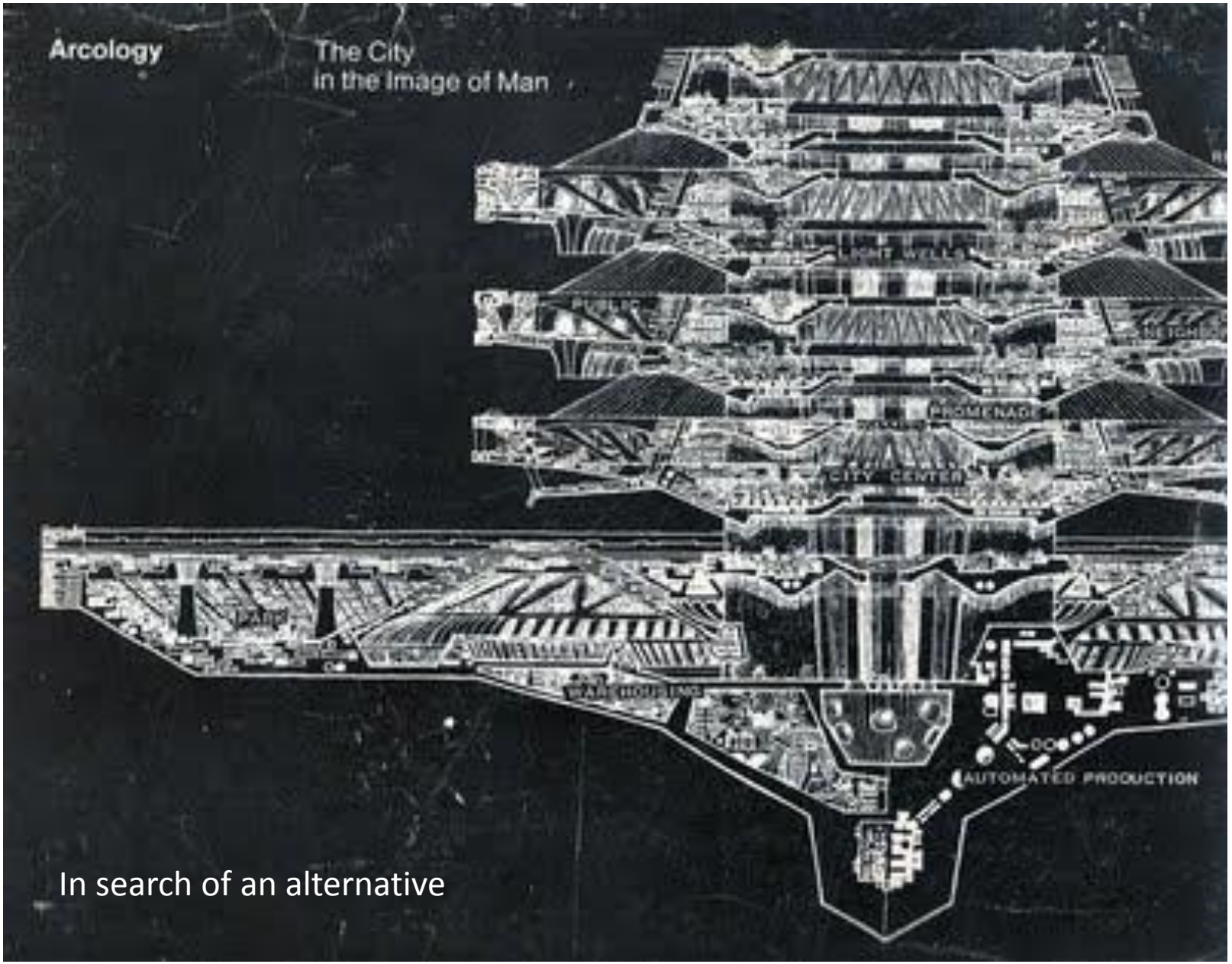
ngs are half of the problem. What is the other half?

Crisis of the Spirit

Life Changing

- **The problem is of hypocracy**
- **I could design zero carbon buildings but my lifestyle is not ´sustainable´ so I´m only responding to half the problem**
- **Not a call for abundance but for austerity (not more…but less)**
- **Not a confrontation with others but with myself**
- To meet target I need to reduce my own emissions dramatically
- **I** need to change
- But **how?**

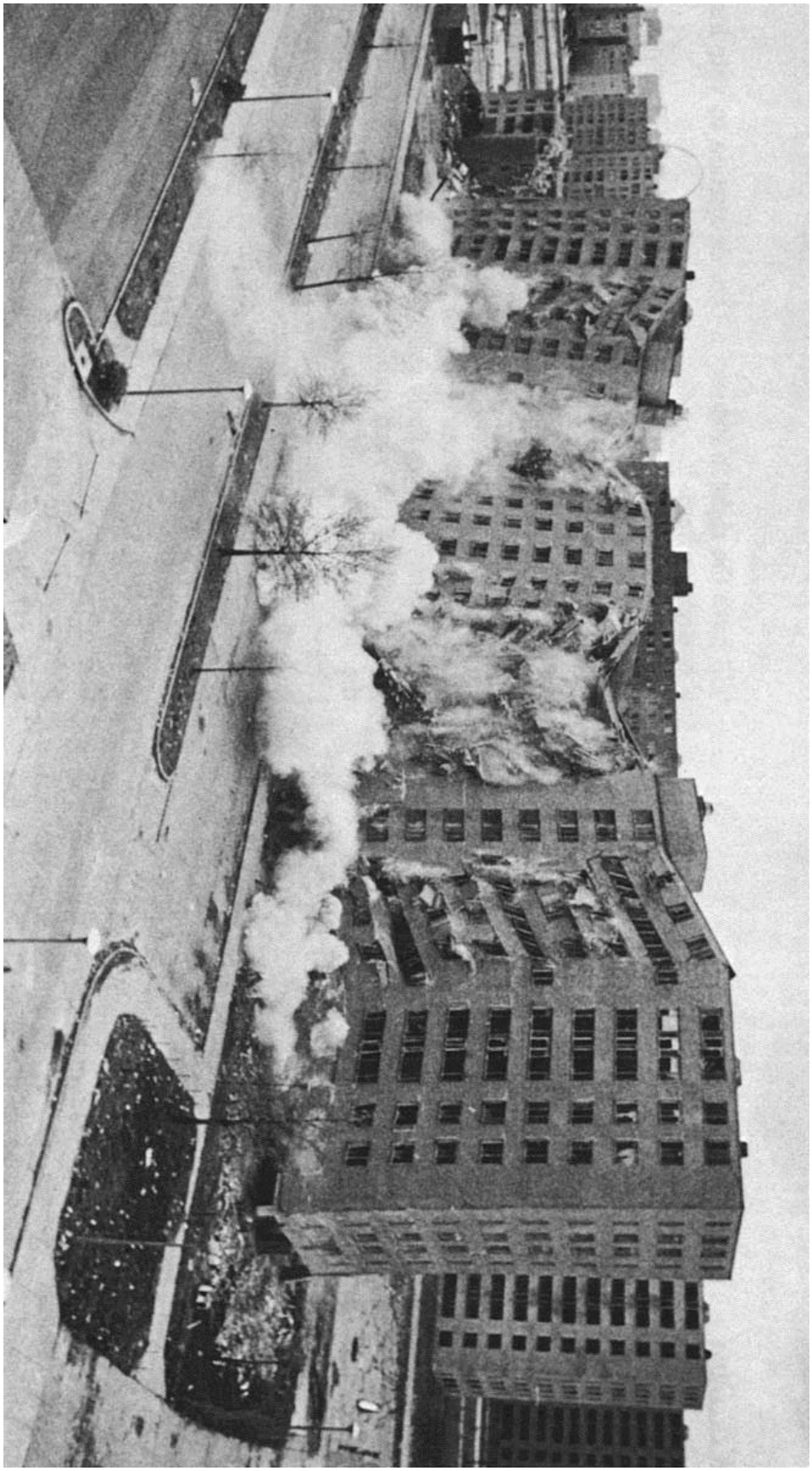
1968



In search of an alternative

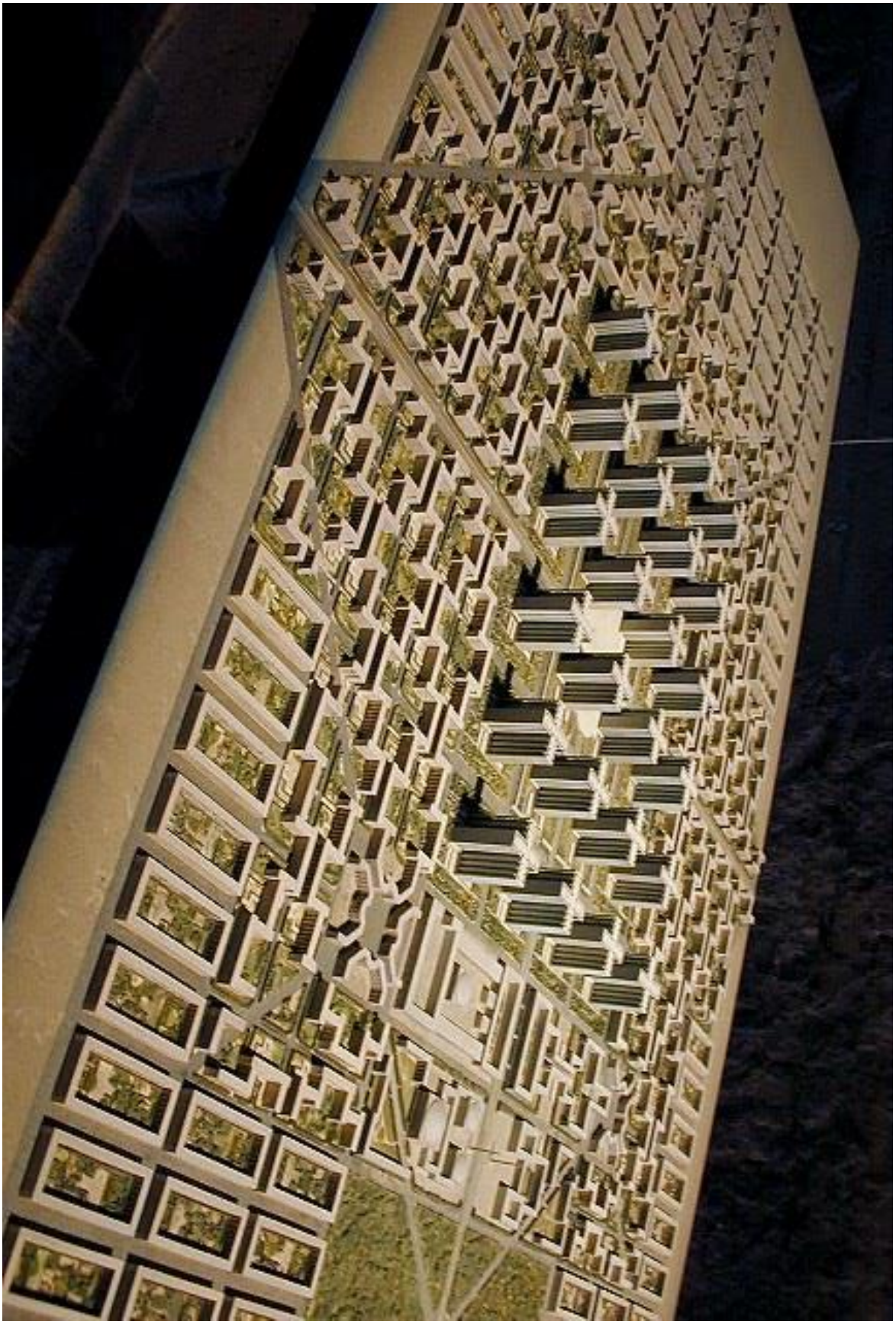
City in the Image of Man, 1969

April 1970 – First Earth Day Protest, NY

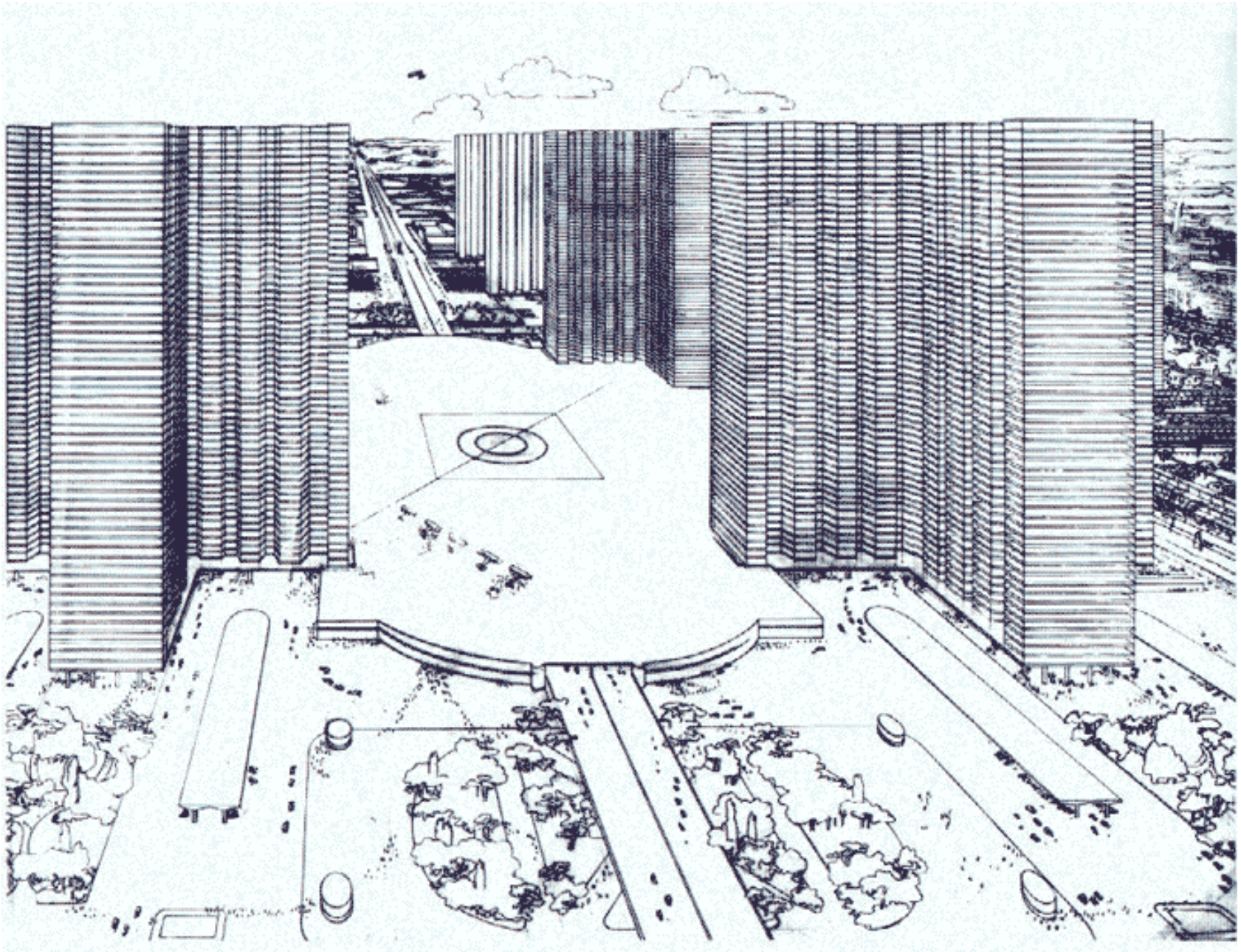


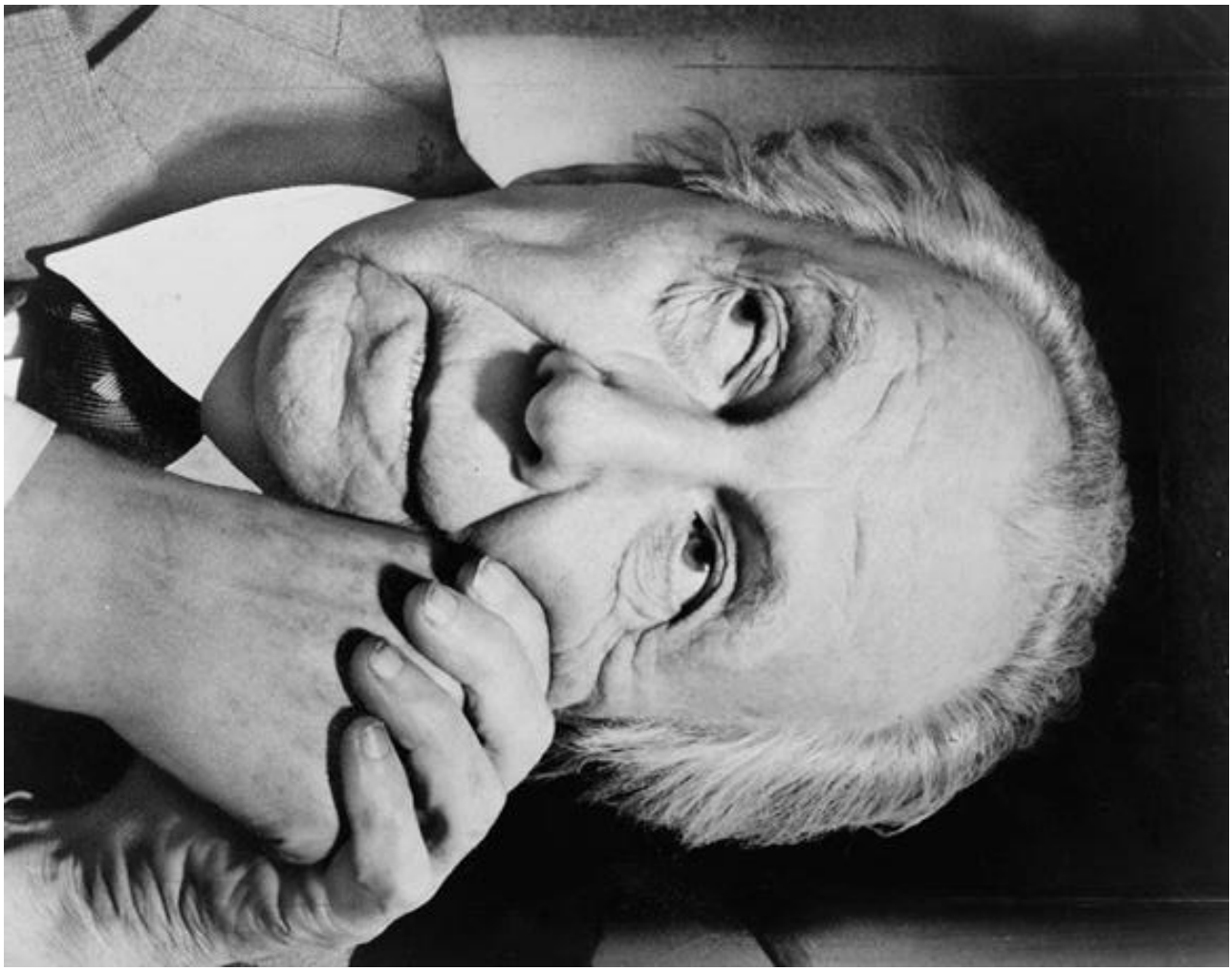
March 1972 – Pruit Igoe, St. Louis, Missouri

Le Corbusier, 1887 - 1965



A Contemporary City of Three Million, 1922



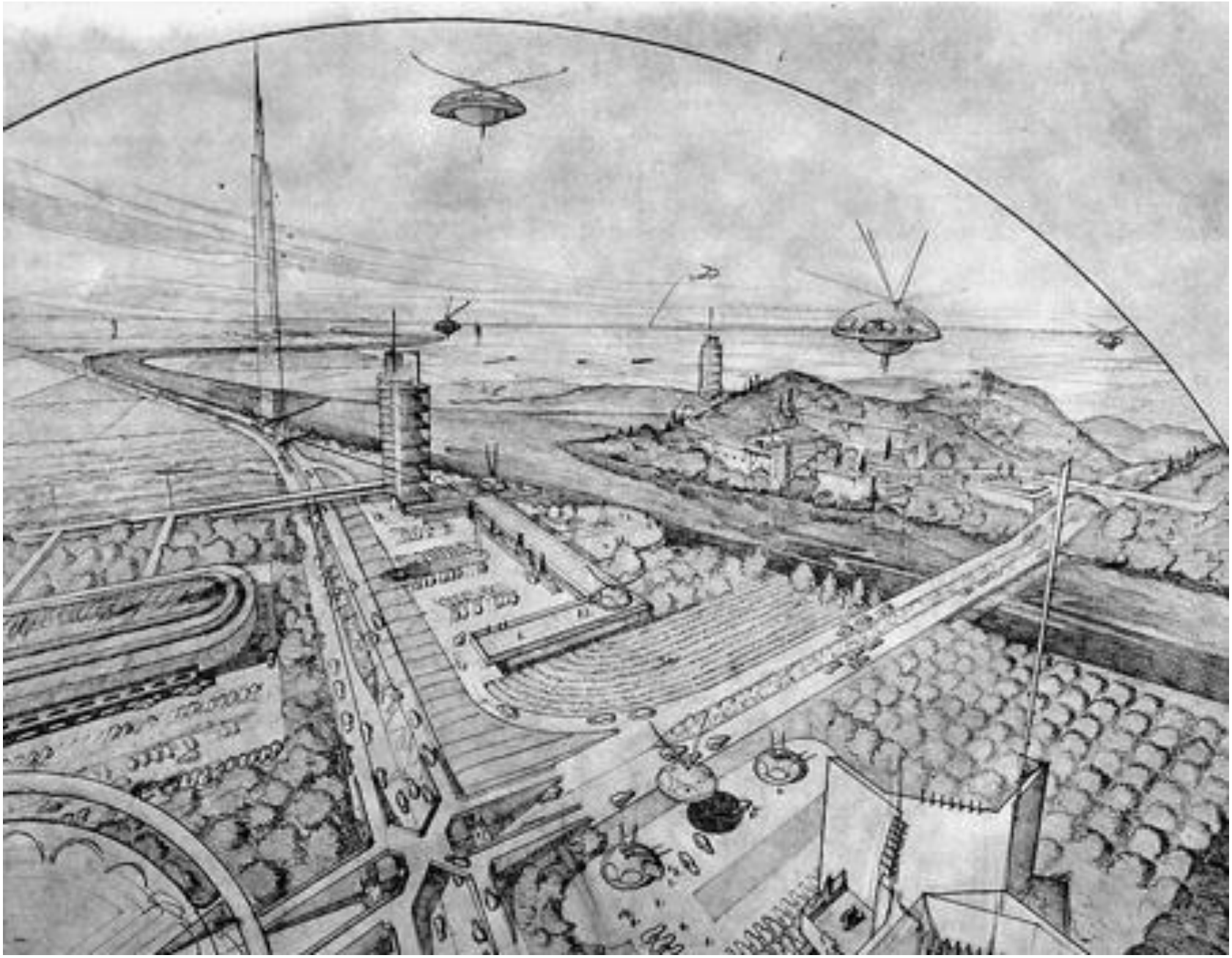


Frank Lloyd Wright, 1867 - 1959

Taliesan West, Arizona

Broadacre City, 1932 - 1959

Elizabeth Mock “The Architecture of Bridges”, 1948



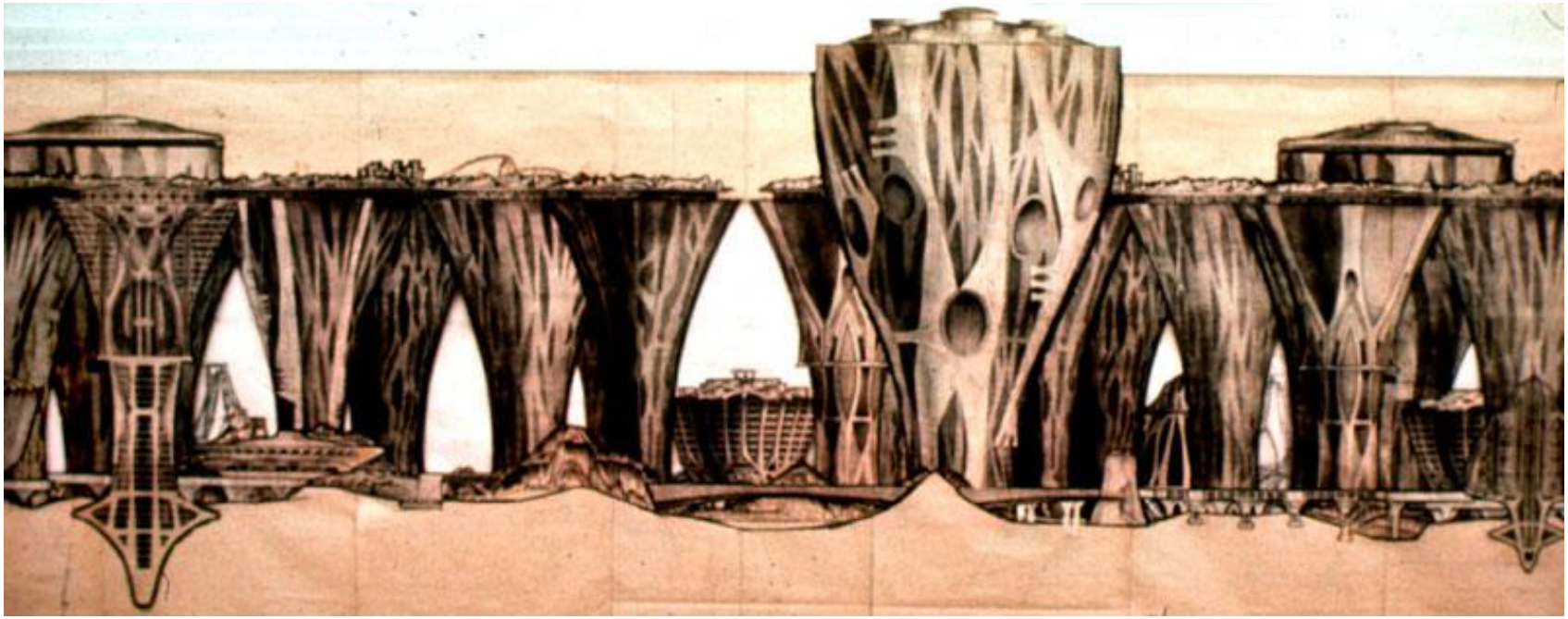
Taliesan West, Arizona

Paolo Soleri, born 1919

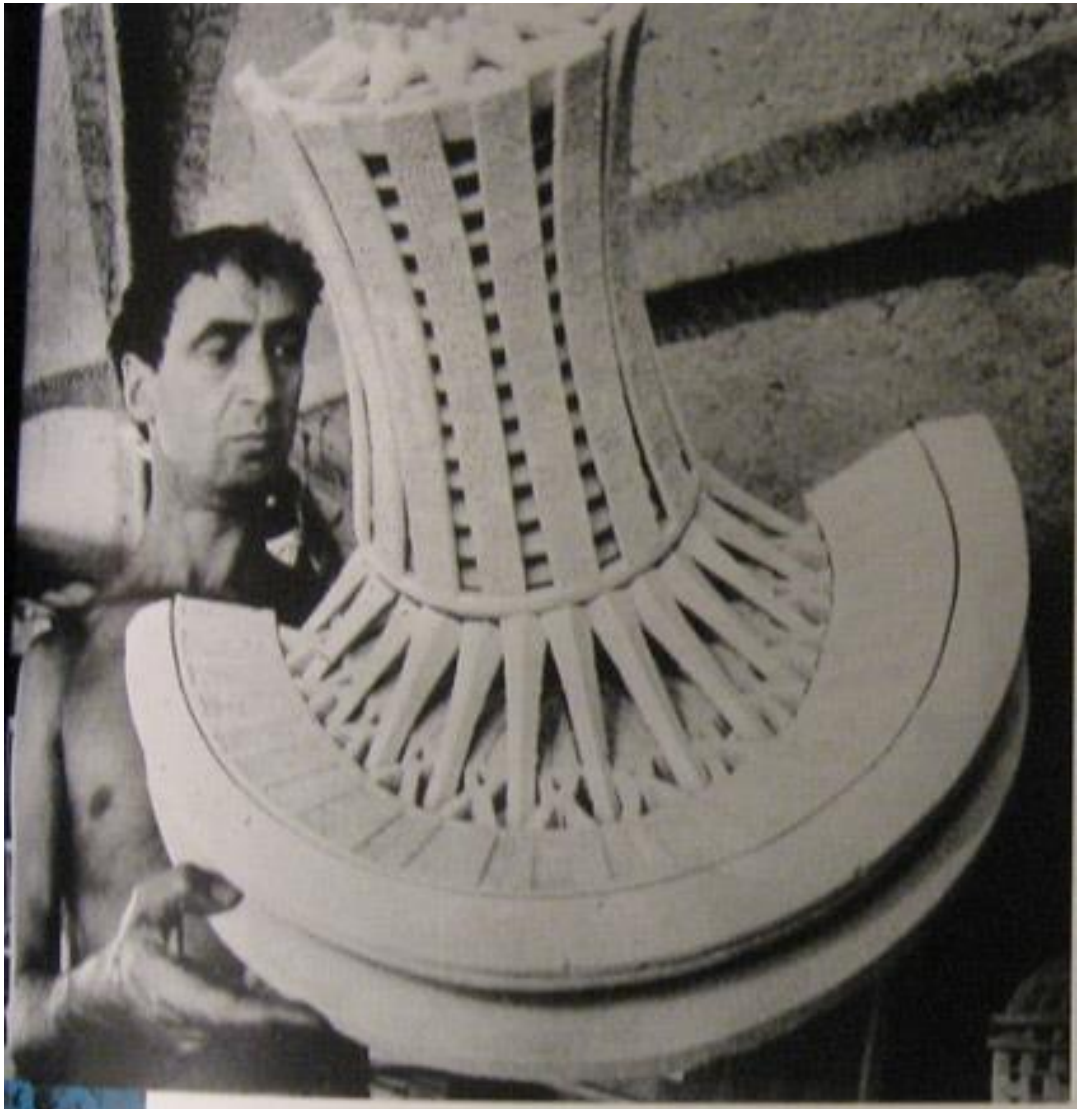
Cave Creek Dome House, 1949

Ceramica Artistica Solimene, Vietra sul Mare, 1958

Mesa City, 1955

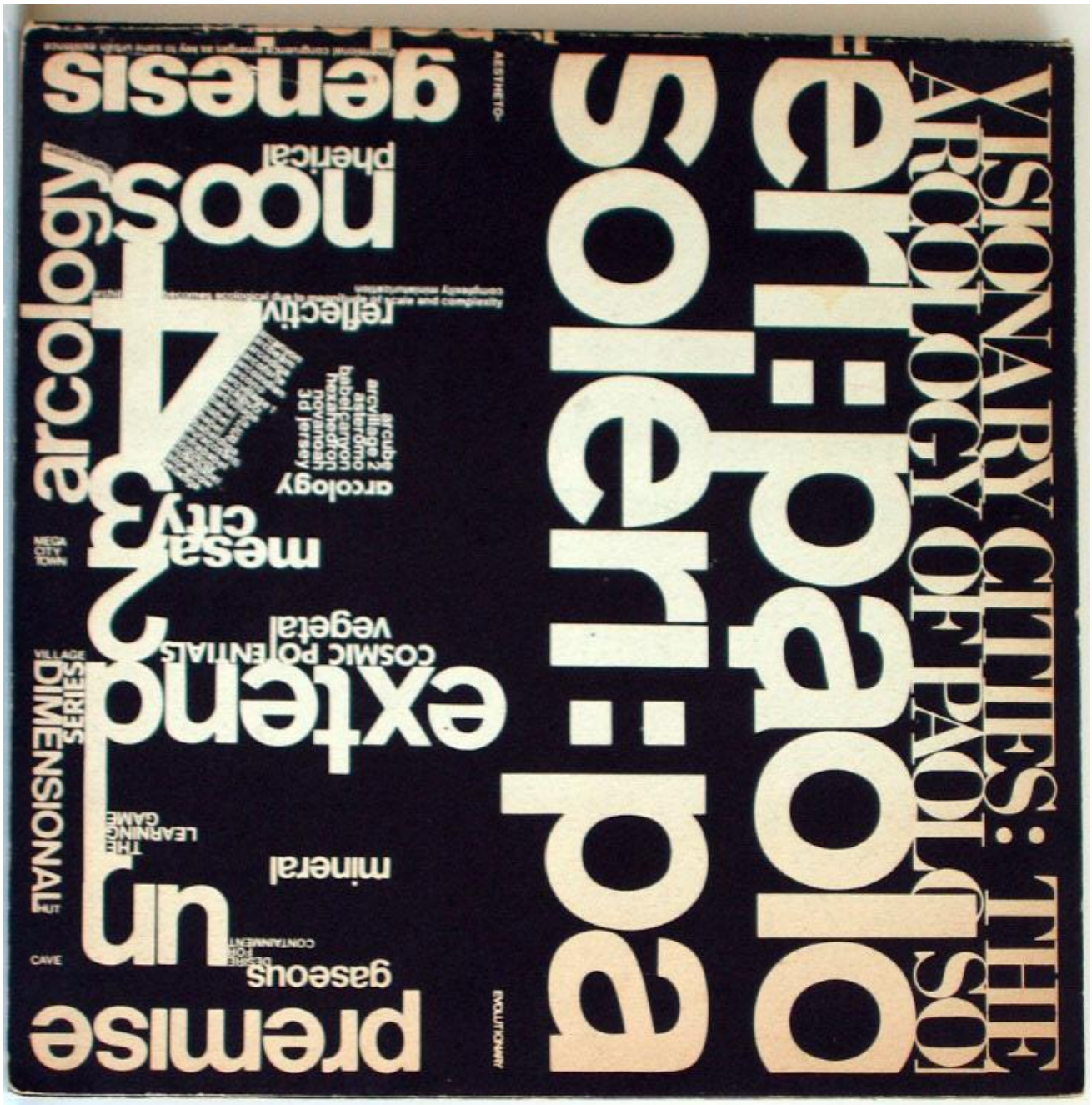


Higher Learning Center, early 1960s



Free forming soft cities.

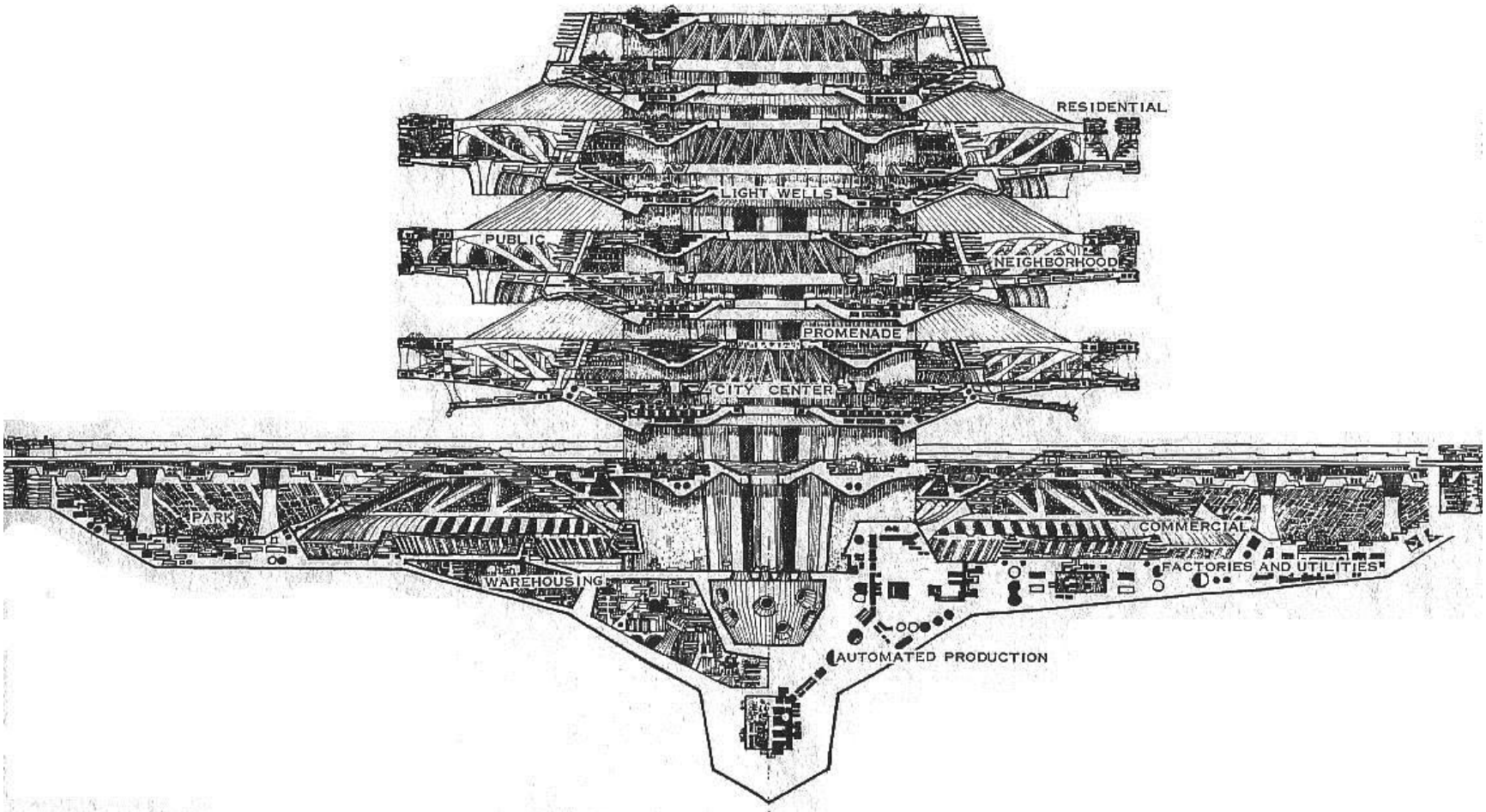
ABOVE: *Paolo Soleri*, Visionary Cities, *1970*.



Exhibition, Corcoran Gallery, 1970

Exhibition, Corcoran Gallery, 1970

Workshops at Cosanti, early 1970s

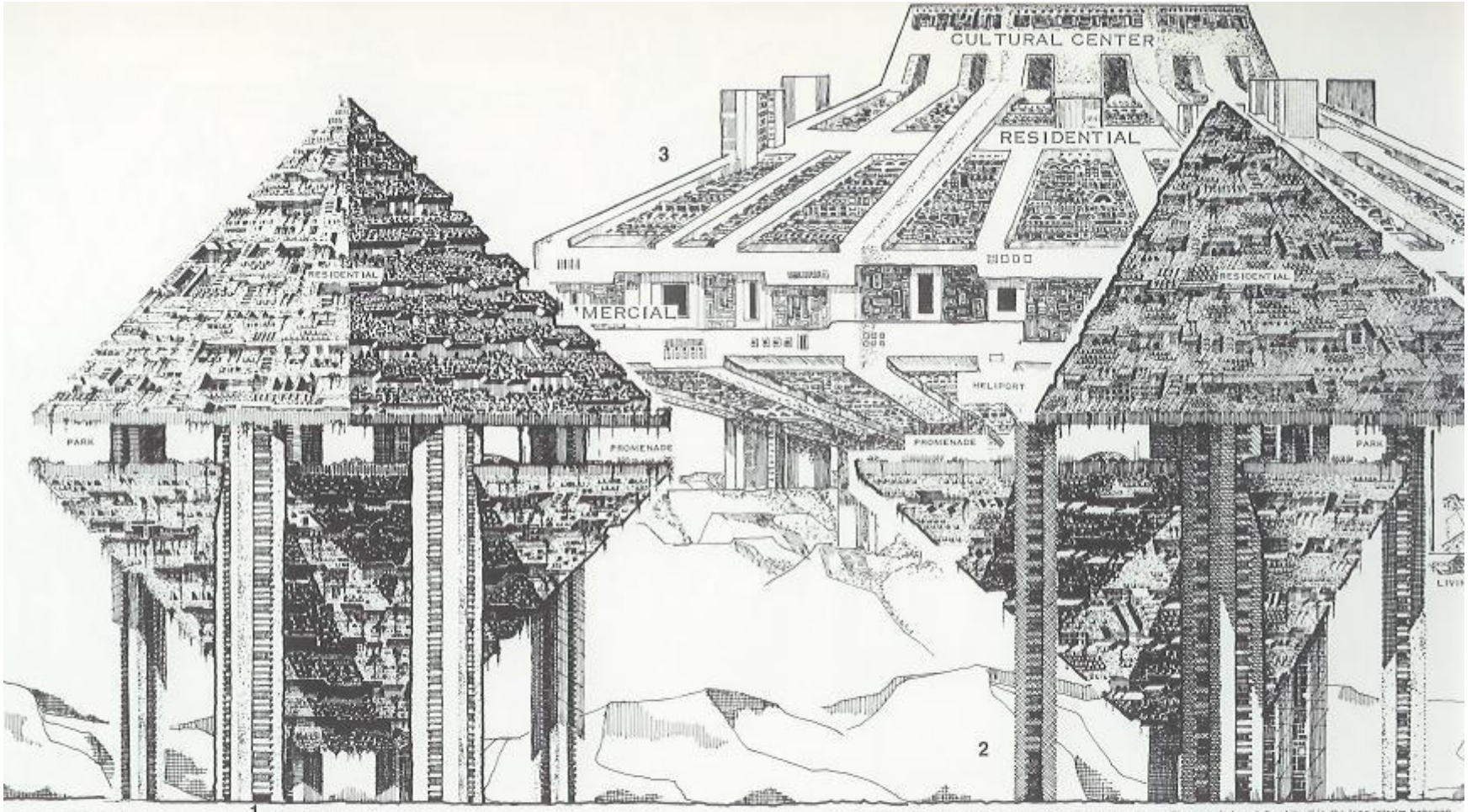


9.Babel IIB

Babel IIB (Flat land)	
Population	520,000
Density	662/hectare; 268/acre
Height	1,050 meters
Diameter of structure	3,160 meters
Surface covered	778 hectares; 1,920 acres

1,2. Section and elevation: scale 1:10,000

Babel IIB, 1969



Hexahedron

1

Hexahedron
(Any topography)

Population	170,000
Density	2,964/hectare; 1,200/acre
Height	1,100 meters
Side	1 kilometer
Surface covered	57 hectares; 140 acres
1. Elevation: scale	1:5,000
2. Side elevation: scale	1:500

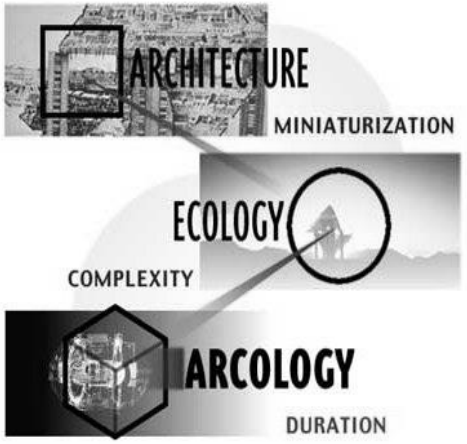
Comparative Arcology

Babel IIC	
Population	340,000
3. Elevation: scale	1:5,000

The danger of the pseudo-organic is that man can only metaphysically be defined as one of the many cells combining in the social body because man is not morphologically, seasonally, functionally like a biological cell. The micro-environment that allows the cell to act is a reflection on and a determinant of the cell's own structural and functional characteristics. Exclusive of these characteristics are sight, hearing, smelling, feeling, unpredictability, and so on. It is not that a cell has none of these characteristics but that those that it has are only approximately comparable to the corresponding ones in a complex organism. Then, for instance, to blow up an artery and pretend to run people in it as if they were blood cells is not very logical. It is to take form at face value and miss the substance of the problem and its predicaments.

The organic has defined itself in the long interim between the mineral and the mental, and the beauty of its power is somehow contained there. The organization of the inorganic to construct a container to the condition of man is thus turned upon a specific and not organic structurality, a postorganic structure and indeed a pseudostructure compared with the miraculous order of the mineral and of the living. This is why such pseudostructures, purely functional and always on the threshold of obsolescence, must find redemption in form, the aesthetic side of compassionate man. Morphologically and structurally, Hexahedron is, like Arcube, a pseudocrystal. Its validity would be in the high human and emotional standard texturing it.

Hexahedron, 1969



"The natural landscape is not the apt frame for the complex life of society. Man must make the metropolitan landscape in his own image…The only realistic dimension toward a physically free community of man is toward the construction of truly three-dimensional cities."

Soleri 1969

arcology model

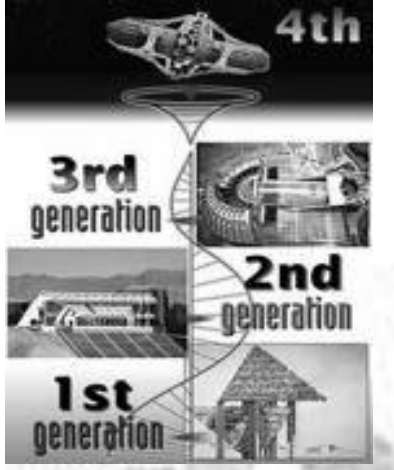
•**An arcology** (architecture + ecology) **takes the place of the natural landscape by constituting a new kind of topography** (a "neonature") **that:-**

•is a complex, miniaturized, multi-level configuration

•recognises the need for the radical re-organisation of urban sprawl into dense, integrated, compact three-dimensional urban structures

•contains all the elements that make the physical life of the city possible

•pre-figures the possibility of the *energy city* by promoting material recycling, waste reduction and the use of renewable energy sources as viable components in a coherent sustainable strategy aimed at reducing the environmental impact of the entire urban system



"The most common mistake about my work is the assumption that years of introspection have produced a take it or leave it package…rather I am proposing a methodology and at the same time trying to illustrate it ."

Soleri 1981

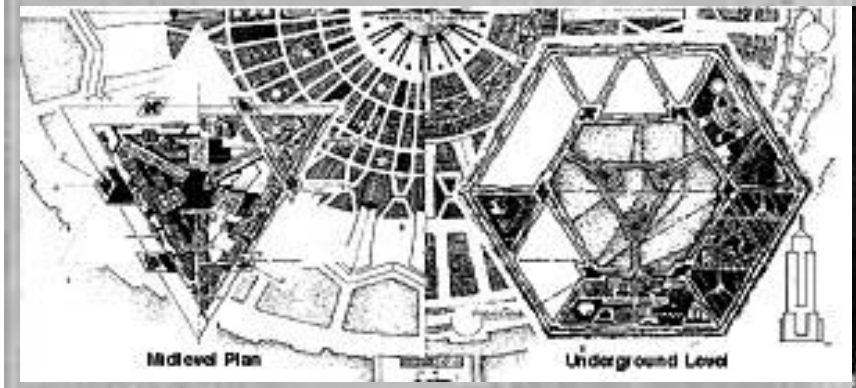
generations

The development of the arcology concept

- **Mesa City Project** (1958 - 67) - theoretical regional plan for two million people on a 55,000 acre isolated, pre-flattened desert plateau
- **First generation arcologies** (1969) - published in *City in the Image of Man.* Thirty structures designed for different environmental contexts (oceans, deserts, mountains and canyons) and varying in size, shape and form
- **Second generation** (1975) - The *Two Suns* (or "energy city") concept. Structures split in half exposing the core to the sun
- **Third generation** (1980) - Habitats for shifting populations
- **Fourth generation** (1984) - *Space for Peace*

first generation arcology

- Thirty arcologies were designed from 1963 - 69.
- Consisted of 2 groups - 'free-form' *Dionysian* & the simple geometry of *Apollonian*

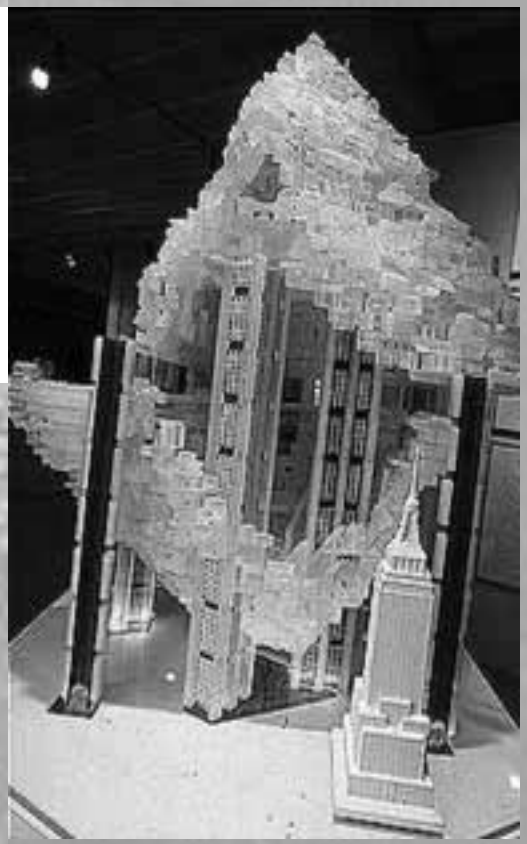


Hexahedron plan

Population	170,000
Density	2,964/hectare
Height	1,100 metres
Side	1 kilometre

Comparative densities (1969)

Mexico City	22/hectare
Paris	264/hectare



Hexahedron model

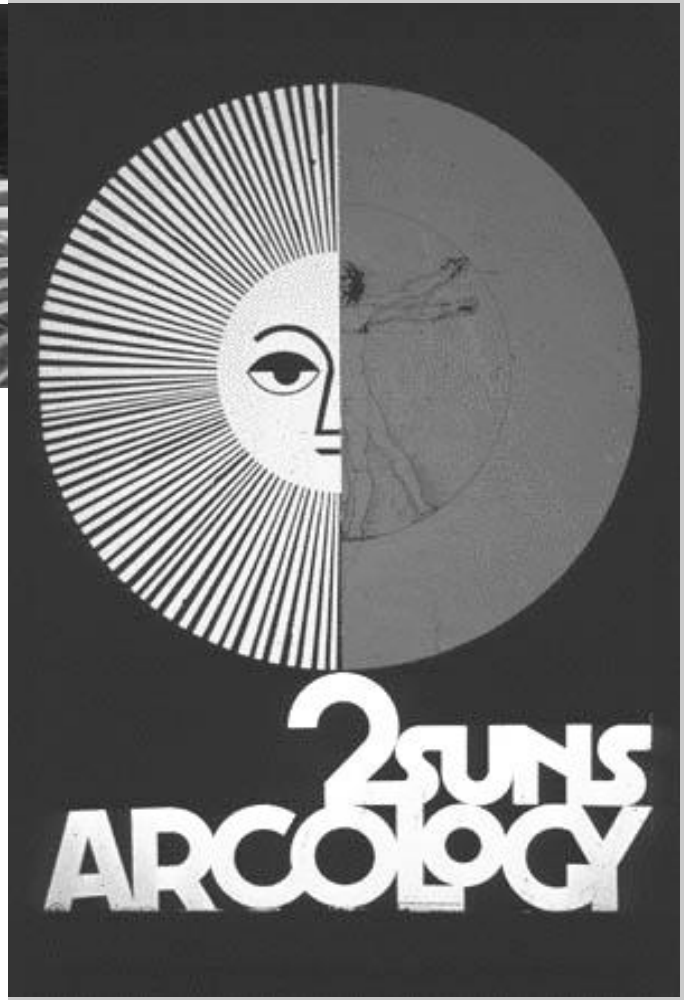
second generation

Climate Zone, Air Dam, India Village, Maryland **and** ***Regina*** **form of the urban structure including south-facing greenhouses - designed to maximise use of solar energy & reduce dependence on external energy sources.**

Energy city

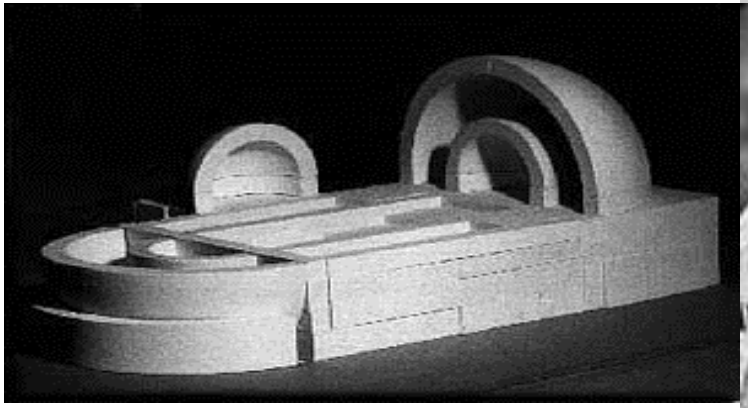
Two Suns (in response to the growing energy crisis of the mid-70s) **described related architectural effects which collectively (within the "urban effect") offer a response to many of today's environmental problems:-**

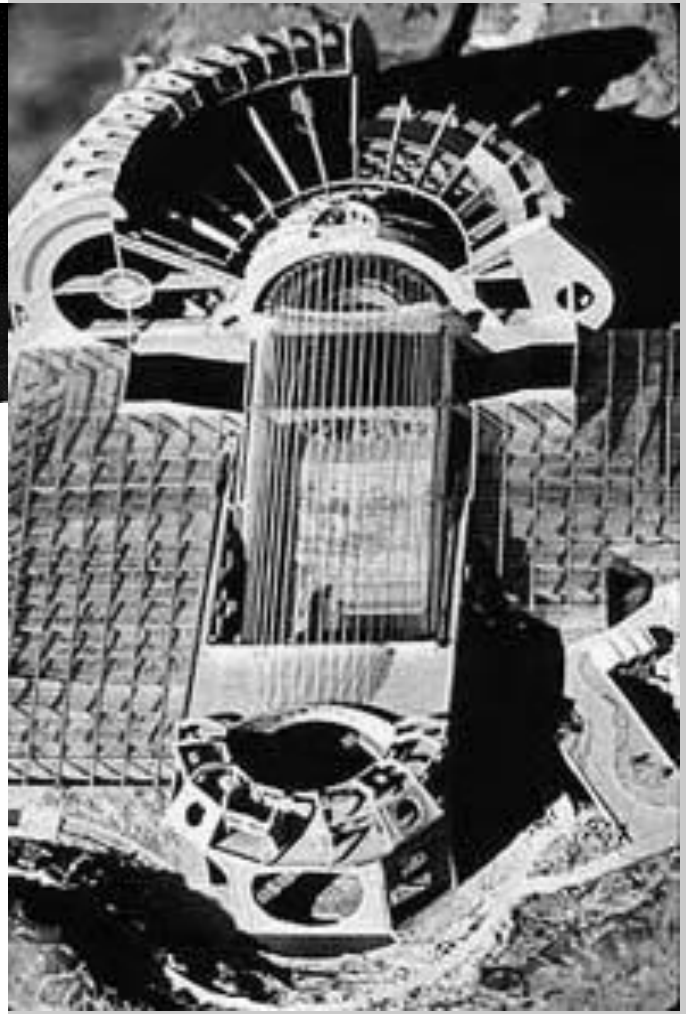
- **THE GREENHOUSE EFFECT**
- **THE HORTICULTURAL EFFECT**
- **THE APSE EFFECT**
- **THE CHIMNEY EFFECT**
- **THE HEAT SINK EFFECT**



early 80s - package the combined effects of 2G into modular and standardised structures designed to respond to environmental, climatic, technological and social change

third generation





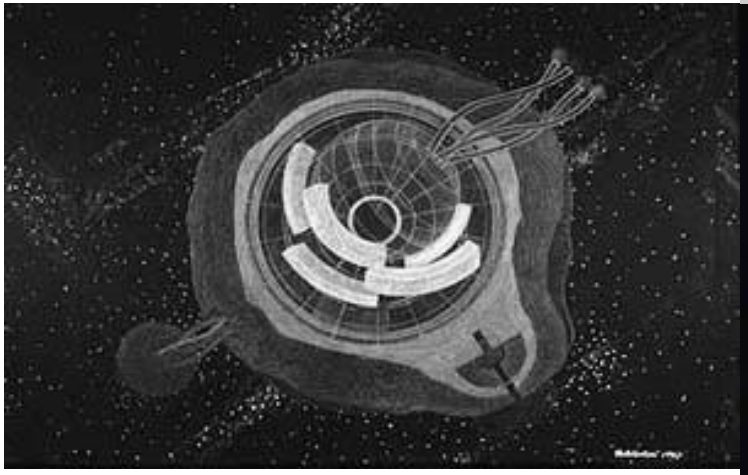
Valetta Spring Complex

Apse form **became the generating structure as a passive solar device. It has inherent strength, envelopes space and becomes the anchoring element for shading/sheltering membranes attached via a tensile mechanism. By adapting the space and function of the prototype the structure could be adapted to serve human population shifts of various kinds including:-**

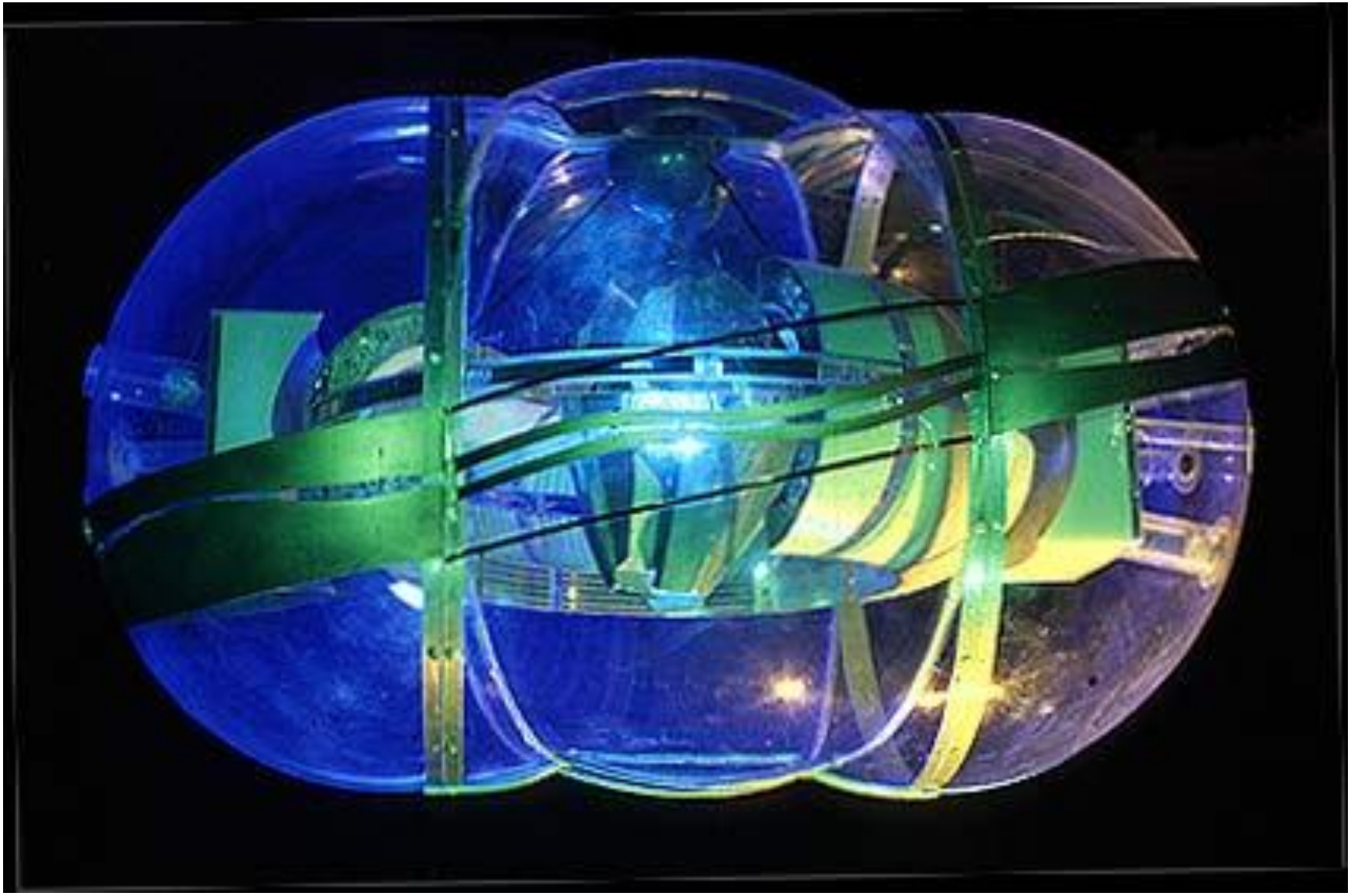
- **MIGRATION - OLD TO NEW SETTLEMENTS**
- **MIGRATION CAUSED BY CLIMATIC CHANGES**
- **POLITICAL REFUGEES**
- **THE COLONISATION OF SPACE**

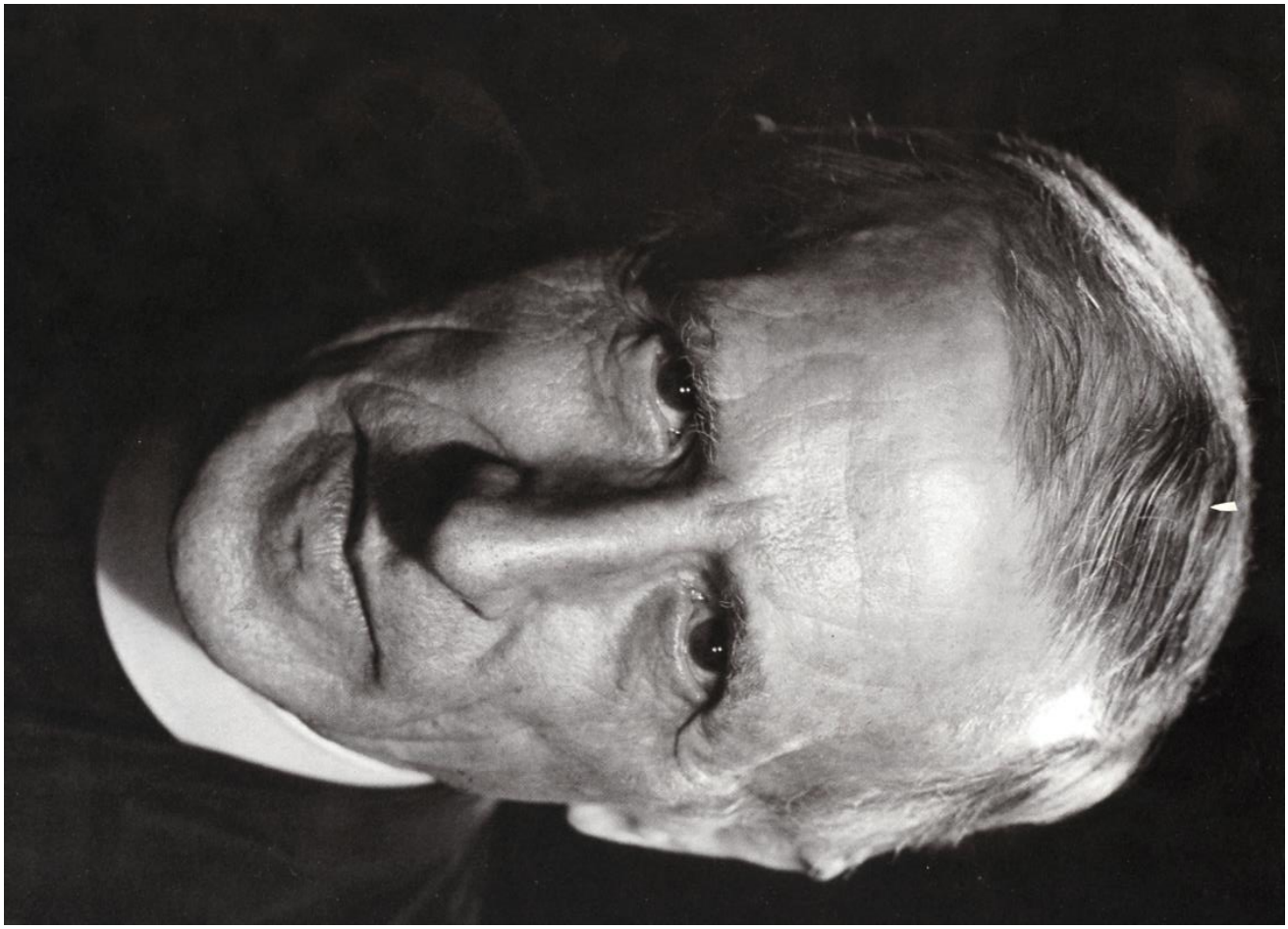
fourth generation

Space for Peace **proposed a series of space cities or colonies** (with names like *Euclidean, Urbis et Orbis, Ovum II and In Orbit)* **as testing grounds for the eventual "urbanisation of space".**

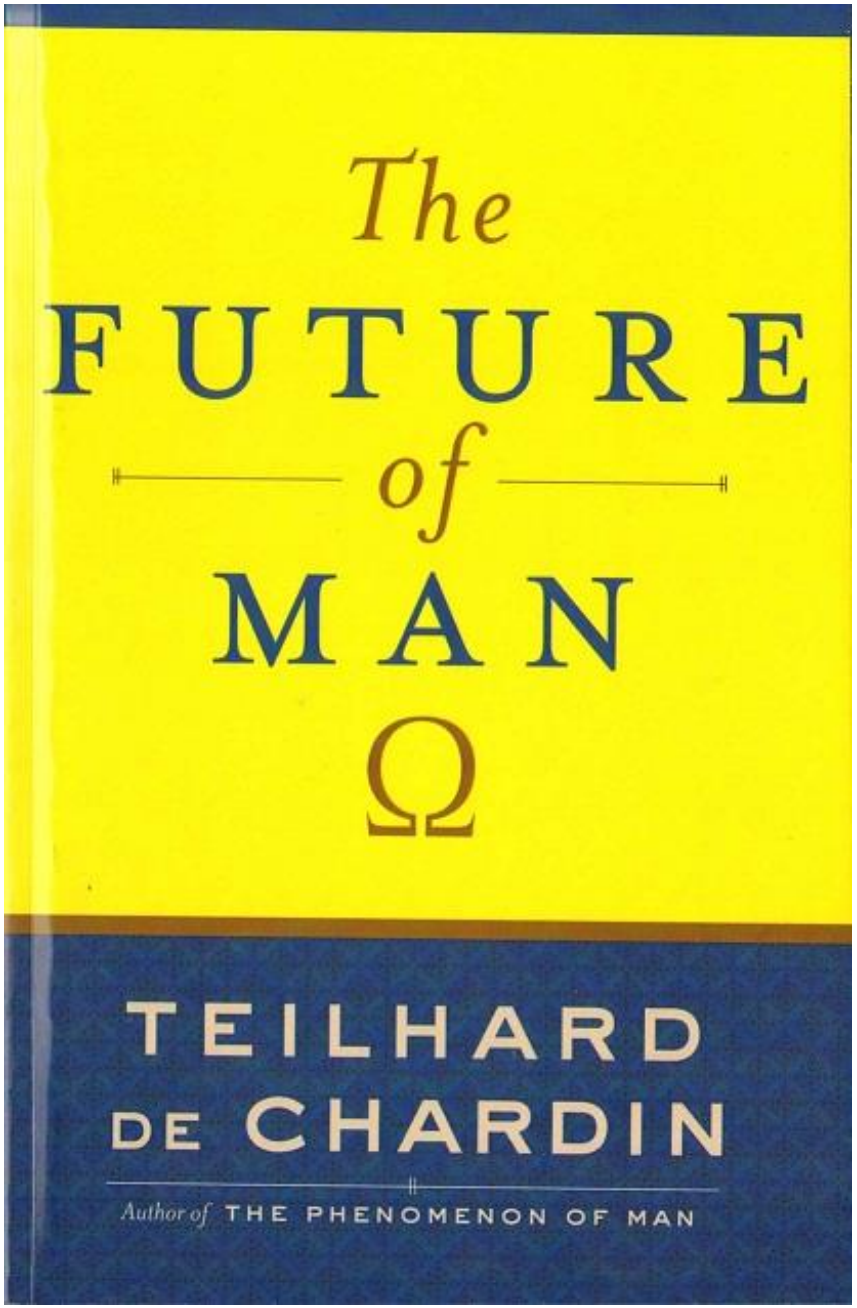


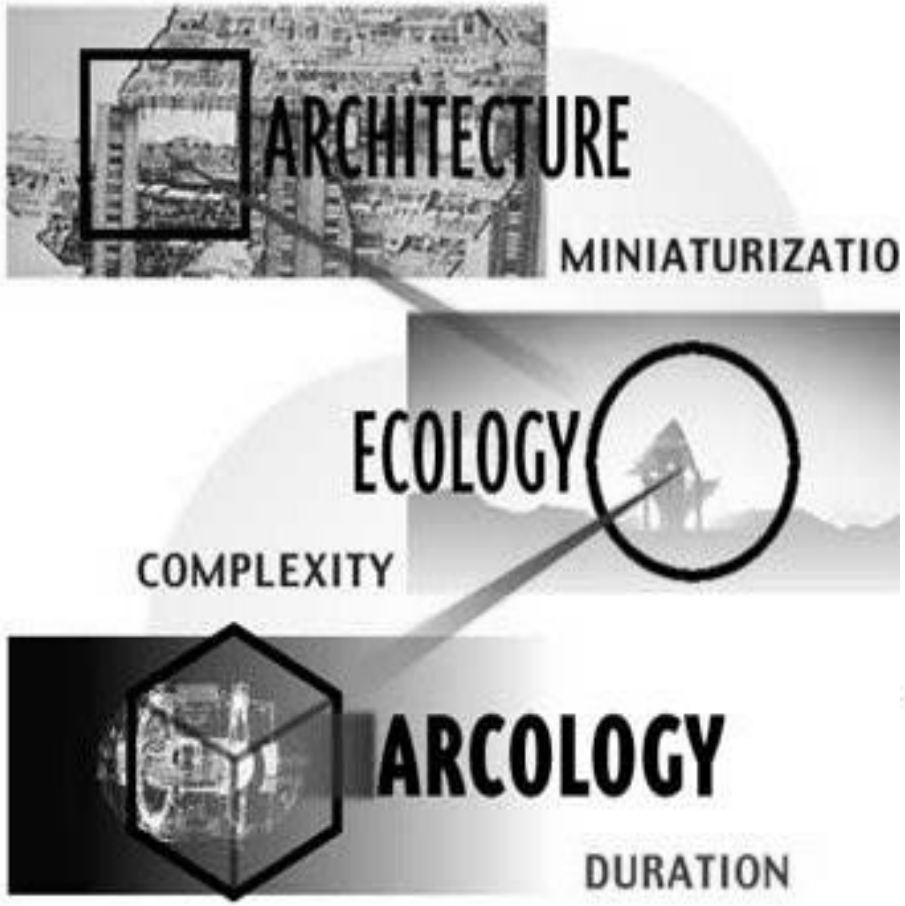
- **Theoretical attempt to examine the rules of complexity and miniaturization and predict what some of the characteristics of space habitats might be**
- **Addressed notions of confinement, introspection, loneliness, defining a balanced ecology, and self-reliance within a hostile environment**
- **Show how asteroids of different sizes and types, once "captured" could be processed into small, simple, habitats functioning as centres of:-**
  - **MINING, PROCESSING AND SHIPPING**
  - **URBAN** (environmental & social) **EXPERIMENTS**
  - **LEISURE FOR SPACE TRAVELLERS**

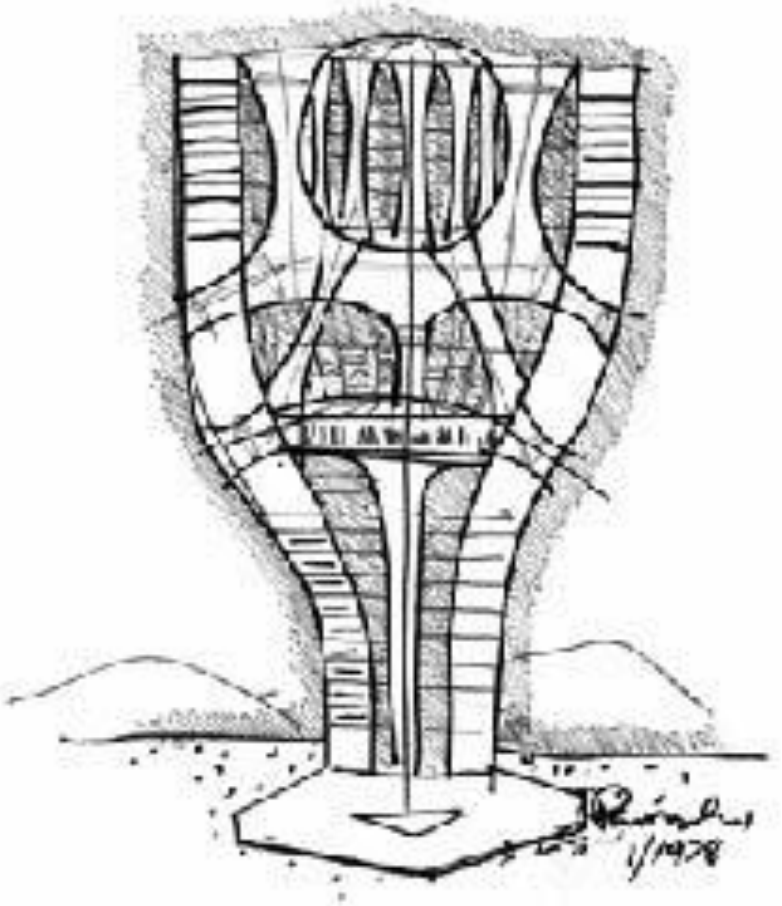




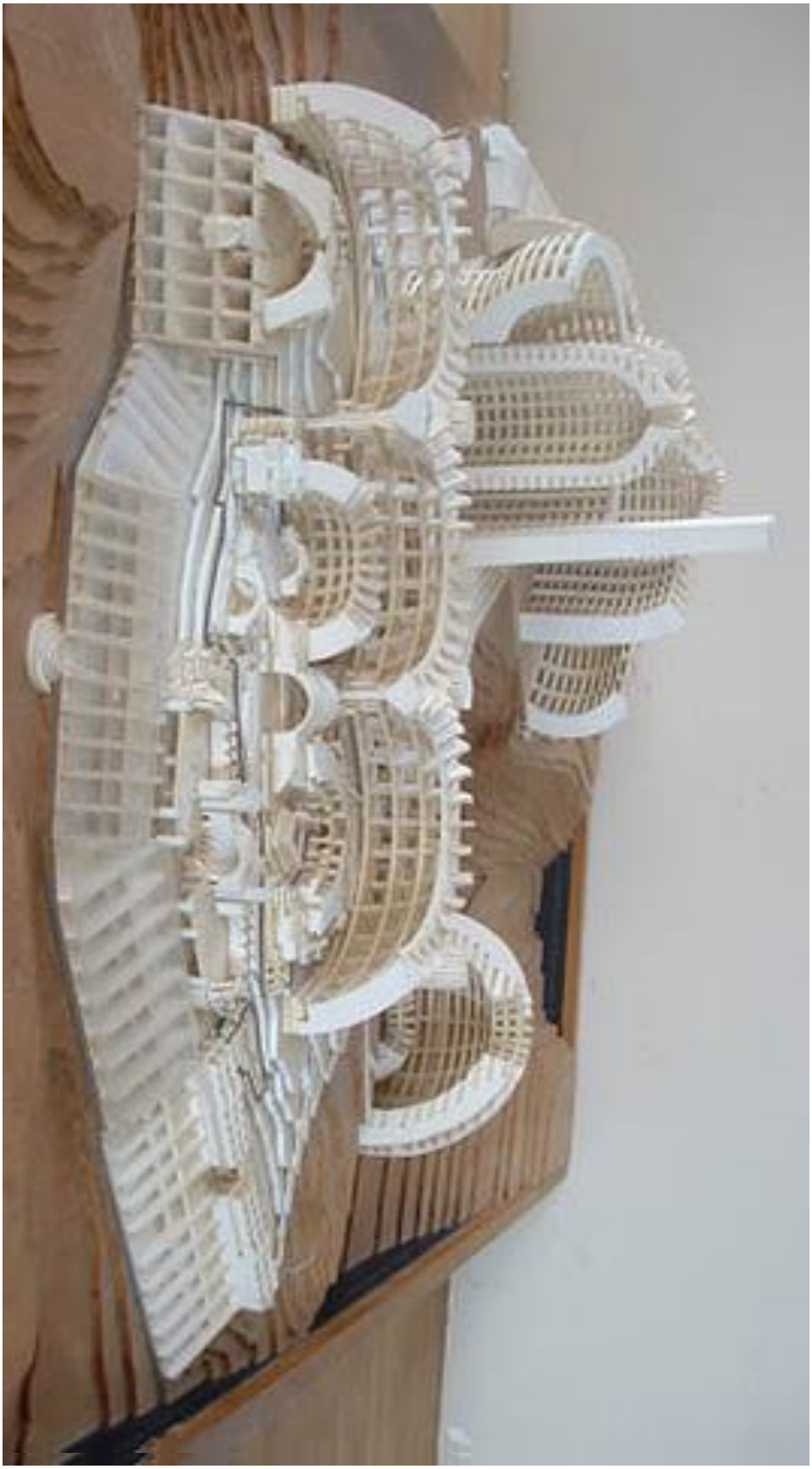
Pierre Teilhard de Chardin, 1881 - 1955


The
FUTURE
of
MAN
Ω
TEILHARD
DE CHARDIN
Author of THE PHENOMENON OF MAN





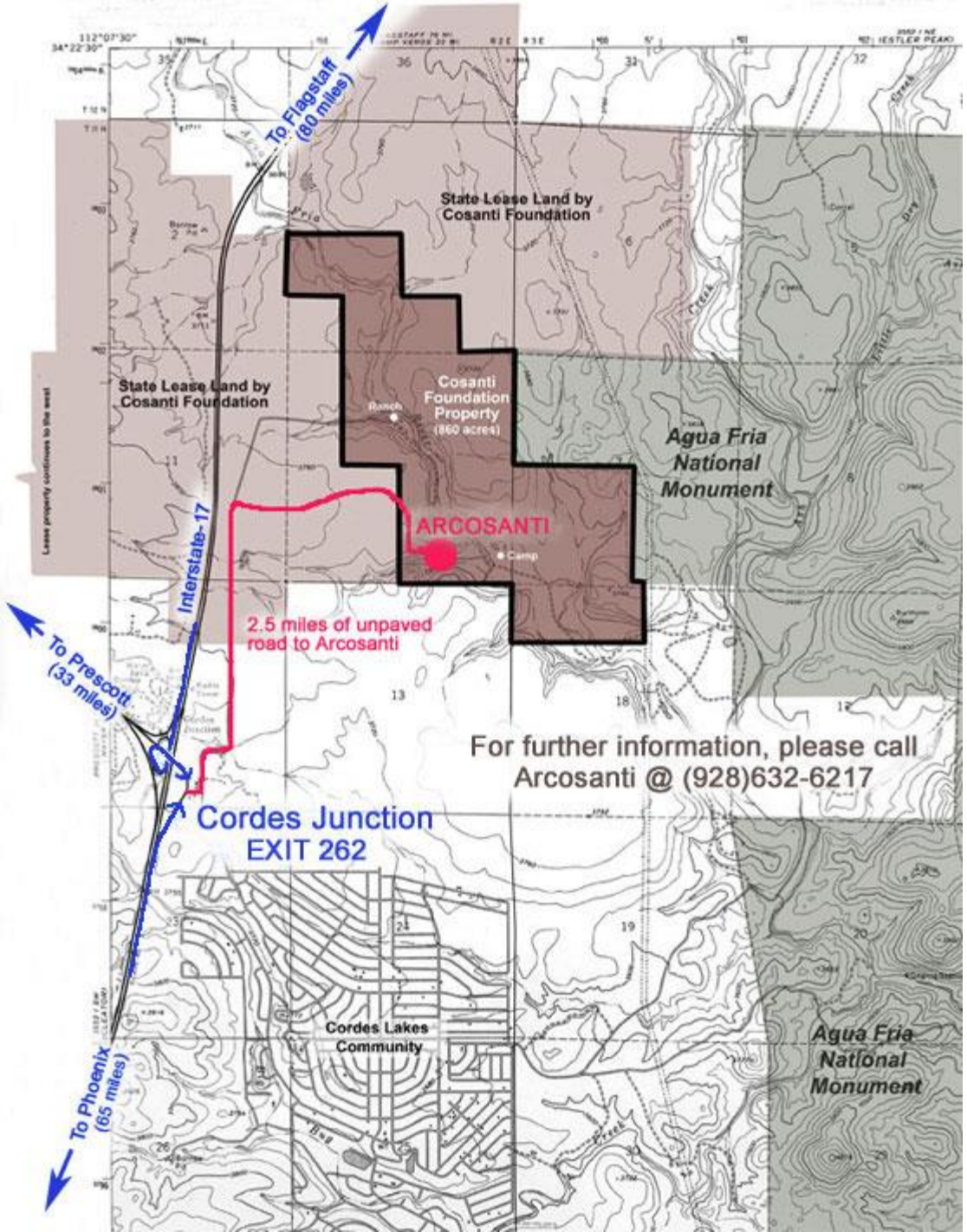
CMD Paradigm



Arcosanti 2000, Model

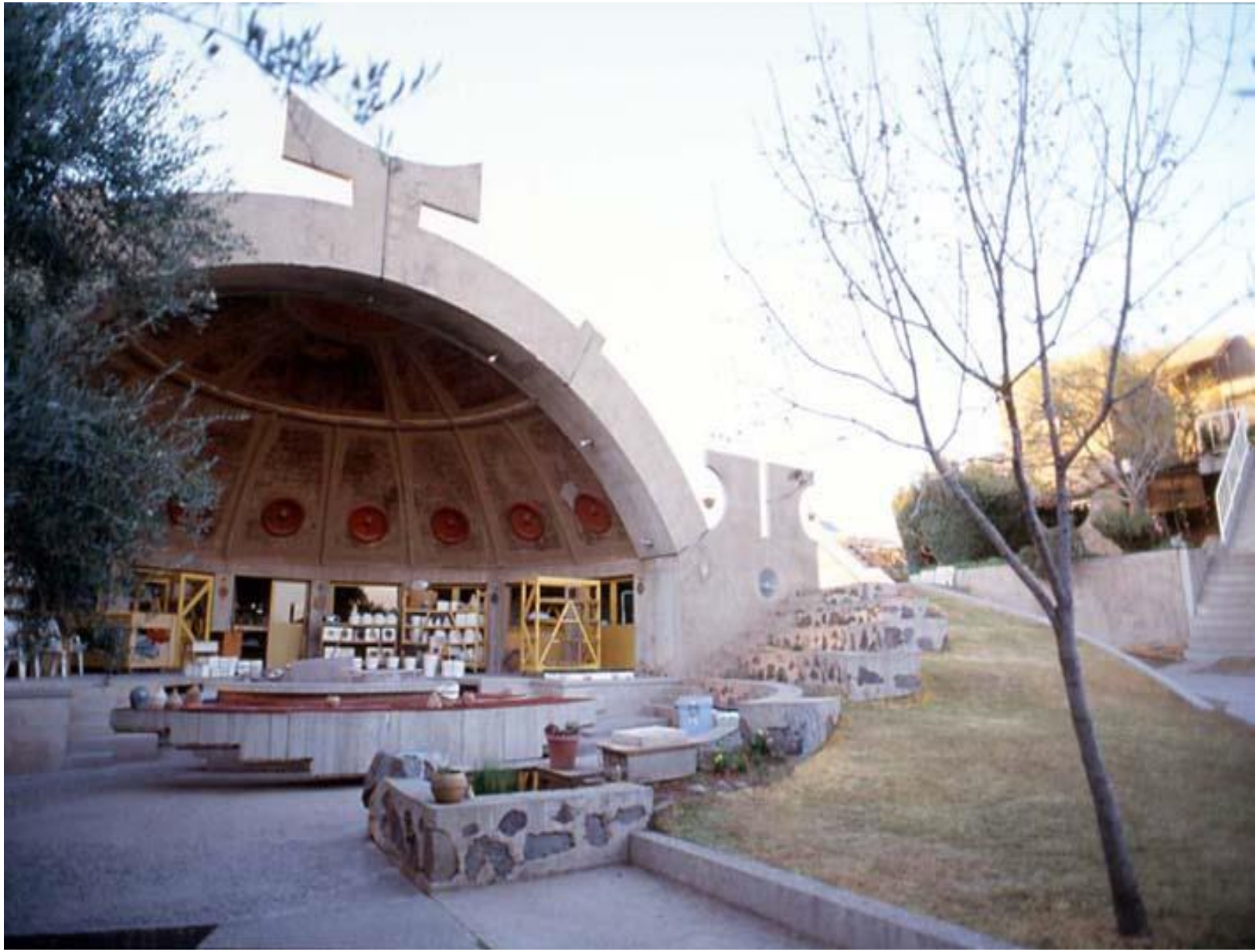

Discoveries...America
ARIZONA
Play Movie/Intro
Grand Canyon
Ballooning
Arcosanti/Cosanti
Lake Havasu
Tuscon
Saguaro
Monument Valley
Canon de Chelly
Navajo


UTAH
PAGE
NEVADA
GRAND CANYON
FLAGSTAFF
SEDONA
PRESCOTT
ARCOSANTI
COSANTI
PHOENIX
GLOBE
CALIFORNIA
YUMA
TUCSON
NEW MEXICO
ARIZONA
MEXICO

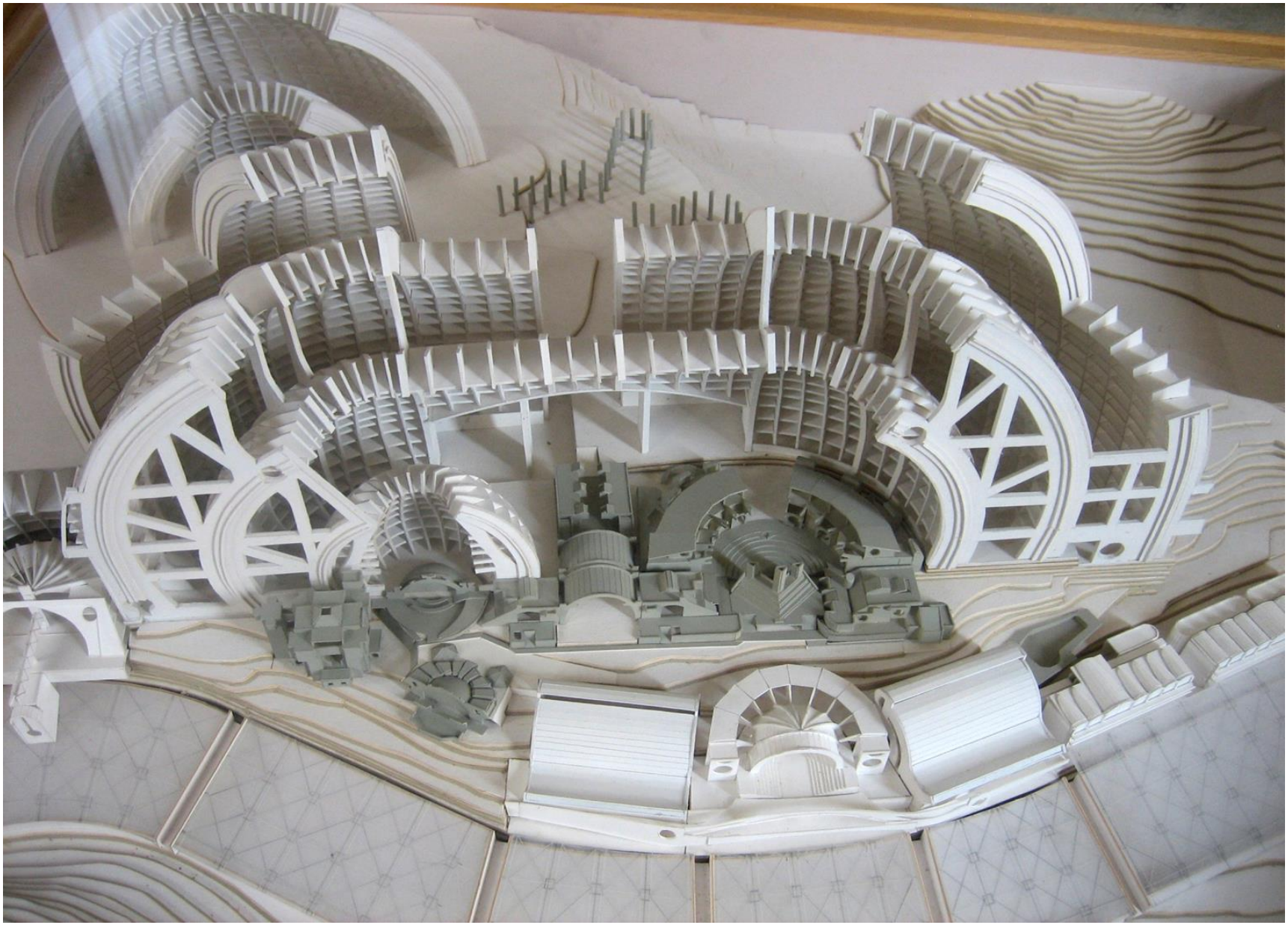

To Flagstaff
(80 miles)
State Lease Land by
Cosanti Foundation
State Lease Land by
Cosanti Foundation
Cosanti
Foundation
Property
(860 acres)
Ranch
Agua Fria
National
Monument
ARCOSANTI
Camp
Interstate-17
2.5 miles of unpaved
road to Arcosanti
To Prescott
(33 miles)
For further information, please call
Arcosanti @ (928)632-6217
Cordes Junction
EXIT 262
Cordes Lakes
Community
Agua Fria
National
Monument
To Phoenix
(65 miles)

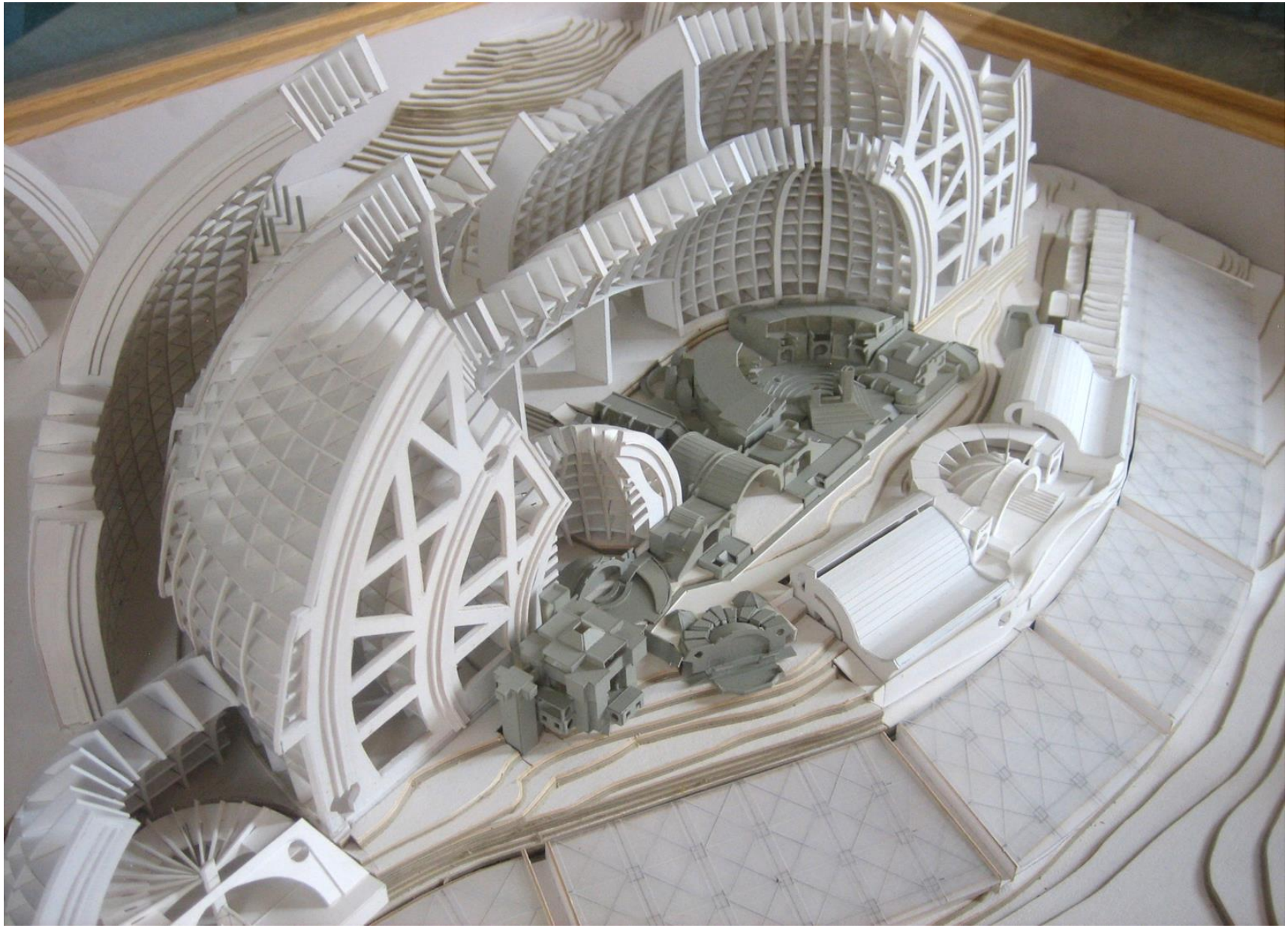
Arcosanti, Main Vaults

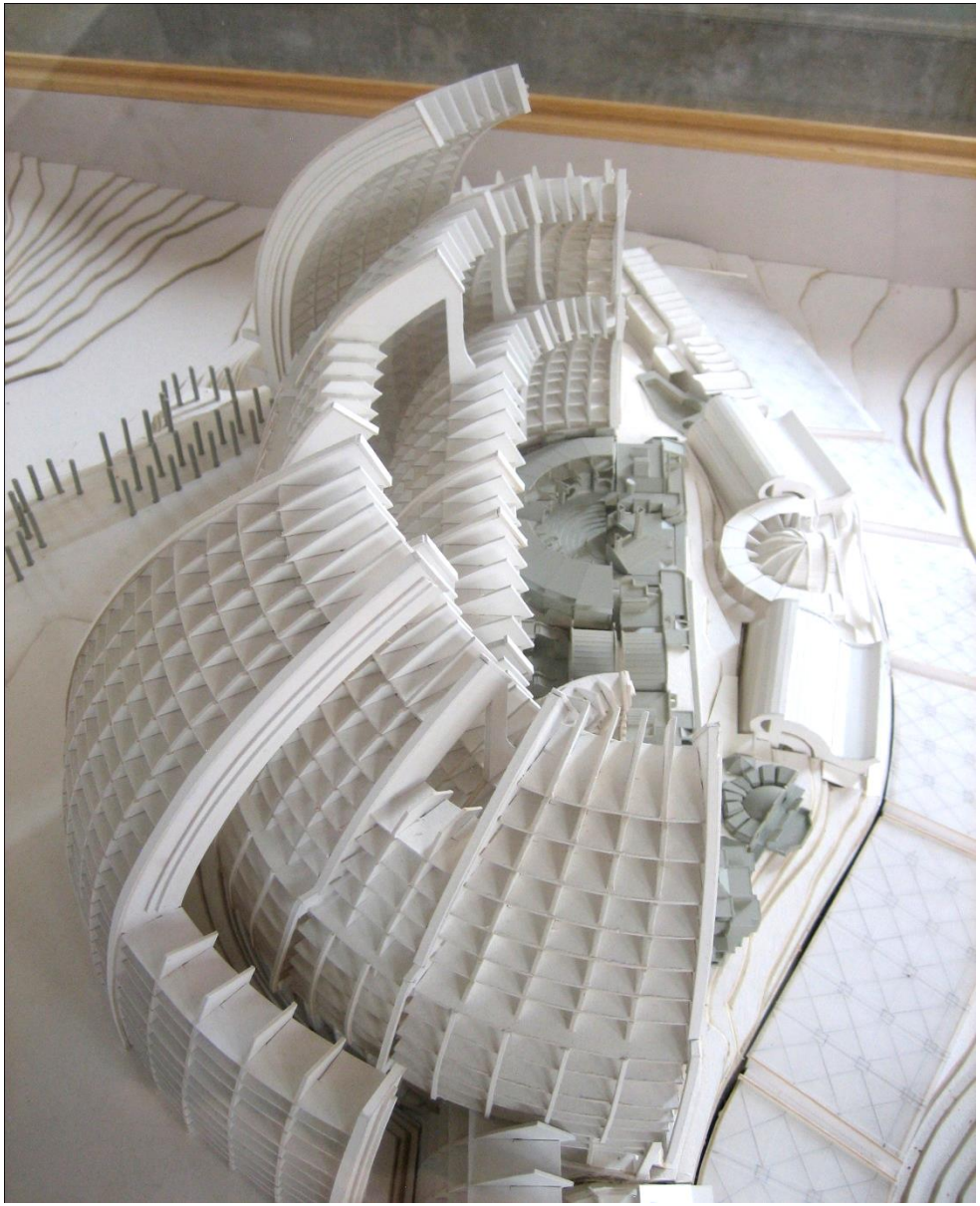
Arcosanti, 1985



Arcosanti, Now



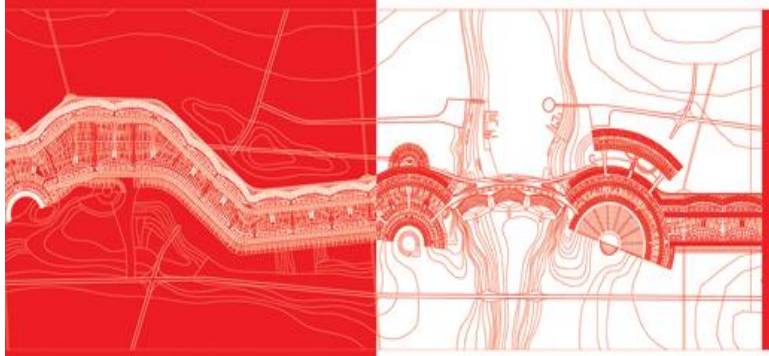




1) Green
2) Mobility & Integration
3) Social Integration
4) The Presence of Technology

Edward Paes, Mayor Rio de Janiero

.00 Printed in USA



978-1-883340-07-0

781883 340070 >

COSANTI PRESS

LEAN LINEAR CITY

ARTERIAL ARCOLOGY

PAOLO SOLERI

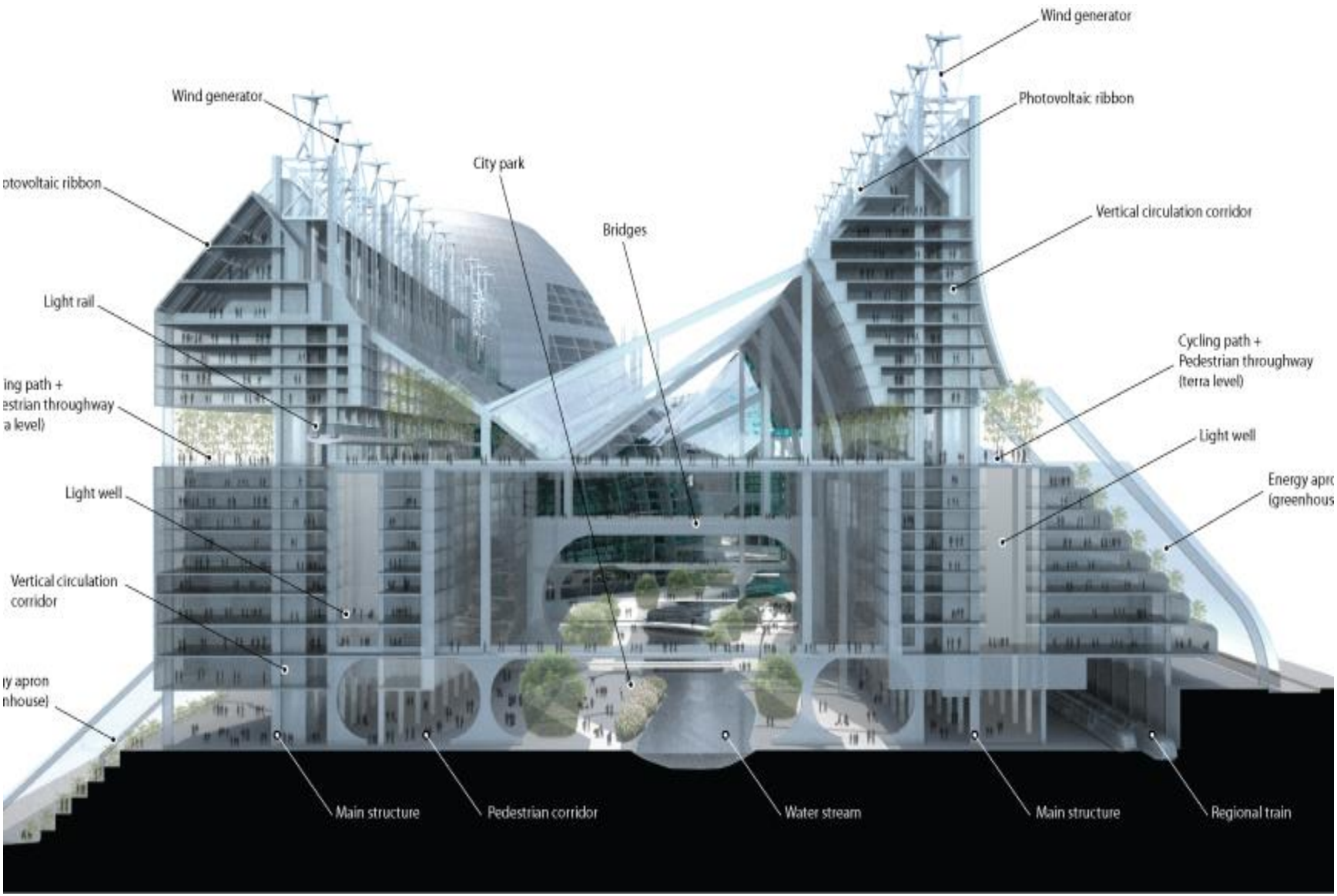
LEAN LINEAR CITY

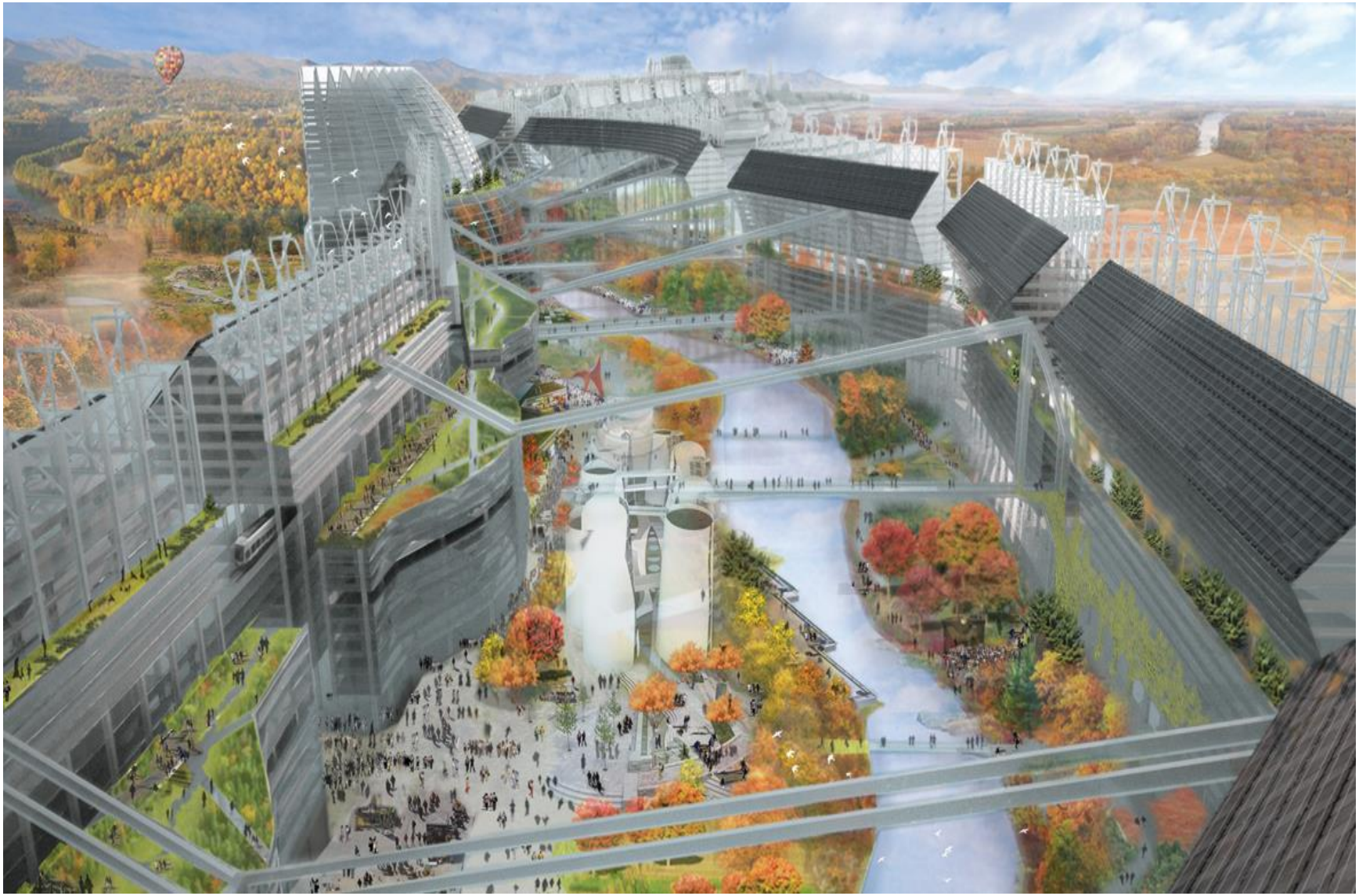
ARTERIAL ARCOLOGY

PAOLO SOLERI

YOUNGSOO KIM
CHARLES ANDERSON
ADAM NORDFORS
SCOTT RILEY
TOMIAKI TAMURA

FOREWORD BY JEFF STEIN • EDITED BY YOUNGSOO KIM • TEXT EDITED BY LISSA McCULLOUGH


Wind generator
Photovoltaic ribbon
Wind generator
City park
Bridges
Vertical circulation corridor
Light rail
Cycling path +
Pedestrian throughway
(terra level)
Light well
Light well
Vertical circulation
corridor
Main structure
Pedestrian corridor
Water stream
Main structure
Regional train



Paolo Soleri, aged 92