

#0 Introduction

Theory of Urban Structure

Kwon, Young Sang

Seoul National University

Department of Civil and Environmental Engineering, Urban Design Major

#1. Introduction

457.551

Theory of Urban Structure

Class time : Wed. 14:00~16:50

Lecture room :

Professor : Prof. Youngsang Kwon

Office : 35-413 / Email : yskwon@snu.ac.kr /

phone : 02-880-8200 / web : udl.snu.ac.kr



1. Class Outline

Urban form and spatial structure

- Urban forms and spatial structures provide the most basic concepts in the planning and design of cities and the study of cities. Urban forms and spatial structures indirectly show human cultural, social, and economic relations and show such superstructure in concrete terms.

1. Class Outline

Urban form and spatial structure

- The lesson of “Theory of Urban Structure” will help to understand how the urban form and spatial structure that have defined the physical form and spatial structure of the human settlement environment by the ages will be acquired and the logic and the theory inherent in it will be obtained. It will also provide an opportunity to explore how urban forms and spatial structures will emerge in the future.**
- Students will have an opportunity to meet about 100 articles and articles on 10 themes related to urban form and structure. Students will also learn how to set up research topics and research papers on urban forms and structures.**

2. Purpose of Class

How to write academic paper on Urban design and Urban form ?

- This Class aims at a broad understanding of theories of urban form and spatial structure.**
- Students will study on the theoretical background and character to determine the desirable urban form and spatial structure in the future in the creation of a new city.**
- And they will acquire basic knowledge about researching urban form and spatial structure, and will select research topics, seek methodology, set up hypotheses, research design, and conclusions.**

3. How to proceed?

Ten themes about urban form

- **Each lesson will cover the main contents of urban form and spatial structure with 10 themes, and it will be taught by professor (80 minutes) and student presentation (80 minutes).**
- **The final announcement of personal research will be made by the students to select research themes on urban form and spatial structure and present them in PPT in small research paper or research proposal form and submit them in writing.**
- **The final test assesses the basic qualities of the theory of urban form and spatial structure covered in the lesson.**

3. How to proceed?

Ten themes about urban form

Theoretical framework of urban form and urban structure

Before Modernism
Ancient, Medieval, Renaissance, Baroque

19C Utopian, 20C Modernism

Post Modernism, Neo rationalism, Neo Empiricism

Urban form by Planner, Designer, Architect / New town / Future City

#1~#5 Historical Overview

How to write academic paper on Urban form and structure?

Urban form -> Other factor

Axis(축) / Space Syntax
Transportation / Pedestrian

Urban tissue(도시조직) / Landscape(경관) / Behavior pattern / Energy, Resilience

Other factor -> Urban form

Polycentric / Location Theory(입지이론) / Land, Housing Price(부동산가격)

Regulation(제도) / Social Structure / Historical & Cultural Heritage

#6~#10 Categorical Overview

4. Notes to attendees

Assignment: Summary 2times

- **Assignment of small presentation (2 times): The presentation of students' weekly lessons will be held by two students during 20 minutes for presentation and another 20 minutes for discussion.**
- **Presentation The PPT is prepared in English, but the presentation language can be chosen among English or Korean. Assignment Articles are scheduled for the first class and should be presented once in the first half term and once in the second half term.**

4. Notes to attendees

Assignment: Research

- **Research presentation (final): The final announcement will be prepared in consideration of going to international academic conferences, 20 minutes for presentation and 20 minutes for discussion. Presentation The PPT is prepared in English, but the presentation language can be English or Korean.**
- **The final report is based on the journal, and may be submitted in Korean. The theme is a short essay or research proposal on urban form and spatial structure.**
- **If you submit a paper on the topic during the course or announce it at a conference, you will be upgraded to a upper level.**

5. Assessment

- **Attendance (10%):** Lateness or early withdrawal 2 times will be counted by absences 1 time / 4 times absences F grade
- **Discussion (10%):** Read the class article faithfully and engage in class
- **Assignment and small presentation (20%):** Read the class article faithfully
- **Research proposal & Final reports (thesis) (40%):** research design, fidelity of research, presentation ability, level of visual data, appropriateness of research
- **Exam (20%):** Prospective written essay writing test (It will be in the Qualifying test)

#2. Summary

#1 Framework of Urban form and urban structure

Theory of Urban Structure

Kwon, Young Sang

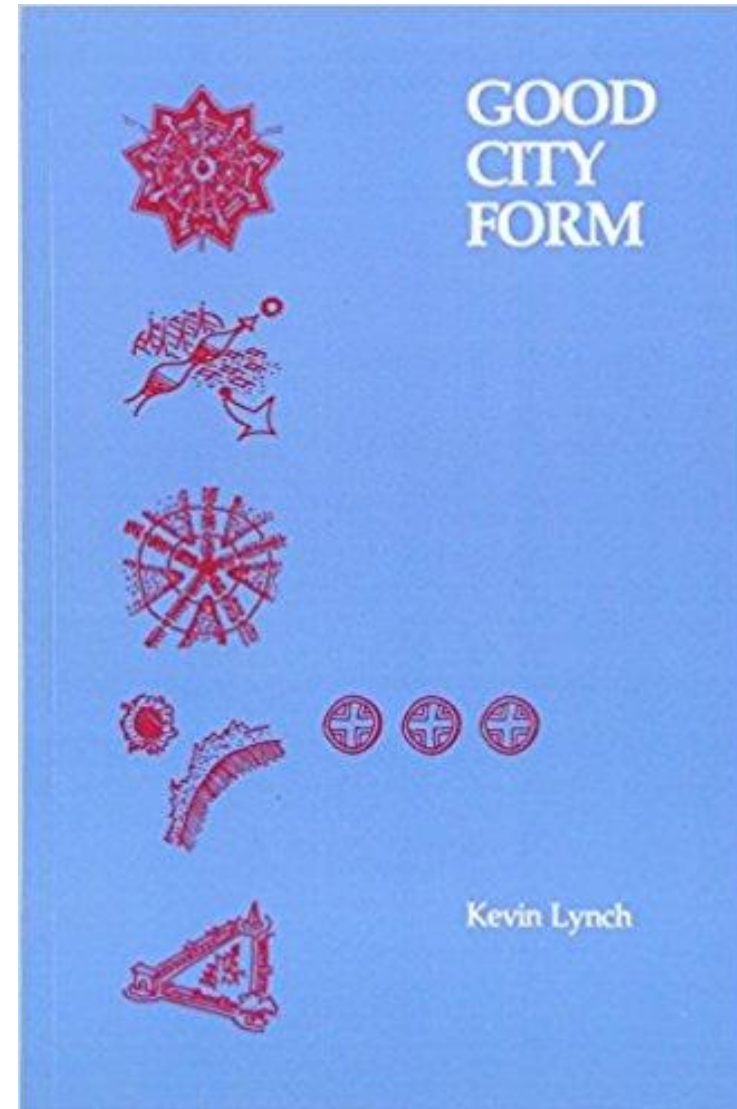
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Kevin Lynch

A Theory of Good City Form

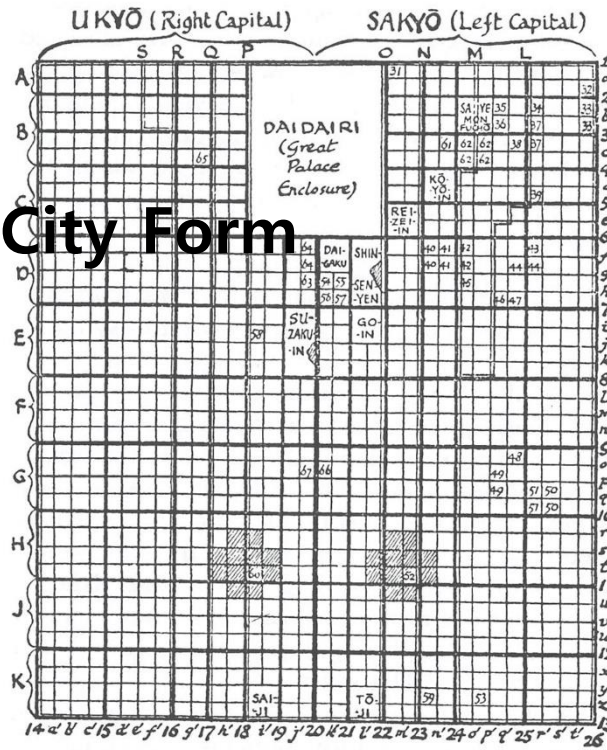
- Cambridge, Mass. : MIT Press, c1981.
- Vitality, Sense, Fit, Access, Control, Efficiency



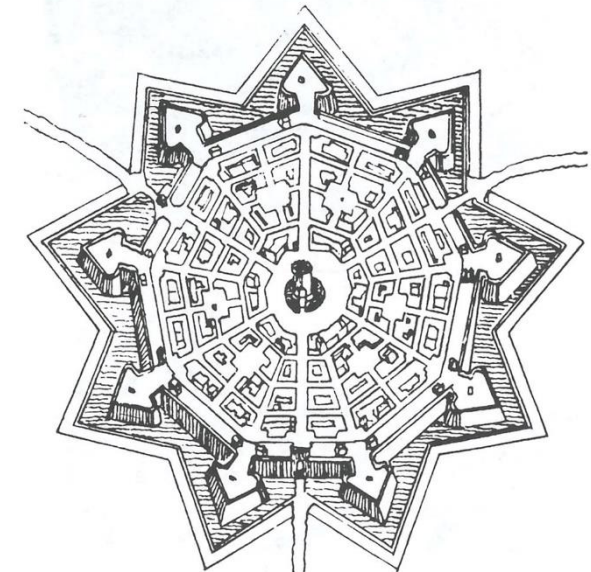
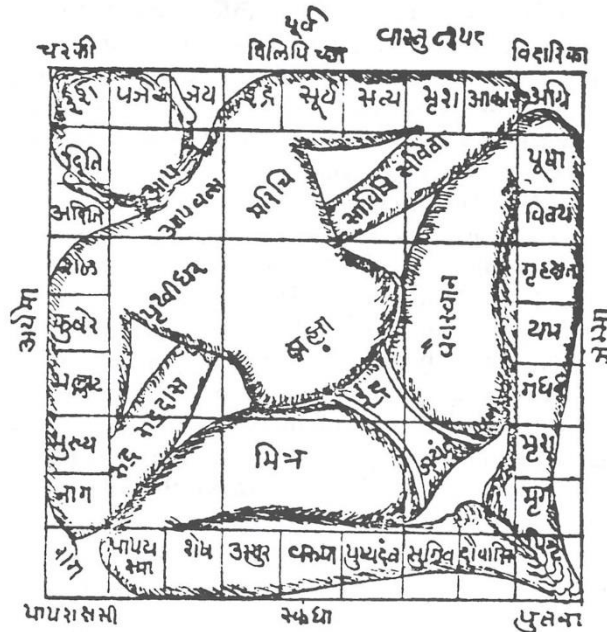
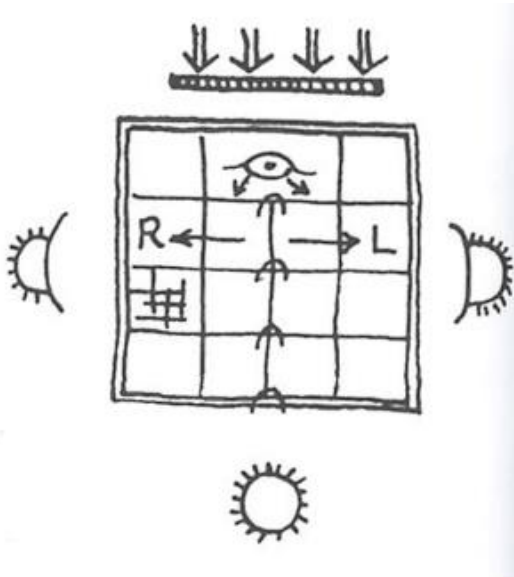
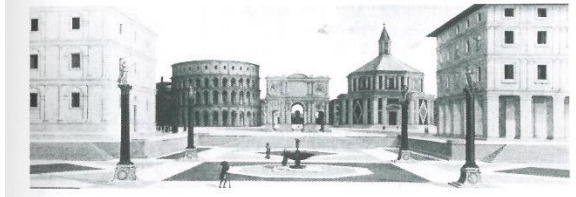
Kevin Lynch

A Theory of Good City Form

- Cosmic Form

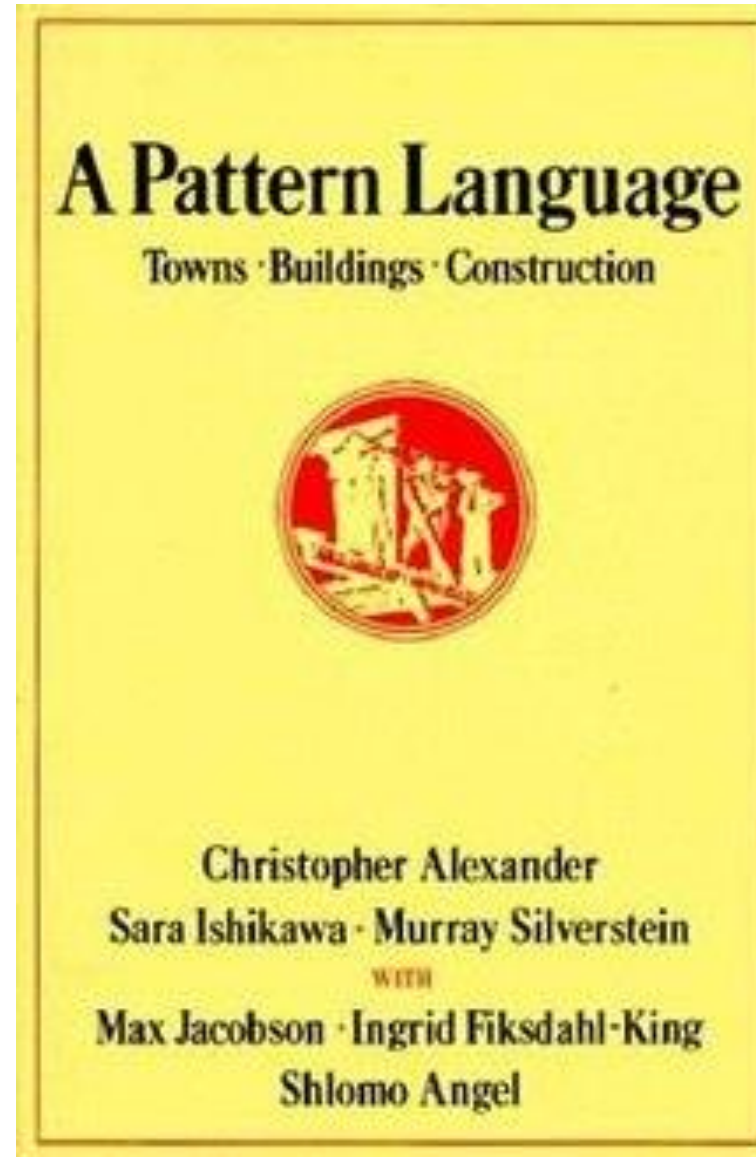


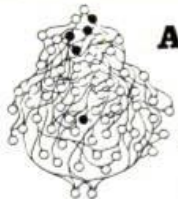
39 A plan of central Madurai, India, as it is today. Note the central temple, the major encircling streets, and the indirect radials or capillaries which run between them. The plan coincides with the encircling processions which take place on special holy days. Although the city was established earlier, this plan dates from the sixteenth and seventeenth centuries.



4. Christopher Alexander

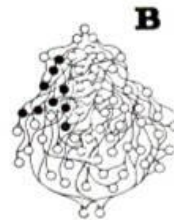
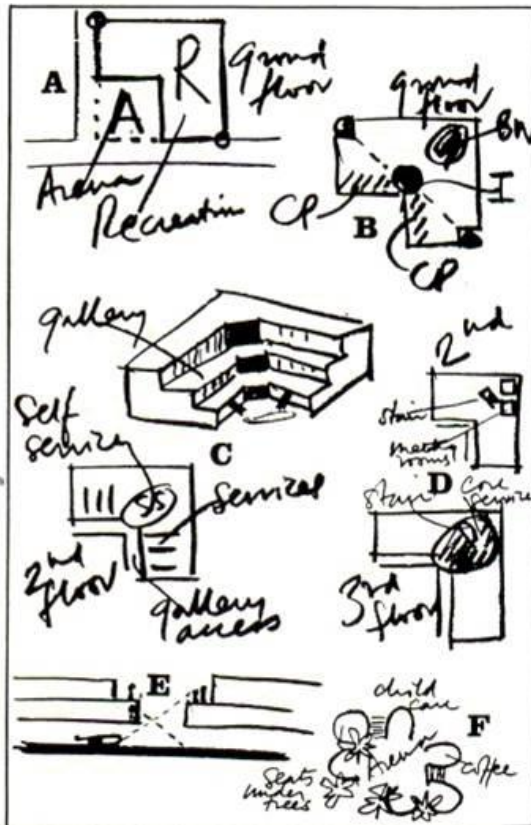
A Pattern Language





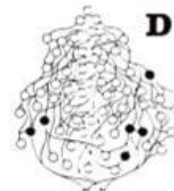
A

- 3. Size Based on Population
- 4. Community Territory
- 7. Entrance Location
- 11. Arena Enclosure
- 43. Waiting Diversions



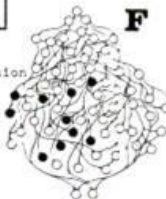
B

- 9. Arena Thoroughfare
- 10. Open to Street
- 16. Necklace
- 17. Community Projects
- 23. Entrance Shape
- 24. Subcommittee Watchdogs
- 28. The Intake Process
- 29. Outdoor Seats
- 35. Information



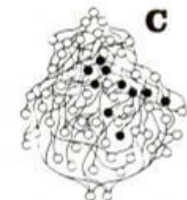
D

- 19. Core Service
- 41. Town Meeting
- 45. Block-worker Layout
- 47. Meeting Rooms
- 49. Staff Lounge
- 53. Square Seminar Rooms



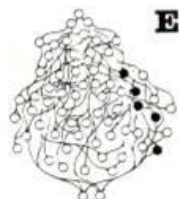
F

- 20. Activity Pockets
- 27. Self-Service Progression
- 29. Outdoor Seats
- 32. Child-Care Position
- 35. Community Wall
- 42. Sleeping OK
- 46. Barbering Politics
- 51. Form-Filling Tables
- 54. Accessible Bathrooms
- 57. Child-Care Contents



C

- 13. All Services off Arena
- 14. Free Waiting
- 15. Overview of Services
- 21. Self-Service
- 22. Pedestrian Density
- 25. Building Stepped Back
- 26. Vertical Circulation
- 31. Short Corridors
- 39. Arena Diaper
- 51. Stair Seats



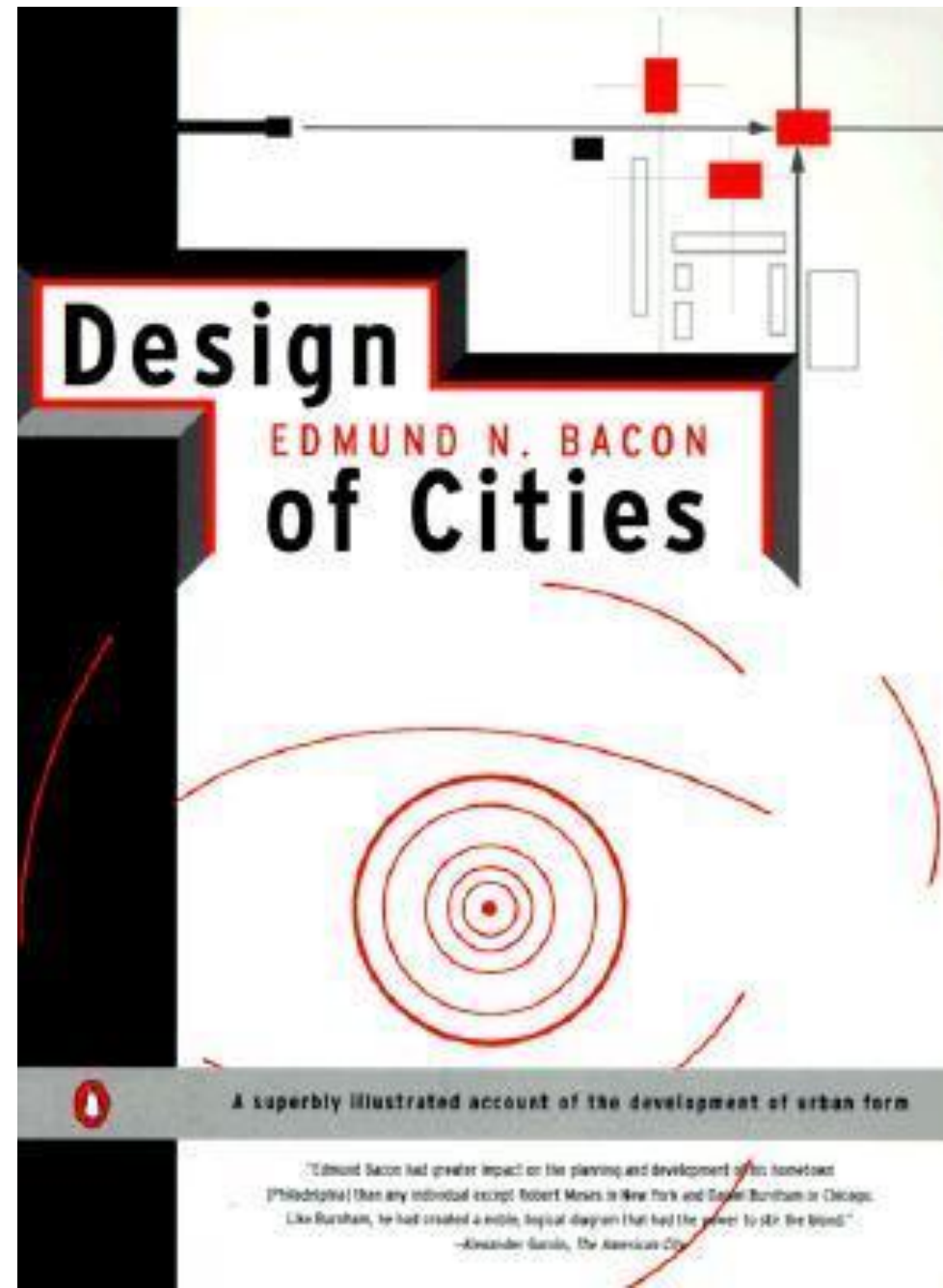
E

- 18. Windows Overlooking Life
- 26. Vertical Circulation in Services
- 33. Service Layout
- 40. Office Flexibility
- 56. Informal Reception



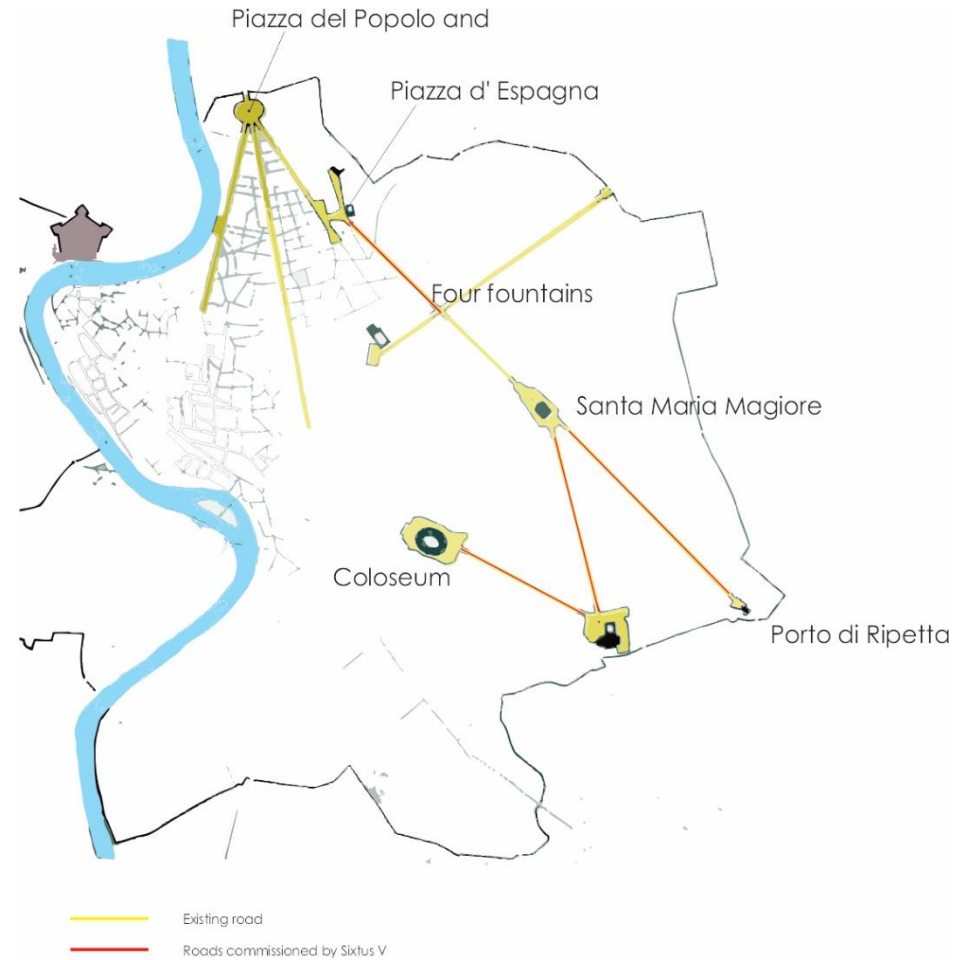
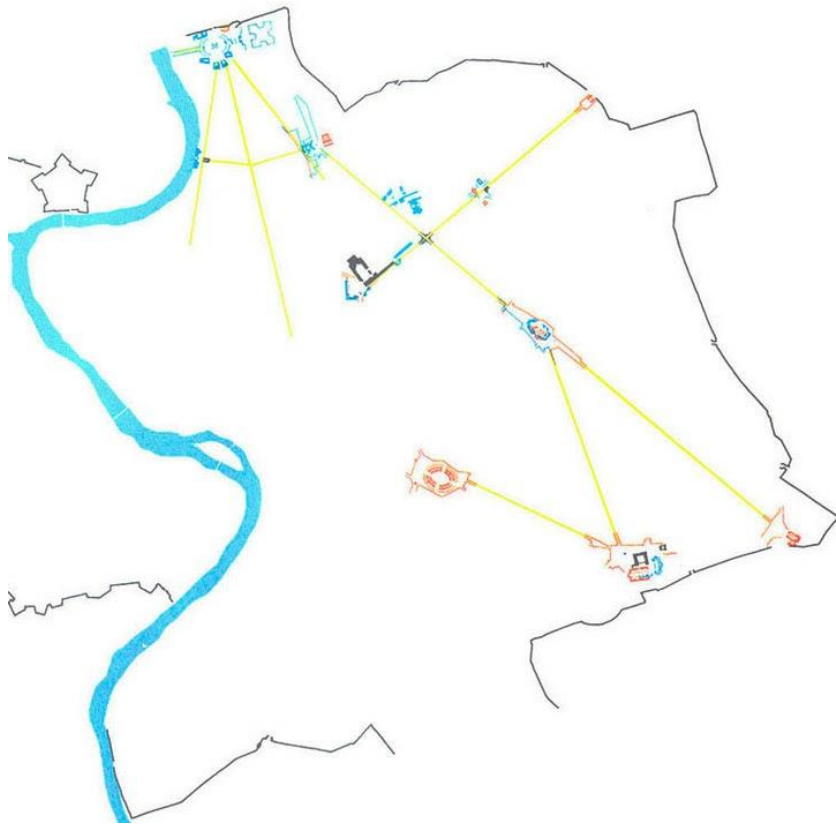
Edmund Bacon

Design of Cities



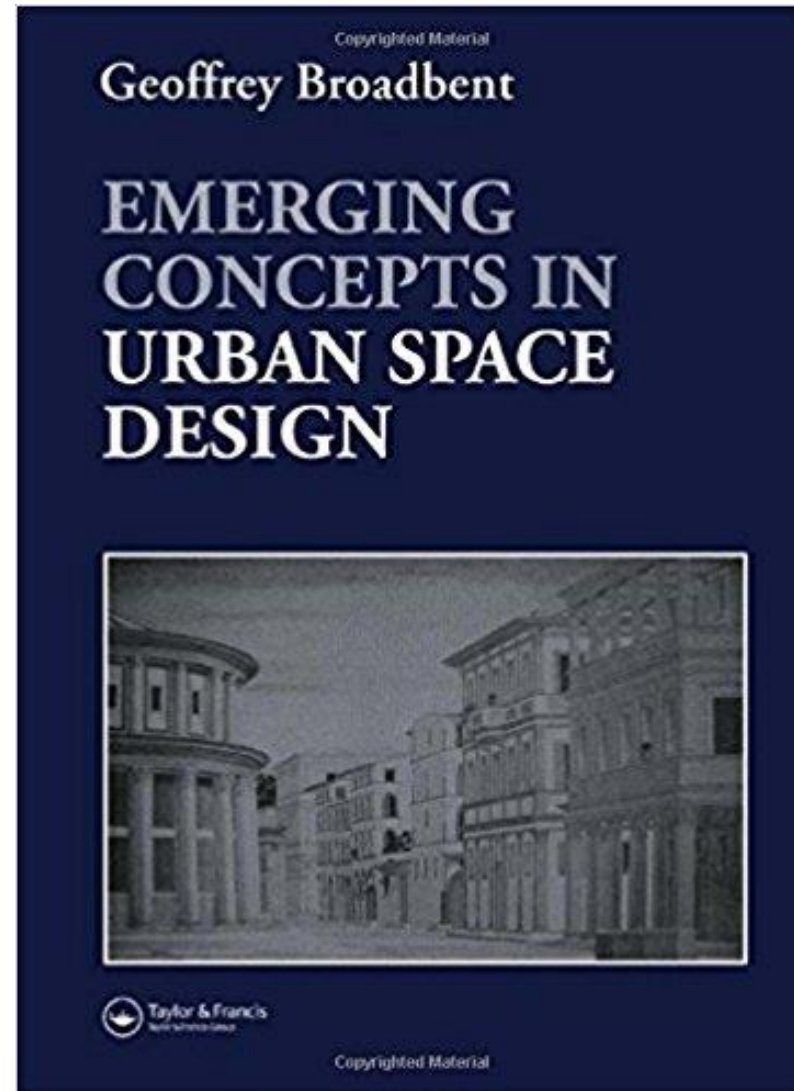
Edmund Bacon

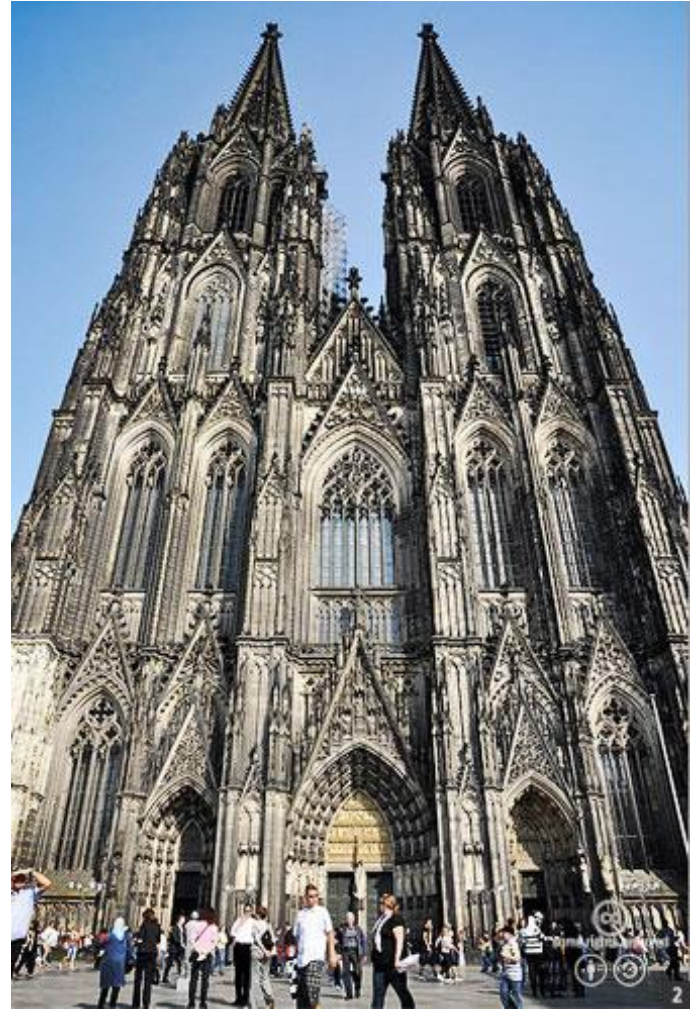
Design of Cities



Geoffrey Broadbent

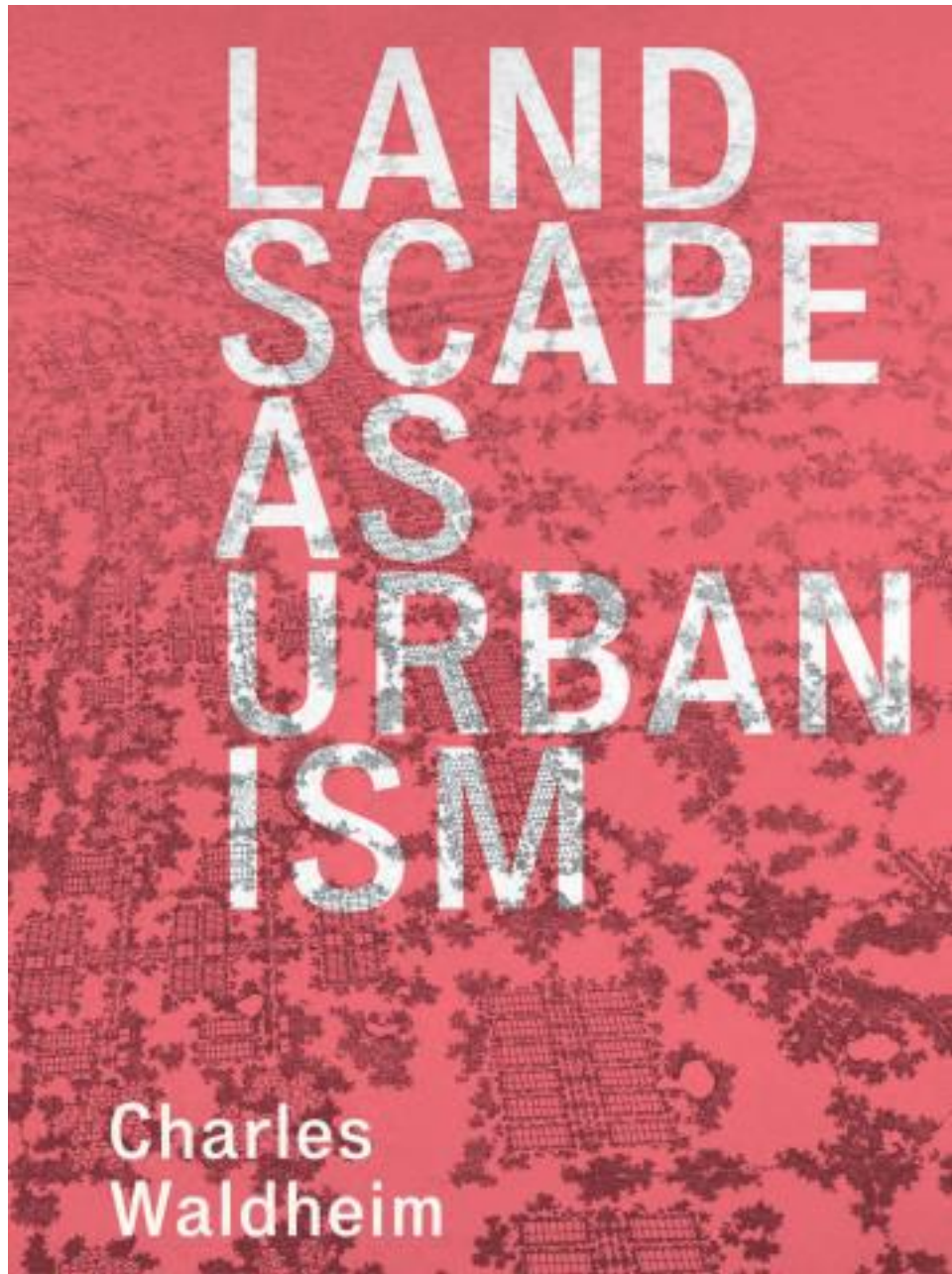
Emerging Concepts in Urban Space Design





Charles Waldheim

Landscape as Urbanism



#2 Pre Modernism

Theory of Urban Structure

Kwon, Young Sang

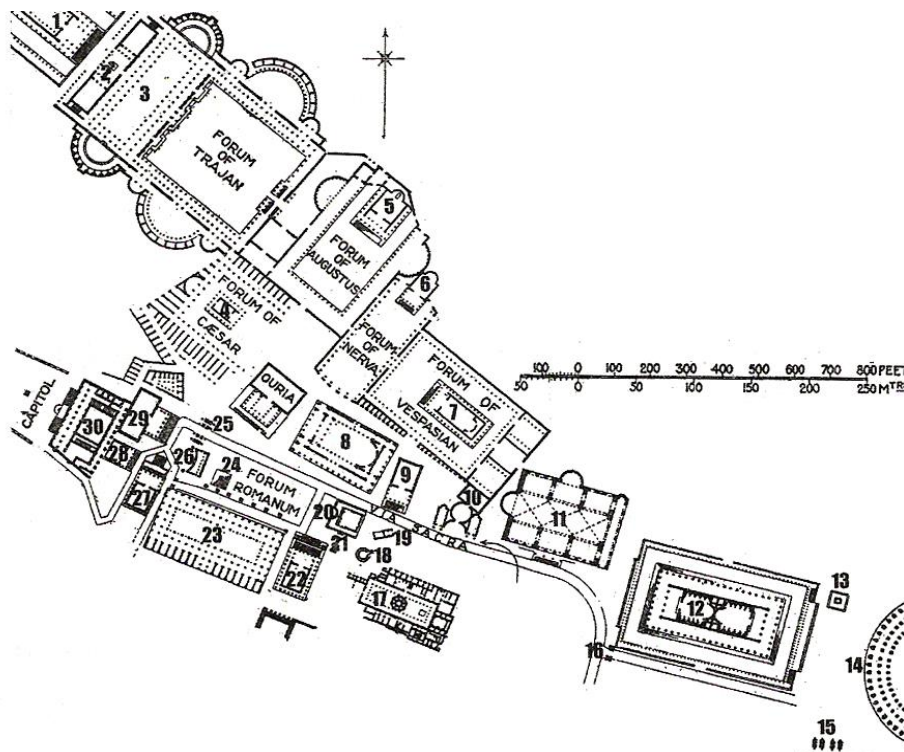
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2. Rome/Forum

Forum

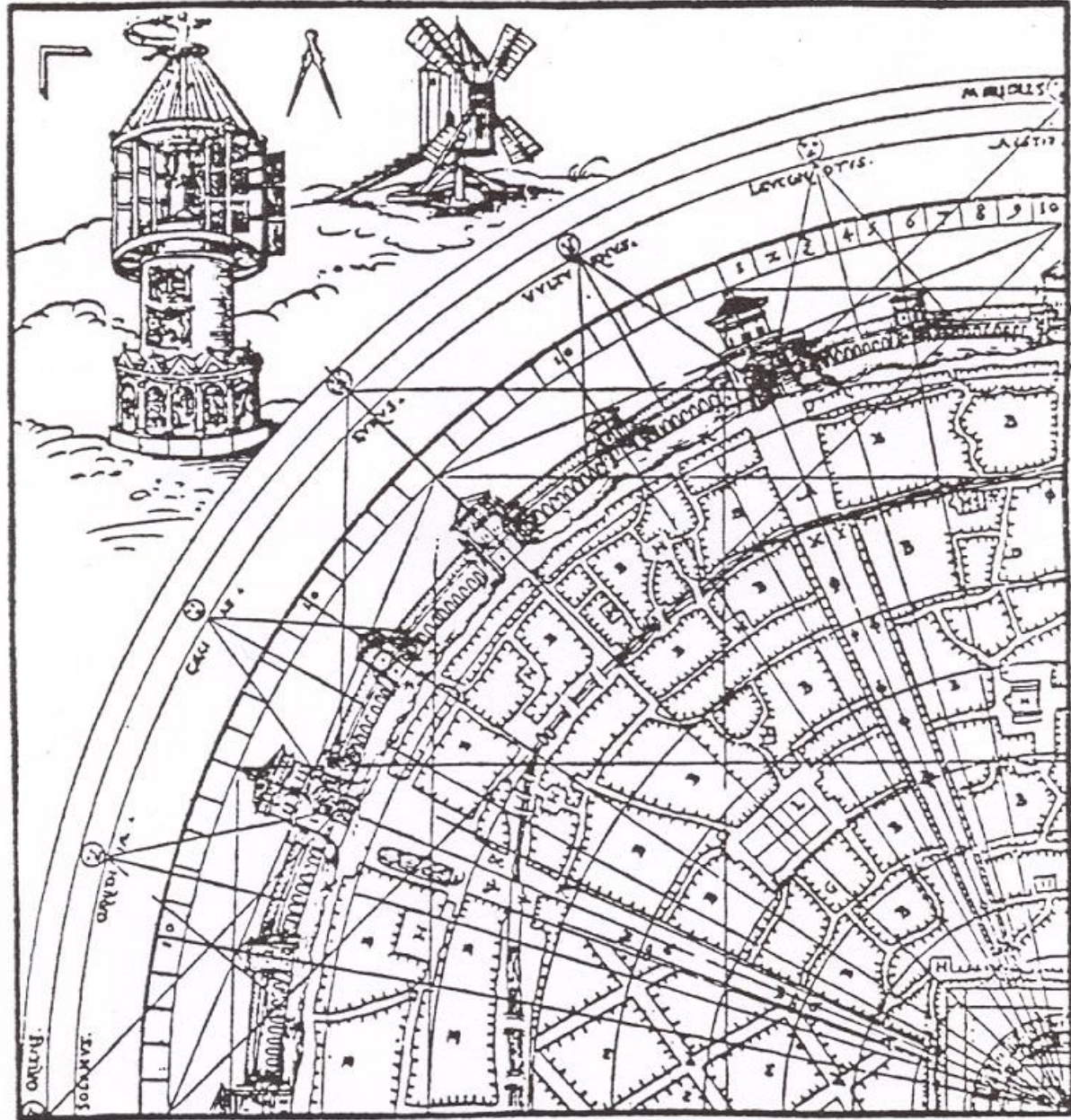
- 도시의 종교, 상업, 정치적 기능이 복합된 지역
- 광장의 주변에 시민기관, 종교시설 등이 배치



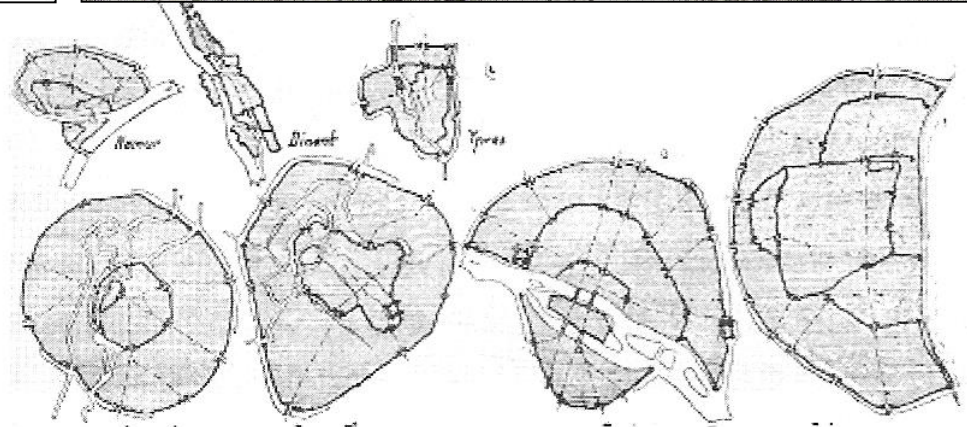
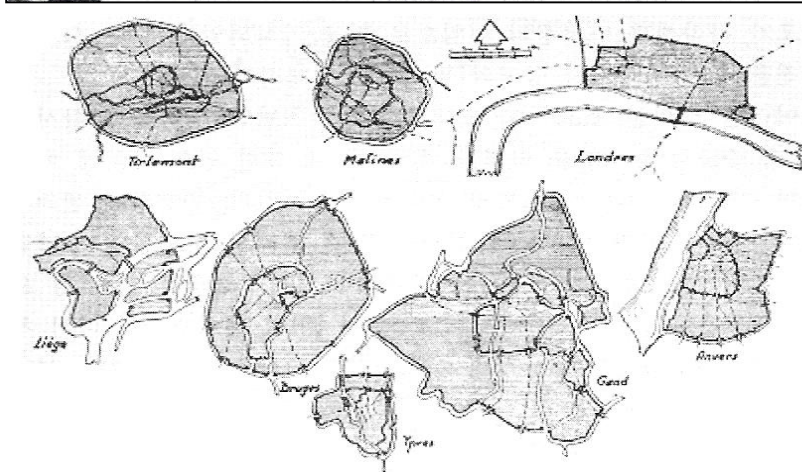
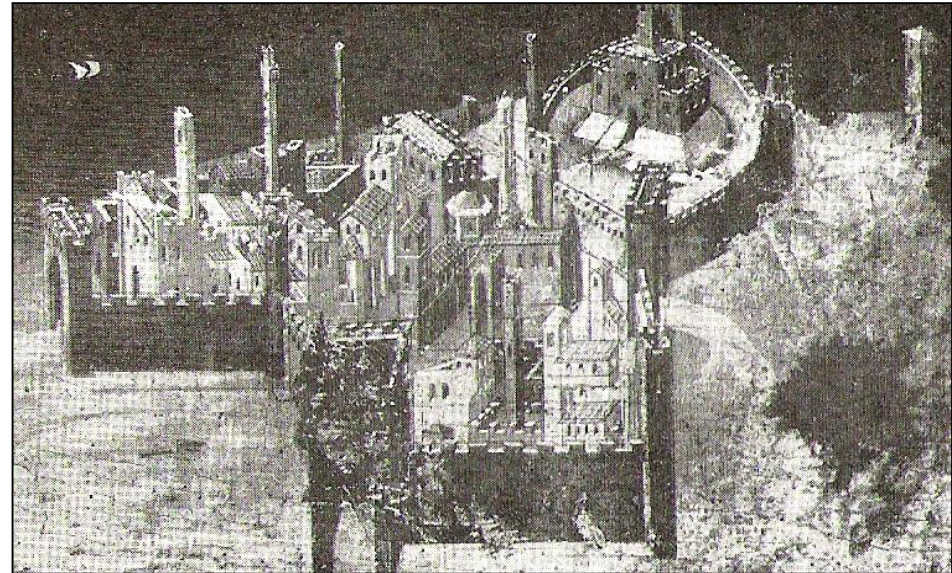
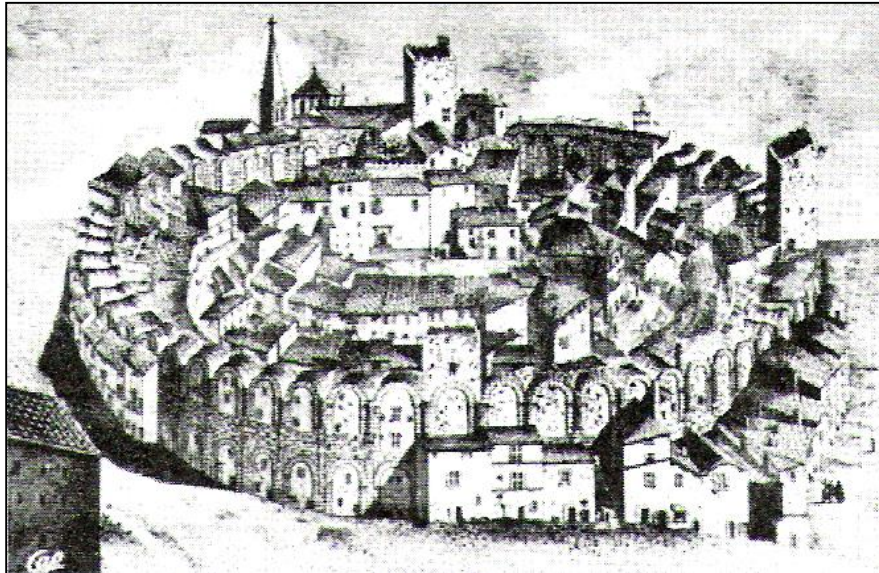
- | | | |
|------------------------------|---------------------------------|--------------------------------|
| 1. Temple of Trajan | 11. Basilica of Constantine | 21. Arch of Augustus |
| 2. Trajan's Column | 12. Temple of Venus & Rome | 22. T. of Castor & Pollux |
| 3. Trajan's Basilica | 13. Colossus of Nero | 23. Basilica Julia |
| 4. T. of Venus Genetrix | 14. The Colosseum | 24. Column of Phocas |
| 5. Temple of Mars Ultor | 15. Arch of Constantine | 25. Arch. of Septimius Severus |
| 6. Temple of Minerva | 16. Arch of Titus | 26. Rostra |
| 7. Temple of Peace | 17. House of The Vestal Virgins | 27. Temple of Saturn |
| 8. Basilica Aemilia | 18. Temple of Vesta | 28. Temple of Vespasian |
| 9. T. of Antonius & Faustina | 19. The Regia | 29. Temple of Concord |
| 10. Temple of Romulus | 20. Temple of Divus Julius | 30. Tabularium |



원형도시



Gothic



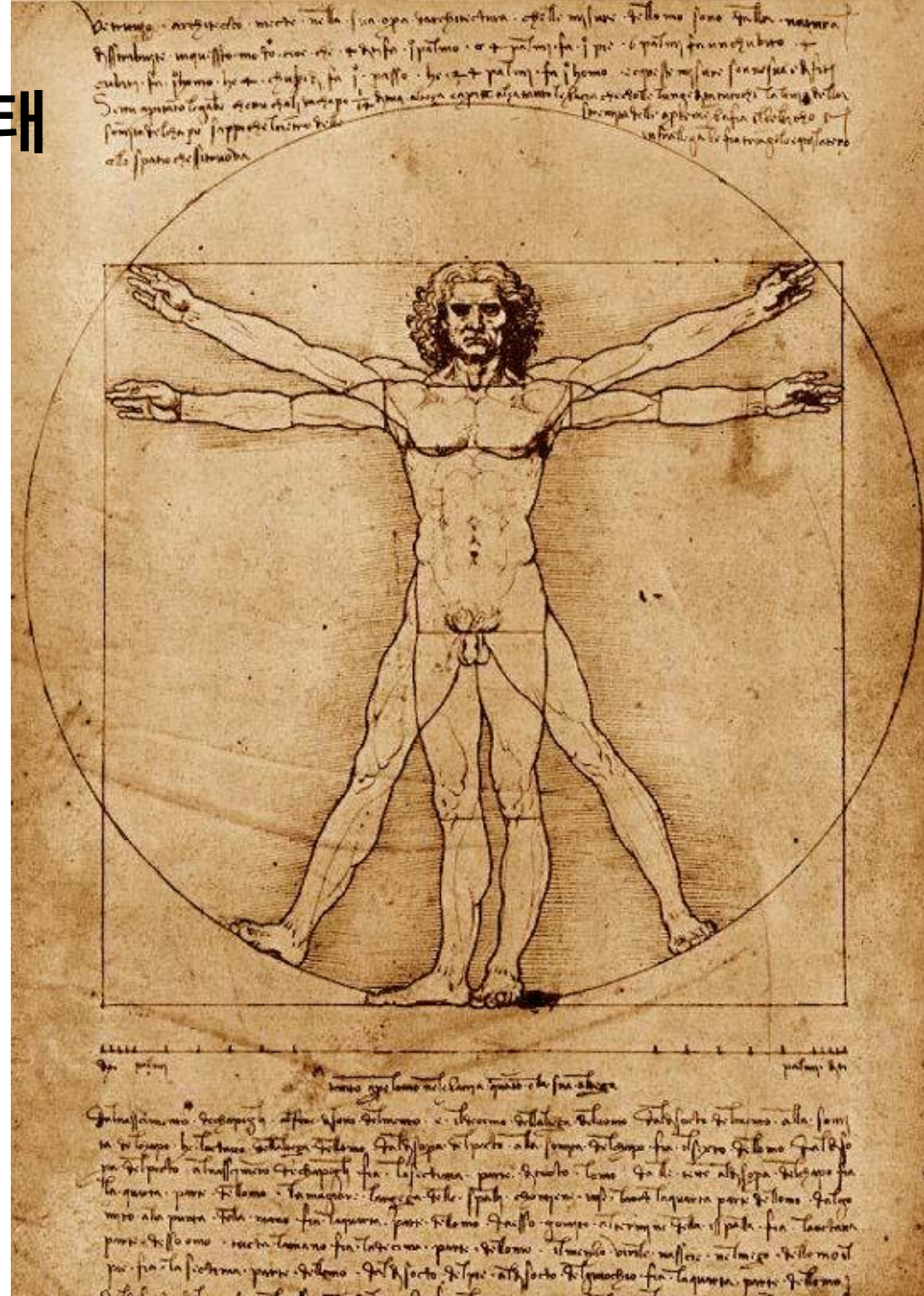
4. 르네상스 이상도시형태

Renaissance

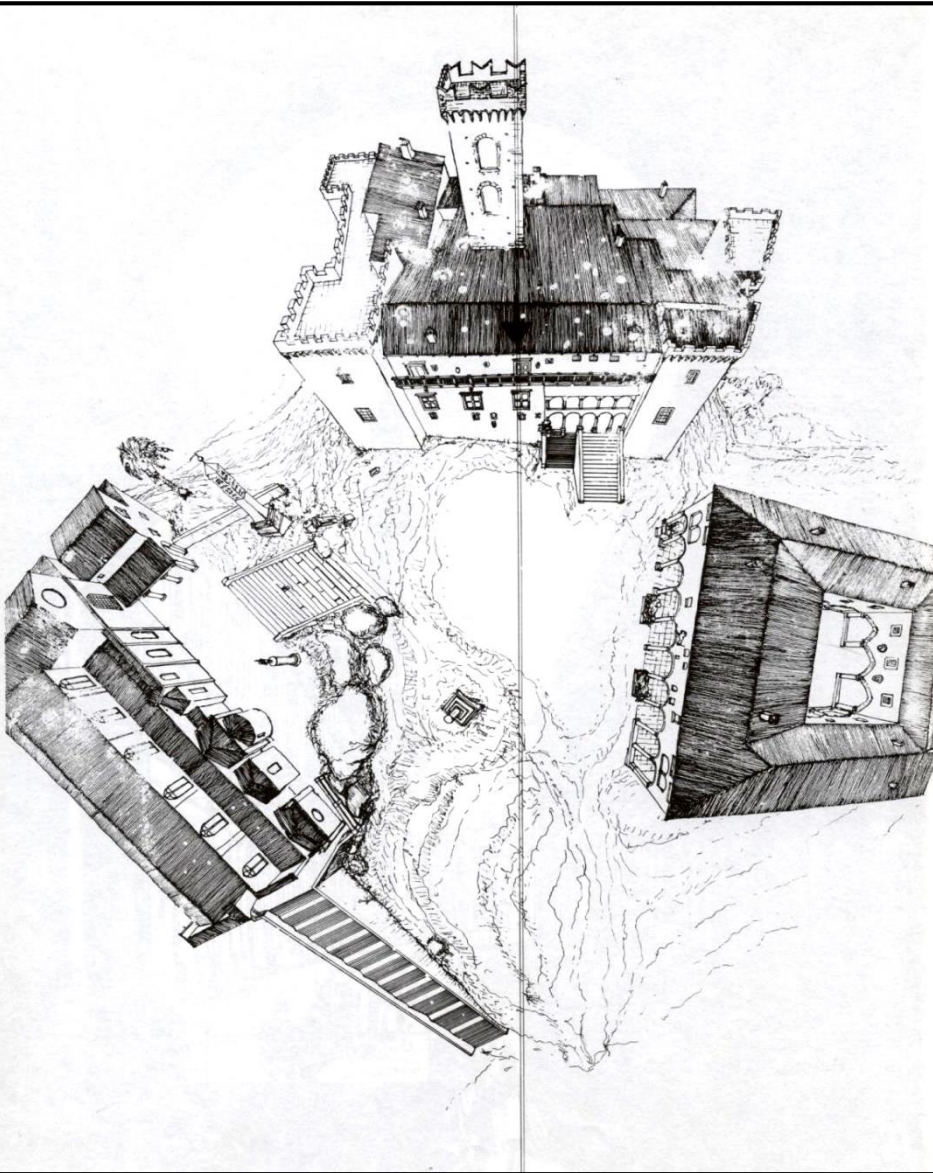
인본주의적 이상과 기하학적 질서를
바탕으로 한 이상도시 계획

팔마노바 같은 계획도시
피렌체, 로마와 같은 중심도시의 공
간계획

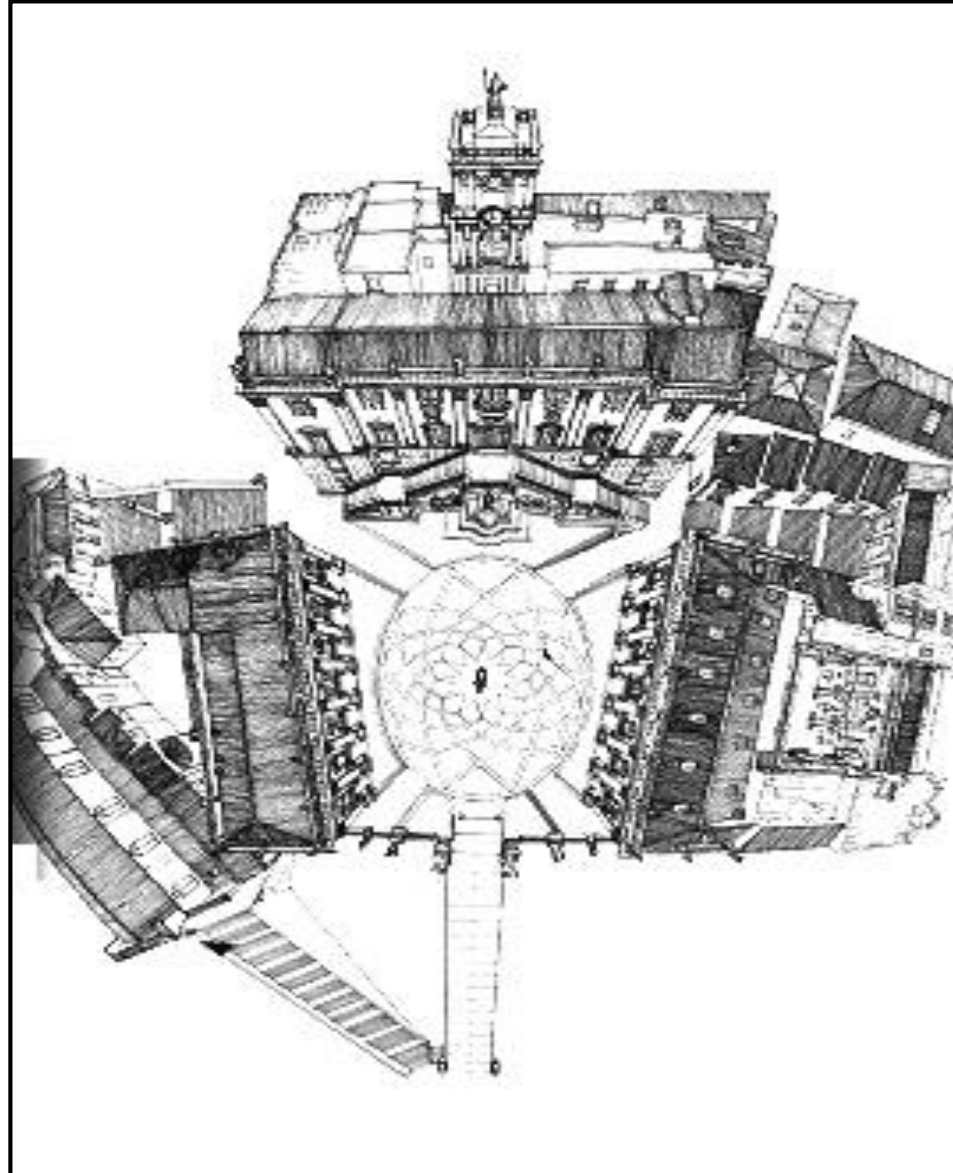
Leonardo da vinci (1452~1519)



4. Renaissance, Baroque / 캄피돌리오



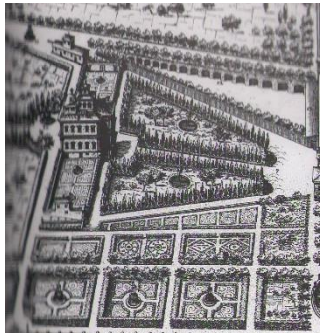
중세시대



르네상스 도시디자인 이후, Michelangelo 28

4. Renaissance, Baroque / 베르사이유

- 전제왕권 상징
- 강력한 대각선 형태



로마, 빌라 몬탈토, 1642, 정원의 세 갈래 길

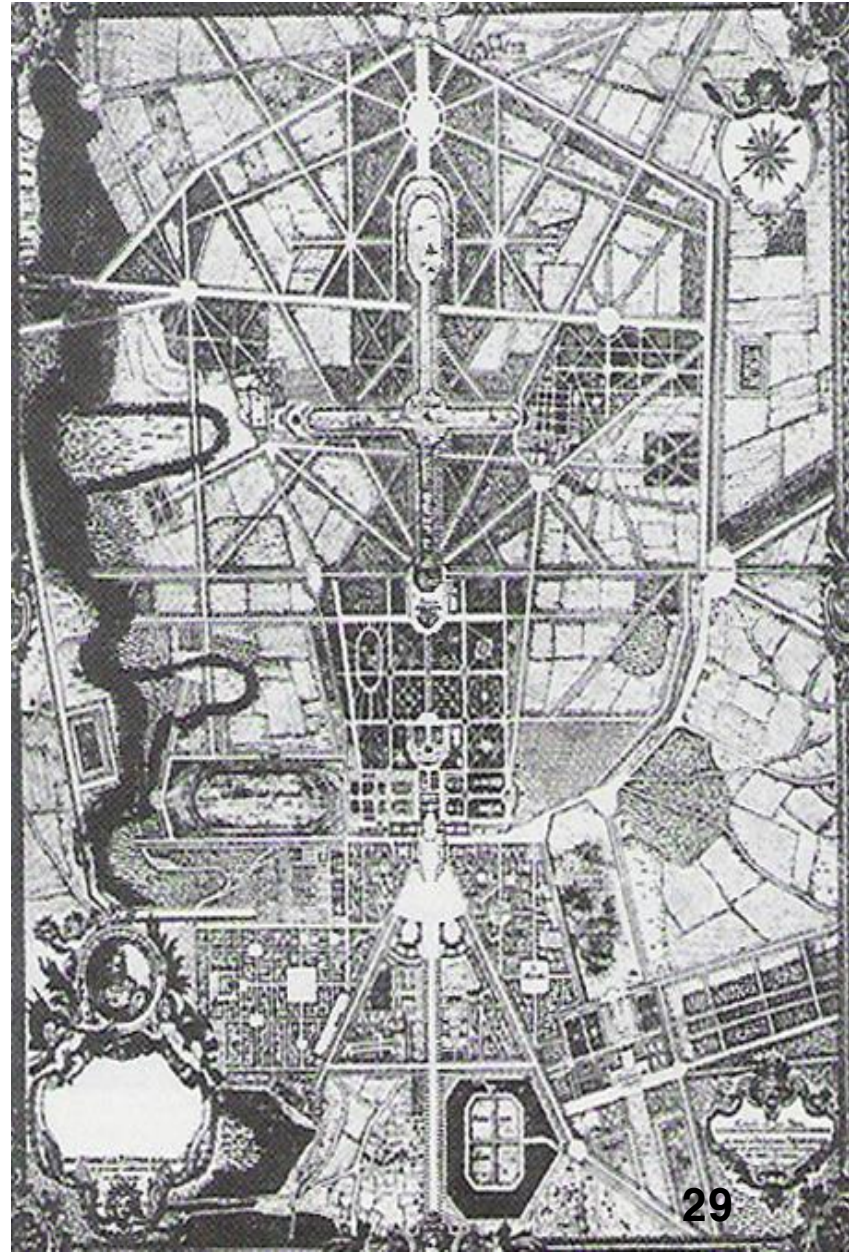
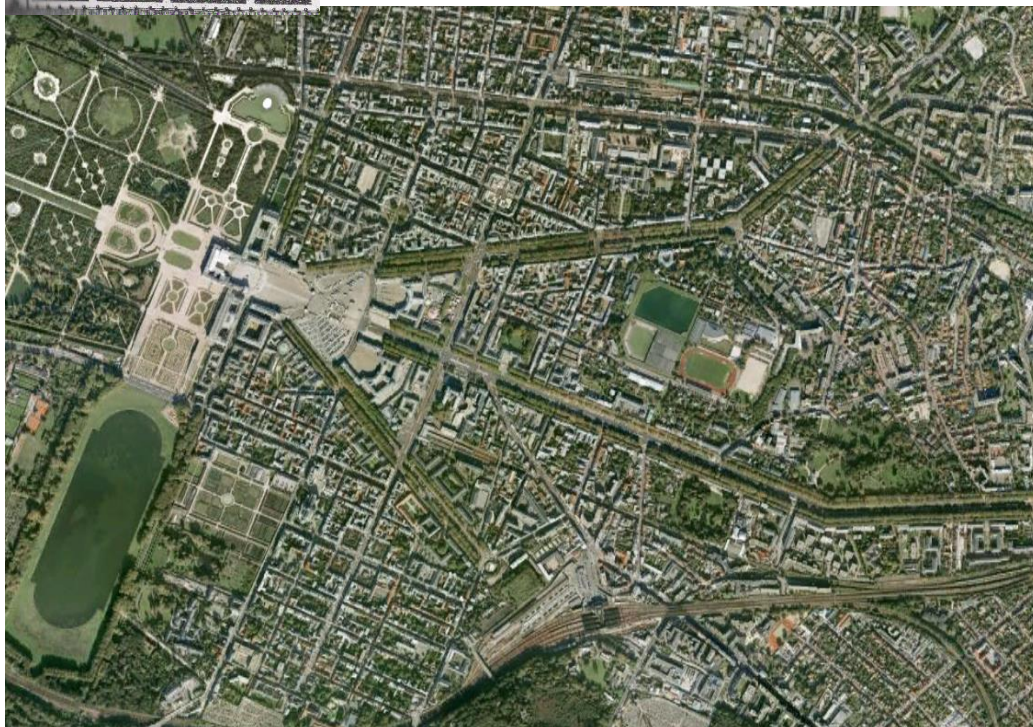
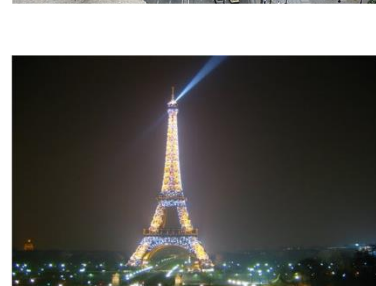
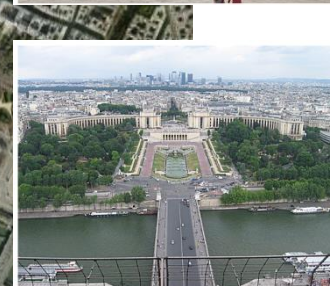
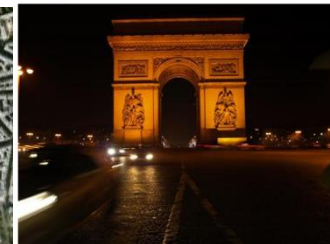
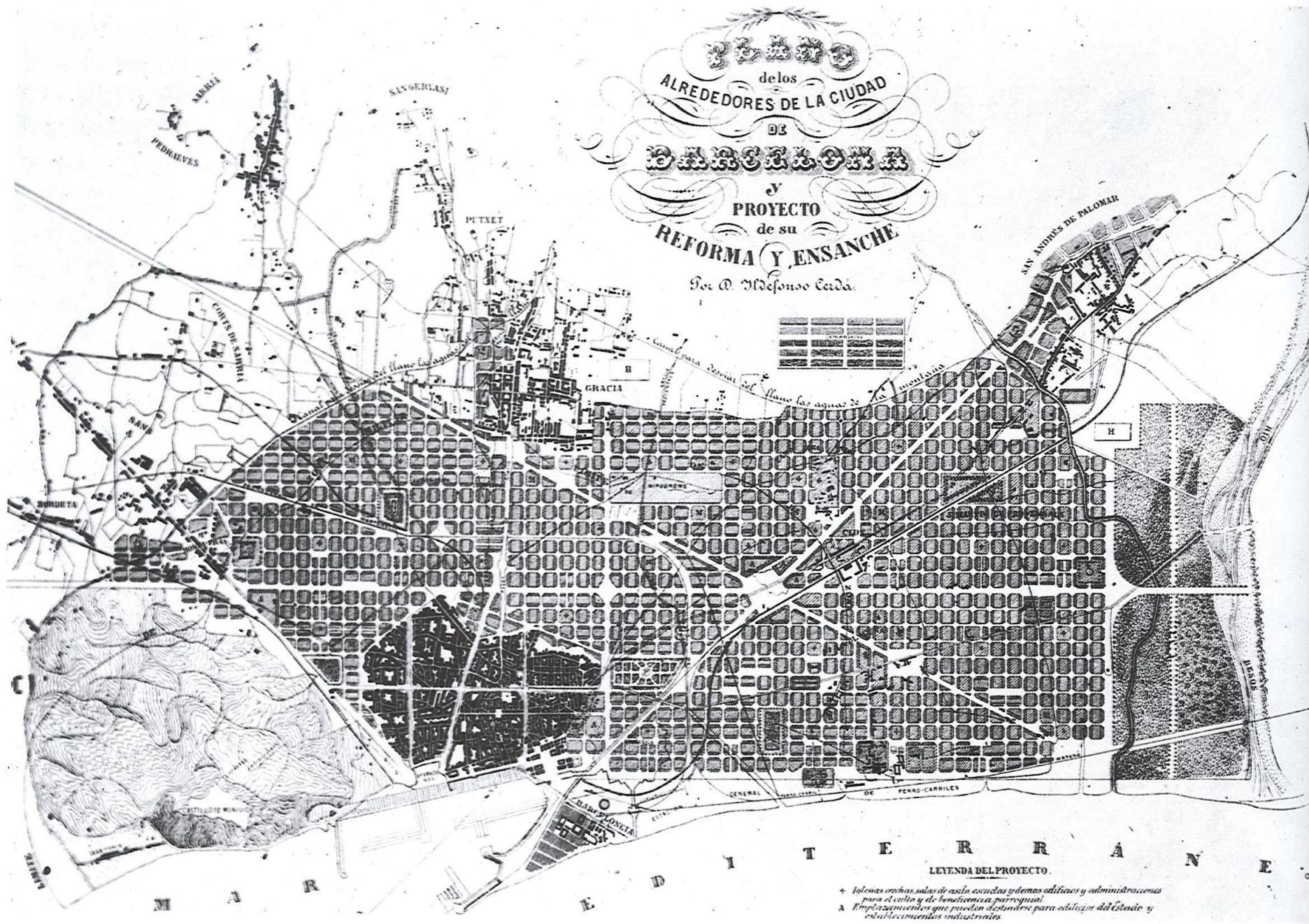




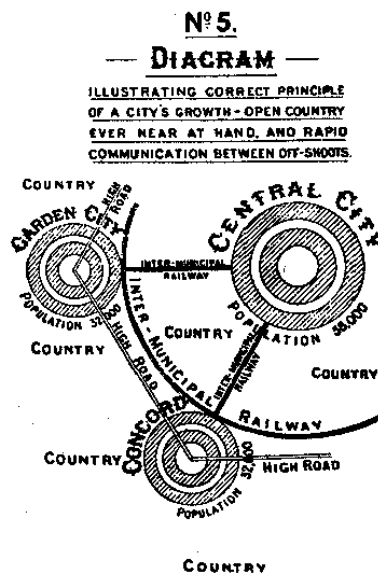
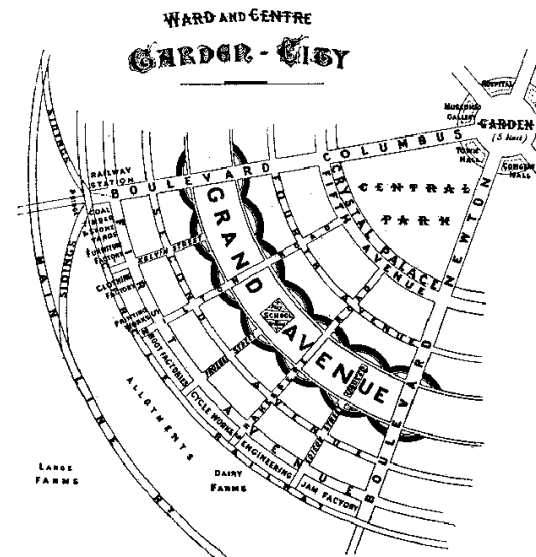
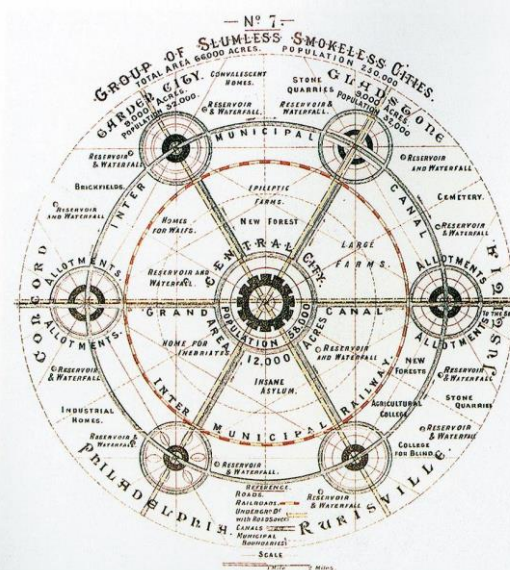
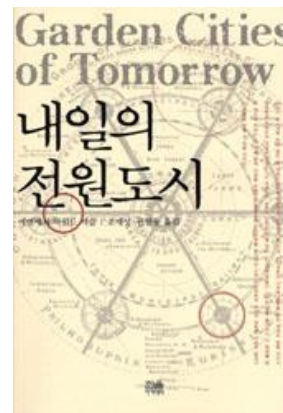
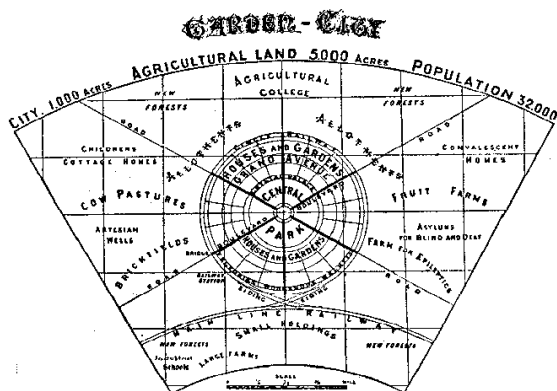
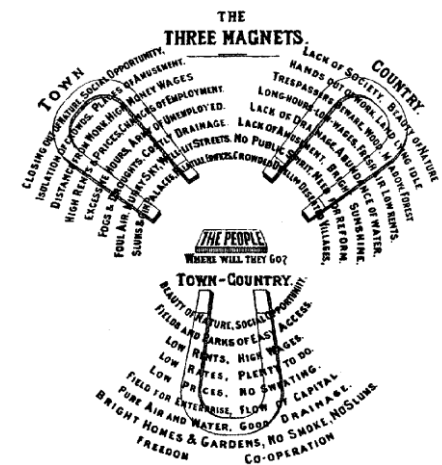
Image © 2009 Aerodata International Surveys



Google



3. 전원도시이론 Garden City

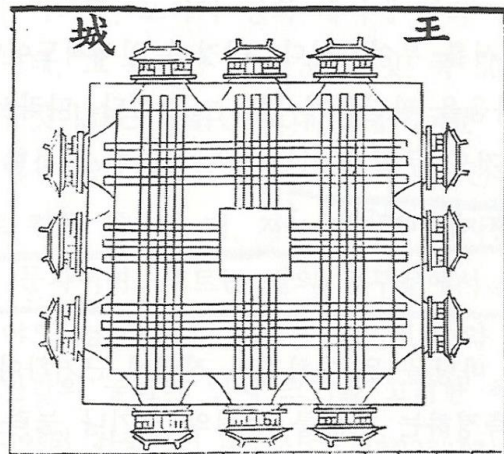


1. 한국의 전통적인 배치

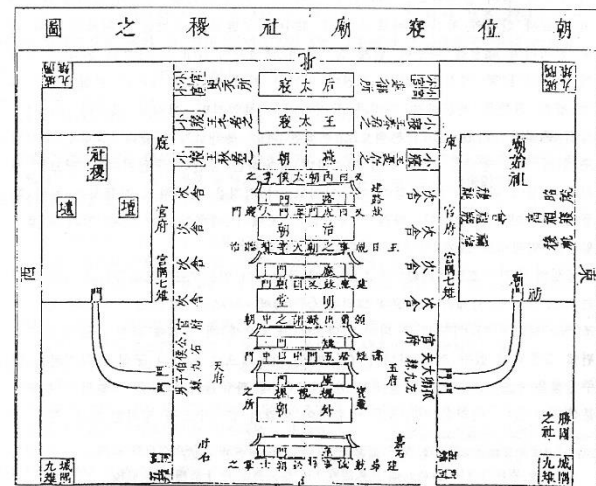
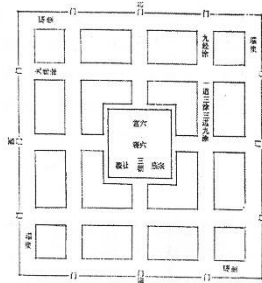
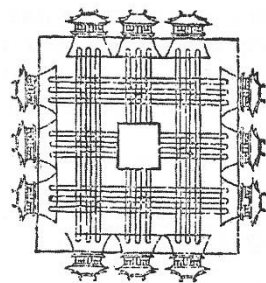
궁궐-백제(부소산성)

Buso Mountain Fortress
BaekJe Dynasty

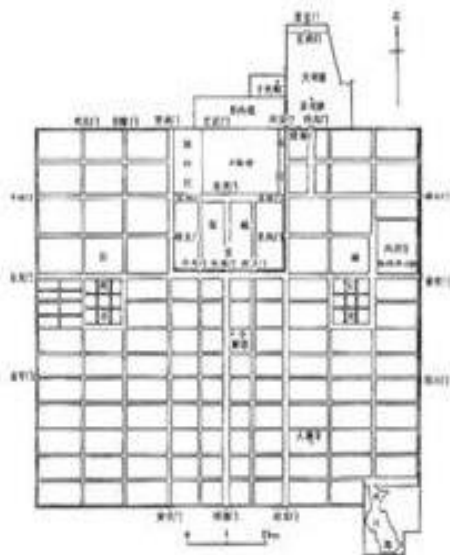




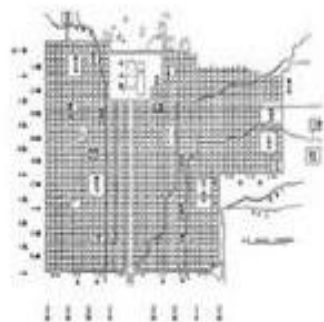
聶崇義『三禮圖』의 「王城圖」와
戴震의 『考工記圖』의 「王城圖」



『周禮』의 궁성계획에 따른 궁궐내부구조



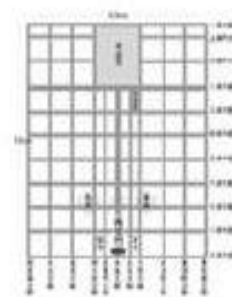
장안성



평성경



등원경



평안경



상경용천부

1. 한국의 전통적인 배치

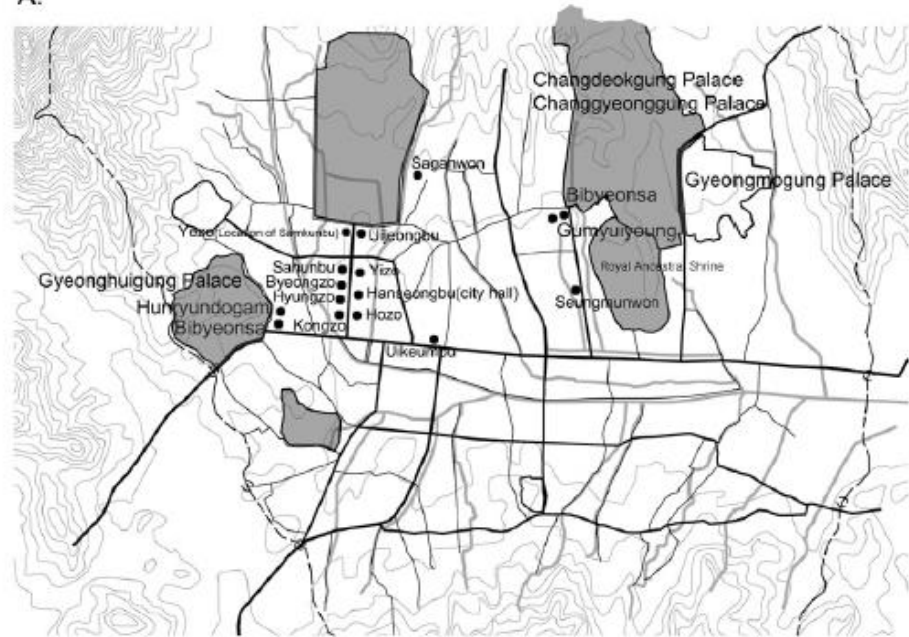


서울의 도시공간구조

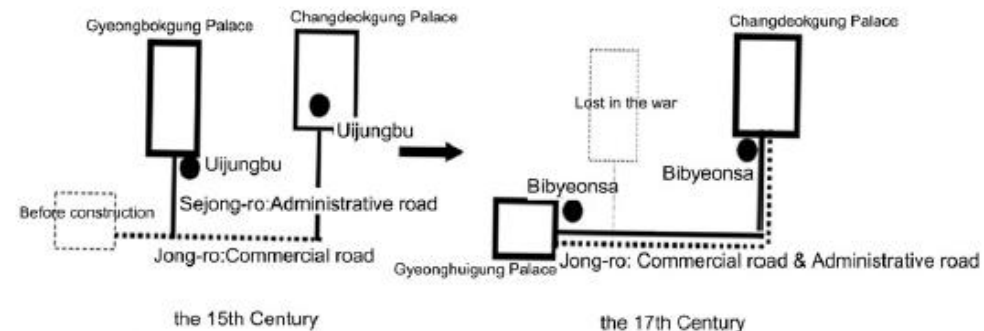
Ys.Kwon et al., 2015. The Seventeenth-century Transition of Seoul's Spatial Structure to Functional Pragmatism, Journal of Asian Architecture and Engineering



A.



B.

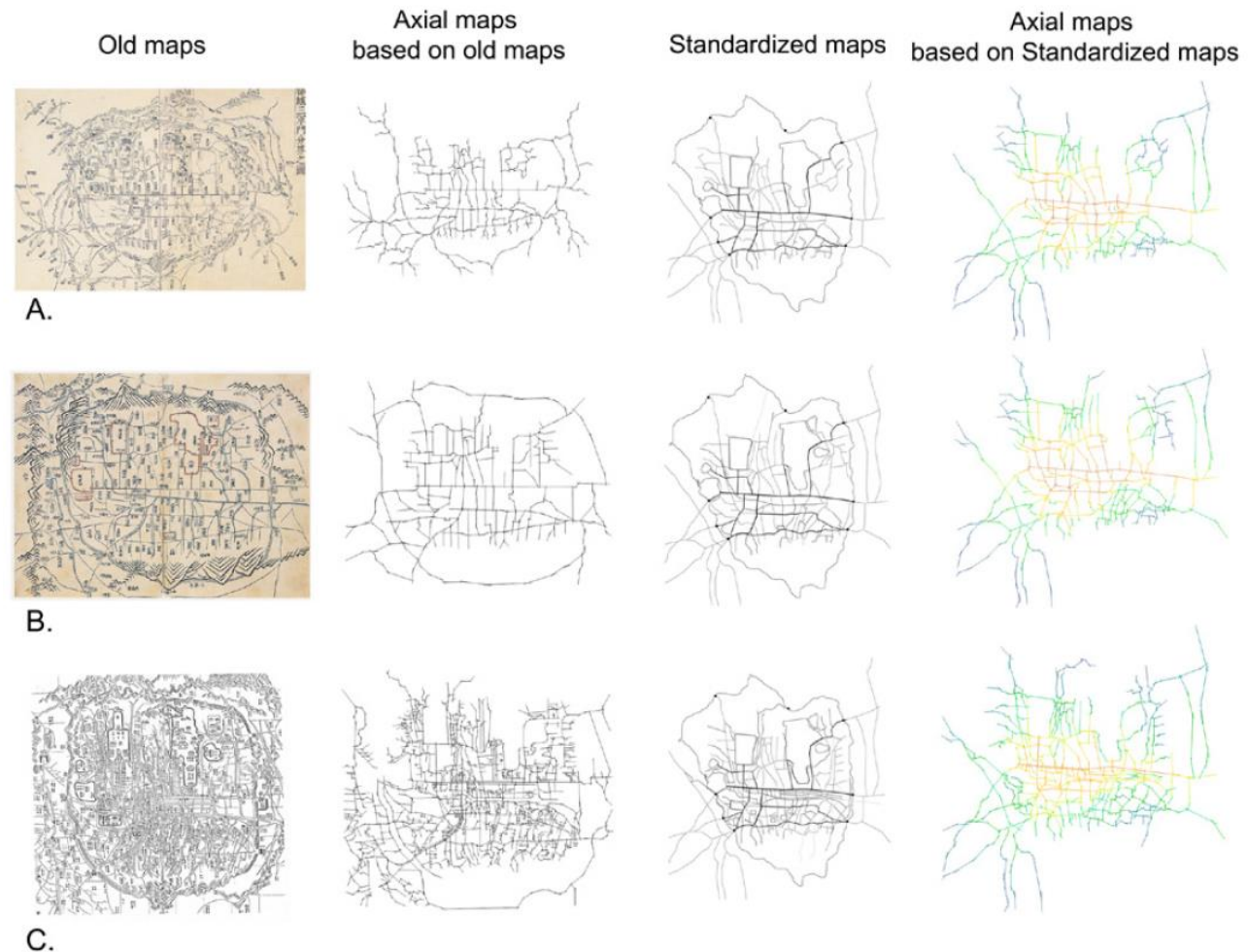


C.

서울의 도시공간구조

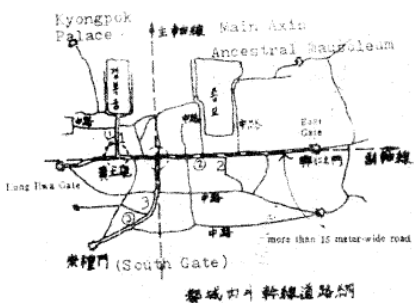
Ys.Kwon et al., 2015. The Seventeenth-century Transition of Seoul's Spatial Structure to Functional Pragmatism, Journal of Asian Architecture and Engineering

The Space Syntax Analysis Procedure (A: The 1751 Map of Seoul (Dosung Samkunmun Bungoejido); B: The 1861 Map of Seoul (Daedong Yojido); C: The 1902 Map of Seoul (Hanseongbu Jido))



서울시 도시형태 형성

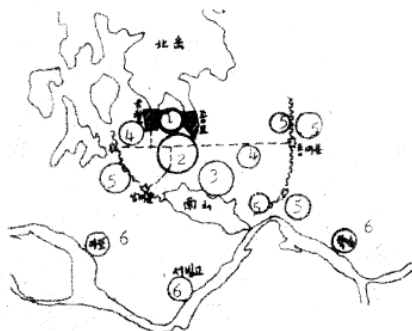
주종원, 1981. 서울시 도시형태의 형성에 관한 연구, 국토계획



1. Main Road for King and Administrative District
2. Shopping Road
3. Road for Envoies

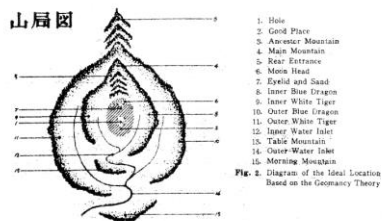
Fig. 7. Main Road Network within the Wall

lanes were not systematic and the width of many lanes was only one meter. With the lapse of time the main streets and the middle streets were narrowed by temporary stores or houses which were built in violation of the regula-



1. North Village where High Officials lived
2. Shopping area
3. South Village where scholars lived
4. Offices of the Middle Men(physical doctors, interpreters, and artisans) and Military Training Center
5. Slum Area
6. Satellite Cities alongside the River

Fig. 8. Locations of the Different Centers and Areas



The sites of the important buildings were selected applying the geomancy theory.

Fig. 9. Old Map of Seoul City

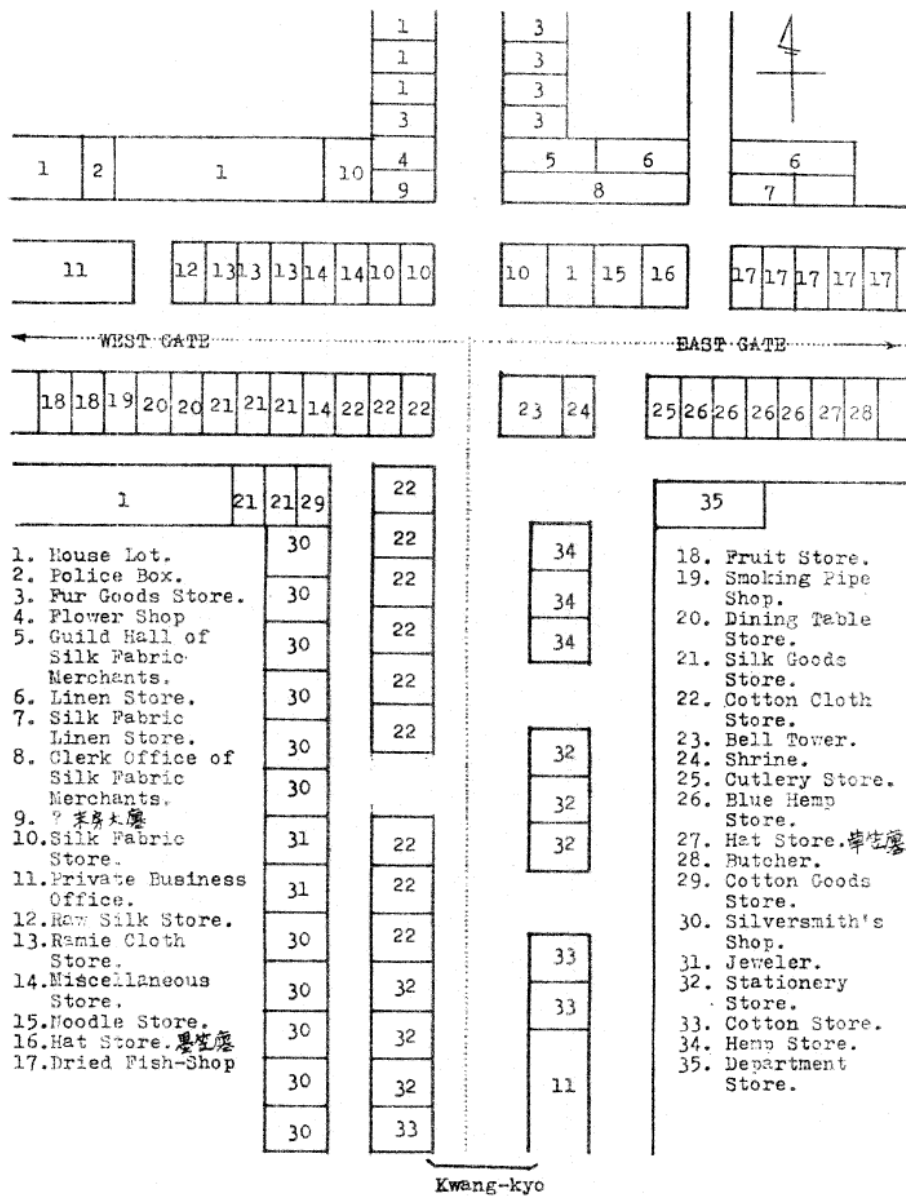


Fig. 9. Plan of Market in Seoul

Fig. 1. "Ssu-shen (Four Deities) Tile," Ink-rubbing, ca. 200 B.C.

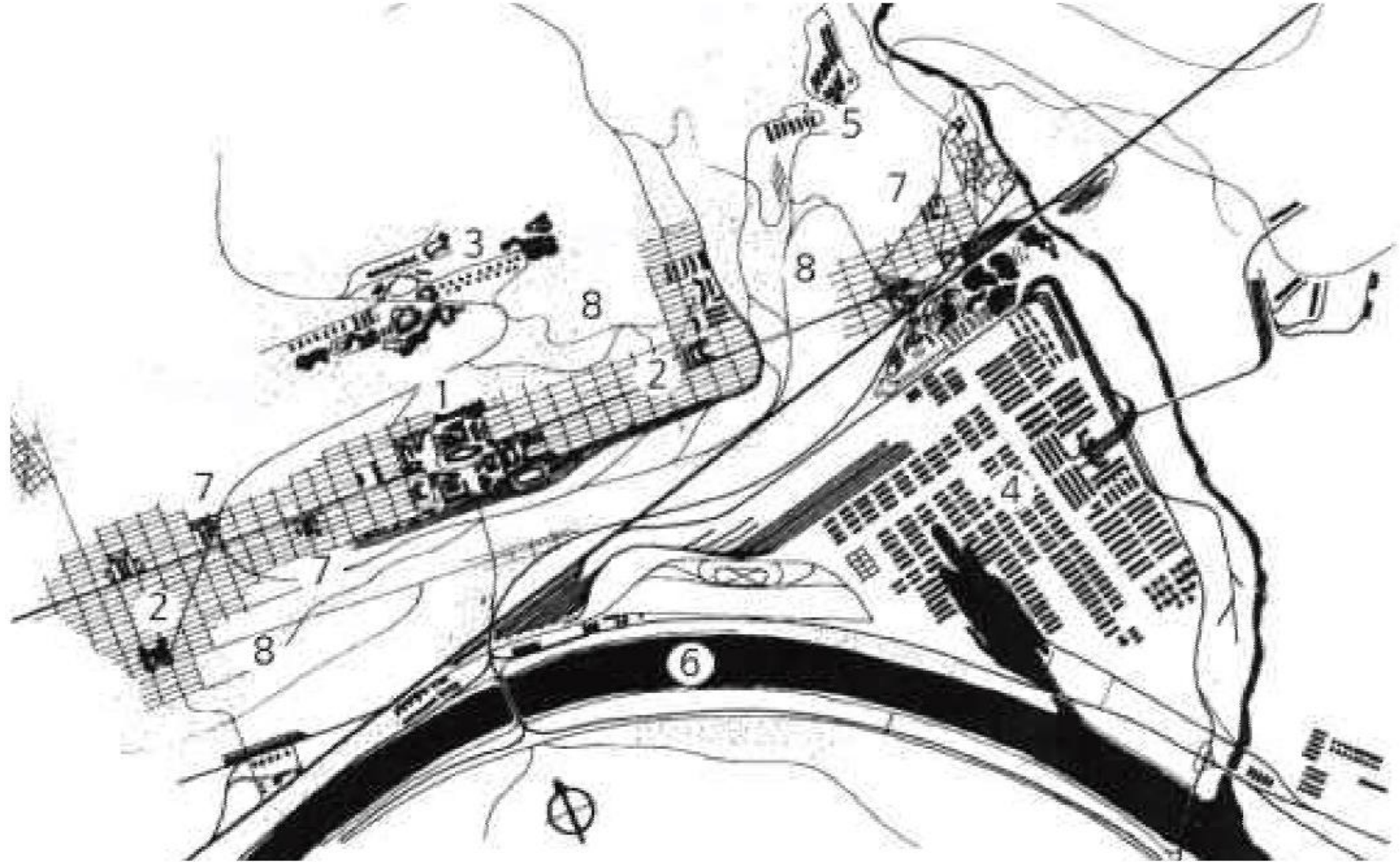
#2 Utopian, Modernism, Planning Theory

Theory of Urban Structure

Kwon, Young Sang

Seoul National University

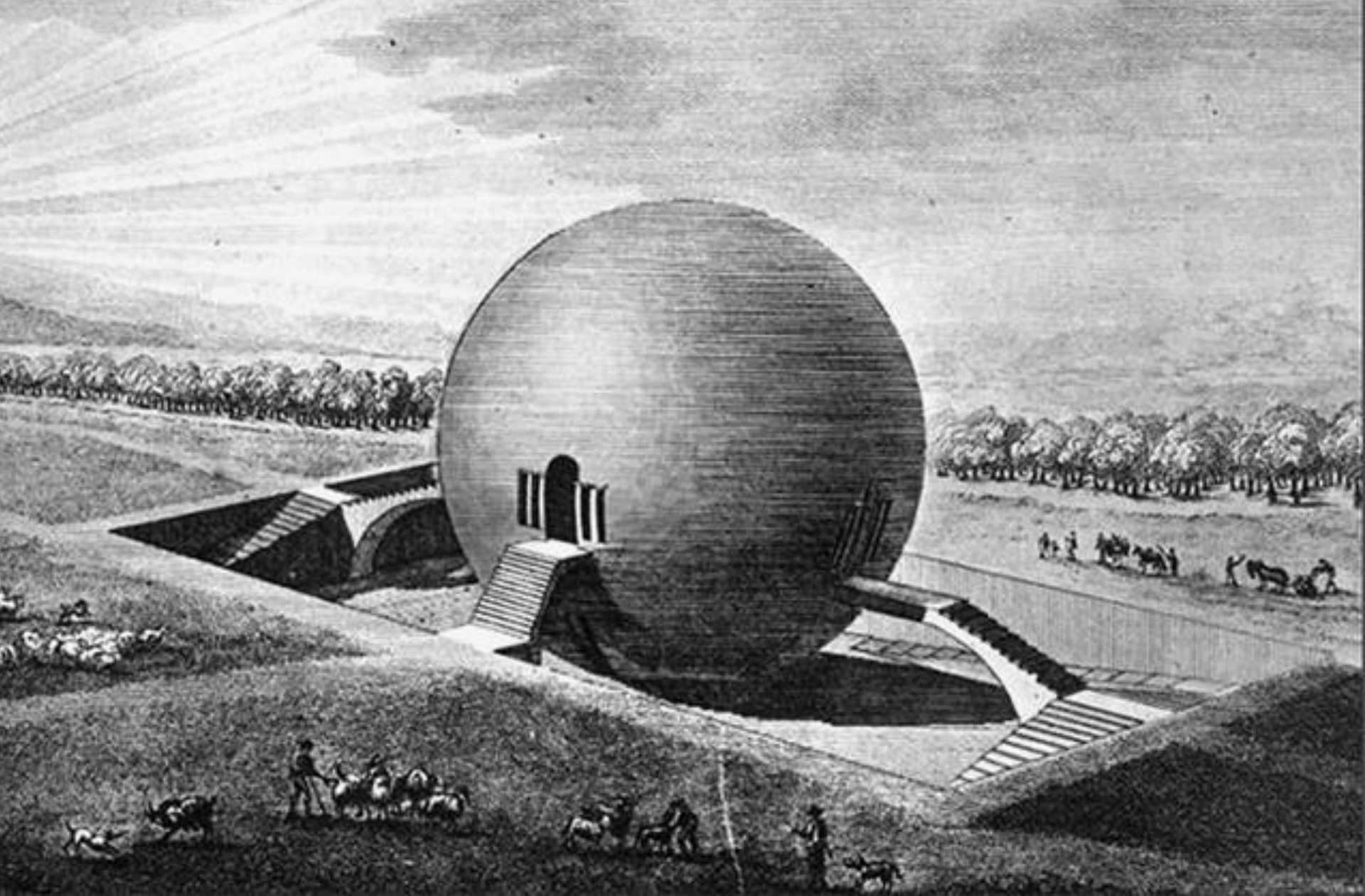
Department of Civil and Environmental Engineering, Urban Design Major



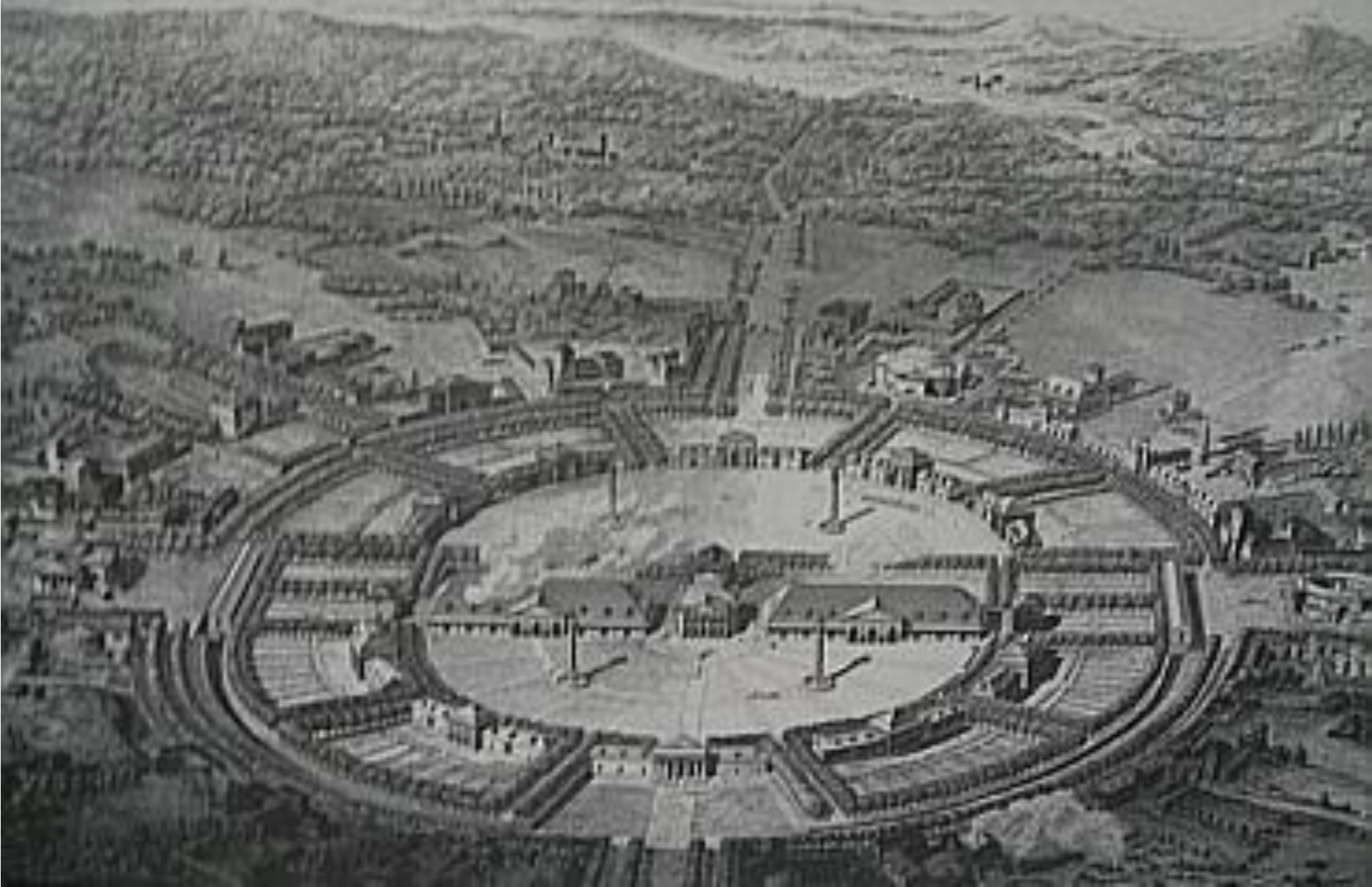
범례 : 1. 공공시설 2. 주거지역 3. 병원지역 4. 공장지역
5. 기존도심 6. 철도시설 7. 초등학교 8. 녹지지역

그림 10. 토니 가르니에의 공업도시 배치도 다이어그램

Claude Nicolas Ledoux(1736.3.21~1806.11.18), Ideal Shepard's House (Sphere) 이상적인 양치기의 집

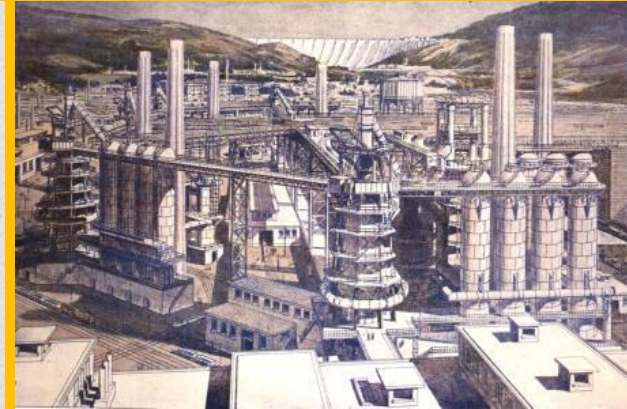
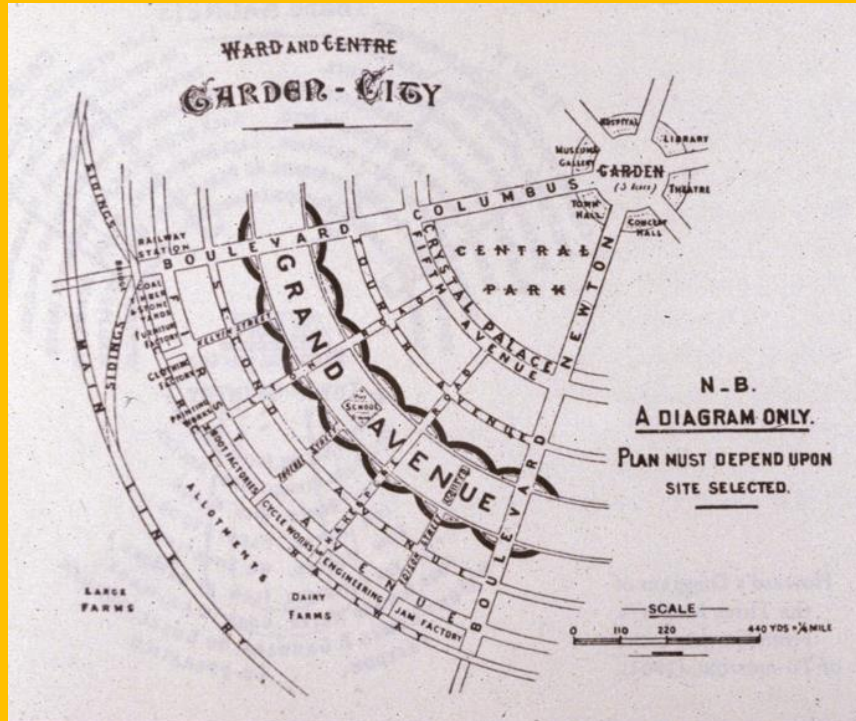


Claude Nicolas Ledoux, Ville de Chaux, 18th century 쇼우 이상도시계획안

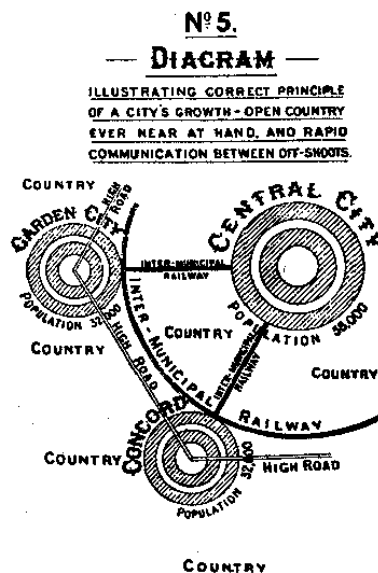
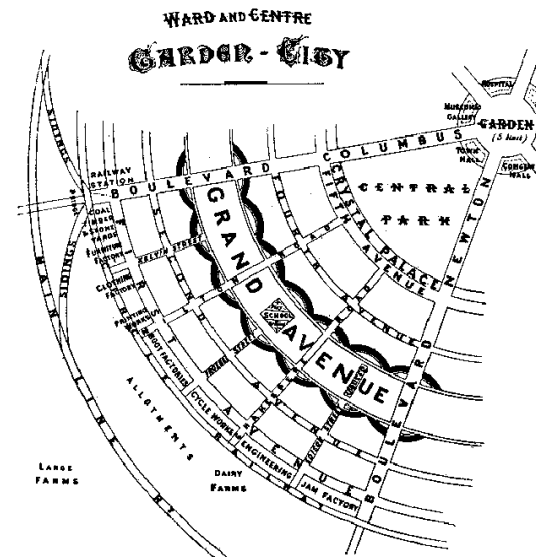
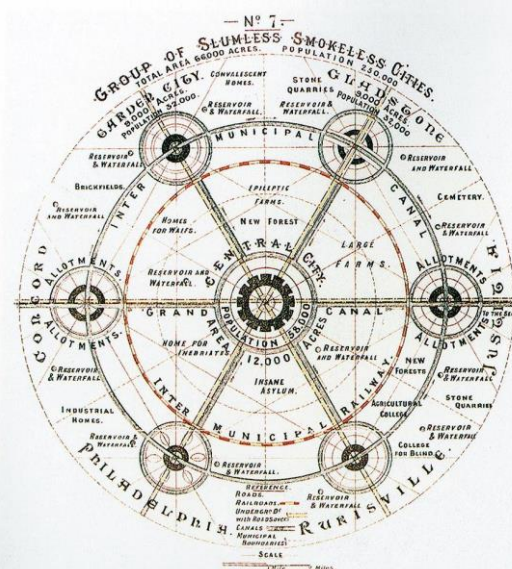
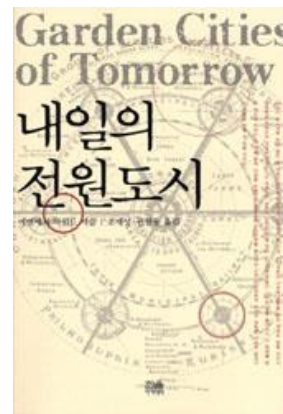
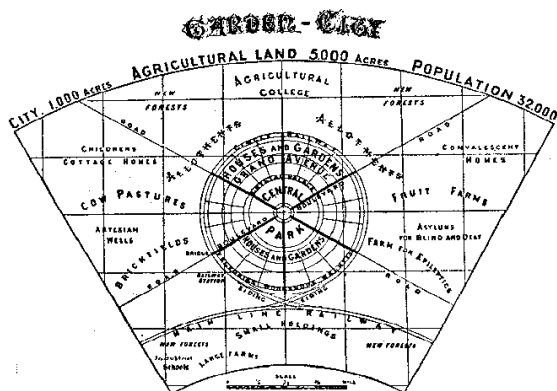
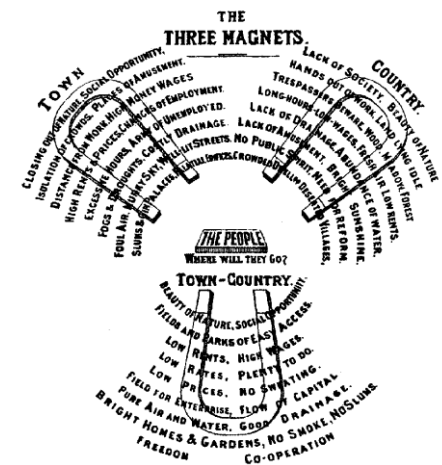


3. 전원도시이론 Garden City

- **Garden City** 전원도시, **E. Howard** 에베네저 하워드
 - realization of the concept of ideal city during 19th century
 - self-sufficient city with housing, farming, manufacturing
- **The Cite Industrielle** 산업도시, **Tony Garnier** 토니 가르니에
 - Linear city 선형도시, composed with rail road and pedestrian path 철도와 보행도로

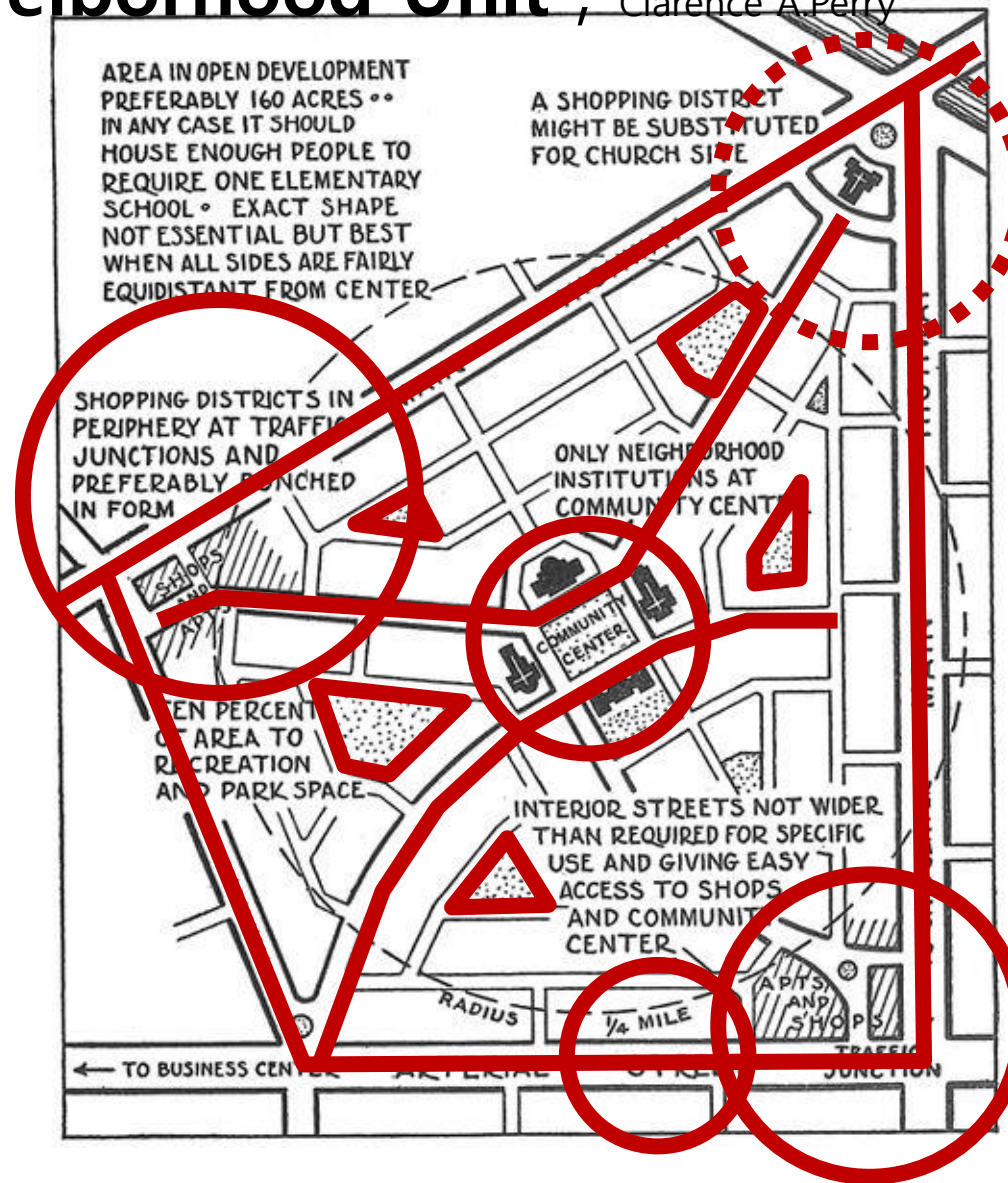


3. 전원도시이론 Garden City



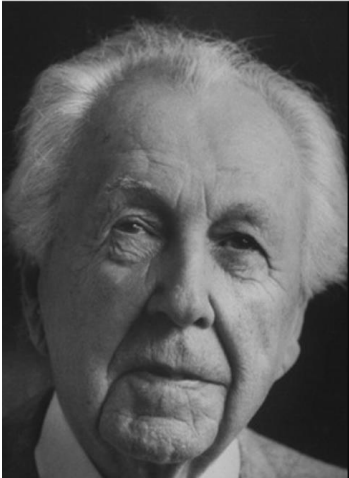
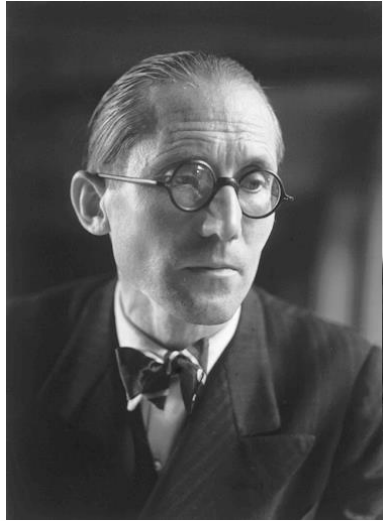
4. 1924, 근린주구이론 Neighborhood Unit ; Clarence A Perry

- A diagram of Clarence Perry's neighborhood unit,
- illustrating the spatiality of the core principles of the concept, from the New York Regional Survey, Vol 7. 1929



Modernism

모더니즘



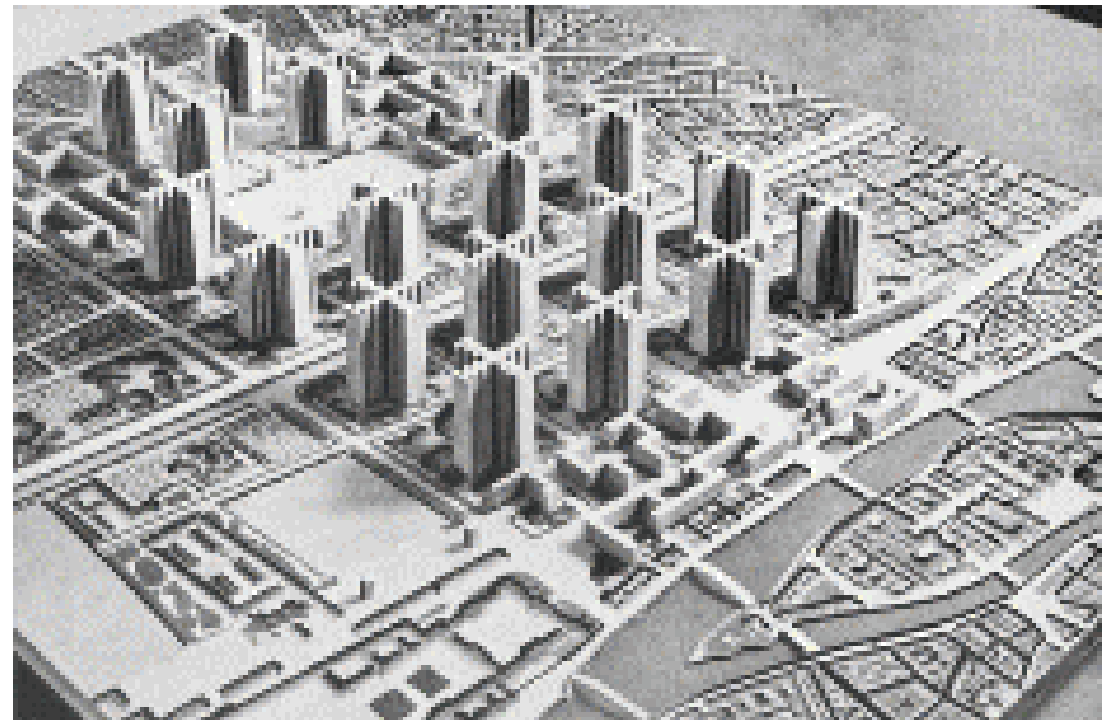
The good building is not one that hurts the landscape, but one which makes the landscape more beautiful than it was before the building was built.

— Frank Lloyd Wright —

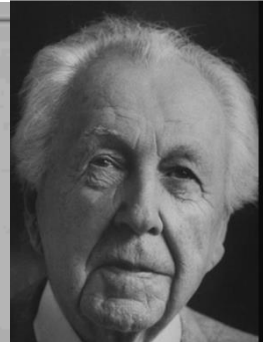
AZ QUOTES



5. Modernism 모더니즘

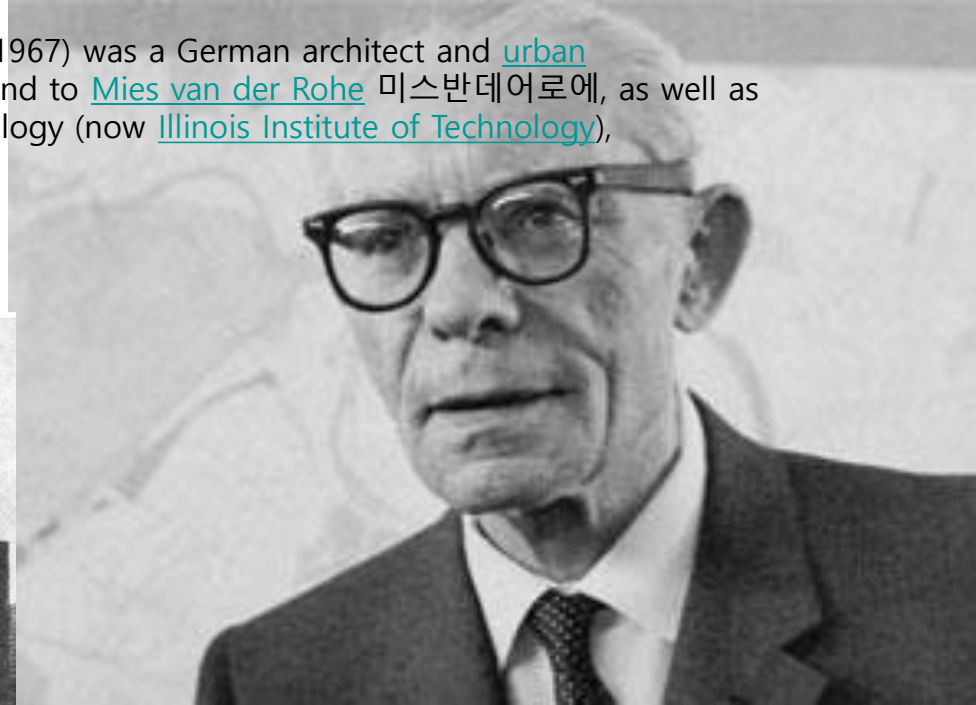


Plan Voisin, 1925 (paris, paper, not realized)

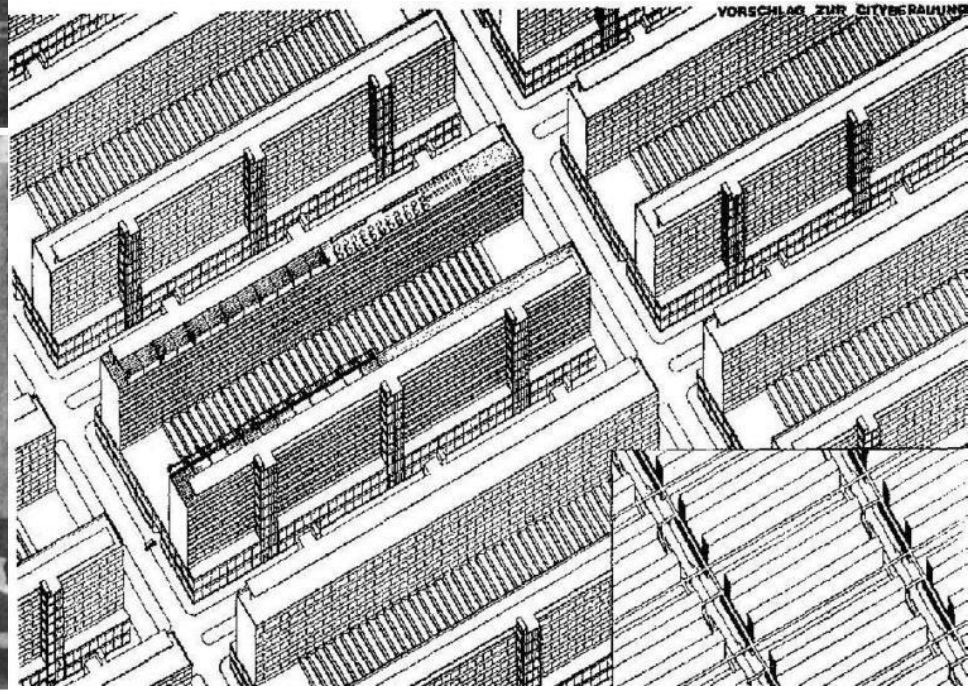
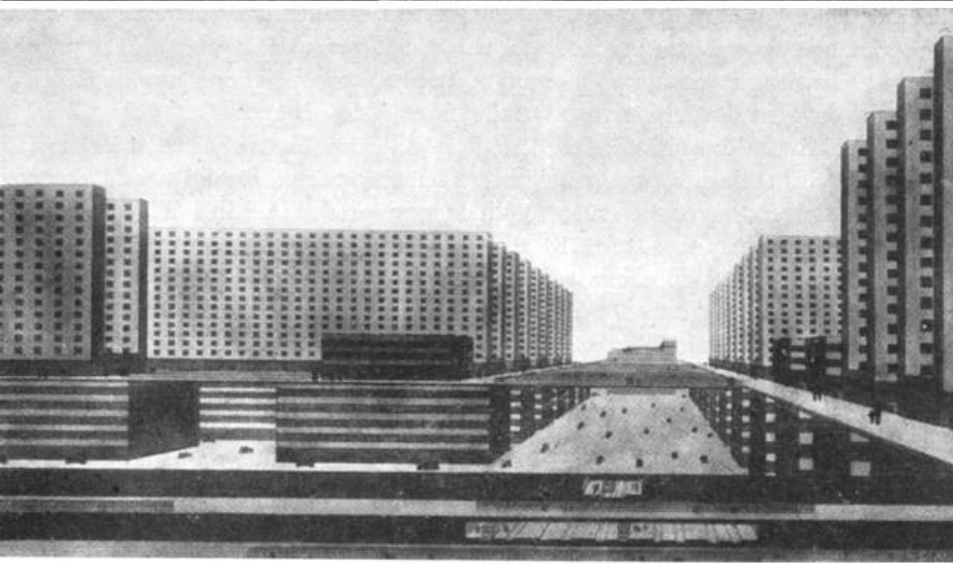
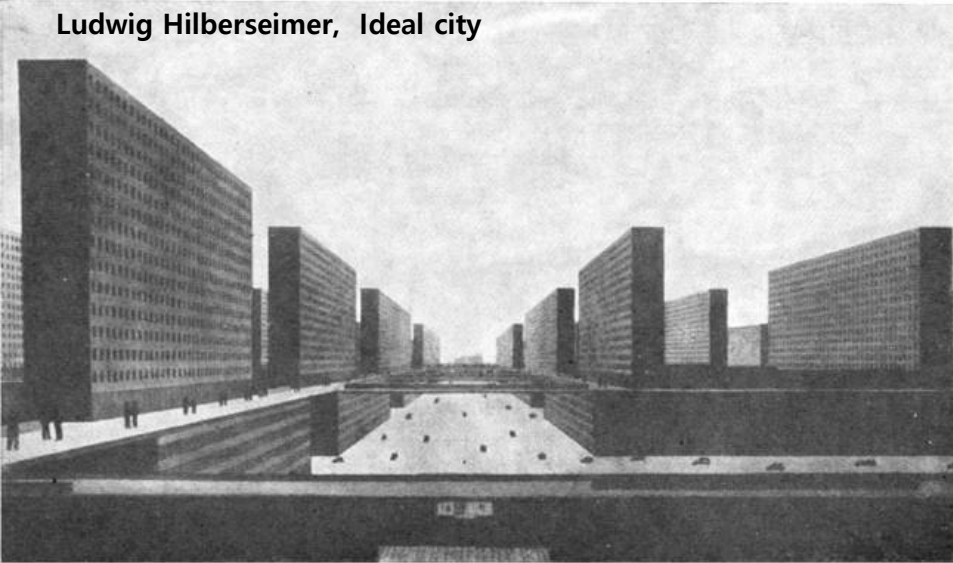


Frank Lloyd Wright
'Broadacre City'
The Living City 1958

Ludwig Karl Hilberseimer 루드비히 칼 힐베르자이머 (1885–1967) was a German architect and [urban planner](#) best known for his ties to the [Bauhaus](#) 바우하우스 and to [Mies van der Rohe](#) 미스반데어로에, as well as for his work in urban planning at Armour Institute of Technology (now [Illinois Institute of Technology](#)), in [Chicago](#), Illinois.

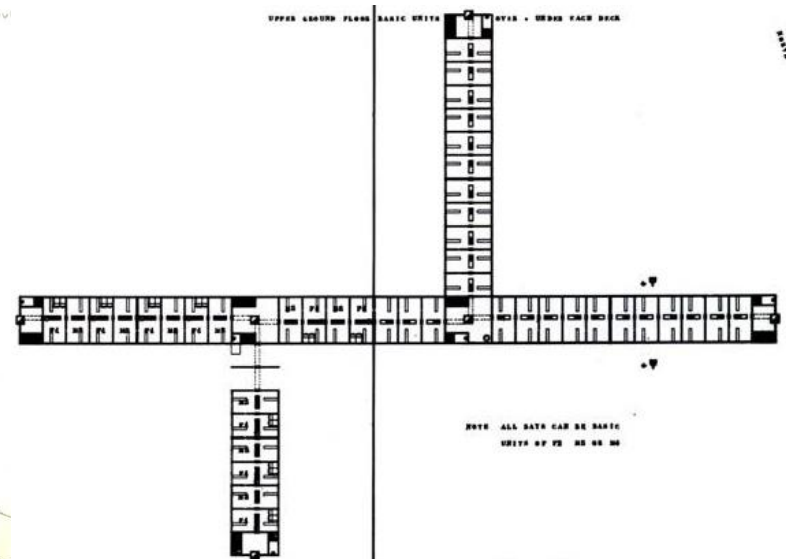
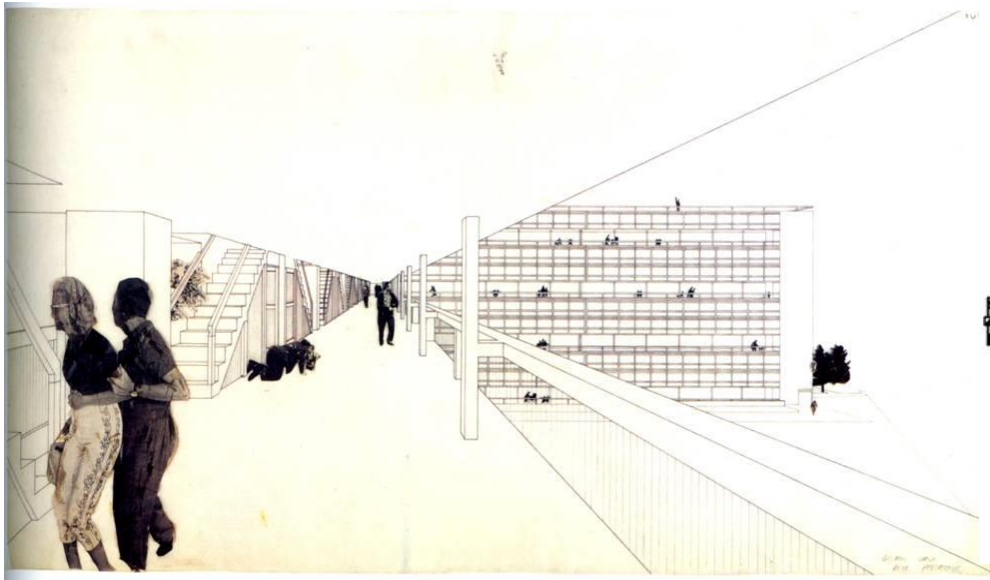


Ludwig Hilberseimer, Ideal city



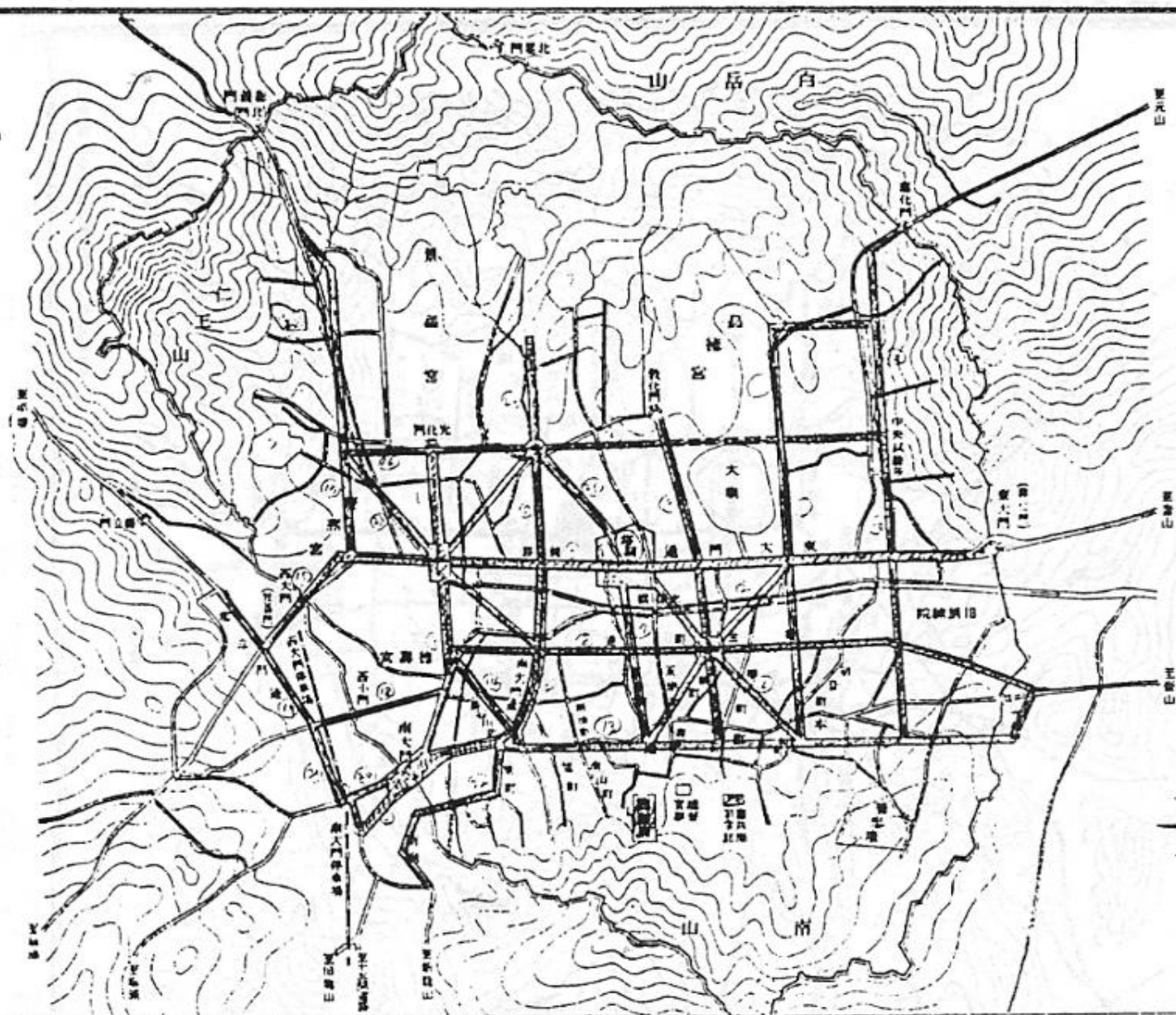
9. 1952, Golden Lane Housing; Smithson, Team X

- Prototype of housing district designed by Smithson, Team X
 - Hierarchical spatial structure
 - Housing-Road-Region-City
- **Team X(10)**
 - just as often referred to as "Team X", was a group of architects and other invited participants who assembled starting in July 1953 at the 9th Congress of [C.I.A.M.](#) and created a schism within CIAM by challenging its doctrinaire approach to [urbanism](#).

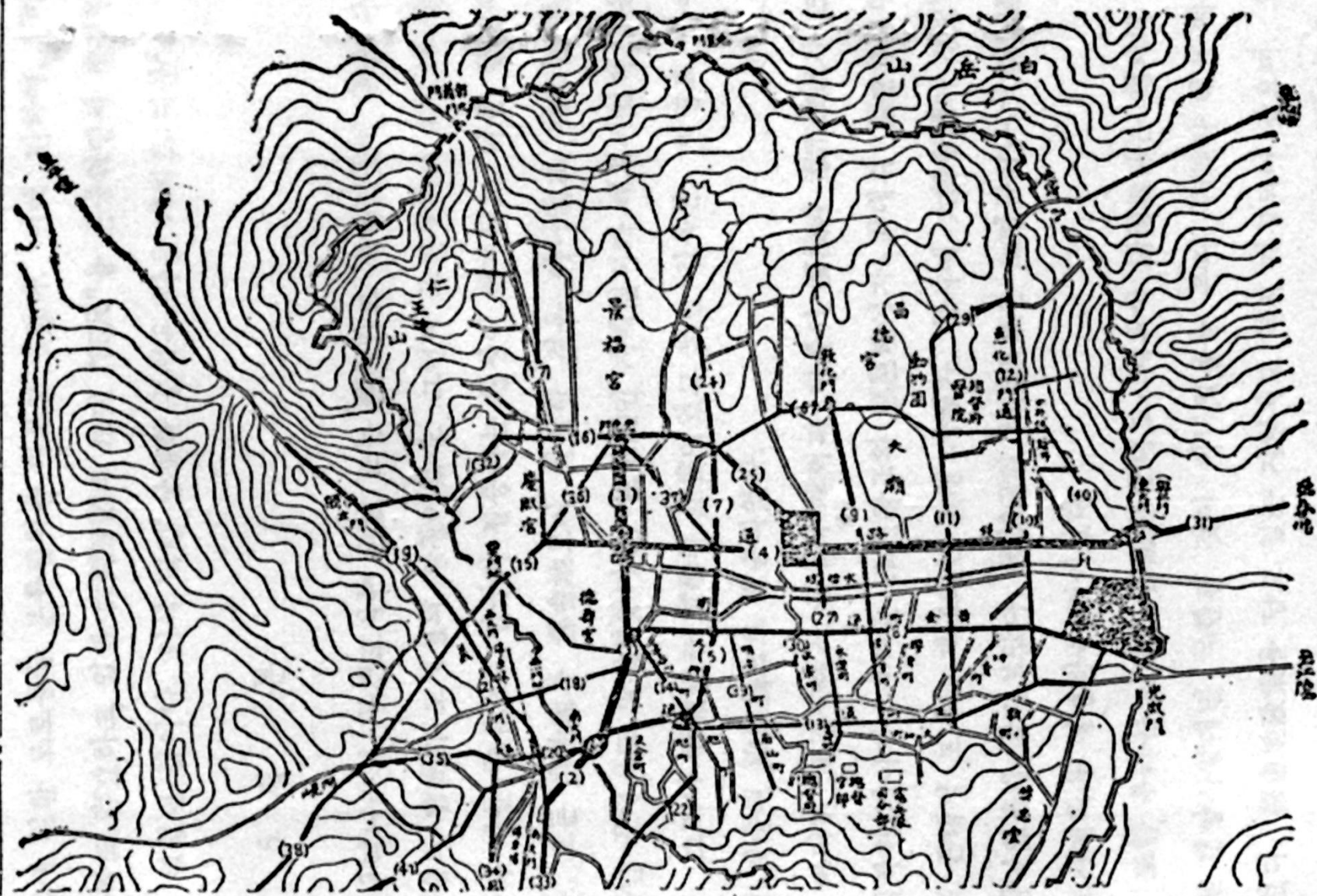


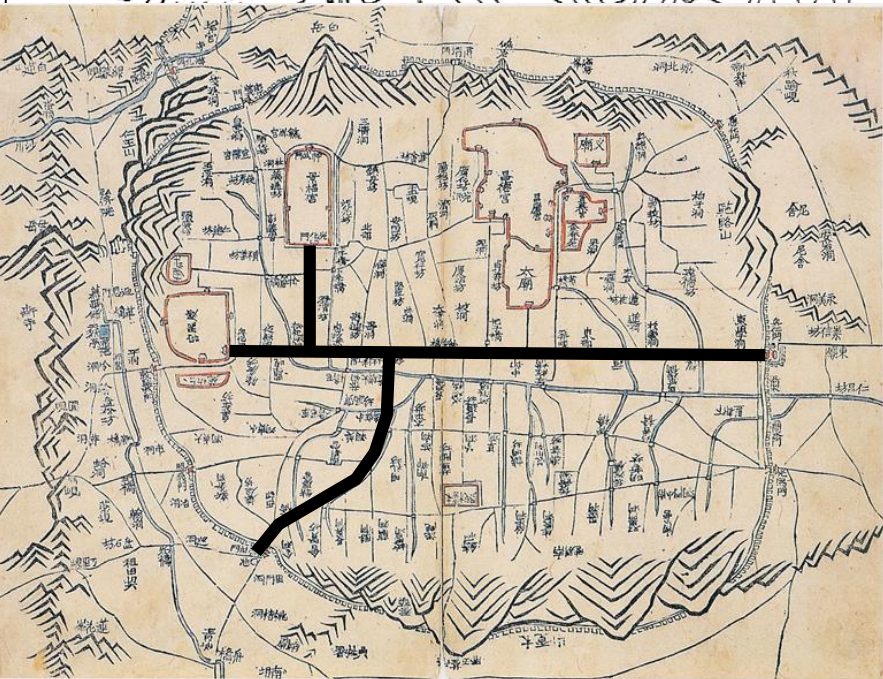
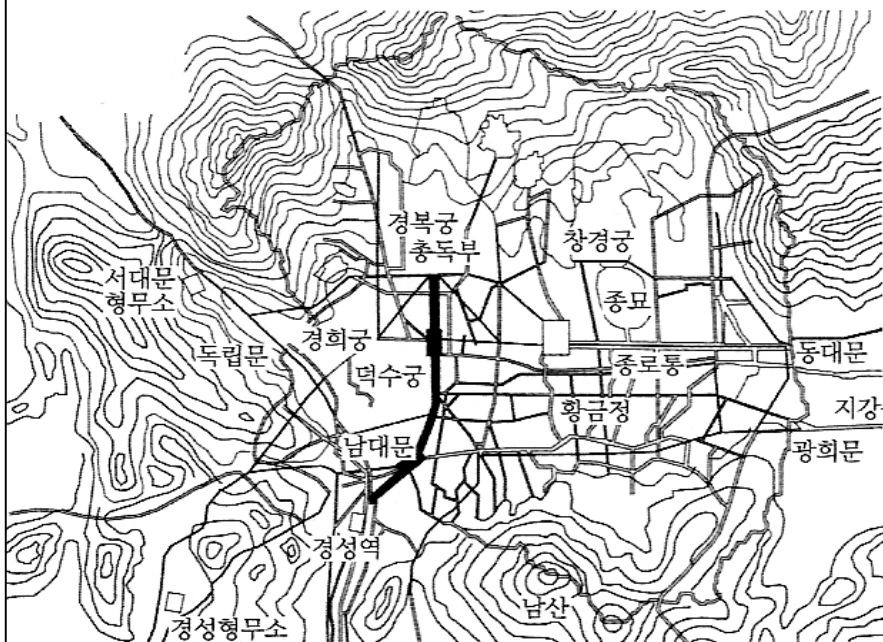
京城市區改修豫定計畫路線圖

縮尺三萬分之

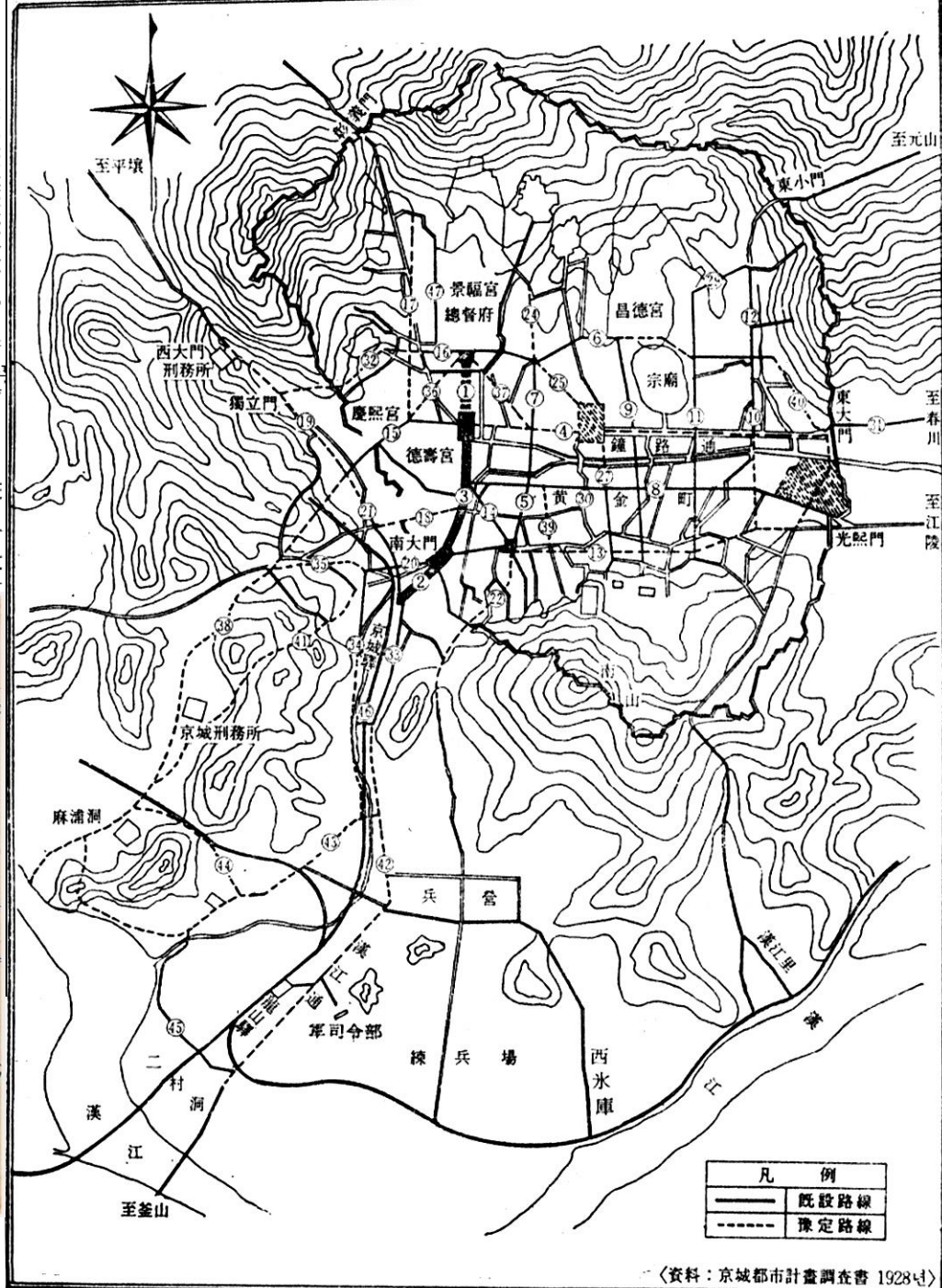


<그림 3> 경성시구개수에정계획로선도(1912.11.6.)





1928 총독부 고시 78호 경성지구개수에정노선

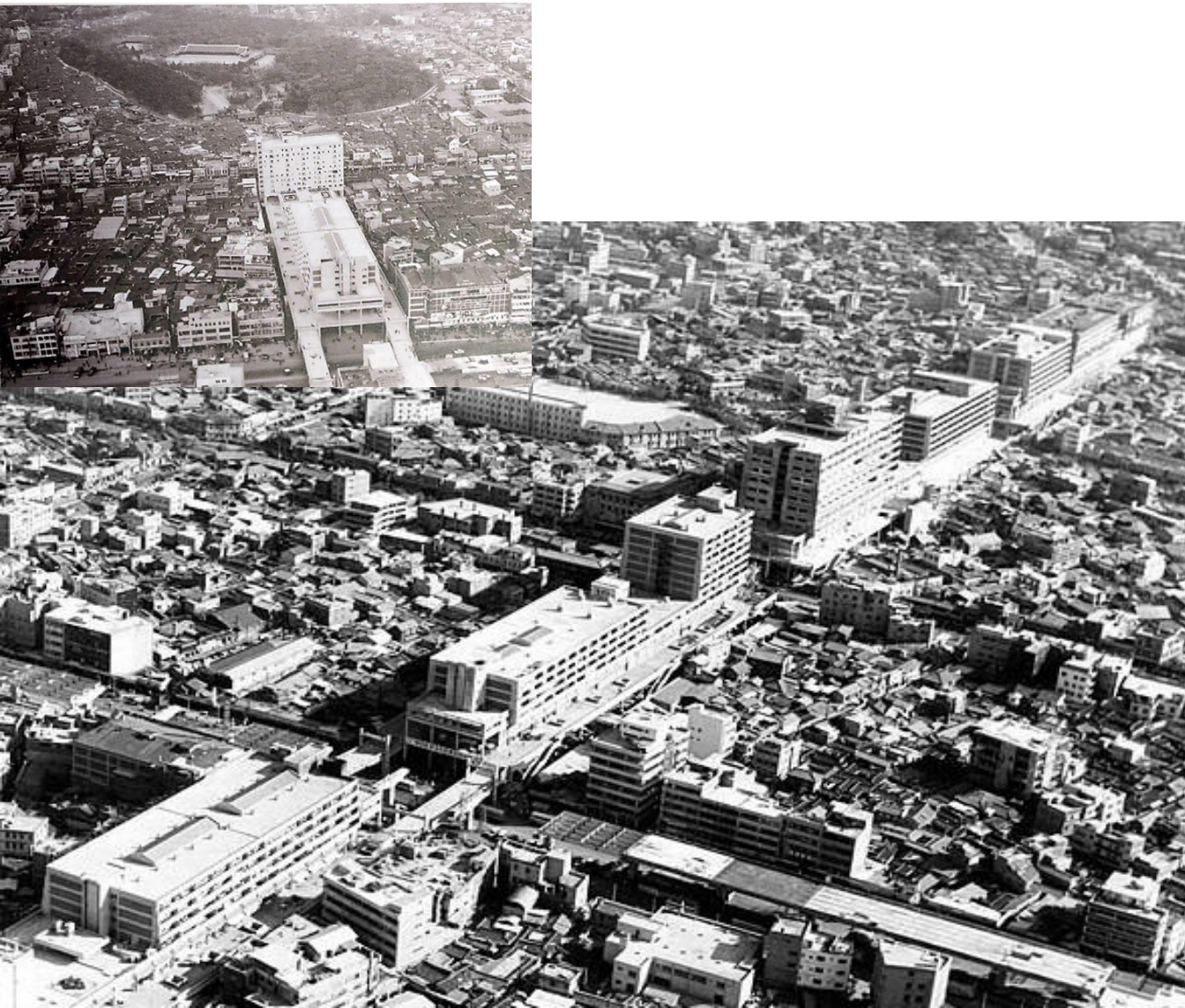


〈그림 1〉京城市區改修路線

〔資料：京城都市計畫調查書 1928년〕

외국 도시형태이론의 도입

세운상가, 1968



Le Corbusier, Plan Voisin, 1925



영동제2지구 토지구획정리사업 조감도

Gangnam District Development Plan, Seoul, 1973
Superblock, 600~1000m

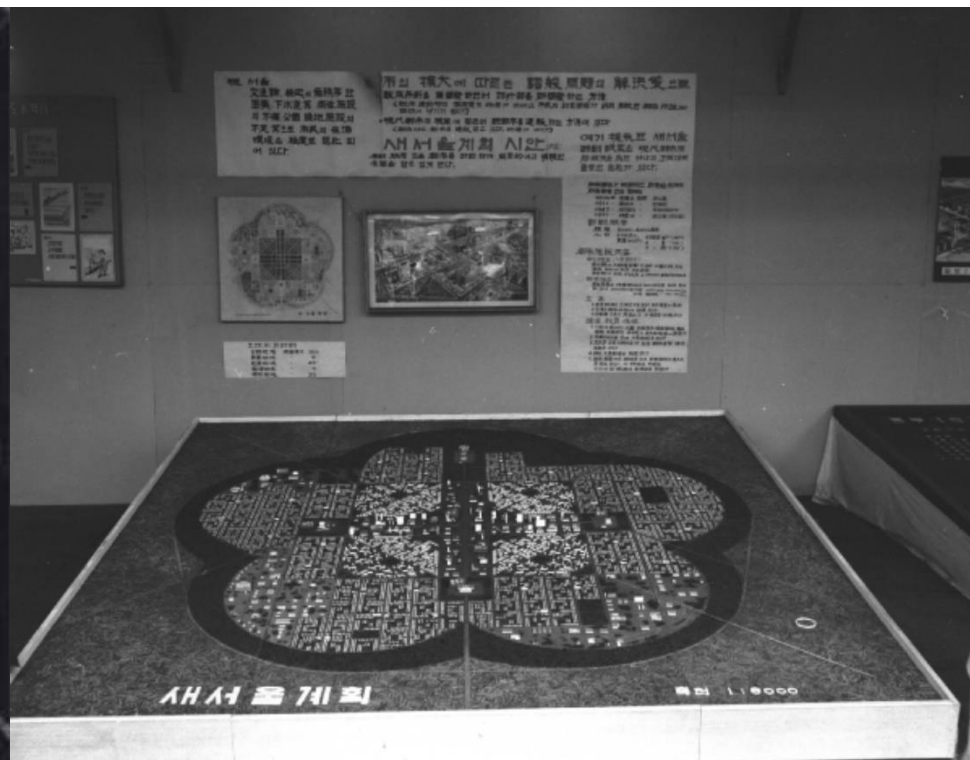
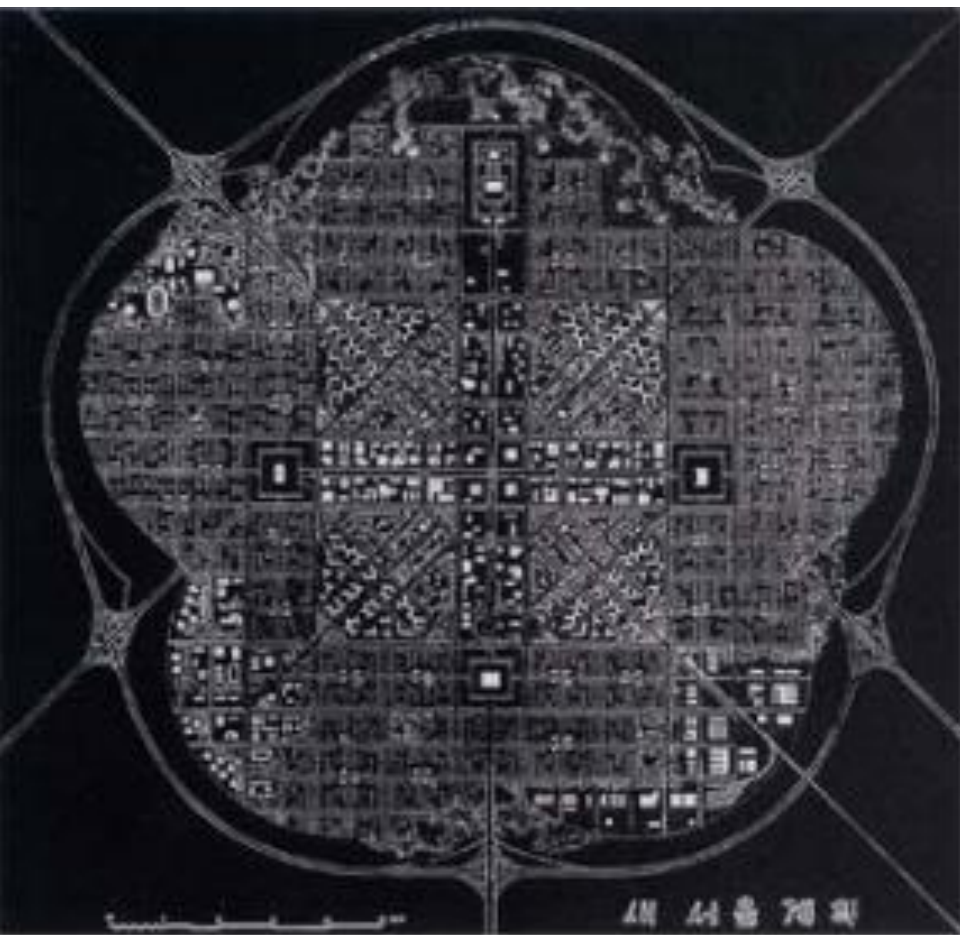
사업개요

총사업면적	365 만평
총사업비	73 억원
시행기간	1970-1973(4개년)

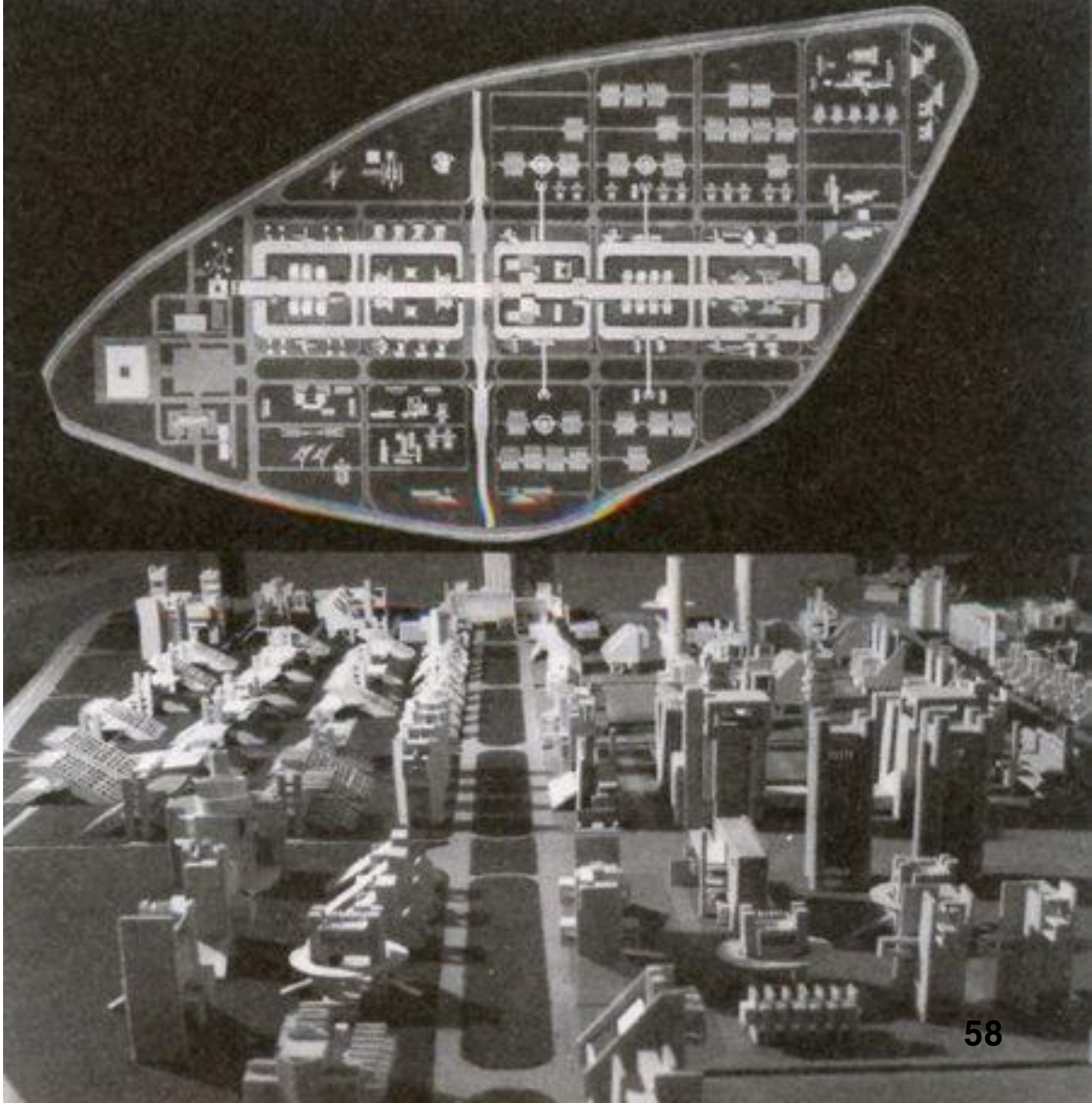
내용

택지	239 만평(69.6%)
도로	85 " (24.4%)
학교	5 " (1.5%)
시장	2 " (0.5%)
기타	14 " (4.5%)
계	345 만평(100%)

※ 자연공원 20만평 포함



Yoyuido, 1968,
Kim, Soogeun

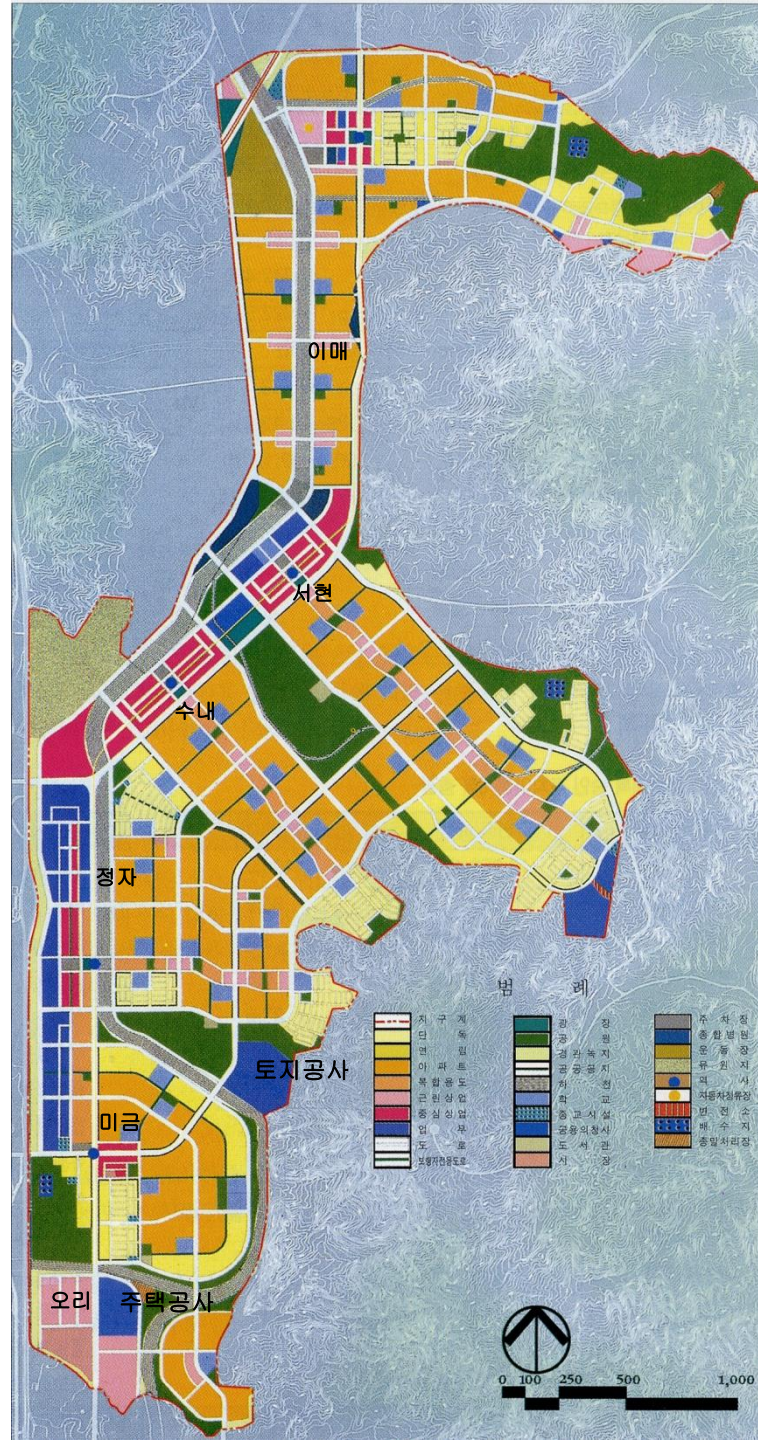




반포아파트단지 전경

자료 : 대한주택공사, 주택도시 40년, 2002, pp42~43

Bundang Newtown



#4 Post Modernism, New Urbanism

Theory of Urban Structure

Kwon, Young Sang

Seoul National University

Department of Civil and Environmental Engineering, Urban Design Major

Jane Jacobs (1916-2006)



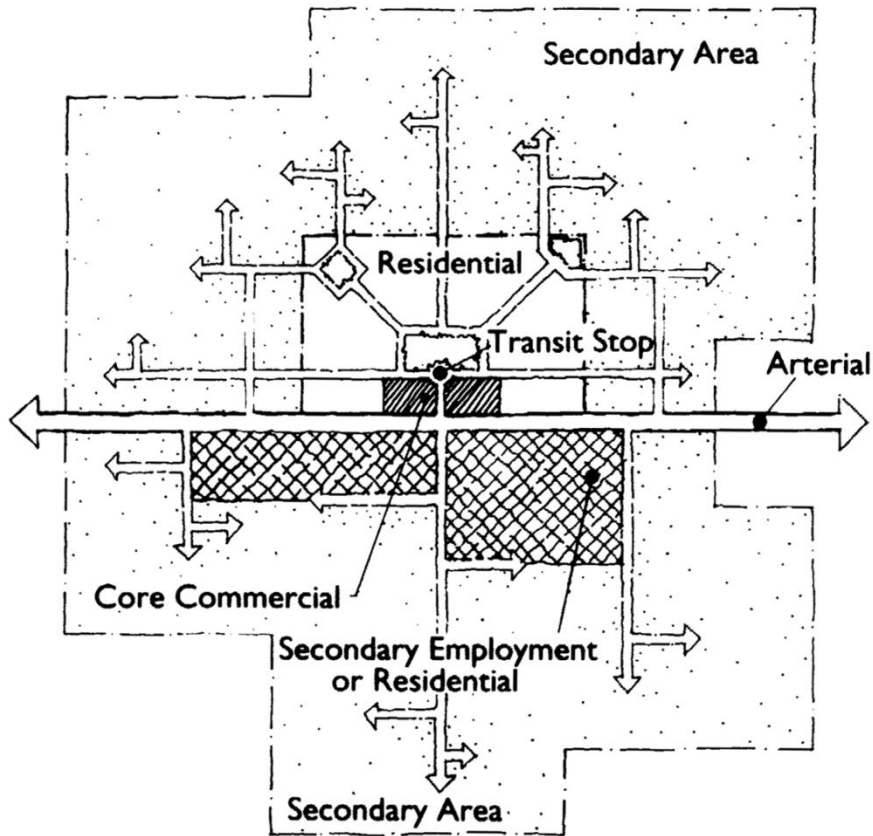
- leading community organizer against slum clearance and urban renewal in the 1960's
- create Jacobisms

Robert Moses

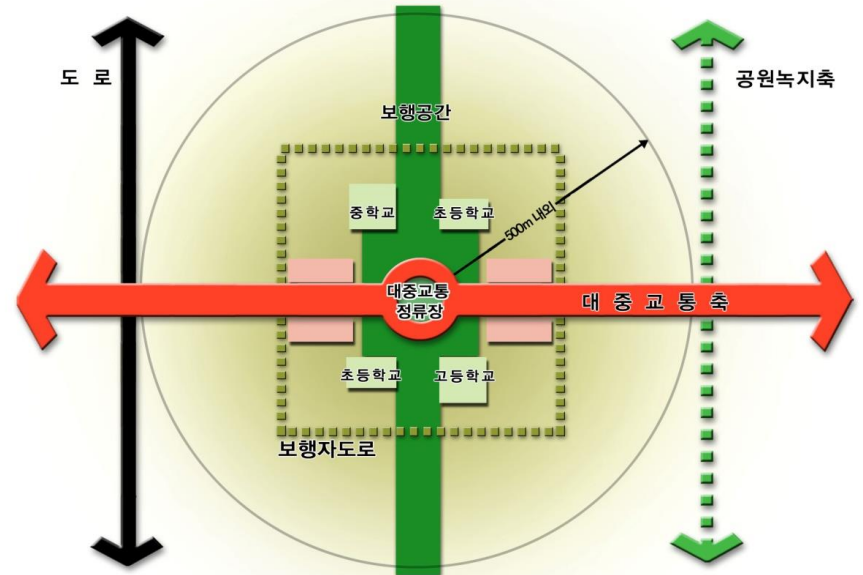


- New York City Parks Commissioner
- Long Island State Park Commission
- State Parks Council (Head)
- State Power Commission (Head)
- Triborough Bridge and Tunnel Authority (Chairman)
- NYC "Construction Coordinator"

5. New Urbanism, TOD



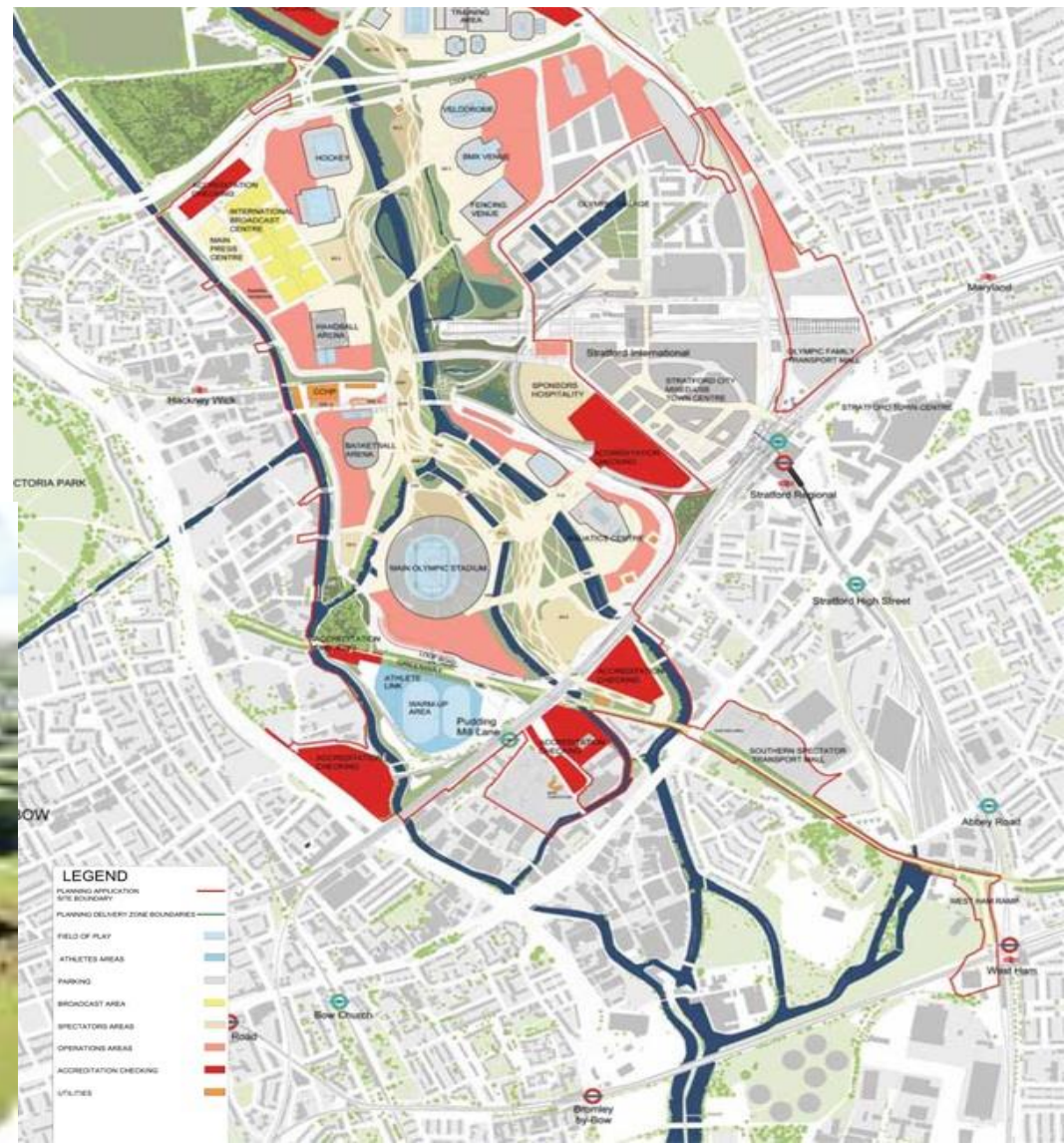
TOD model; Peter Calthorpe



Sejong si model

■ 런던 올림픽 빌리지(영국):

그린 인프라 구축, 에너지효율성 향상, 폐기물 재활용, 그린펀드 신설, 공장부지 재개발, 직주근접, 친환경 계획수법 적용



OMA - Tree City

"완결된 형태 위주의 마스터 플랜을 제시하기 보다는 공원 자체의 진화 가능성에 대응할 수 있는 전략을 구축하는 일에 디자인의 초점을 두었고, 형태를 디자인 한 것이 아니라 전략을 디자인하였다."

"전략을 디자인 하였지, 형태를 디자인한 것이 아니다."

-Rem Koolhaas

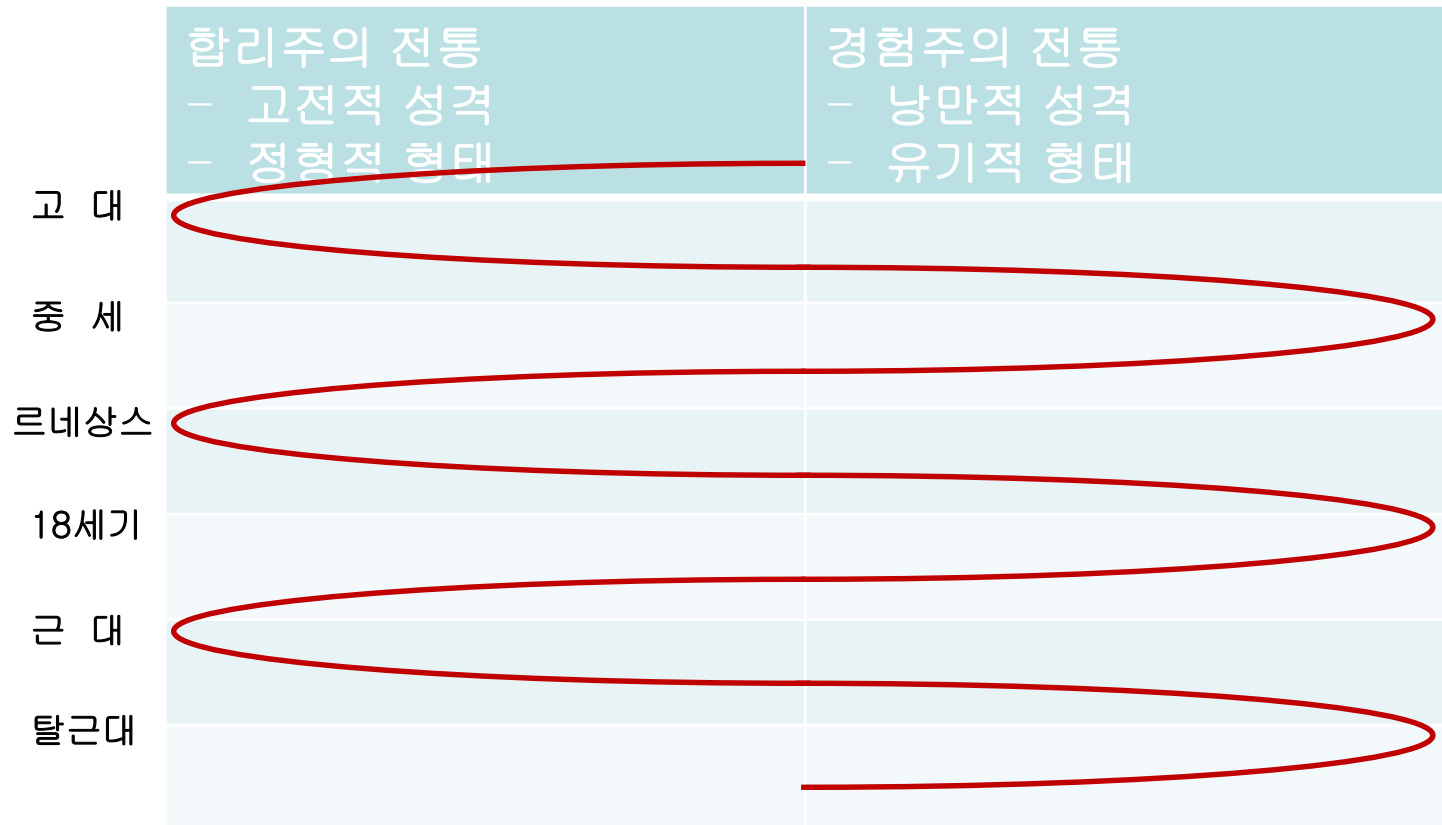


1. 합리주의·경험주의 설계사조의 역사적 주기성

1.7. 종합

■ 합리주의·경험주의의 주기적 패턴

- 고대로부터 합리주의와 경험주의의 연속적, 주기적 패턴을 볼 수 있음



#5 Planner, Designer, Architect's Form Newtown, Future City

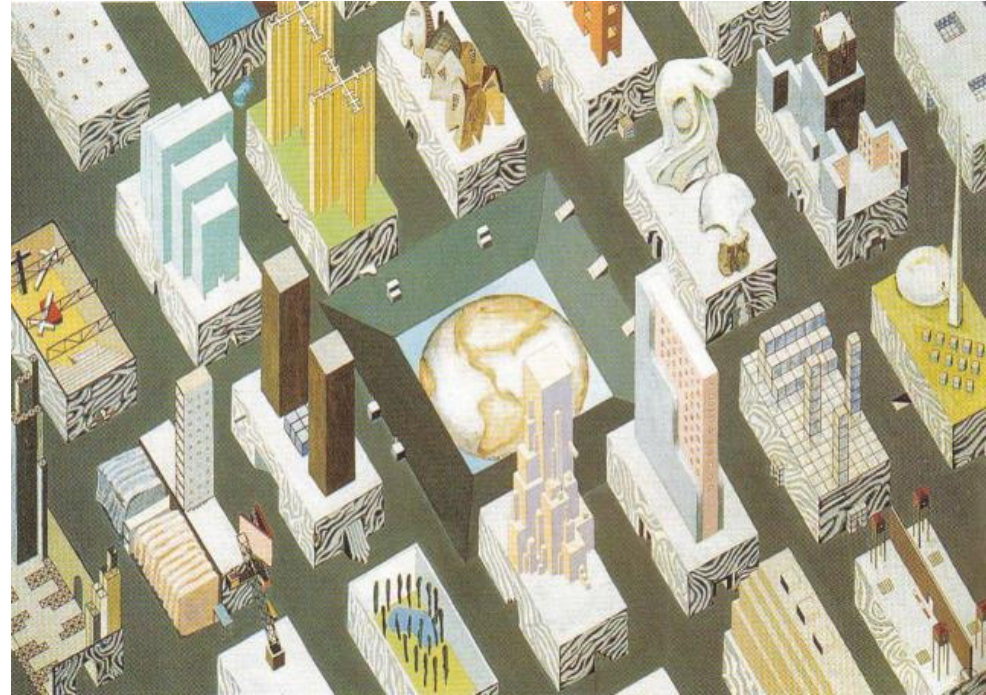
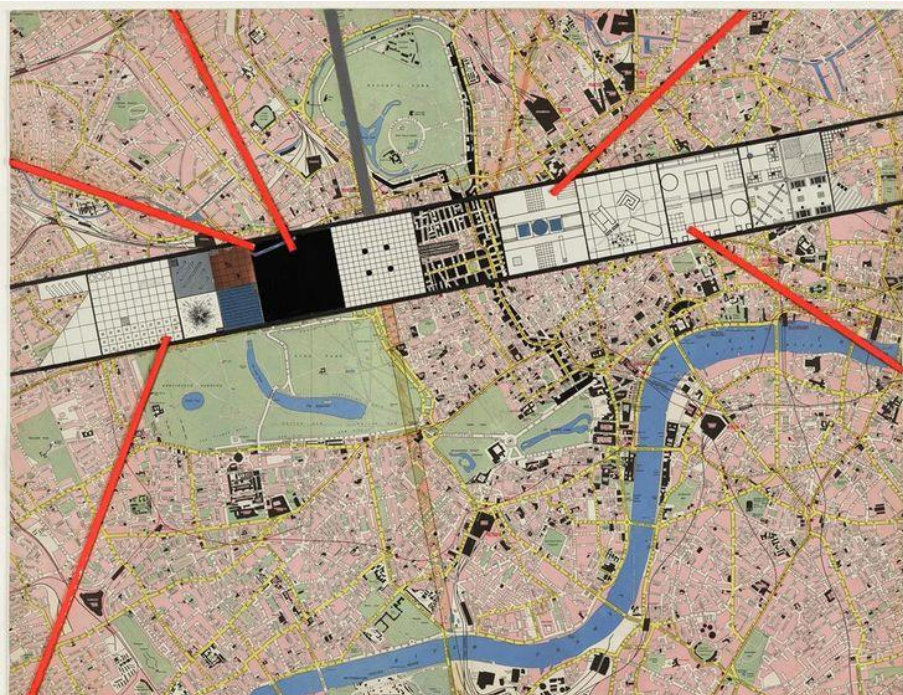
Theory of Urban Structure

Kwon, Young Sang

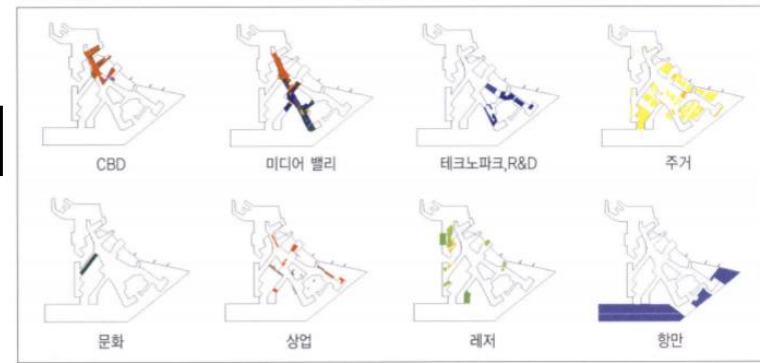
Seoul National University

Department of Civil and Environmental Engineering, Urban Design Major

OMA/Rem Koolhaas



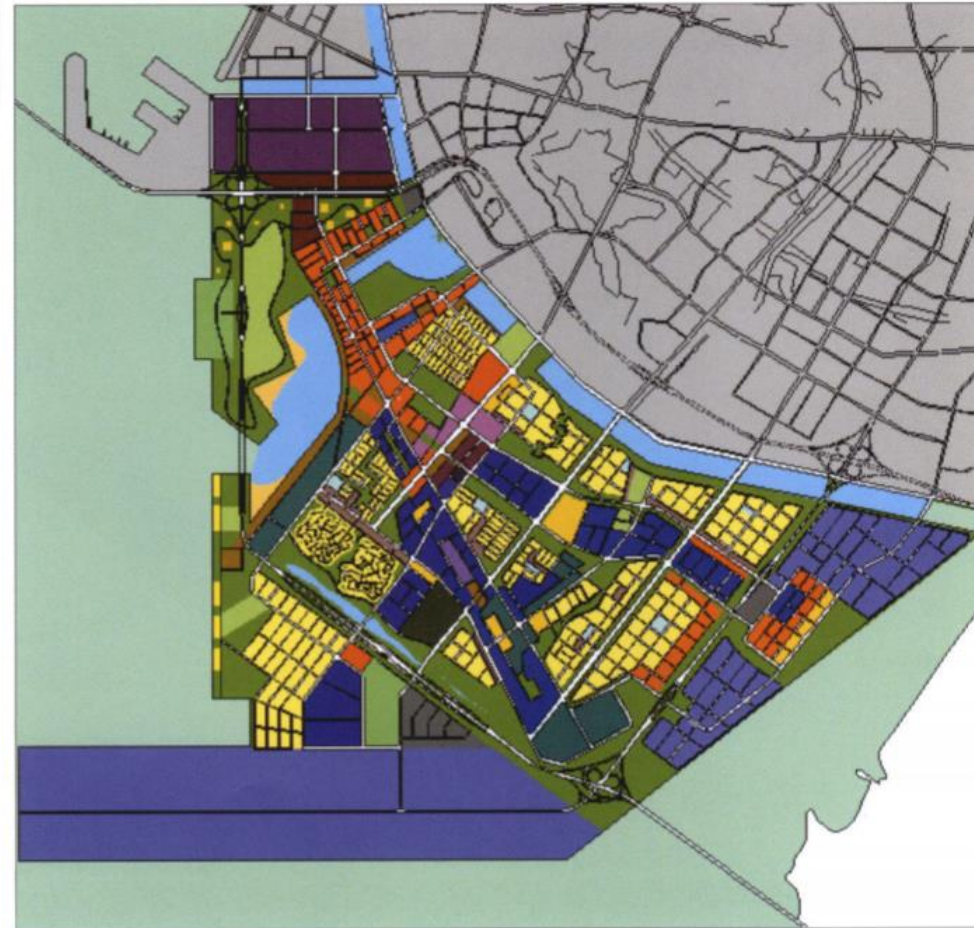
2000년대 이후의 새로운 신도시 송도신도시



Patio/Network의 토지이용개념



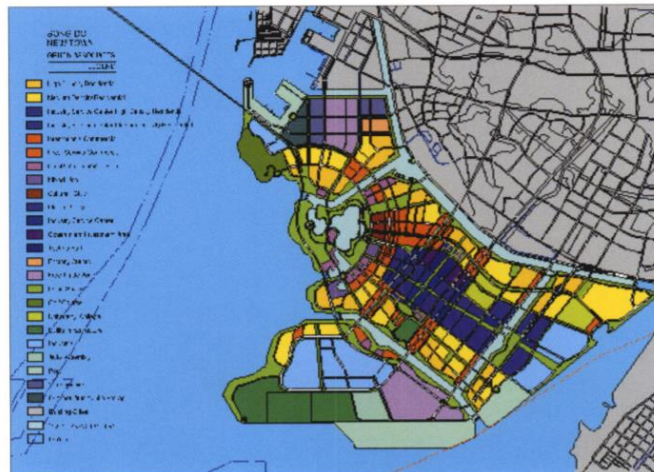
Network와 Patio



OMA의 2단계 최종 구상안



Nikken Sekkei의 토지이용구상



Gruen Associates의 토지이용구상



Plan



Venice



Canal





ALT #1 SHARING CITY

ALT #2 FULL MOON CITY

ALT #3 FLOATING DELTA

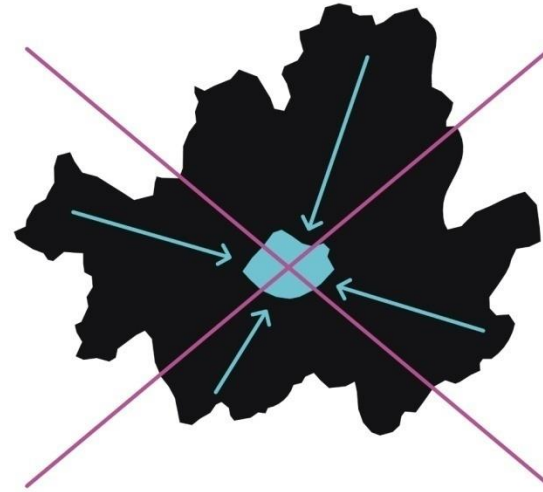


Second Capital of South Korea
Sejong City, 2006

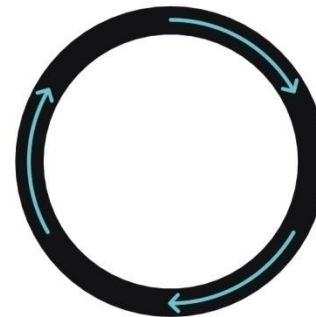
Decentralization

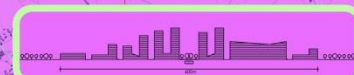
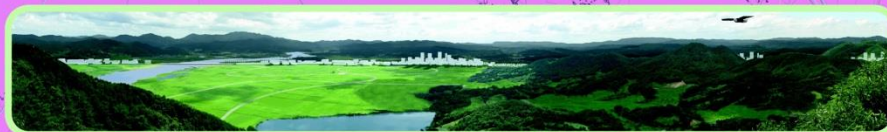
What should be the city structure for the 21st century
to build the city of peace and democracy ?

The city of the 20th century:

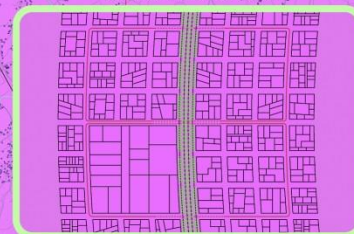


The city of the 21st century:

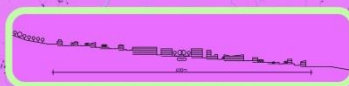




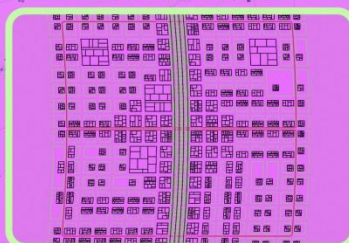
Section commercial area 1/2000



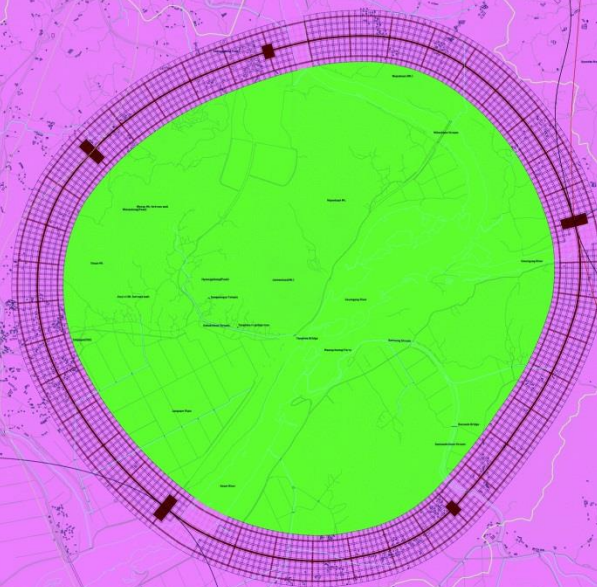
Ground floor commercial area 1/2000



Section residential area 1/2000



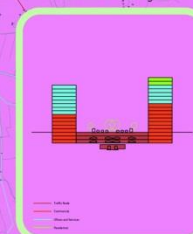
Ground floor residential area 1/2000



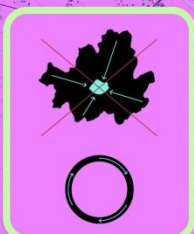
Links to the region



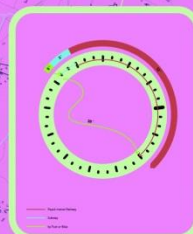
Public transport grid



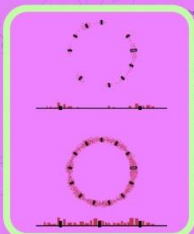
Hybrid Center/ Traffic node



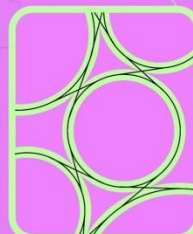
The city of the 20th century vs. the city of the 21st century



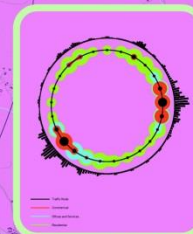
Commuting distances within the New City



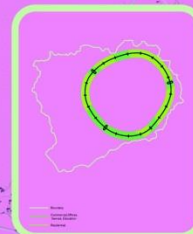
The city growth



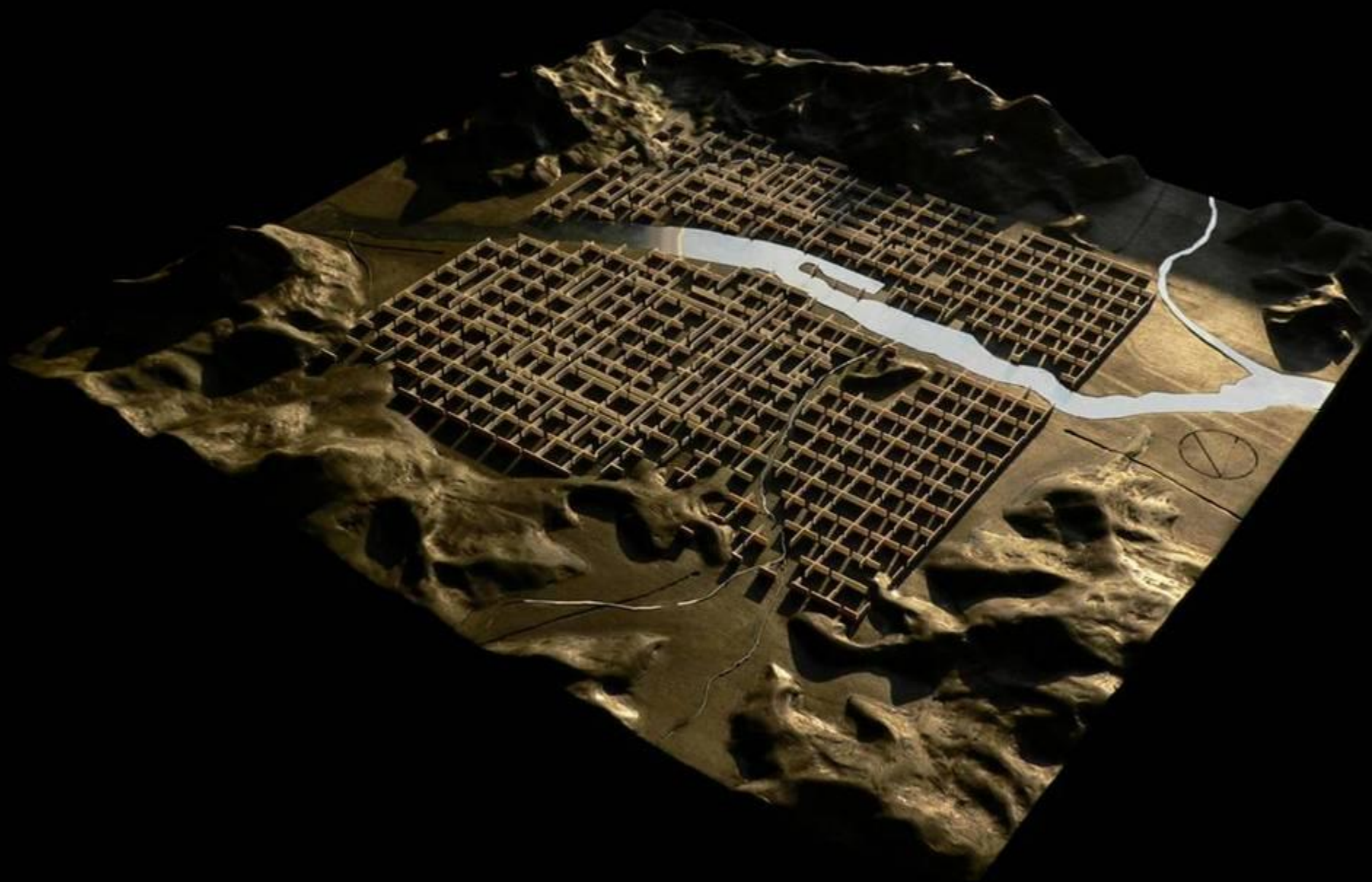
Ring cities

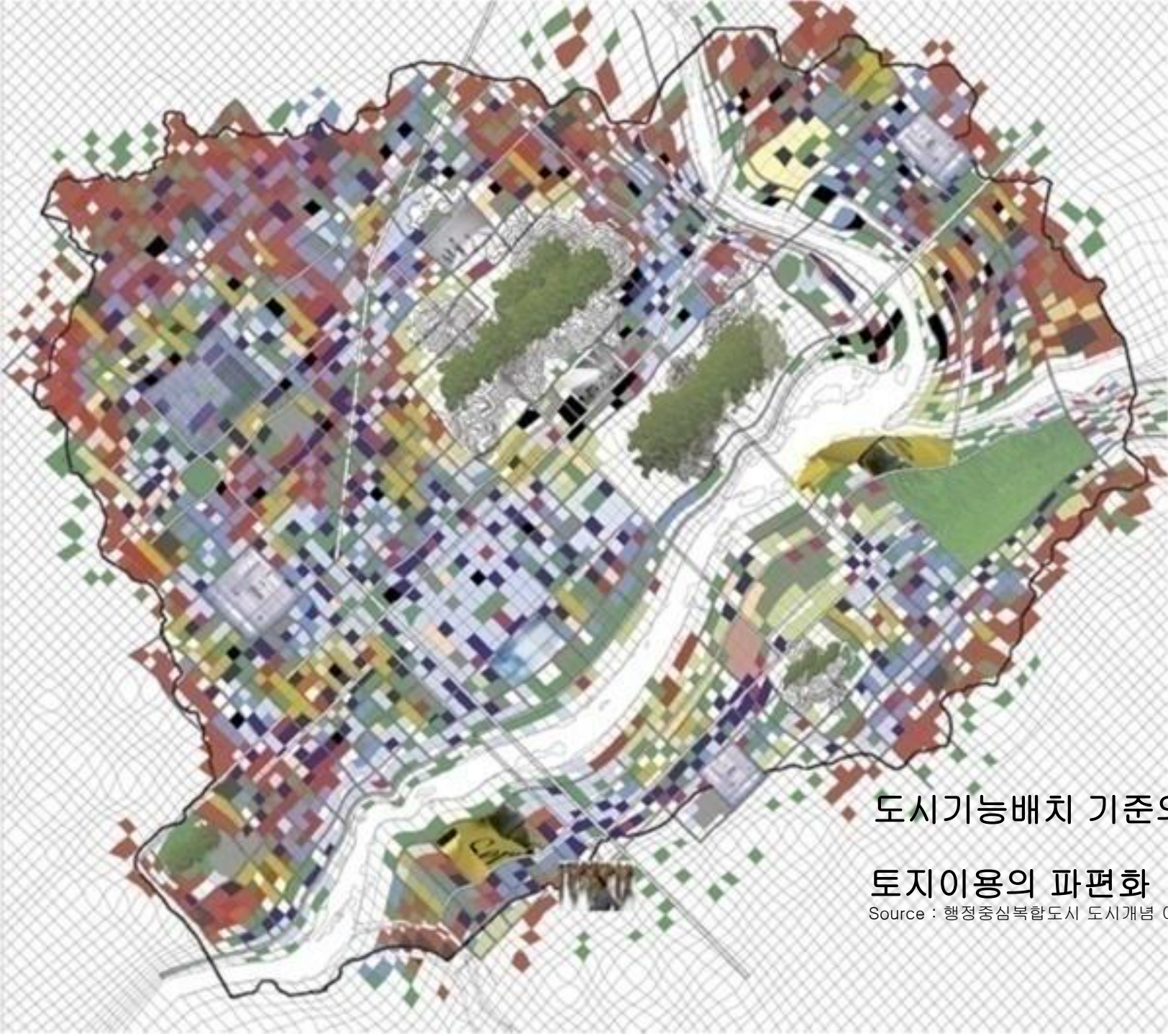


Density based on infrastructure configuration



Usage distribution





도시기능배치 기준의 변화

토지이용의 파편화

Source : 행정중심복합도시 도시개념 아이디어 국제공모

드론과 미래교통/물류

드론

- 하이브는 뉴욕 맨해튼 지역을 중심으로 상업용 드론을 도킹하고 충전할 수 있는 중앙 통제 건물
- 미국을 기반으로 활동하는 3명의 디자이너 하딜 아이드 모하마드 (Hadeel Ayed Mohammad), 이펑 차오(Yifeng Zhao), 첵다 주 (Chengda Zhu)의 아이디어를 바탕으로 탄생
- 무인 항공기 관련 현행법에 따라 건물 주변 상공을 수직 고속도로 형태로 다닐 수 있게 설계





HoneyComb, 수상에 계획한 미래도시

서울대 협동과정도시설계학, 도시설계스튜디오 2015 지도교수: 안건혁, 권영상

Libelium Smart World

Air Pollution

Control of CO₂ emissions of factories, pollution emitted by cars and toxic gases generated in farms.

Forest Fire Detection

Monitoring of combustion gases and preemptive fire conditions to define alert zones.

Wine Quality Enhancing

Monitoring soil moisture and trunk diameter in vineyards to control the amount of sugar in grapes and grapevine health.

Offspring Care

Control of growing conditions of the offspring in animal farms to ensure its survival and health.

Sportsmen Care

Vital signs monitoring in high performance centers and fields.

Structural Health

Monitoring of vibrations and material conditions in buildings, bridges and historical monuments.

Quality of Shipment Conditions

Monitoring of vibrations, strokes, container openings or cold chain maintenance for insurance purposes.

Smartphones Detection

Detect iPhone and Android devices and in general any device which works with Wifi or Bluetooth interfaces.

Perimeter Access Control

Access control to restricted areas and detection of people in non-authorized areas.

Radiation Levels

Distributed measurement of radiation levels in nuclear power stations surroundings to generate leakage alerts.

Electromagnetic Levels

Measurement of the energy radiated by cell stations and WiFi routers.

Traffic Congestion

Monitoring of vehicles and pedestrian affluence to optimize driving and walking routes.

Smart Roads

Warning messages and diversions according to climate conditions and unexpected events like accidents or traffic jams.

Smart Lighting

Intelligent and weather adaptive lighting in street lights.

Intelligent Shopping

Getting advices in the point of sale according to customer habits, preferences, presence of allergic components for them or expiring dates.

Noise Urban Maps

Sound monitoring in bar areas and centric zones in real time.

Water Leakages

Detection of liquid presence outside tanks and pressure variations along pipes.

Vehicle Auto-diagnosis

Information collection from CanBus to send real time alarms to emergencies or provide advice to drivers.

Item Location

Search of individual items in big surfaces like warehouses or harbours.

Waste Management

Detection of rubbish levels in containers to optimize the trash collection routes.

Smart Parking

Monitoring of parking spaces availability in the city.

Golf Courses

Selective irrigation in dry zones to reduce the water resources required in the green.

Water Quality

Study of water suitability in rivers and the sea for fauna and eligibility for drinkable use.