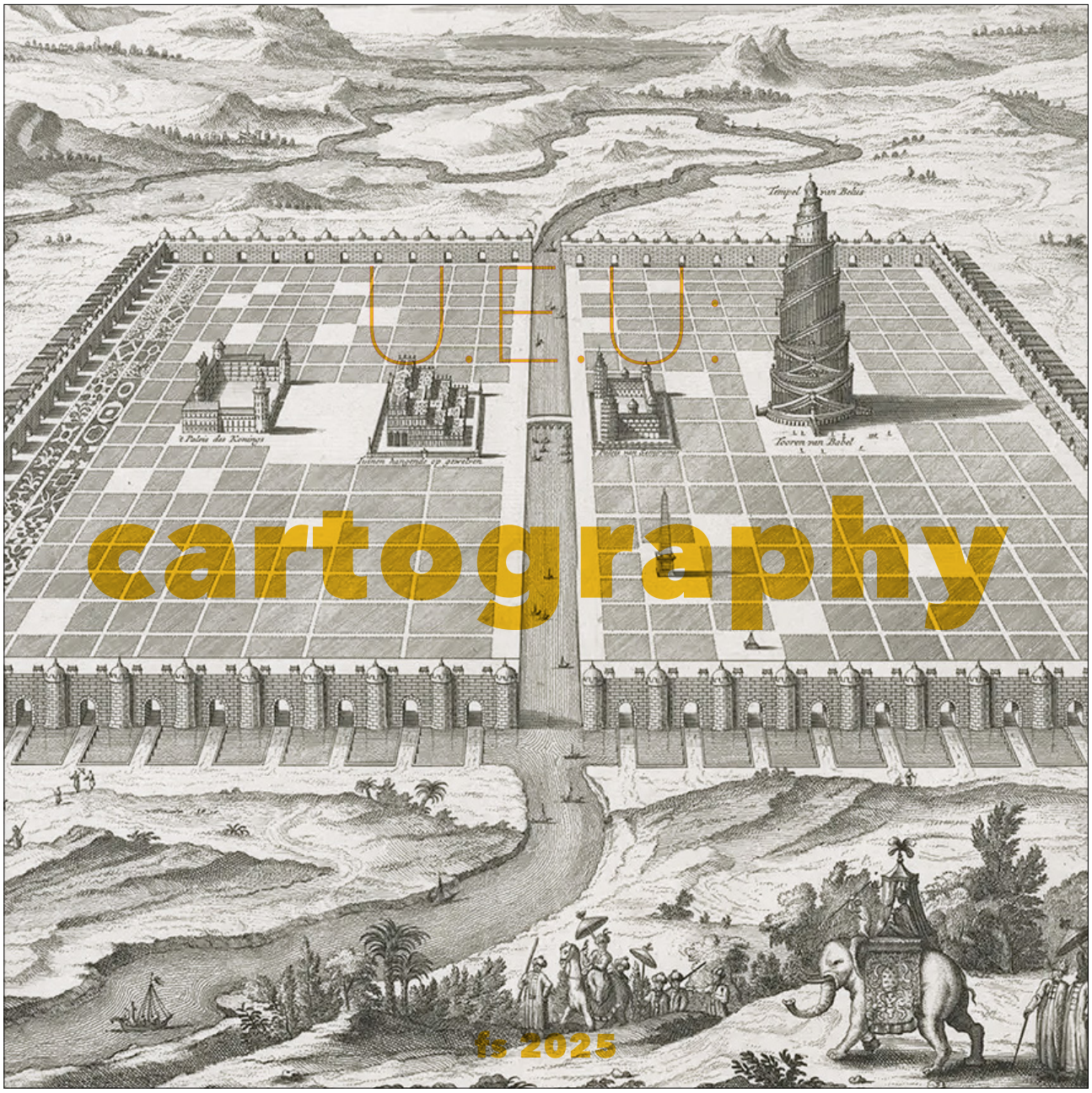
EPFL 2025/26
AR-476
UE U: CARTOGRAPHY

Bárbara Mações Costa



Augustin Calmet, *A Plan of the City of Babylon According to Herodotus and F. Kircher*, 1732.

Lecturer
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Info

Programme	Architecture Master 1 and 3
Laguage	English
Credits	4
Semester	Fall
Hours	5h weekly × 12 weeks
Schedule	Fridays 13-18h, in room AAC 114
Moodle	https://go.epfl.ch/AR-476
Website	https://ueucartography.com

Summary
Teaching unit on mapping environmental relations in architecture.

Sessions
1. Cartography and Modern Abstraction
2. Drawing: Visual Layers
3. Tracing: Spatial Figures
4. Mapping: Environmental Formations
5. The Dialectical Method
6. GIS Workshop w/ Aurèle Pulfer

7. *Midterm Reviews*
8. The Map as Critique and Praxis
9. Pipes, Enclosures, Frontiers
10. Primitive Hut vs. Tower of Babel
11. Brutalist Landscapes w/ Douglas Murphy
12. *Final Reviews*

Content
Maps are visual tools for thinking about the world at many scales. They shape scientific hypotheses, organize political and military power, delineate private property, and reflect mental conceptions about landscapes and nonhuman nature. They are in our pockets and we use them all the time, but they are, in fact, as banal as they are complicated.

In the Western tradition, medieval maps were not accurate descriptions as much as conceptual cosmologies, depicting biblical stories, mythology, history, flora, fauna, and exotic peoples and species.[1] With the advent of modernity, Cartesian perspectives began to trace the world in relation to a fixed human subject, while mathematical God's eye views surveyed the land from an abstract elevated 'nowhere'. Accurate maps, stripped of all elements of fantasy, religious belief, and authorship, became essential tools for modern scholars and states seeking rational progress through scientific prediction, social engineering and planning. Cartography became concerned with analyzing and measuring the *res extensa*, and the land survey became the quintessential instrument of land development.

Capitalism, as Neil Smith wrote, required the invention of "space as emptiness, as a universal receptacle in which objects exist and events occur, as a frame of reference, a coordinate system . . . within which all reality exists."[2] But the flip side of treating the environment as an abstract container was treating architecture as an abstract object, disembedded and aestheticized for its own sake. From this radical separation, maps became quantitative systems for managing phenomena, while buildings became circulating commodities for the valorization of land rent. Today, this neat division has shown its limits. The environment is not a backdrop or a container of natural resources, just as architecture is not a collection of icons floating in a vacuum. Buildings and landscapes constitute each other dialectically, be it through collaboration or antagonism.

This teaching unit proposes a method for critically embedding architecture in its environment. By mapping

buildings in their space and time, we reveal the invisible backgrounds that form their material conditions of possibility. The aesthetic choices conveyed in the so-called 'object' thus appear no longer disinterested, but complex, as a rich totality of environmental relations. Throughout the course, students will consider the following questions: how should architecture reflect society's relation to the environment, how should it constitute a critique of said relation, and how should it predict/project a collective ideal?

1. The term 'cartography' was coined at the beginning of the nineteenth century, based on the Latin *charta*, meaning 'paper' or 'map', and *-graphia*, meaning 'description', which derives from *graphein*, meaning 'to write' or 'to draw'. It is an umbrella concept derived from older terms such as geography, chorography, and topography, respectively meaning the description of *geo* or 'earth', *khōra* or 'region', and *topos* or 'place'.
2. Neil Smith, *Uneven Development: Nature, Capital and the Production of Space* (London and New York: Verso, 2010), 95.

Method

The course takes a skeptical stance towards claims of mathematical truth by addressing cartography's historical tension between sensuous perspective and rational plan. The method uses tools drawn from art, planning, and history. Hand drawing guides the initial process of abstraction and layering; planning offers a set of spatial figures as metaphors for the urban palimpsest; and a dialectical approach to historical development reveals hidden relationships between form and context. Cartography reconciles the immanent (object) and the contingent (environment).

Theoretical content is provided through weekly lectures. Practical assignments are supported by desk critiques (scheduled in advance to cover the whole class every two weeks). Group discussions engage in close readings of historical maps and the analysis of texts and films on cartography, landscape, and environmental aesthetics. Special emphasis is placed on hand drawing, Adobe Illustrator, CAD, and GIS but no previous experience is required.

Assessment

Continuous assessment:
- Intermediate exercises and class participation: 20%.
- Midterm review: 20%
- Final review: 60%.

All lectures will be held in English, reviews and table crits may be held in English or French.

Learning Outcomes

Preparation for design and research studios that reflect on cross-scale relationships and the environmental backgrounds of architectural form. Provides methodological support for orientation C. Cities – Territories and *Enoncé théorique de master*. Content is closely related to the theory course Modernity, Architecture and the Environment (AR-505), which offers a more literature-based version of the same critical question and method.

Expected Costs

Costs may vary according to personal investment and project specifics, e.g. printing costs will depend on the size of maps and the amount of work produced by the students. An afternoon excursion to the Geneva Botanical Gardens and a list of optional and compulsory drawing materials should cost an additional 30 to 60 Swiss francs.

General Bibliography

- AURELI, Pier Vittorio. "Life, Abstracted: Notes on the Floor Plan." e-flux Architecture, October, 2017.
- HARVEY, David. "The Experience of Space and Time." In *The Condition of Postmodernity*, 201–326. Cambridge, MA: Blackwell, 1990.
- MAÇÃES COSTA, Bárbara. "Conduit, Patio, Waste Mapping Environmental Relations in Bairro da Malagueira." Ph.D. diss. École polytechnique fédérale de Lausanne, 2021.

Top: Bedolina Map; Tabula Peutingeriana; Pietro del Massaio, Map of Rome after Ptolemy.
Middle: Rosselli's View of Florence; Portuguese Portolan map; Mercator map
Bottom: Survey of Philadelphia; Buckminster Fuller's Dymaxion map; Satellite photograph of Berlin.

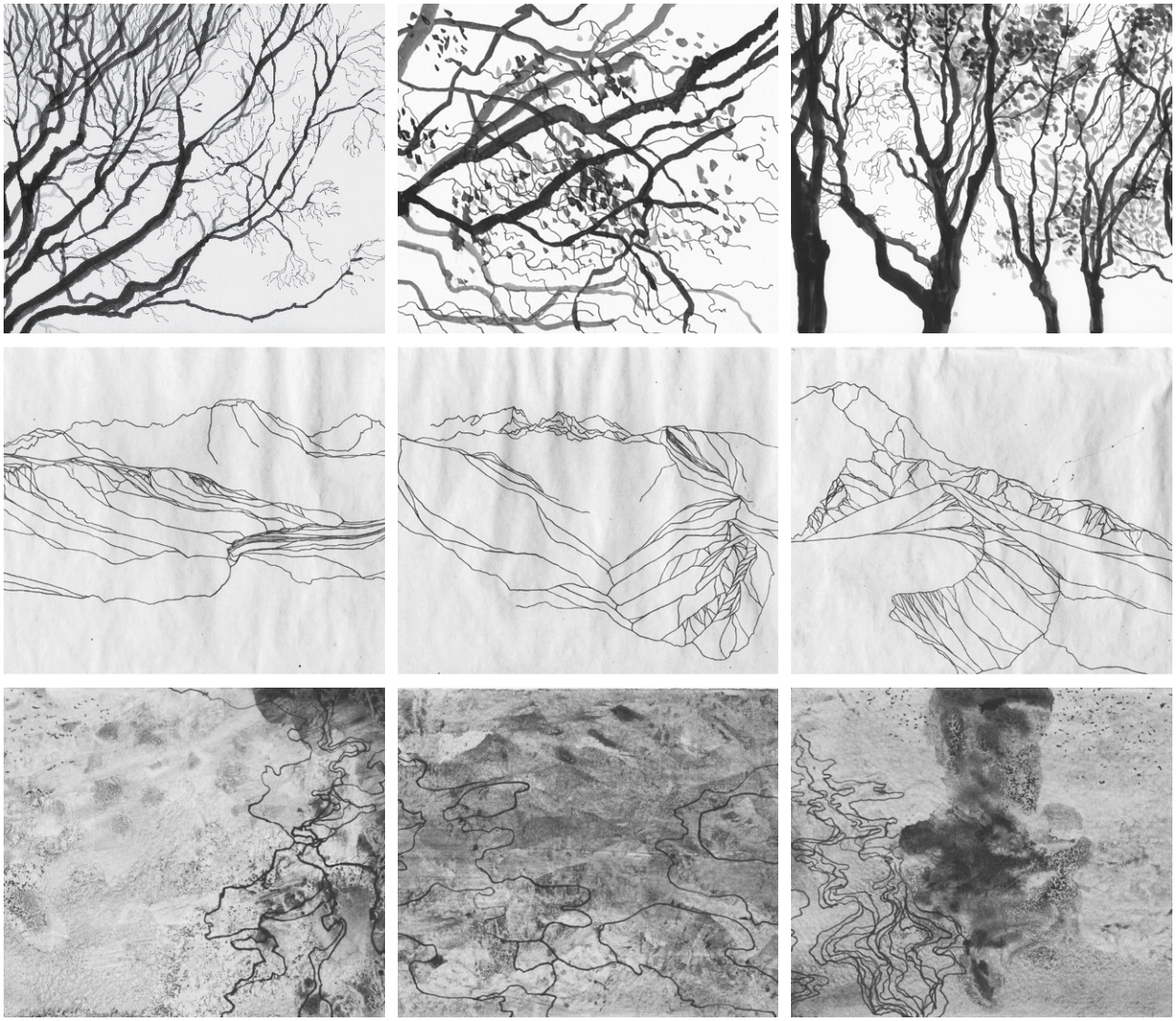
1. Cartography and Modern Abstraction

12 September

Lecture: The rise of modern territorial abstraction and the transition from cartographic "description" (*-graphie*) to the more quantitative nature of the land survey. Premodern maps and the sensuous experience of local space-time vs. modern synoptic vision: the survey's goal to annihilate space and time. Land enclosure, "improvement," and ecological imperialism: capital trying to free itself of its material barriers. Naturalization vs. historicization.

Activities: Introduction to class goals, presentation of list of buildings to map, partial screening of *David Hockney: A Bigger Picture* (2009).

- FARINELLI, Franco, *La crisi della ragione cartografica*. Torino: Einaudi, 2009.
- BLOMLEY, Nicholas. "Law, Property, and the Geography of Violence: The Frontier, the Survey, and the Grid." *Annals of the Association of American Geographers* 93, no. 1 (March 2003): 121–141.



Drawings from Bárbara Mações Costa, Master thesis FBAUL, 2016.
Vegetation, Topography, Hydrography.

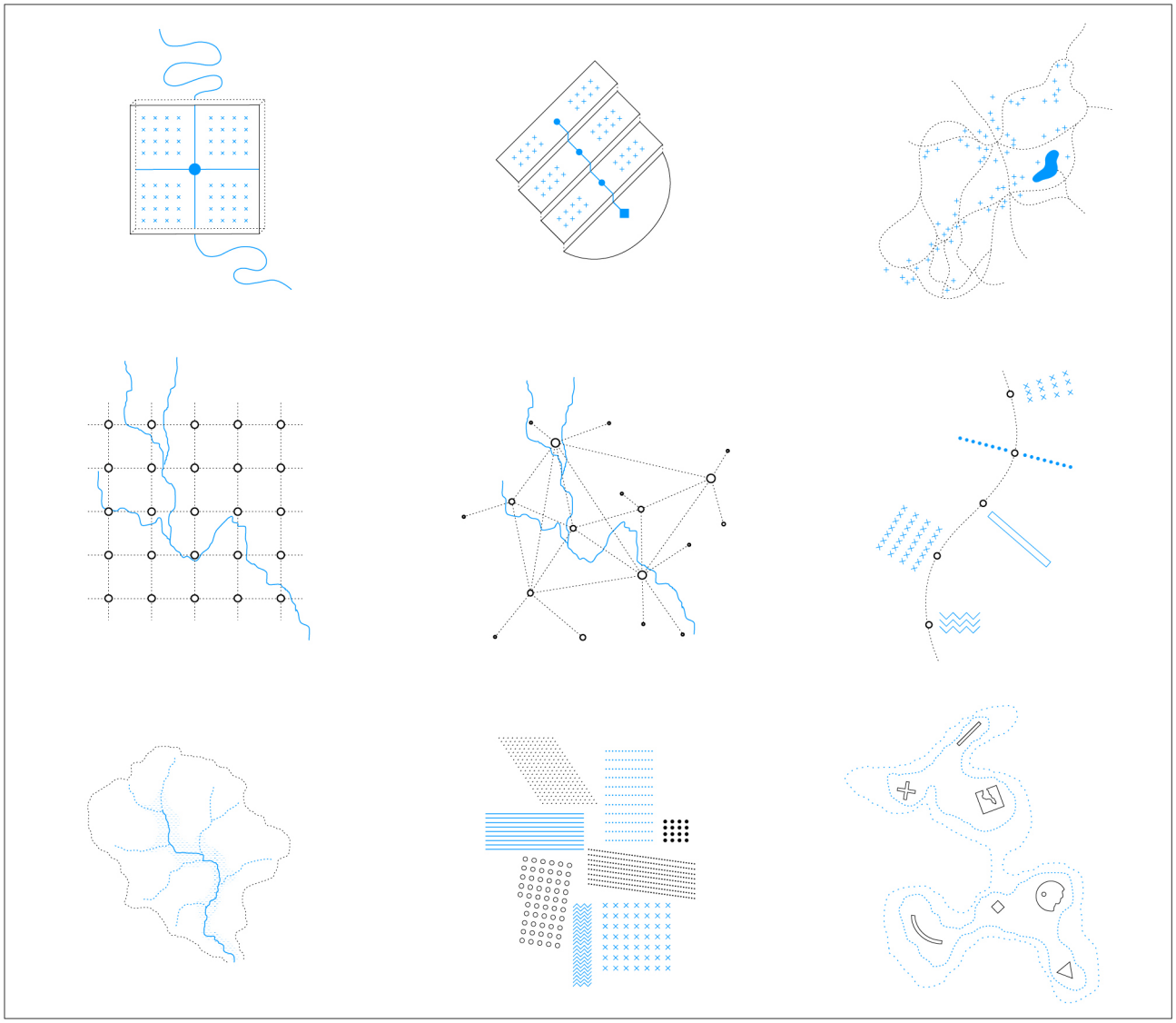
2. Drawing: Visual Layers

19 September

Lecture: Introduction to drawing's basic challenges: hierarchy of weights, relational composition between elements, the presence and shape of voids, the problem of stereotypes, the unconscious tendency for symmetry, fear of complexity, etc. Introduction to hand drawing materials, wet and dry. Patterns of graphic codes: lines, dots, textures, voids, colours.

Activities: Exercise I – Drawing: quick hand drawing exercises from projected photographs of landscapes, with the goal of extracting and overlaying graphic layers. Possible live drawing at the Geneva Botanical Gardens.

- BERGER, John. "The Basis of All Painting and Sculpture is Drawing." In *Landscapes: John Berger on Art*, 27–32. London and New York: Verso, 2016.
- MAÇÃES COSTA, Bárbara. "Desenho de paisagem: investigações sobre representação espacial." Master diss. Faculdade de Belas-Artes da Universidade de Lisboa, 2016.



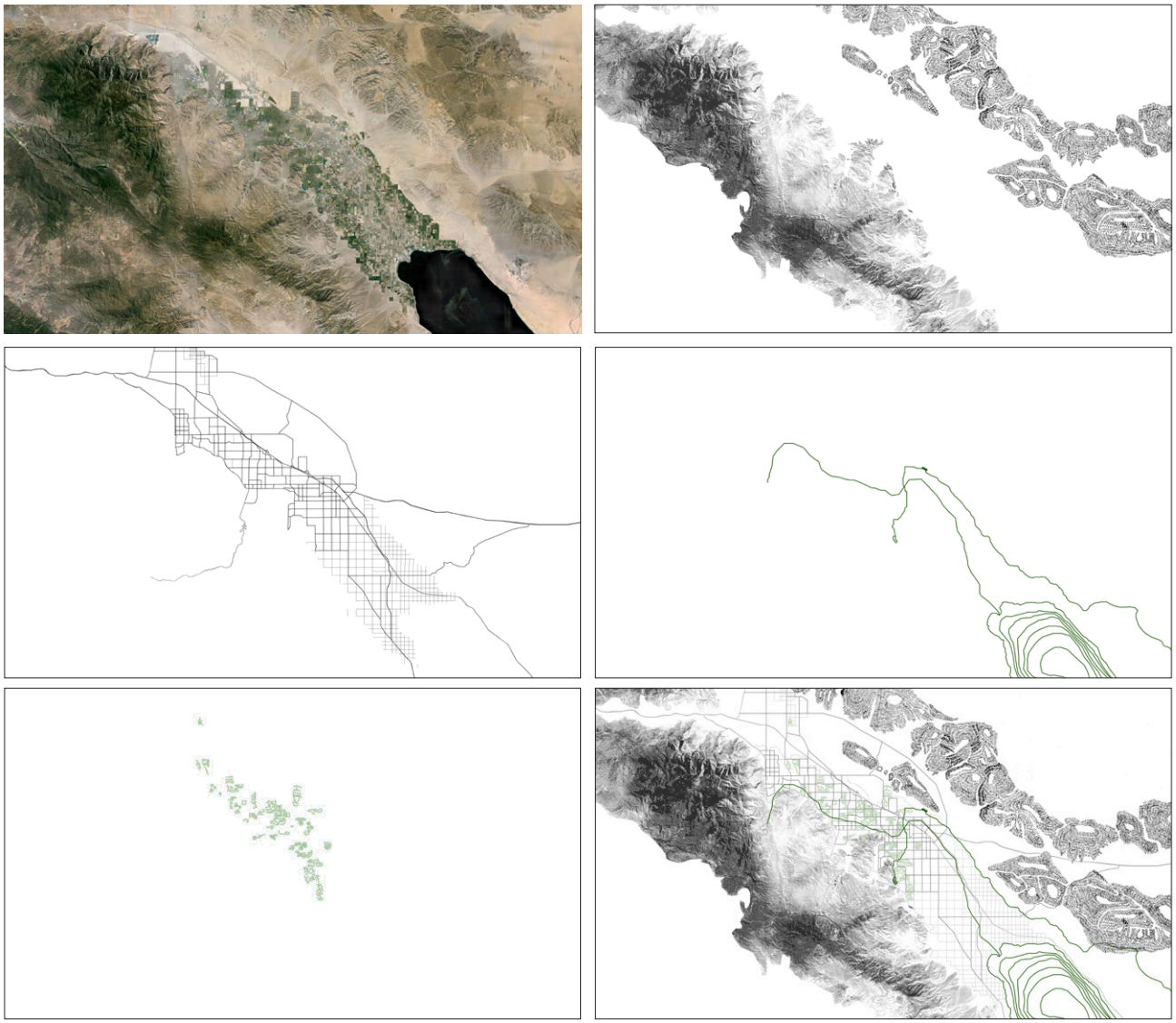
Spatial Systems:
Cloister, Garden, Park.
Grid, Network, Line.
Watershed, Patchwork, Archipelago.

3. Tracing: Spatial Figures
26 September

Lecture: Decoding the land as palimpsest. Rendering graphic layers more concrete by organizing them into typologies of land systems. These systems are nevertheless abstract rationalizations, diagrams to be used as figures of speech in our developing understanding of the environment.

Activities: Exercise II – Plan: mixed hand and computer drawing exercise from chosen building plan, with the goal of extracting and overlaying the builgding's layers: slab, structure, cladding.

- CORBOZ, André. "Le territoire comme palimpsest." *Diogène* 31, no. 121 (Jan–Mar 1983): 14-35.
- SMITHSON, Robert. "A Provisional Theory of Non-Sites." In *Robert Smithson: The Collected Writings*, edited by Jack Flam, 364. Berkeley and Los Angeles: University of California Press, 1996 [1968].



Map by Gilda Gysin, *Coachella Valley, California*, EPFL UE U 2015.
Aerial view, or frame. Topography.
Infrastructure. Hydrography.
Vegetation. Total map.

4. Mapping: Environmental Formations

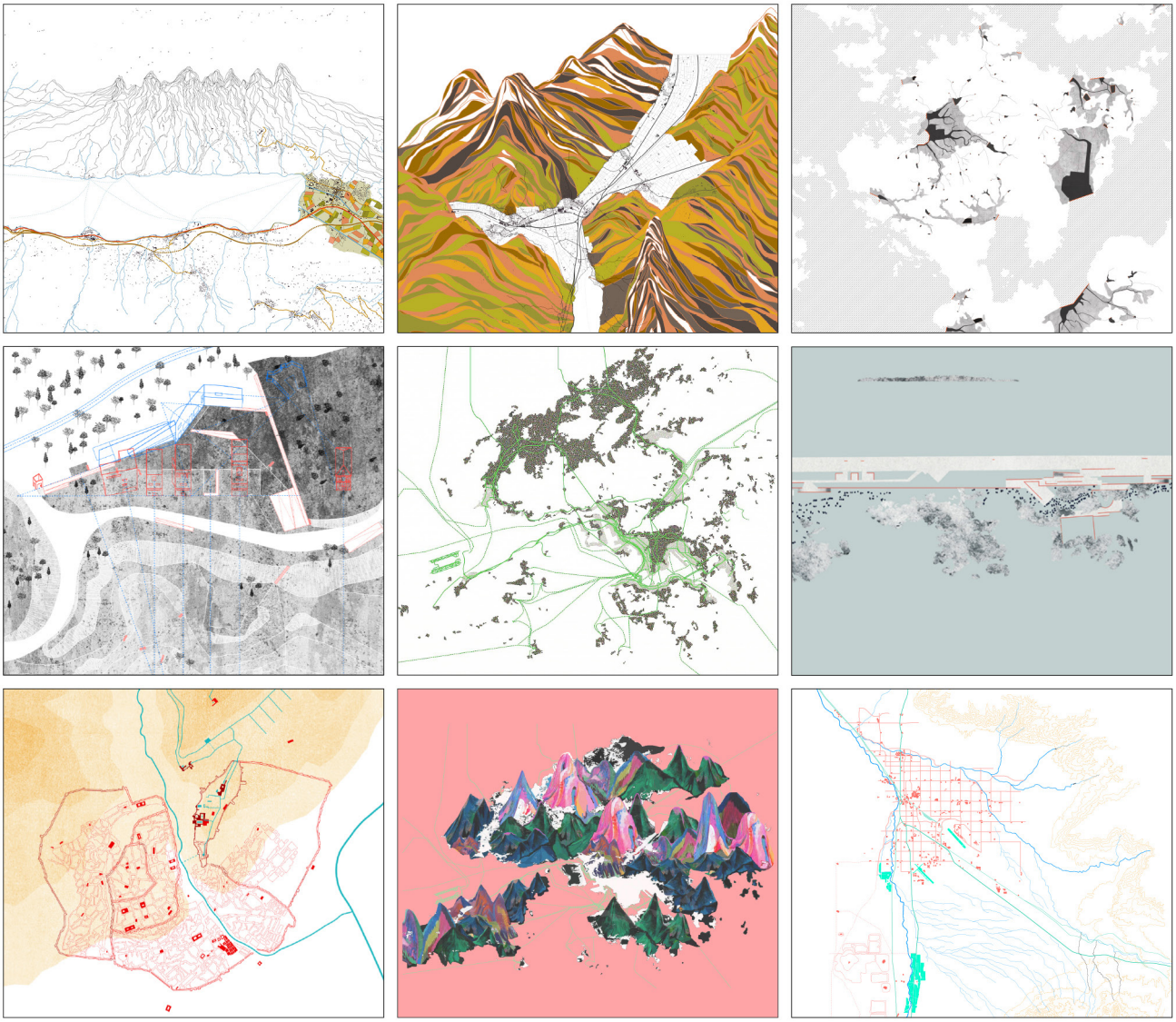
3 October

Lecture: A four-fold method:

1) Identify and frame site,
2) Extract layers separately with individual graphic identities,
3) Combine graphic layers to form spatial systems,
4) Contextualize building as an environmental totality, i.e., a relational loop of ground + technology + production + reproduction + aesthetics.

Activities: Exercise III – Map: begin historical research collecting historical maps and essays on the urban development of the chosen building's site.

- COSGROVE, Denis E., *Social Formation and Symbolic Landscape*. Madison, Wisconsin: University of Wisconsin Press, 1984.
- JAMESON, Fredric. "Cognitive Mapping". In *Marxism and the Interpretation of Culture*, edited by Cary Nelson and Lawrence Grossberg, 347-60. Urbana and Chicago: University of Illinois Press, 1988.



Studentwork: Mapping exercise, EPFL UE U, 2015-21.

5. The Dialectical Method

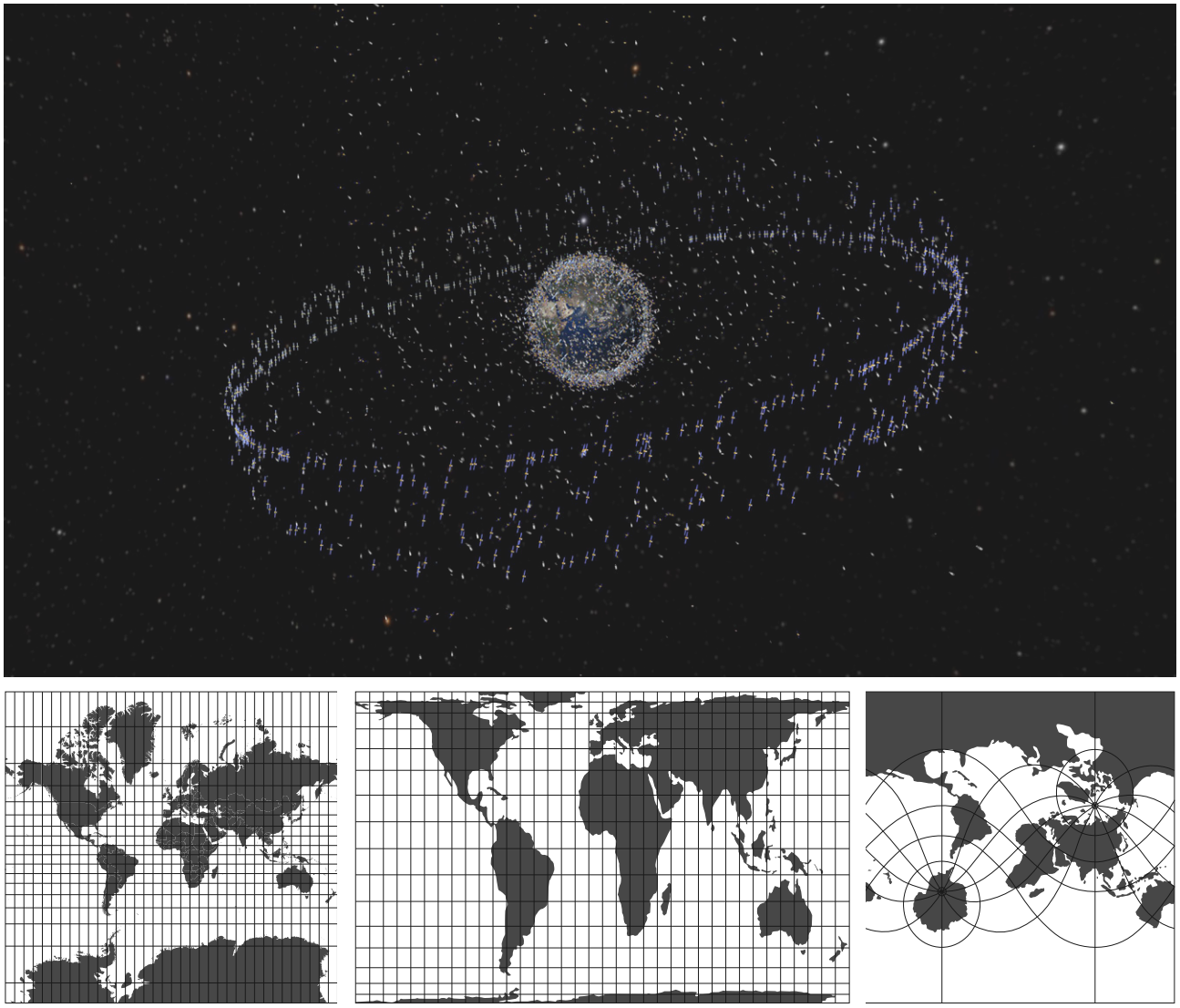
10 October

Lecture: A totality of environmental relations:

1) Ground: geography, ecosystems, climate, raw materials.
2) Technology: infrastructure, land management and construction techniques.
3) Production: economic practices, labour and property relations.
4) Reproduction: divisions of labour, social hierarchies, institutions, rituals.
5) Aesthetics: ideology, beliefs, culture, politics.

Activities: table reviews.

- HARVEY, David. "What Technology Reveals." In *A Companion to Marx's Capital: The Complete Edition*, 191–203. London and New York: Verso, 2018 [2010].
- MAÇÂES COSTA, Bárbara. "The Totality of Environment." *Modernithy, Architecture & the Environment* 2 (August 2024): 1–7.



Top: European Space Agency, map of all trackable satellites and space debris orbiting Earth, 2008.
Bottom: Comparative diagrams of Mercator projection, Gall-Peters projection, and Oblique Mercator projection with curved rhumb lines.

6. GIS Workshop with Aurèle Pulfer

17 October

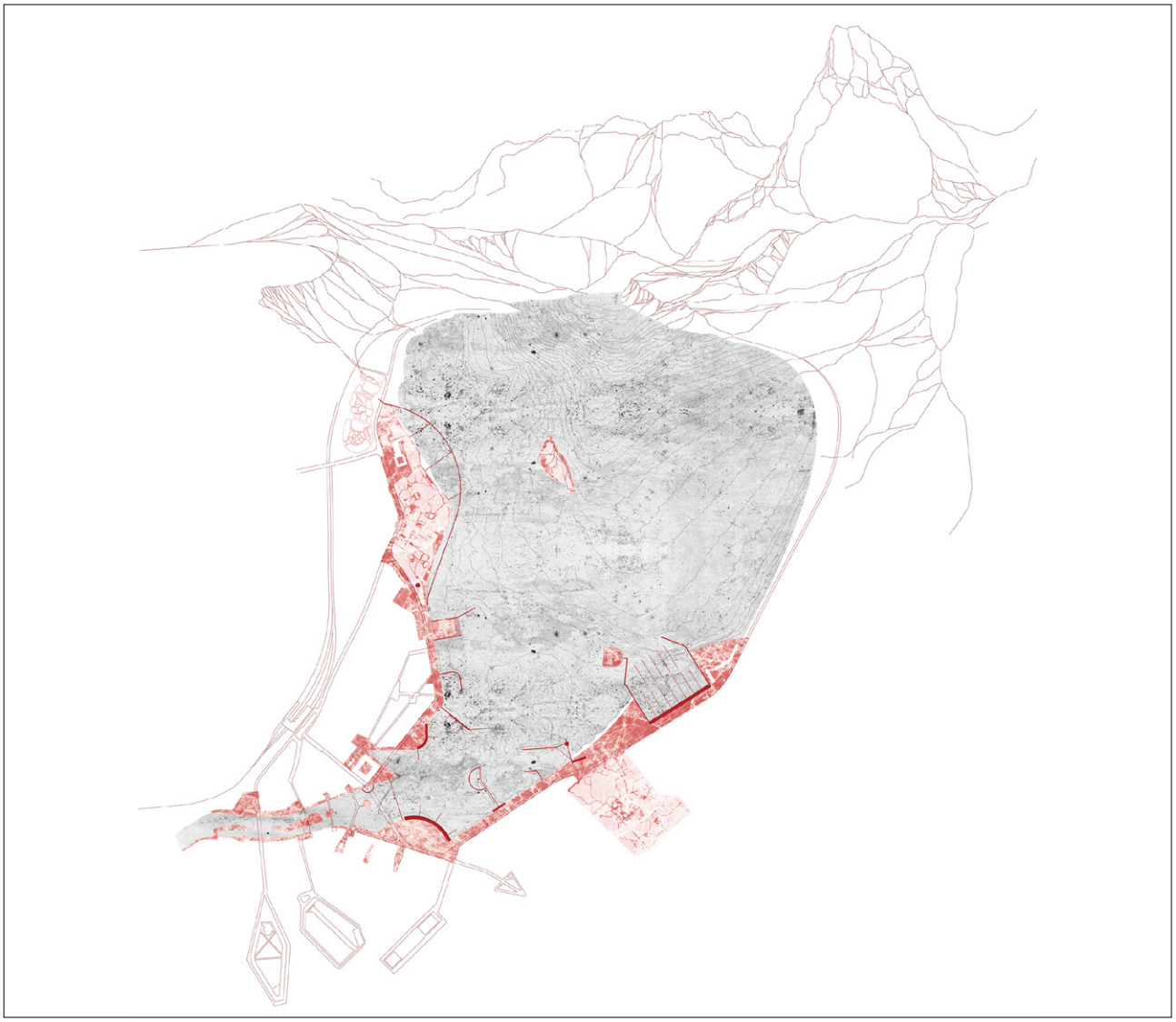
Lecture: The GIS data processing cycle: abstraction, acquisition, archiving, analysis, displaying, anticipation. Paralels with the 'analogue' work modes. How to think with GIS: possibilities, misconceptions, biases, and correct use. Beginner's user guide and open data sources.

Activities: GIS exercise and table reviews.

7. Midterm Reviews
31 October

Deliverables
• Drawing exercise: show during pin up.
• Plan exercise: print and pin up for review.
• Map excercise: aerial photo and map, print and pin up side-by-side on the same scale and frame.
• Architectural object: extra drawings, historical maps, and photos.

Presentation (5–7minutes)
1. *Object*: what is it, where is it, when was it built, who is the architect (use photos).
2. *Frame*: what you take to be part of your object's environment (use aerial photo).
3. *Layers*: what cartographic layers you extract from aerial view, how you represent them, how you combine them (use map and extra layers if needed, use historical maps).
4. *System*: how your layers combine to make territorial systems.
5. *Totality*: what that building does environmentally, how it interacts with the territorial systems and how it becomes an agent of spatial contradictions. Explain relational loop of: ground + technology + production + reproduction + aesthetics.



Bárbara Maçães Costa and Truwant + Rodet +, *La Rade de Genève*, 2017.

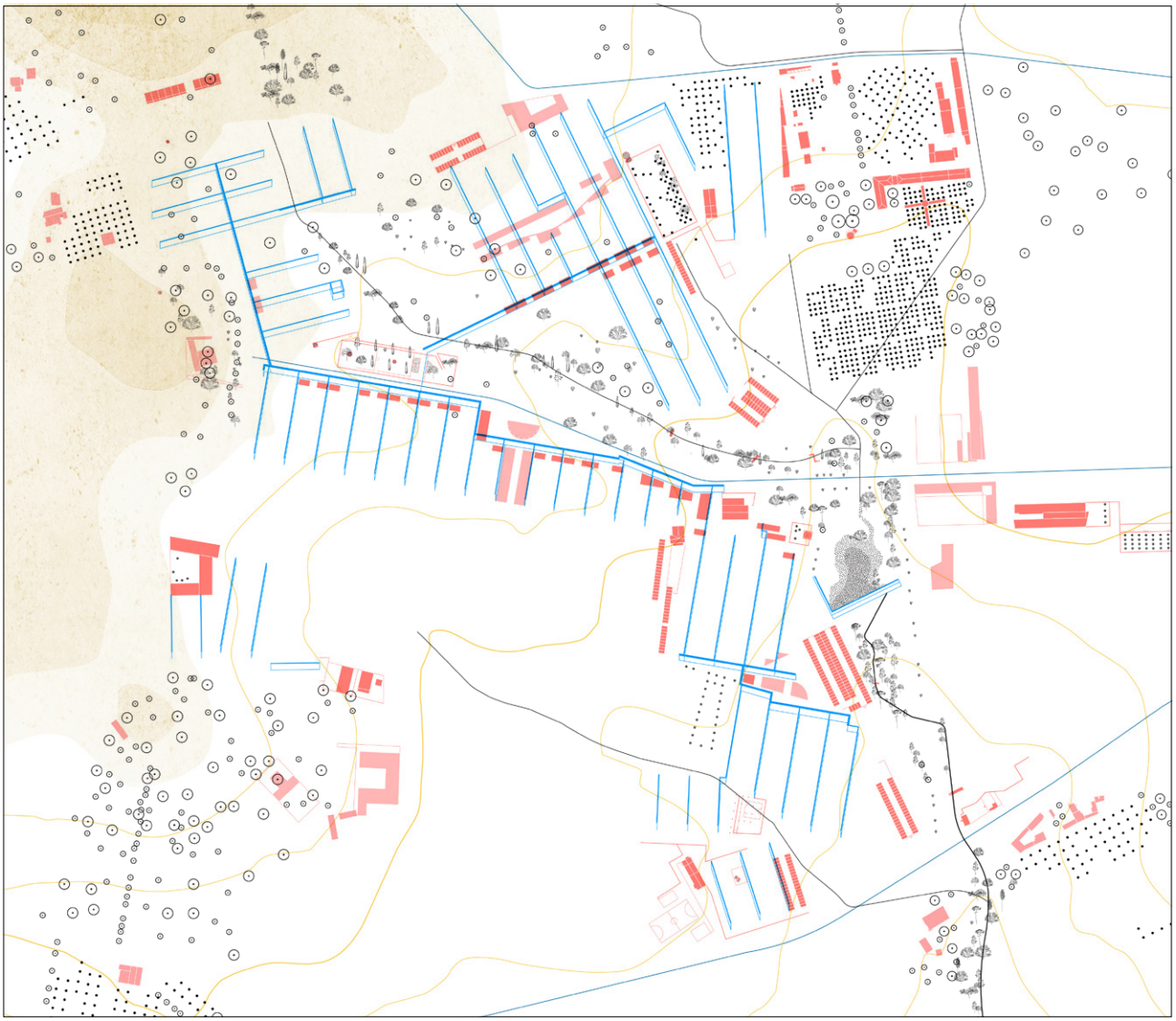
8. The Map as Critique and Praxis

7 November

Lecture: The map as a critique (negation) of the site. Practice as the dialectical unity of work and subjectivity, i.e., construction and criticism. Examples of the course method employed in the elaboration of landscape architecture projects.

Activities: table reviews.

- MAÇÃES COSTA, Bárbara. "Cartography's Weak Messianic Power." *Modernithy, Architecture & the Environment* 1 (August 2024): 1–7.
- SMETS, Bas, *Landscape Stories*. Brussels: Peinture Fraiche, 2016.



Bárbara Mações Costa, Bairro da Malagueira's conduits from "Conduit, Patio Waste," Ph.D diss, EPFL, 2021.

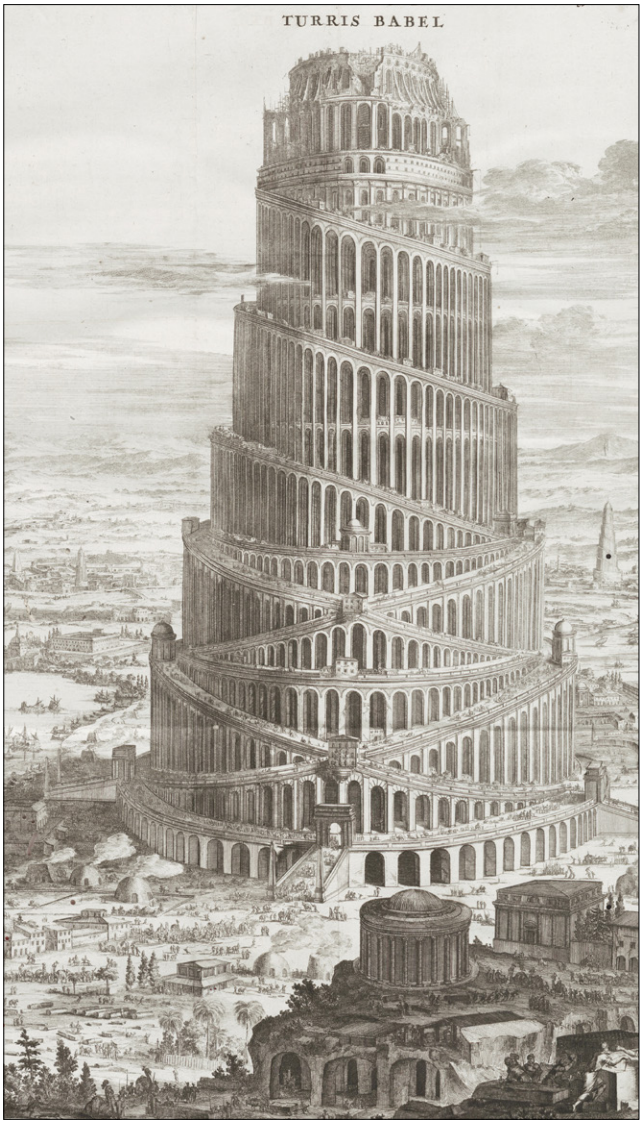
9. Pipes, Enclosures, Frontiers

14 November

Lecture: A conduit is a 'pipe' that extracts a resource from a place of abundance and transports it to a place of relative scarcity. A patio is a piece of nature transformed into landed property, a domesticated, fenced-off open space that may be privately or collectively owned. A wasteland is an empty piece of land that lacks investment. It is wasted because it has not yet been 'improved' and thus does not yield a profit.

Activities: table reviews.

- MAÇÃES COSTA, Bárbara. "Conduit, Patio, Waste Mapping Environmental Relations in Bairro da Malagueira." Ph.D. diss. École polytechnique fédérale de Lausanne, 2021.



Piero di Cosimo, *Vulcano ed Eolo maestri dell'umanità*, 1505.
Athanasius Kircher, *Turris Babel*, 1679.

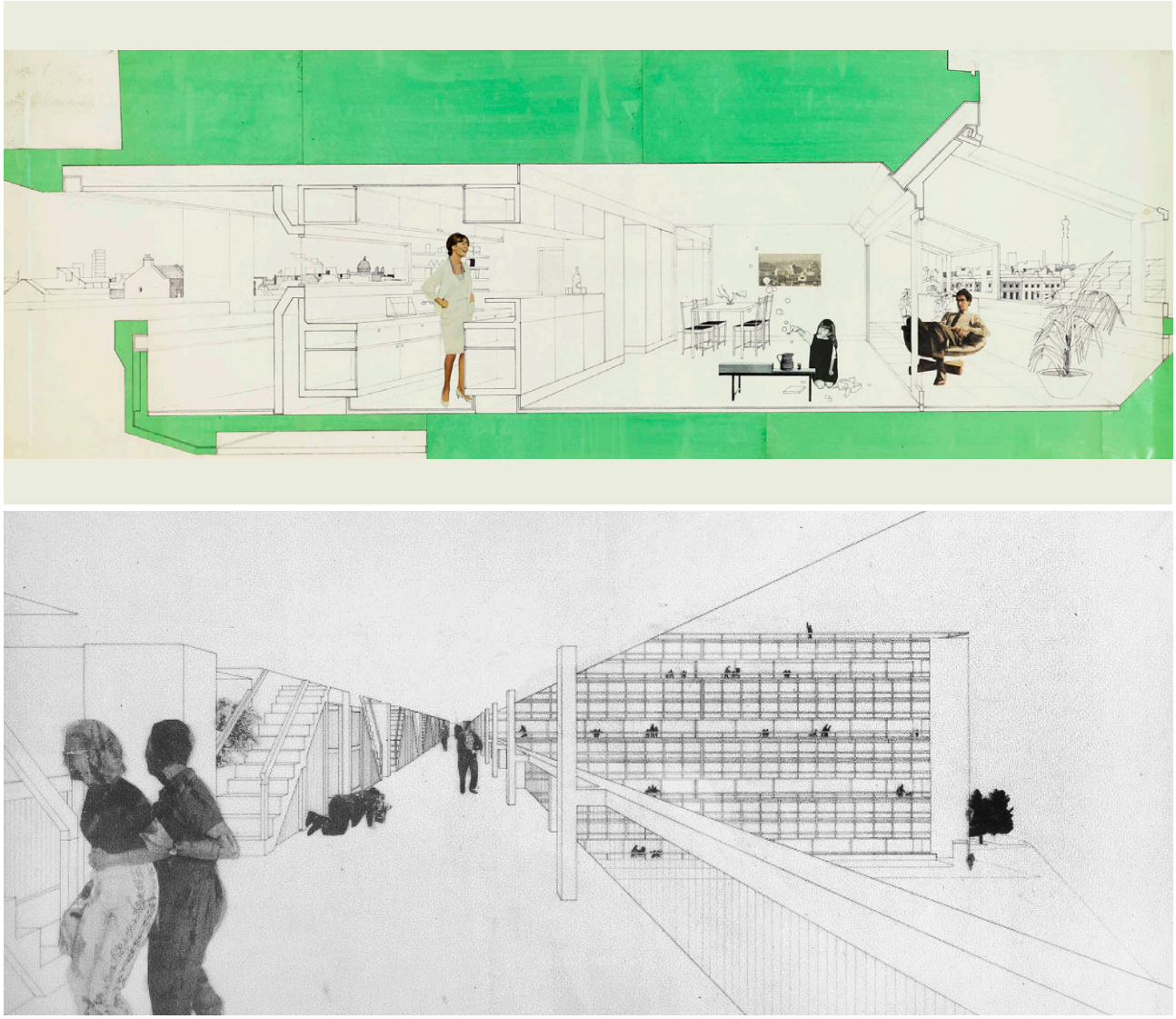
10. Primitive Hut vs. Tower of Babel

21 November

Lecture: The state of nature and the primitive hut, an ahistorical abstraction. The tower and the city: marking and assembling as founding principles of architecture. Object and totality: architecture as the representation of Spirit, as collective self-understanding and self-realization. Sensing the whole: city, metropolis, landscape, environment.

Activities: table reviews.

- VIDLER, Anthony. "The Idea of Type: The Transformation of the Academic Ideal, 1750–1830." In *Oppositions Reader*, edited by K. Michael Hays, 437–60. New York: Princeton Architectural Press, 2018.
- SCOLARI, Massimo. "The Tower of Babel: Form and Representation." In *Oblique Drawing: A History of Anti-Perspective*, 359–373 (Cambridge, MA: MIT Press, 2012).



Birkin Haward, drawings of the Brunswick Centre by Patrick Hodgkinson (London, 1968) and Golden Lane by Alison and Peter Smithson (London, 1952).

11. Brutalist Landscapes with Douglas Murphy

28 November

Lecture: The architectural utopias of the postwar consensus in Britain. Megastructures, ziggurats, and streets in the air. An architecture of territory. Contextualism, regionalism, and anti-picturesque. Brutalism vs. New Humanism. Collages and territorial sections.

Activities: table reviews.

- MURPHY, Douglas, *Last Futures: Nature, Technology and the End of Architecture*. Verso, 2016.

12. Final Reviews

5 December

Deliverables

- Drawing exercise: show during pin up.
- Plan exercise: rework, print and pin up for review.
- Map excercise: aerial photo and map, print and pin up side-by-side on the same scale and frame.
- Architectural object: extra drawings, historical maps, and photos.
- Text in bullet-points following presentation structure.

Presentation (5–7minutes)

1. *Object*: what is it, where is it, when was it built, who is the architect (use photos).
2. *Frame*: what you take to be part of your object's environment (use aerial photo).
3. *Layers*: what cartographic layers you extract from aerial view, how you represent them, how you combine them (use map and extra layers if needed, use historical maps).
4. *System*: how your layers combine to make territorial systems.
5. *Totality*: what that building does environmentally, how it interacts with the territorial systems and how it becomes an agent of spatial contradictions. Explain relational loop of: ground + technology + production + reproduction + aesthetics.

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