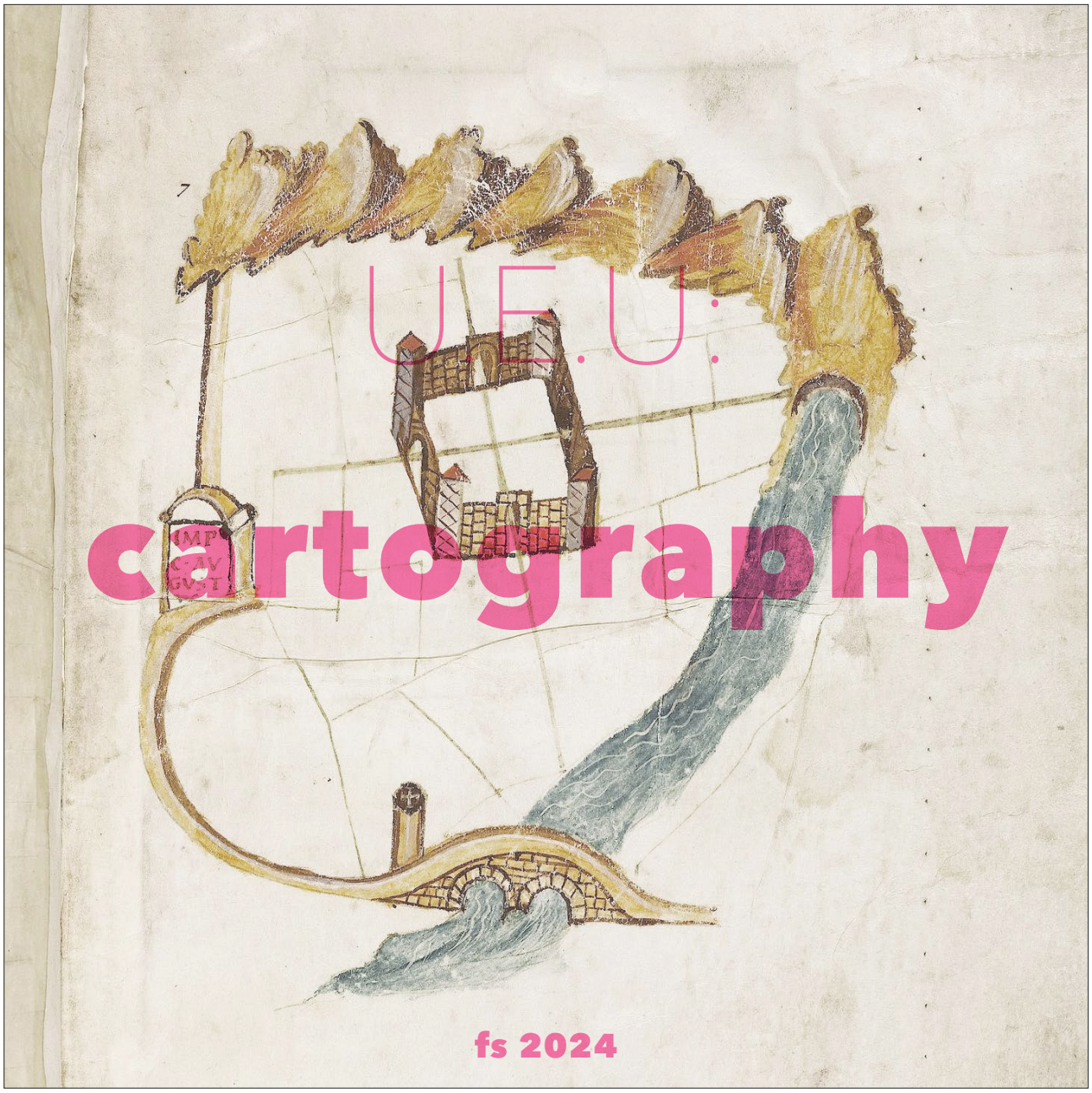
EPFL 2024/25
AR-476
UE U: CARTOGRAPHY

Bárbara Mações Costa



Miniature from *Codex Palatinus Latinus*, 1564 (after *Corpus Agrimensorum Romanorum*, ca. 9th cent.).

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

7. *Midterm Reviews*
8. The Map as Critique and Praxis
9. Primitive Hut vs. Tower of Babel
10. Pipes, Enclosures, Frontiers
11. The Cartographic Essay
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. In the Western tradition, medieval maps were not territorial descriptions as much as conceptual cosmologies, depicting biblical stories, mythology, history, flora, fauna, and exotic peoples and species.[1] With the advent of modernity, an important shift took place. 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 thus became concerned with analyzing and measuring the *res extensa*, and the land survey emerged as a crucial instrument of capitalist development.

As Neil Smith explained, capitalism 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 is treating architecture as an abstract object, disembedded, consumed, and aestheticized for its own sake. From this radical separation, maps become quantitative systems for managing phenomena, while buildings become circulating commodities for the valorization of land rent. In today's context of global social and ecological crisis, this separation has proven to be misleading. The environment is not a backdrop or a container of natural resources, just as architecture is not a collection of iconic objects floating in a vacuum. Buildings and landscapes constitute each other dialectically, regardless of whether their relationship is

collaborative or antagonistic; and cartography can render this dynamic concrete.

This teaching unit proposes a cartographic method for critically embedding architecture in its environment. By mapping buildings in their space and time, we reveal the invisible backgrounds that make up 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 sceptical stance toward traditional claims of mathematical truth by addressing cartography's internal tension between sensuous perspective and rational plan. The method uses tools from art (hand drawing), planning (remote sensing), and history (dialectical criticism). Hand drawing guides the initial process of abstraction and layering; planning offers a set of spatial figures as metaphors for the urban palimpsest; finally, a dialectical approach to historical development reveals hidden relationships between form and context. In this way, 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 will 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: 25%.
- Midterm review: 25%
- Final review: 50%.

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 a methodological basis for the *Enoncé théorique de master* and the orientation *Project Urbain*. Content is closely related to the theory course Modernity, Architecture and the Environment (AR-505), which teaches a more historical and literature-based version of the same critical question and method.

Expected Costs

Costs will 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 50 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.

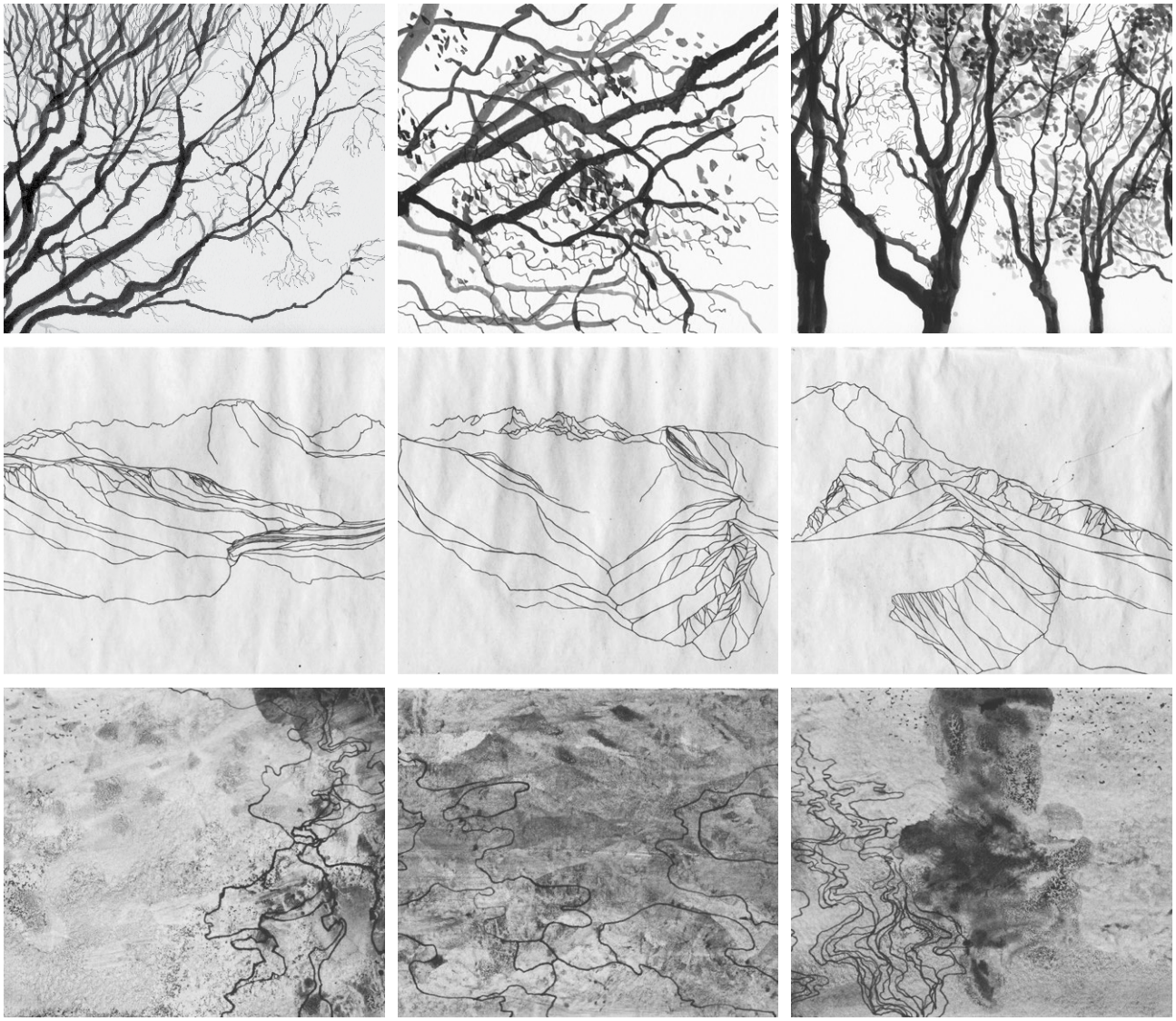
1. Cartography and Modern Abstraction

13 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.

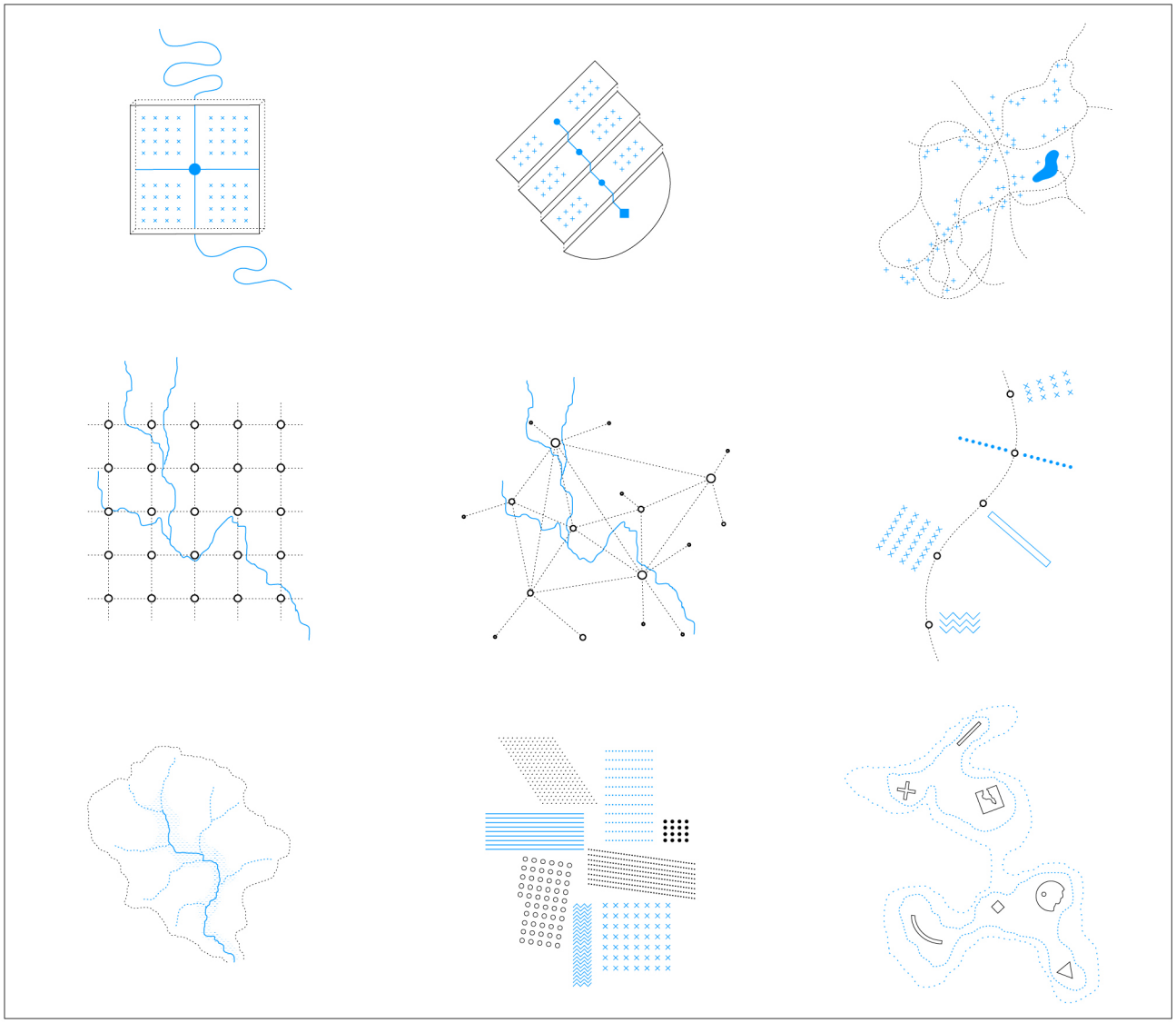
2. Drawing: Visual Layers

20 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.

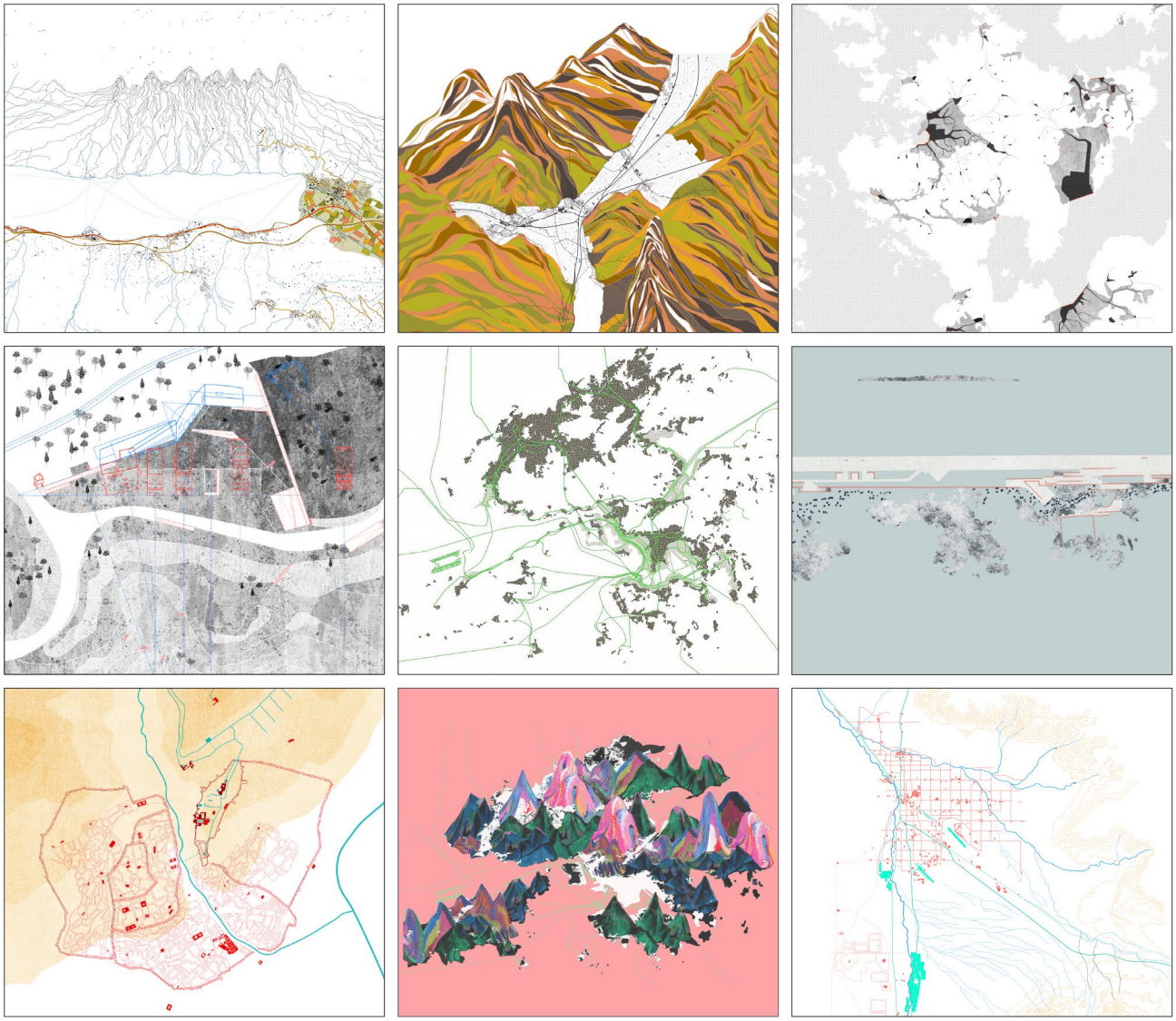
3. Tracing: Spatial Figures

27 September

Lecture: Decoding the land as palimpsest. Rendering graphic layers more concrete by organizing them into typologies of landscape 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 – Tracing: pick team and project, mixed hand and computer drawing exercise from chosen building plan, with the goal of extracting and overlaying graphic layers that now have a more concrete spatial meaning.

- 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].



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

5. Mapping: Environmental Formations

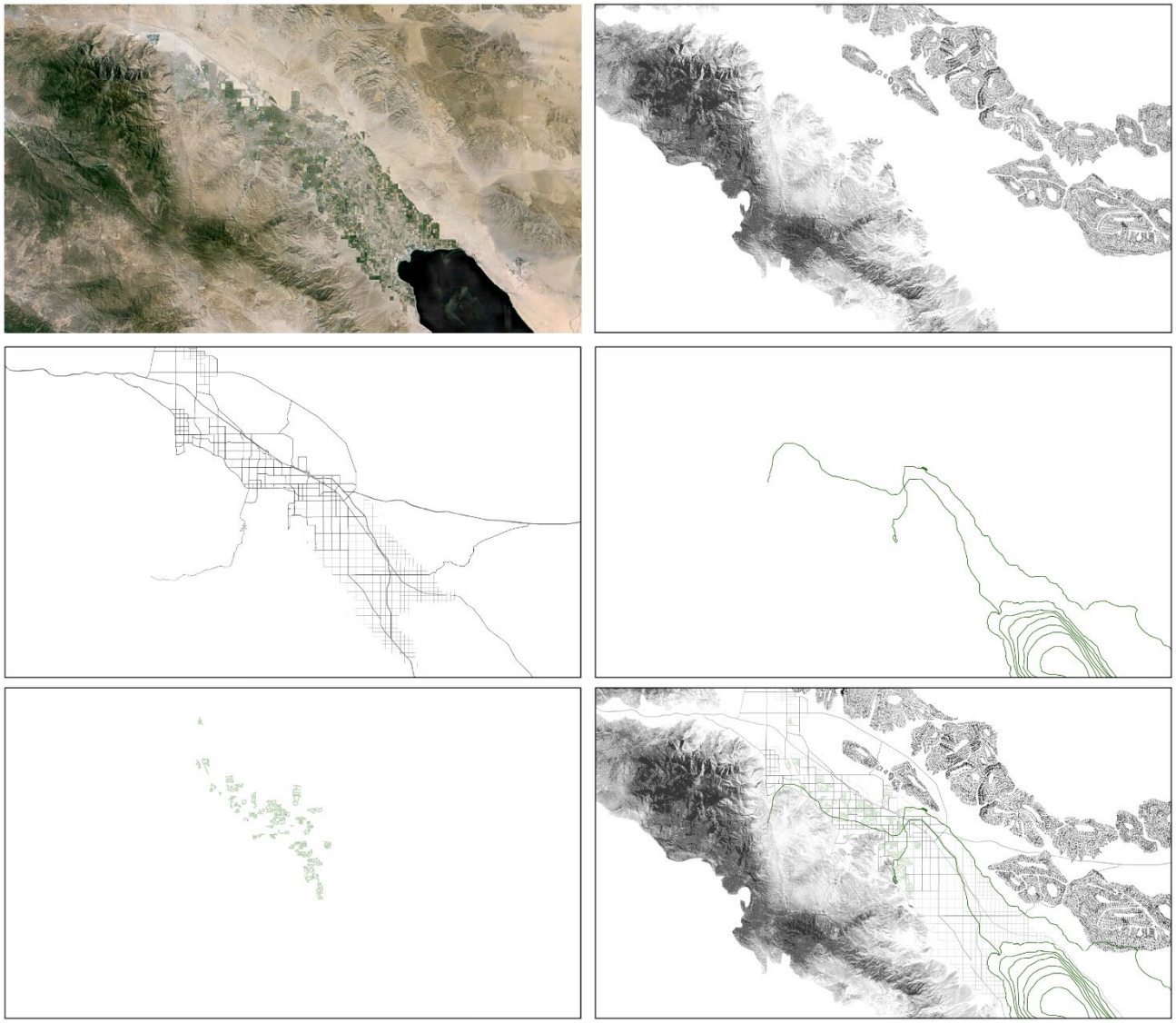
4 October

Lecture: A totality of environmental relations:

1) Nature: 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: Exercise III – Mapping: begin historical research collecting historical maps and essays on the urban development of the chosen place.

- 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.



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

4. The Dialectical Method

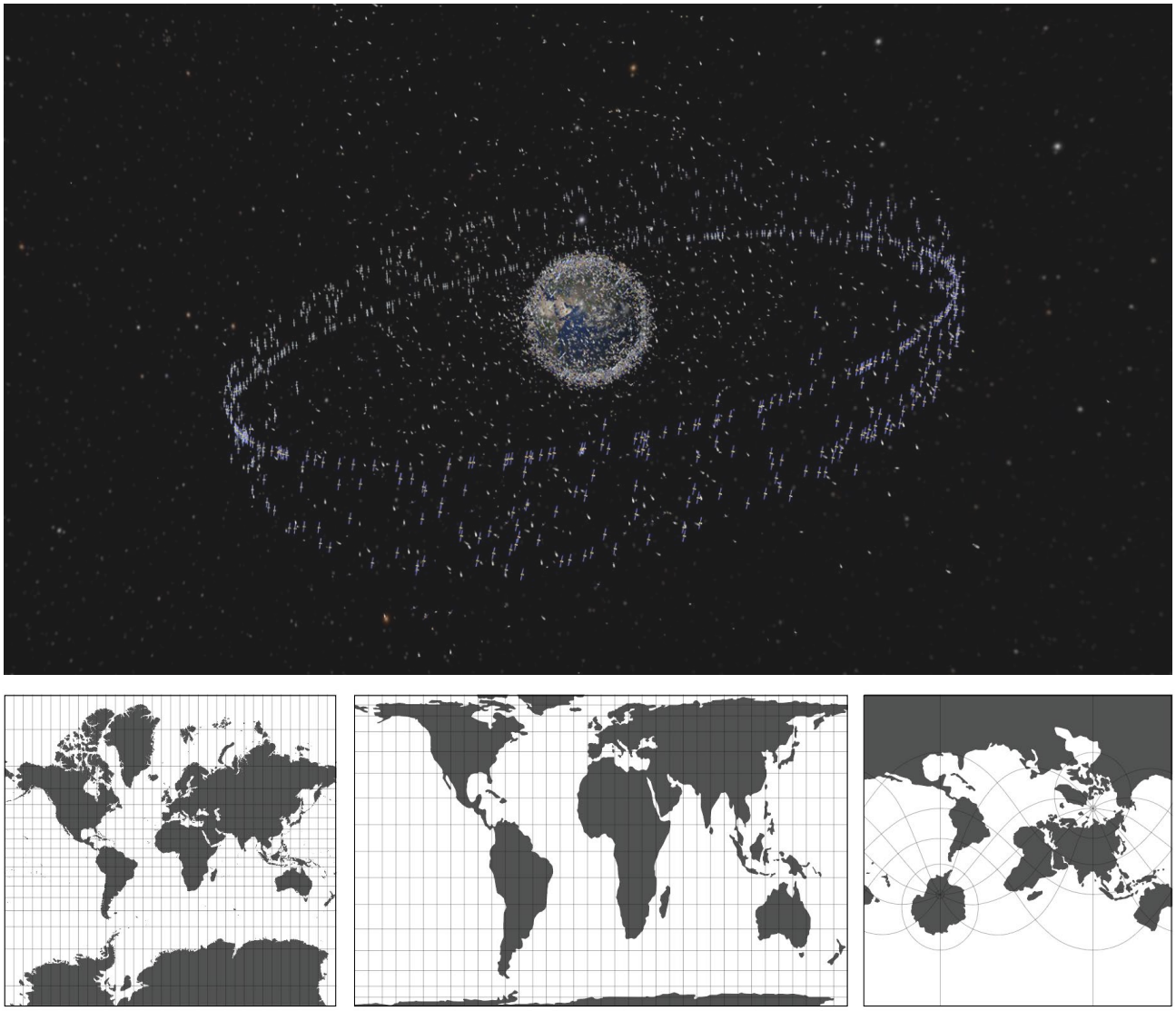
11 October

Lecture: A four-fold process:

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 nature + technology + production + reproduction + aesthetics.

Activities: table reviews.

- HARVEY, David. "Dialectics." In *Justice, Nature and the Geography of Difference,* 46–68. Malden, MA and Oxford, UK: Blackwell, 1996.
- COSGROVE, Denis E., *Social Formation and Symbolic Landscape*. Madison, Wisconsin: University of Wisconsin Press, 1984.



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

18 October

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

Activities: GIS exercise and table reviews.

7. Midterm Reviews

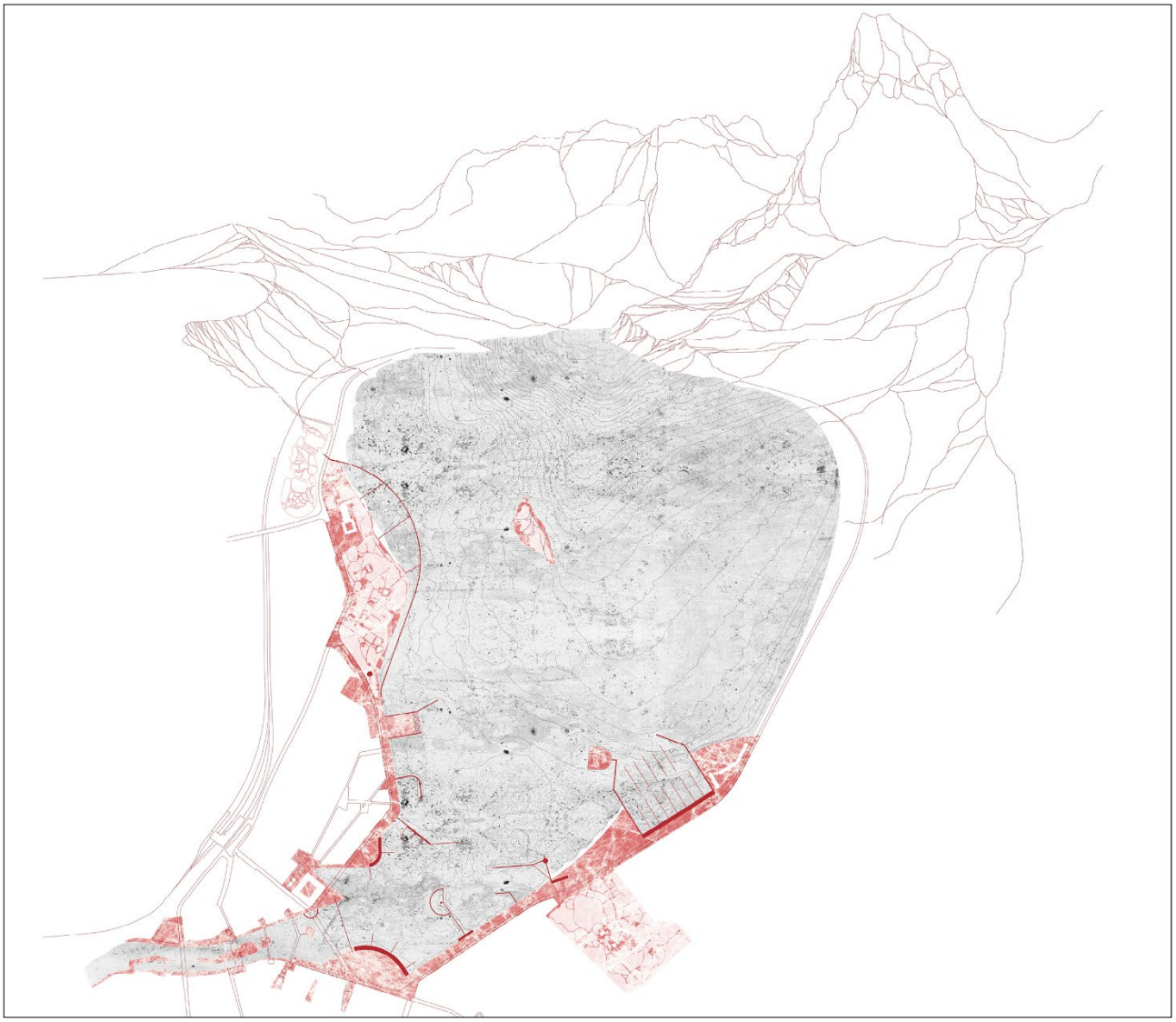
1 November

Deliverables

• Drawing exercises: to show during pin up.
• Tracing exercise: print and pin up for review.
• Mapping excercise: aerial photo and map, print and pin up side-by-side on the same scale and same 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: nature + technology + production + reproduction + aesthetics.



Bárbara Mações Costa and Charlotte Truwant, *La Rade de Genève*, 2017.

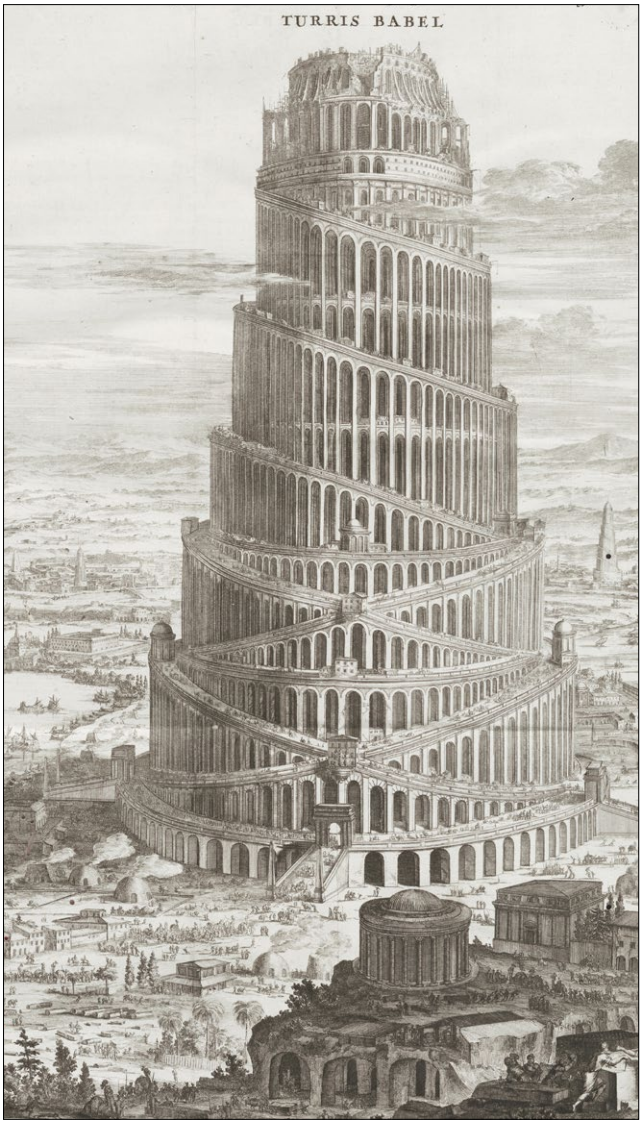
8. The Map as Critique and Praxis

8 November

Lecture: The map as a critique (negation) of the site. Praxis (architectural 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.



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

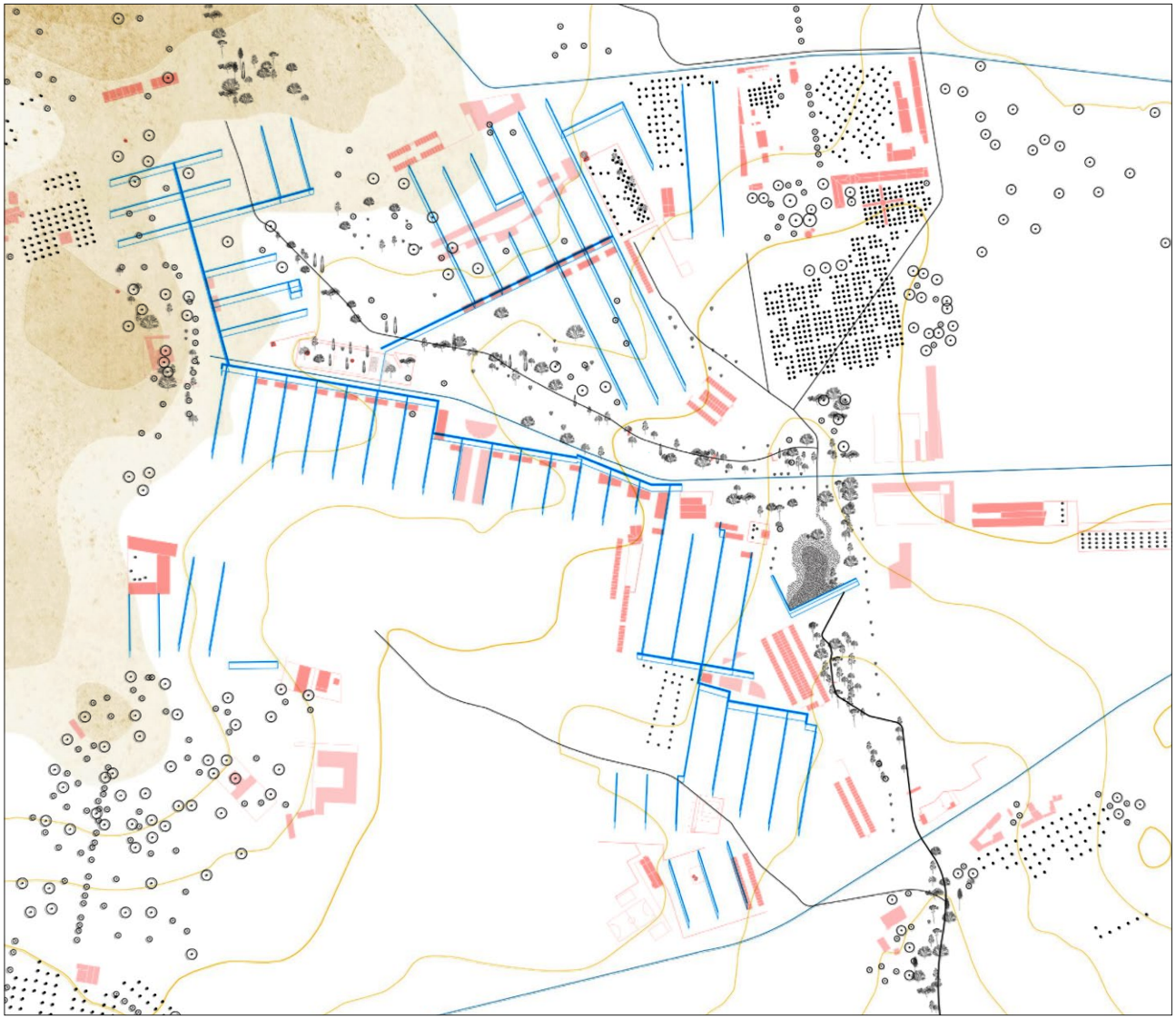
9. Primitive Hut vs. Tower of Babel

15 November

Lecture: The fetish of the object and its secret: the building-commodity circulating abstractly in the market. The politics of environment: habitation vs. improvement. Dialectics vs. atomism: subject–object, foreground–background, architecture–nature. Autonomy vs. alienation; heteronomy vs. contextualism. From object vs. landscape to mediating threshold.

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).



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

10. Pipes, Enclosures, Frontiers

22 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.

Limbourg Brothers, "A Map of Rome" in *Très Riches Heures du duc de Berry*, 1411-16.

11. The Cartographic Essay

29 December

Lecture: The dialectics of the concrete: everyday contexts mediated by concepts. To map the lived, everyday world and its appearances by means of a critical perspective that grasps the imediacy of everydayness in dialectical unity with the historical totality. The "amphibian" nature of modern humans: we are corporeal bodies, part of material nature, and meaning-making, reason-responsive subjects. The unity of rational form and contingent context.

Activities: table reviews.

- 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.
- SEKULA, Allan, *Fish Story*. Düsseldorf: Richter Verlag, 1995.

12. Final Reviews

6 December

Deliverables

• Drawing exercises: to show during pin up.
• Tracing exercise: print and pin up for review.
• Mapping excercise: aerial photo and map, print and pin up side-by-side on the same scale and same 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: nature + technology + production + reproduction + aesthetics. Rework the Tracing exercise map of the building plan.

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