



ties –which have undergone various modifications over the years, such as the redefinition of the borders of the Municipality of Venice at the beginning of the 20th century– and of the reclamation consortia that manage the complex mainland hydraulic machine.

cippo (noun)



marker (noun)

Border marker –originally in brick and *cocciopesto*, then in *Pietra d'Istria*– placed by the Republic of Venice starting from 1791 to delimit the lagoon boundary. Originally there were about a hundred stones, to which another twenty in concrete were added in the Twenties of the 20th century following a modification of the boundary line.

conterminazione (*noun*) lagunare (*adj.*)



A delimitation of the lagoon territory within which the provisions and regulations for the environmental protection of the lagoon are valid. It was delimited with markers indicating the border, and its construction was completed in 1792. In 1990 the borders were updated to also include the stretches of water of the three lagoon mouths and the island of Sant'Erasmus.

Il futuro del Comune non è Venezia, è Mestre dove c'è la gente che vive^{►10}

Luigi Brugnaro, Sindaco di Venezia

The reasons behind the land and water disputes during the 16th-century between Alvisè Cornaro and Cristoforo Sabbadino –the greatest experts in lagoon hydraulics at the time of the Republic of Venice– are to be found on a tiny triangle between the island of Chioggia, the port of Brondolo and the agricultural lands reclaimed from the lagoon. On a portion of reclaimed land facing the lagoon overlooking Chioggia are clustered the opposing lines of reasoning that still characterize an important part of the implicit and unspoken rationalities of the ‘Venice problem’. Ideas about the lagoon realized only in part, which in a few kilometres precipitate and crystallize in space and in a territorial capital built on expertise, forms of government, but also of devices such as artificial canals, embankments, reclaimed agricultural fields as well as bridles, dams, pumps, dewatering pumps, and fishing valleys. Chioggia is the island where Cristoforo Sabbadino spent his childhood and where he declared that he had learned about the lagoon phenomena (Cessi 1941). On the mainland, in the nearby Fogolana, a hamlet of Codevigo, were located the headquarters of Cornaro in the lands inherited from his uncle. Here he was able to experiment and become one of the leading reclamation experts, recovering the techniques that were introduced in the Paduan countryside by Benedictine monks, burying and cultivating portions of the lagoon, erecting embankments to achieve a clear separation between water and land, and building part of their economic fortune based on cultivation. This is the place that more than any other gave form and voice to the thinking of the ‘agrarian party’ and that found in Cornaro ‘its main and pleased exponent, who exalted [...] the role of “holy agriculture” and considered decisive for the destiny of Venice, together with a more marked projection of its influence towards the mainland, which was already well consolidated, the conquest of new lands to be reclaimed and cultivated, in order to make the Serenissima autonomous with respect to its primary food needs’ (D’Alpaos 2010, p. 42). It was here, around the Fogolana embankments built illegally by Cornaro, that the most exciting debate on the future of the

►10 ‘The future of the Municipality is not Venice, it is Mestre where there are people who live in’. Auth trans. Quoted from (*La Nuova di Venezia* 2016).

lagoon during the Republic of Venice era would begin, and where the private interests of a land entrepreneur and those of the ‘market party’, represented by Sabbadino on behalf of the *Magistrato alle Acque*, became intertwined. Within this debate between the two *Savi* (saviours), a geographical shift between water and land crystallized, to create a conceptual gap that introduced the specific and well-characterized visions of the lagoon that are still with us today.

The extreme weather events and the devastation that in recent decades have affected the metropolitan city of Venice on several occasions have, on the one hand, highlighted the close and indissoluble relationship that exists between the lagoon and the city that has grown on its drainage basin, while on the other, they have revealed the main rationalities that have shaped this territory since the times of Cornaro and Sabbadino. Within this speculative exercise it is not difficult to recognize who the representatives of one point of view or another are today: on one side there is the ‘agrarian party’, with an often unscrupulous –even if enlightened– vision of entrepreneurship which aspires to become an active part of political action, while on the other side the ‘market party’ places Venice and its waters at the centre, often promoting an implicit project whereby safeguarding the balance of the lagoon must be put above any other interest. In fact, it should not be forgotten that at the time of the Republic of Venice the action of safeguarding the lagoon was often carried out to the detriment of the liminal territories: ‘Focusing on the Brenta for now, it must immediately be pointed out that if its exclusion from the lagoon saved the stretches of water around Venice from silting, a heavy price was paid immediately by the mainland’ (D’Alpaos 2010, p. 43).

On the embankments built to protect the lagoon and, at the same time, separate land, water, and sea, Cornaro wrote many texts between 1540 and 1560. As mentioned, Cornaro became a precursor of the reclamation of these territories in the Codevigo areas located to the south-east of the lagoon, between Venice and Padua, made uninhabitable and marshy due to the construction of the ‘Brenta Nova’ excavated during the 15th century. It was to protect these reclaimed lands that Cornaro erected the Fogolana embankment on the lagoon, which was later demolished by order of the *Magistrato alle Acque* and that generated a judicial and intellectual confrontation with Sabbadino. It is from the stubborn defence of

this first embankment that Cornaro began to gradually formulate the idea of a lagoon entirely closed and separated from the surrounding territory. A healthier, richer, safer, and more beautiful lagoon.

If for Cornaro the separation and protection devices are initially tools intended to defend and protect his lands from *mal-aere* (bad air) and to define a clear limit of ownership of his possessions, they quickly become the hallmark of an overall idea of the lagoon understood as a defined space, in which the land is land, the 'lake' is a 'lake' –lake here stood for lagoon– and the sea is sea. Thus, the embankments towards the land become walls with bastions, doors, and wooded embankments. Along the shores they become barriers against storm surges and dams towards the sea, to 'lock' the ports of Treporti, Sant'Erasmus and Malamocco that expose the lagoon to incursions of the sea and enemy armies. The actions of excavation, reclamation, separation, and protection become design devices capable of satisfying the request for a healthy^{►11}, safe^{►12} and beautiful^{►13} place. A project made possible by the construction of ever larger embankments, walls, and dams. Technological devices that are simultaneously protection and territorial specialization; they define a hinterland which is the productive belly of the region and a lagoon which, isolating itself from floods and storm surges, preserves Venice and crystallizes it over time. Large-scale works on a territorial scale, made possible by the action of the State because, as Cornaro constantly reminds us, 'non si conciede a una privata persona per bonificare li suoi luoghi aprire et serrare l'acque, tagliar arzeri, far scoladori nuovi, cambiar alvei a fiumi, levar via molini, rimover livelli [...]'^{►14} (Cornaro 1540, p. 8).

Water and land today

Long after the 16th-century controversy between Sabbadino and Cornaro, it is still possible to glimpse the strong relationships but also the (historicized) conflicts that emerge between Venice, in the lagoon, and the metropolitan city that has been created around it, on the mainland. In other words, the two great sets of antithetical arguments are revealed: on the one hand, a territory that in its long history has been extensively altered in order to protect the lagoon and on the contrary, the city of Venice which, in recent decades, has been rethought (first politically then spatially) also as a function of its metropolitan area. Indeed, from the

►11 ' [...] il parer mio saria, che fusse fatta una division di questi paludi, o con arzeri, o con altro, et li paludi più bassi [...] vorrei che fossero cavati et datogli fondo fino a confine delli arzeri, acciò s'agrandisse la laguna et si levasse la causa del mal aere, che è il nascer della canella.' (Cornaro 1540, p. 6). 'it is my opinion that a division of these swamps should be made, with embankments or something else, and the lowest swamps [...] I would like them to be excavated and levelled up to the border with the embankments, so that the lagoon could become larger and the cause of the sickness –which is the growth of cane thicket– eliminated' (auth.trans.).

►12 'È dunque necessario chiuder prima il porto deli Treporti, e poi quello di San Rasmus, e poi quello di Malamocco, che essi sonno quelli, che han tolto la laguna a questo, e sono porti aperti senza difesa alcuna, onde si può entrar nella laguna, che è aperta, e massime per quello di Malamocco, che non è pur aperto e patente, ma profondo e commodo ad ogni grande armata nemica' (Cornaro 1565, p. 57). 'It is therefore necessary to close first the port of Treporti, and then that of Sant'Erasmus, and then that of Malamocco, which are those which have taken the lagoon away from it, and are open ports without any defence, so that one can enter the lagoon, which is open, and especially for that of Malamocco, which is not only open and apparent, but deep and convenient for every great enemy army'. (auth.trans.).

►13 'E ricordo che questa città sia recinta de muri, nel terrapieno vi sia uno bosco e dentro di essa città la sia adornata di theatro, di fontana del Sil, come si po', e di uno

vago monticello, le quali, perchè sono cose belle, che si possono fare, sono certo che si faranno, e la vego hora, come si fusseno fatte. Oh che bella città vego, che sarà questa veramente illustre!' (Cornaro 1566, 69). 'And I remember that this city should be enclosed by walls, on the embankment there would a forest and within it there will be a city I adorned with a theatre, a fountain with Sile river water, as it will be possible, and with a vague mound, which, because they are beautiful things, which can be done, I am sure they will be done, and I foresee now as they were done. Oh, what a beautiful city I foresee, which will be truly illustrious!' (auth.trans).

►14 'it is not granted to a private person to reclaim his possessions, open and close the waters, cut embankments, make new drainers, change riverbeds, remove mills, remove levels' (auth.trans).

post-war period to today, the opposing parties (of *mercatura* and 'agrarians') seem to acknowledge each other, even in the local debate. On the one side, the ardent defenders of the conservation of the equilibrium of the lagoon, of its landscape and artistic forms, of the cultural and microeconomic practices that have consolidated here (Montanelli 1969; Mencini 2011; Mencini *et al.* 2013) and on the other those who interpret Venice and the lagoon –also in anticipation of potential economic development processes– within a complex territorial framework (Rollet-Andriane and Conil-Lacoste 1969; Zucconi 2002; Fondazione di Venezia 2019). Starting from the multifaceted reclamation project, Cornaro's



Detail of an ancient map of the lagoon drawn by Zuane Trevisan in 1542 depicting the Fogolana embankment built by Alvise Cornaro and his associates. Archivio di Stato di Venezia, Savi ed Esecutori alle Acque, Disegni, Laguna, n.6.

intellectual legacy informs us about the possibility of looking at the decentralized lands of Venice –the reclaimed and urbanized countryside, the mainland shore, the industrial areas, the islands, the seashores, and the coastal strip– as active places in a necessary transition process. Cornaro pictured a scenario that still appears profoundly timely, separating the lagoon and repositioning it in a wider field of relations within a territory that is made healthy and

productive by the work of man. Looking at the cultivated countryside, Cornaro sheds light on a development model based on autonomy, access to local resources and circularity. Through the obstinate defence and construction of a landscape made of water, of a dense network of navigable rivers and ports, of previously marshy soils transformed into productive agricultural spaces and woods, Cornaro reconceptualized the idea of heritage and brought it back to the territory. In this sense, the lagoon and its drainage basin are not just a background for Venice but, together with the landscapes and practices that cross it, they constitute her fundamental significant frame. In light of environmental emergencies, cyclical economic crises, depopulation, and land consumption phenomena, looking at the areas covered by the Cornaro reclamation plans means examining the problems –but also considering possible solutions– which, inevitably, also affect the lagoon as an environment and Venice as a city.

Conversely, also following the various special laws for Venice and the recent disastrous high tides, the issue of safeguarding the lagoon has become increasingly pressing; even in popular debates the collective need to protect the hydraulic, biochemical, and sociocultural space of Venice emerges. In this setting Luigi D'Alpaos argues, as mentioned, the need to continue with the maintenance work of the lagoon that was carried out by the *proti* (magistrates) to the waters of the Serenissima: this, in fact, has always been an important cultural heritage, between nature and anthropization (D'Alpaos 2010; 2019). Today, the cultural heritage of Sabbadino brings the gaze back to the lagoon intended precisely as heritage: a territory that must be protected and maintained, firstly through the ousting of all that is considered incongruous, irreconcilable (large ships, the industrial port, mass tourism); secondly, through a large project composed as a sum of small works aimed at maintaining the balance between salt and fresh waters that the transformations of the 20th century and the new environmental emergencies risk to irreparably compromise.

Thus, on the edges of the lagoon, the logics of water and land congregate in a contemporary kaleidoscope through incongruous demands, apparently irreconcilable political claims, movements from below, and great modernizing works supported by the Italian state in Rome. The opposing rationalities settle on the ground, populating the territory with a schedule of building works, in-

infrastructures, technological devices whose framework of shared meaning is hard to grasp. In a certain sense, looking at the logic of the land, these are often resistant and hierarchical devices, large works aimed at defining a territorial and functional specialization: sheet piling, embankments, dams, bridges, mobile bulkheads, information and high speed infrastructures; by contrast, looking at the water, they seem to be weaker devices, often inspired by the paradigm of resilience and transition: micro-artifacts made of halophytic plants, aquatic grasslands, clod transplants, bundles of twigs, new amphibious morphological structures, reeds and wetlands.

Today, in the light of the repetition of extreme high-water events and the consequent environmental effects, the hydrodynamic and morphological relationships between water and land re-emerge in a particularly accentuated form by the phenomena of subsidence and eustatism. As hypothesized by Umgiesser (2016; 2020), the gates of the three mobile dams –in anticipation of an average sea level rise of 50 centimetres by the end of the century– will have to come into operation on average at least once a day. As already mentioned, this perspective will lead us to have to choose between safeguarding Venice –through a progressive but total closure of the lagoon– and safeguarding the lagoon for the maintenance of which, as mentioned, the exchanges between sea and salt water are vital. The closure of the lagoon would be incompatible with both navigability and the industrial port on the one hand, with the ecological needs of the natural environment on the other. In facing this choice, Umgiesser mixes the logic of water and land and accepts the idea that the body of water could one day be separated from the sea and the land, returning implicitly –and paradoxically– to the ideas that belonged to the party of agrarians. Therefore, in the perspective of a gradual but total closure of the lagoon, the studies advanced by Cornaro still constitute an important source of reflection: they push us to think about the surface of water around Venice as an artificial space that is the result of the work of man. A space which is neither fixed nor immobile, which can be modelled and transformed.

Elements / Key concepts

Physical division devices

Even if the division of the lagoon may seem immoral, it should be remembered that it has always been a territory-palimpsest designed by physical devices whose purpose is to define, separate and regulate what by nature would be unstable and in transition. The definition occurs through corrugations of the ground, such as embankments, sometimes through small deformations of the soil surface of an incremental type, such as the protection systems of the salt marshes, sometimes through peremptory and resistant limits, as with the sheet piles of the marginal systems of the lagoon or the protection systems towards the sea. Secular corrugations of the ground that have made an uninhabitable territory habitable and whose future is still –as always– threatened by the same water that Venice has been attempting to contain or eliminate for centuries.

Physical division devices



Lagoon protection and division devices

- A. *briccole* (dolphins);
- B. *burghe* (coarse basket), *fascinate* (fascines);
- C. embankments of fishing valleys;
- D. sea defences;
- E. *sponde* (banks);
- F. embankments of the drainage basin.

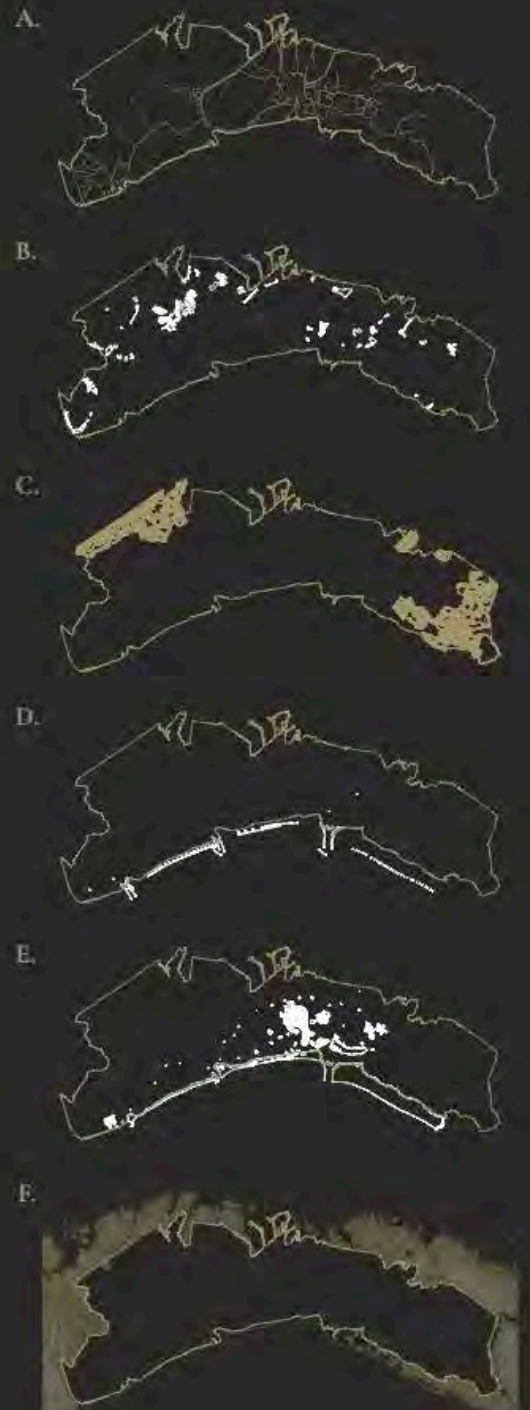
The material divisions that structure the space of the lagoon follow rationalities of control, defence and separation of a space which by nature would otherwise be indefinite and in perennial transformation. In the water space of the lagoon, the *briccole* separate the flows of the boats, define the edges of the canals and

therefore accessibility, making manifest the bathymetry that would otherwise be invisible. *Burghe*, *palafitticole* and *fascinate* protect the *barene*, setting the limits of a microtopography of a few tens of centimetres which by nature would be mutant, osmotic, and alveolar. The banks define the islands and the lands that



have emerged, consolidating and outlining their edges. The levees and sewers of the fish farms compartmentalize the streams, trap, and care for the fish. Towards the lagoon eaves, embankments, sheet piles, pumps and water pumps divert rivers, define the edges and limits of the lagoon, turning into land what would

otherwise be a swamp. Towards the sea *murazzi*, dunes, groynes and mobile dams protect the shores and the lagoon, separate the salt from the brackish water, and protect the space of the lagoon from storm surges.



argine (*noun*)

embankment (*noun*)

Structure built to shelter from the water that can also serve as a defensive purpose in military terms. The first large embankment built by the Republic of Venice was the Saint Mark's Embankment in 1543, following the flood of the Piave river in 1533 which caused the burying of large areas in the northern lagoon near Torcello, Burano and Mazzorbo.



idrovara (*noun*)

water (*noun*) pump (*noun*)

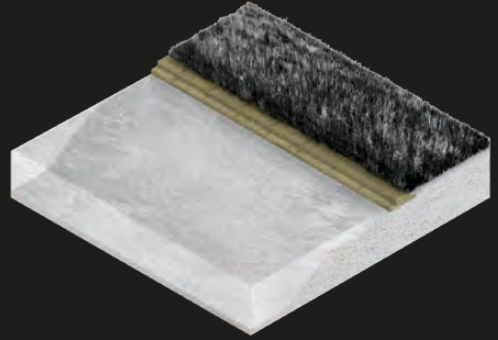
Pump (or pump system) for the disposal of masses of water used in reclamation works. They are housed in a network of buildings that, together with the farmhouses (now largely abandoned), dot and characterize the agricultural areas of the Venetian mainland.



burga (noun)

coarse (adj.) basket (noun)

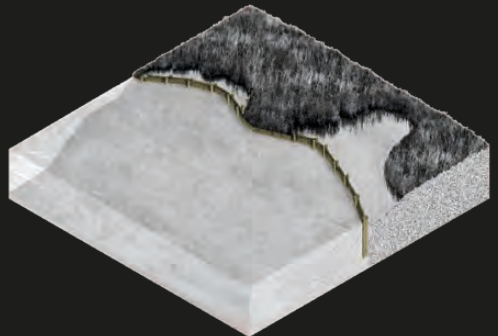
Coarse basket of willow branches, cylindrical or conical in shape, which, filled with stones, works in river defences against the erosion of the *barene*.



fascinata (noun)

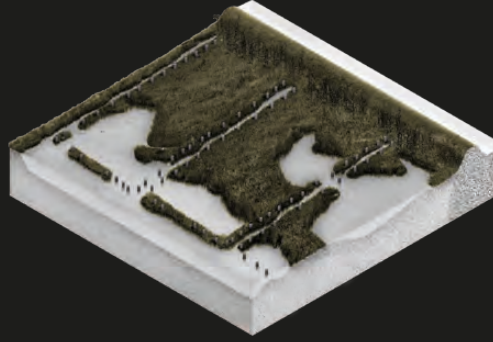
fascine (noun)

biodegradable naturalistic engineering intervention with low environmental impact to protect the margins of the *barene* from waves and currents. It consists in the hand-making of wicker bundles that are placed and fixed, together with the trawling of sediment deposits, transplanting of vegetated clods and installation of wavebreaks, windbreaks and groynes.



gronda (*noun*) lagunare (*adj.*)

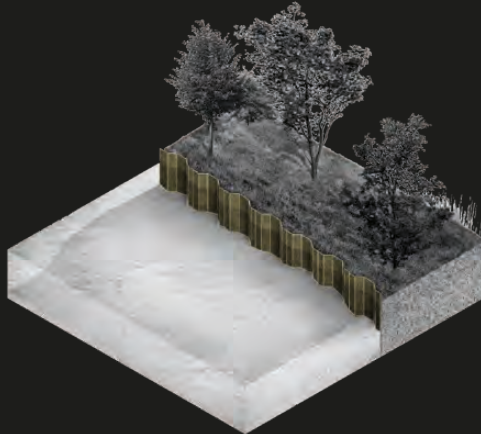
Portion of the drainage basin in which rainwater flows towards the lagoon itself.



palancola (*noun*)

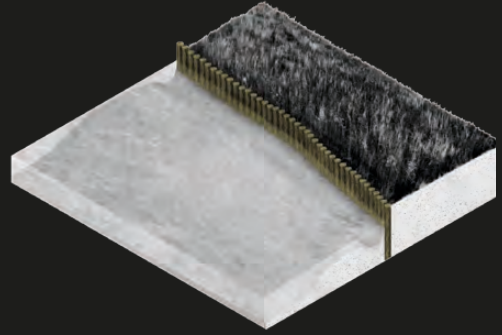
sheet (*noun*) pile (*noun*)

Component with a structural function –commonly steel in hot or cold rolled form– which once driven into the ground below the excavation plane and connected appropriately with other modules forms a continuous vertical element called “sheet piling”. This acts as terrain support and/or hydraulic barrier and can be designed as temporary or permanent.



palafitticole (noun)

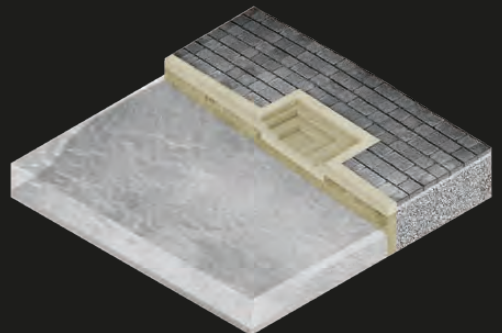
Biodegradable naturalistic engineering intervention with low environmental impact to protect the edges of *barene* from waves and currents. It consists of a barrier of logs implanted in the lagoon-bed with the function of supporting the ground.



sponda (noun)

bank (noun)

The Venetian banks usually have *Pietra d'Istria* edges, may or may not have a parapet and are dotted with landing stages with steps that descend into the water for mooring boats and loading and unloading goods. They are also commonly called *fondamenta*, a term deriving from the consistent continuous piling and the overlying foundation masonry works necessary to build them.



bricola (*noun*)

dolphin (*noun*)

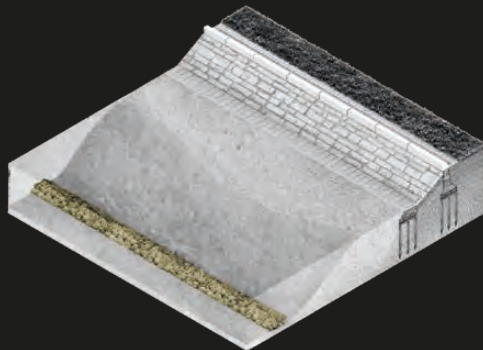
Venetian term that indicates the poles planted on the bottom of the lagoon and used to delimit the navigable canals and occasionally for the mooring of large boats. Today the originally wooden bricole are often replaced by models made of artificial materials that require less maintenance.



diga (*noun*) soffolta (*adj.*)

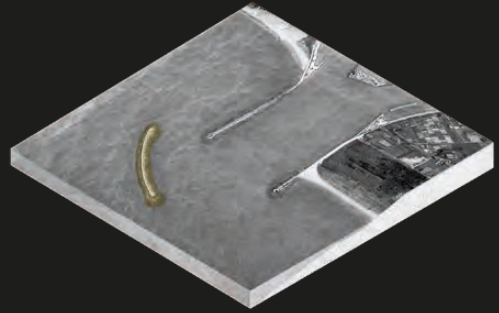
underwater (*adj.*) dike (*noun*)

Modular structure in reinforced concrete, placed and juxtaposed on the seabed along a continuous line parallel to the coast and at a distance of at least one hundred metres from it. The dam is placed in order to dissipate the energy of wave motion, favour the sliding of the sand towards the shore and counteract its return in order to limit the erosion of the coasts.



lunata (*noun*)

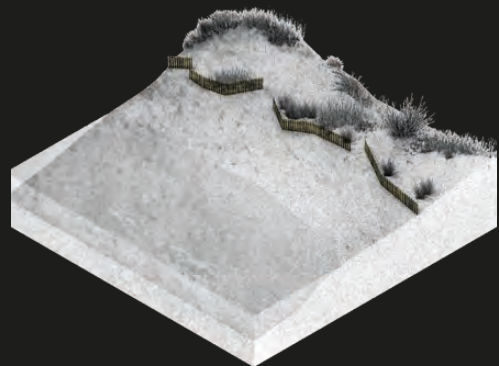
Curvilinear artificial reef that dampens the strength of the tidal currents entering the lagoon.



duna (*noun*)

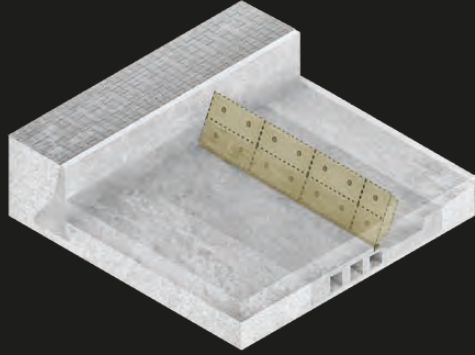
dune (*noun*)

Heap or cord of sand, generally fine-grained and uniform, mostly horseshoe-shaped, with asymmetrical slopes that are formed on the coasts by the action of the wind blowing constantly in the same direction. In addition to the wind, the prevailing sea current, which circulates counterclockwise, also affects the deposit of sand and the consequent formation of dunes in the upper Adriatic.



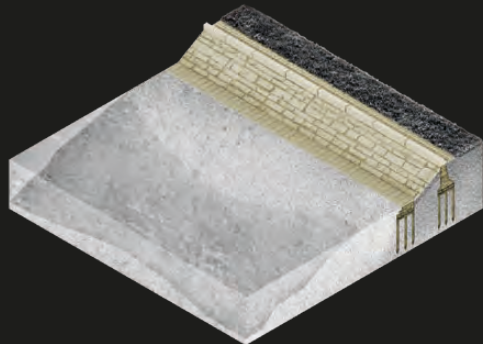
MoSE (acronym)

The Modulo Sperimentale Elettromeccanico (Electromechanical Experimental Module) is a project developed since the late Seventies of the 20th century (following the 1966 flood) to protect the Venice lagoon from high tides. The main feature of the project are the rows of mobile gates –installed at the lagoon mouths of Chioggia, Malamocco and the Lido– capable of temporarily isolating the lagoon from the sea. The works only started in 2003 and should be completed by 2022.



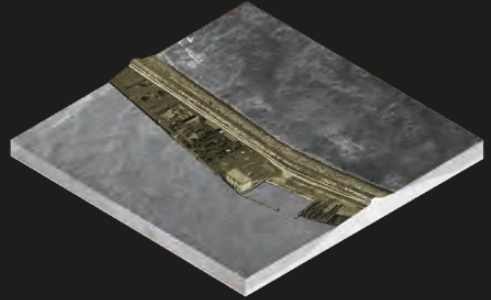
murazzi (noun)

The set of dams parallel to the coast close to the shores to protect them from erosion caused by the sea. They were designed as defence works from the sea in *Pietra d'Istria* and *pozzolana* by the mathematician Bernardino Zendrini starting from 1739 on behalf of the Republic of Venice along the coasts of Malamocco, Pellestrina and Sottomarina.



lido (*noun*)

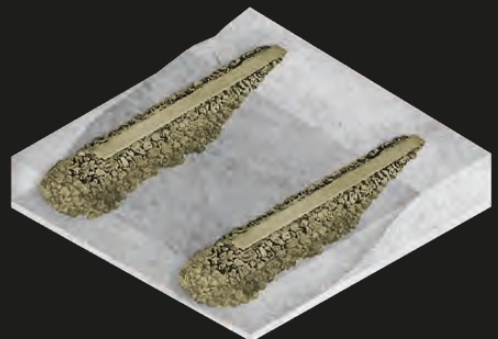
Narrow sandy strip of land parallel to the coast that divides the lagoon from the sea, also known as “coastal strip”.



pennello (*noun*)

groyne (*noun*)

Structure for the defence of the shores or marine beaches that stretches towards the water, perpendicularly or inclined, against or according to the current, built in stone masonry or obtained with simple piles of boulders resting against a reinforced concrete wall, or with gabions.















Chapter 3

On Venice

Venice, year 2100.

‘Grandpa, grandpa, where is Venice?’

‘Alvise, how many times do I have to tell you, we are in Venice, you live in Venice!’

Alvise and his grandfather are travelling on the new tram that leads from Dolo along the Brenta Riviera to the historic island. This weekend they will take advantage of the absence of Alvise’s mother’s –she has to work at the laboratory until late– to take a walk on the historic island and then, on Sunday, given the good springtime weather, take a hovercraft ride in the southern lagoon. At this time of the year the glasswort is bright green. They will sleep in the spare room of the elderly grandparents’ house –now rented to a couple of American climate researchers– that overlooks Riva degli Schiavoni. Alvise is very excited and impatient, as always when he goes to the historic island. He doesn’t know what to make of the words of his grandfather who insists on calling it Great Venice, he just can’t comprehend how Venice is one thing, and the great metropolis overlooking the lake is another... Alvise does not know that the issue of the administrative separation of Venice from the mainland was actually much debated for at least fifty years between the 20th and 21st centuries. The last of the five referendums on the division of Venice from Mestre was

held the day after the high water in 2019. The first three –1979, 1989 and 1994– rejected the dismemberment of the two realities by an overwhelming prevalence of ‘no’ votes . The fourth in 2003 failed because it did not meet the *quorum*. At the end of 2019, on the one hand there was the front composed of those who argued that separate administrations were required, addressing the specific and distinct needs of land and water; on the other hand, those who argued that Venice with Mestre and the other municipalities that overlook the lagoon should become a single city. Those who leant towards separation consisted predominantly of resistant islanders, exhausted by the violent effects of the high water and by the madness of skyrocketing house prices. Supporters of the separation were convinced of the specificity of Venice and the lagoon and sustained the reasons for an administration that needed to be able to deal with the slow rhythms of the tides and the ‘invasions’ of the high tourist season. Against the division there was instead a variegated and composite front in terms of cultural background and political orientation. In the end, abstention still prevailed, a sign of a whole complex world of reasoning and feelings that have always been located in that amphibious space that lies between the extremes of water and land.

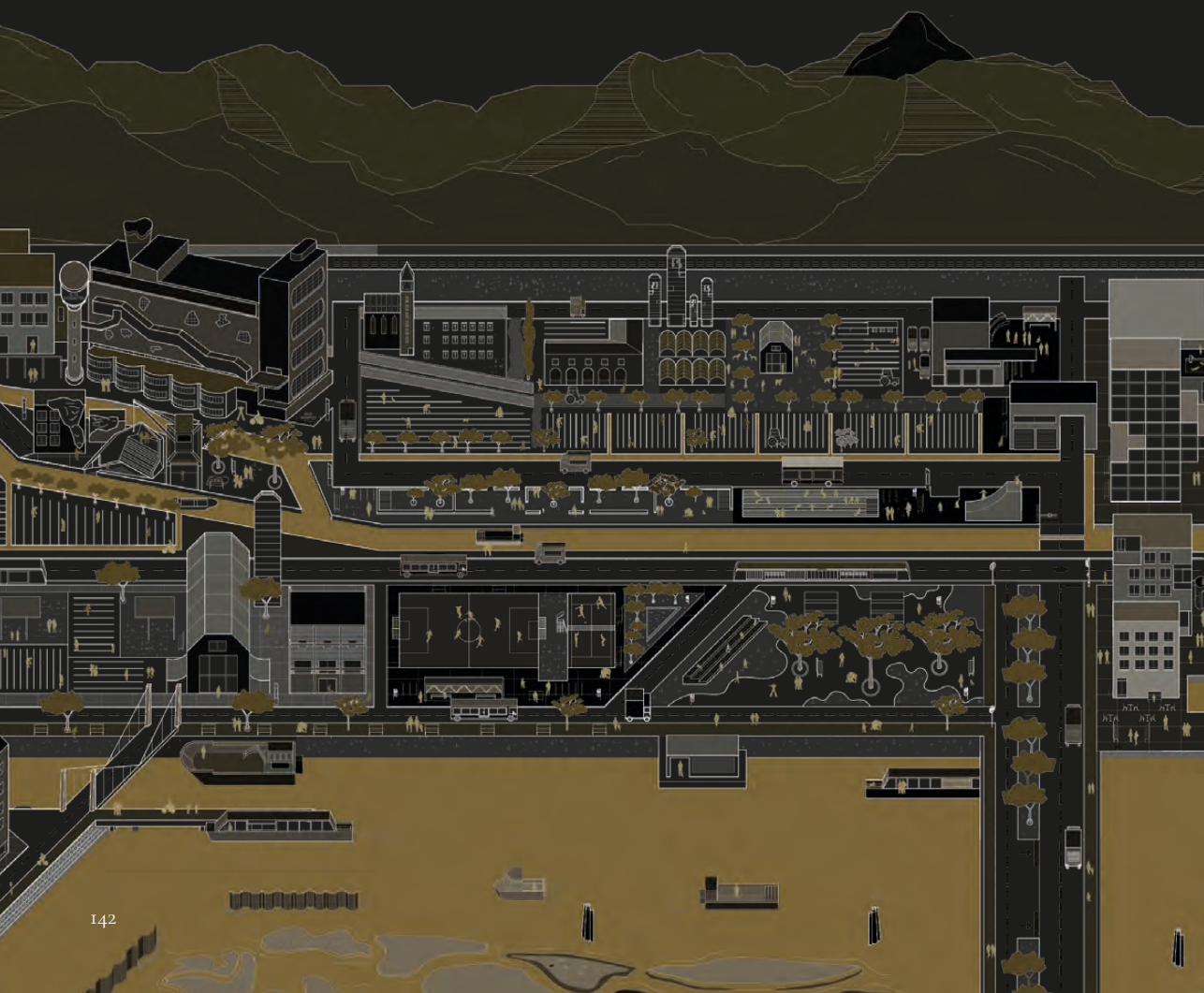
A debate that seems from another time if today we look at the great horizontal metropolis that extends seam-

lessly from Padua to Treviso, passing along the Brenta Riviera to incorporate the centres of Mira and Dolo, along the new lagoon boundary up to Marghera and Mestre and then bending upwards towards the north along the Terraglio road. The idea of a metropolitan city was debated for a long time, then with the stratification of time and the consolidation of urbanization it became a reality.

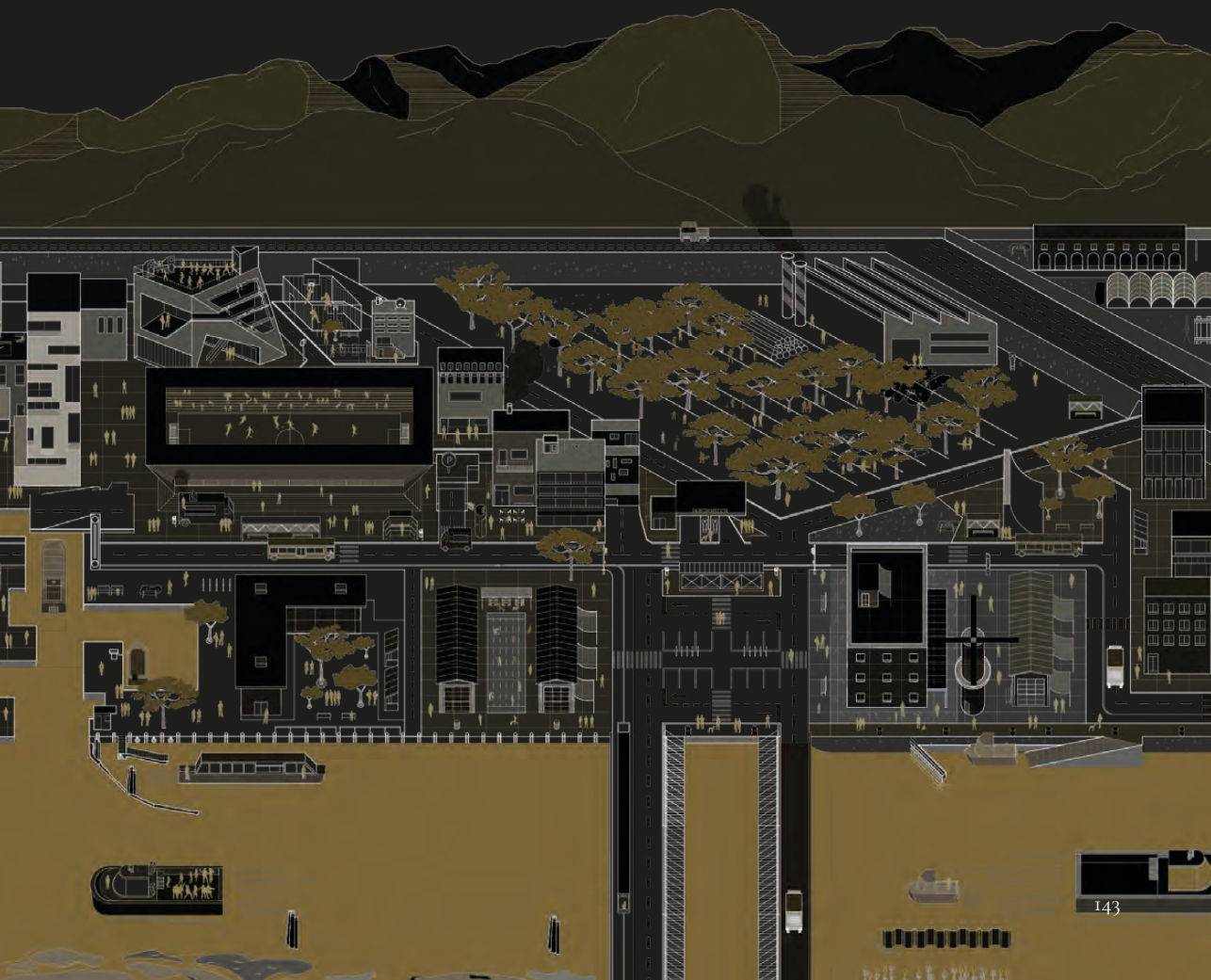
The tram on which Alvisè and his grandfather travel leaves on time from Dolo and silently crosses a peculiar



metropolitan city with an intermittent density made up of Venetian houses, buildings and villas, warehouses and production slabs, small and large historic centres, islands, canals, and large voids, made of water, swamps and cultivated fields. Arriving on the new front of the lagoon, where the petrochemical factories of Marghera were once situated and today are home to the university and research centres in Via Torino where Alvisè's mother also works, the Venetian metropolis suddenly becomes denser. The grandfather looks at the city

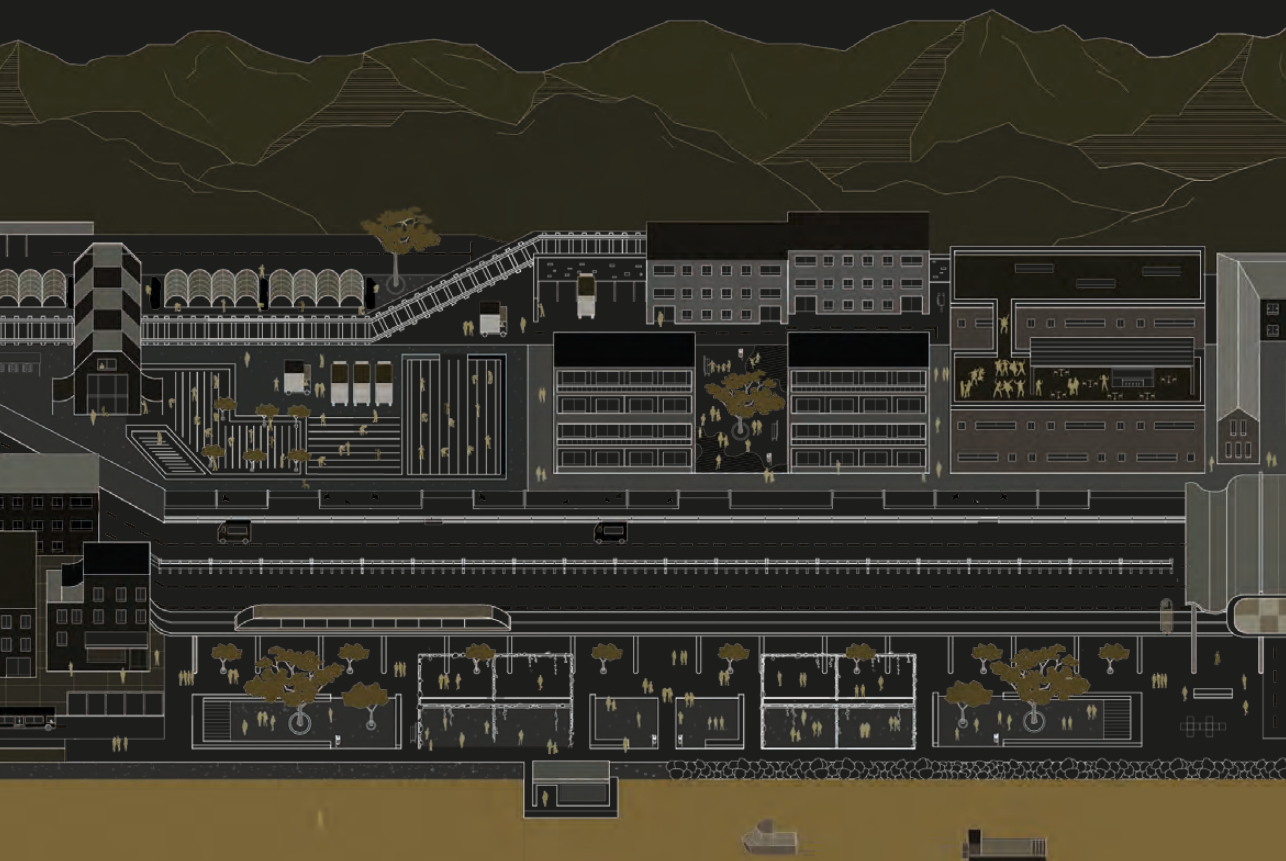


built on the new lagoon shore from the tram, thinks of what remains of the urban centres once immersed in the countryside and of the old industrial centre. The tram window frames a stratification of waterways, drawbridges and roads, old factories transformed into research laboratories, spaces for start-ups, as well as greenhouses, vertical farms, and fields for algae aquaculture, and biodigesters for the production of the energy necessary to separate the hydrogen that feeds the nearby thermoelectric plants from whose chimneys to-



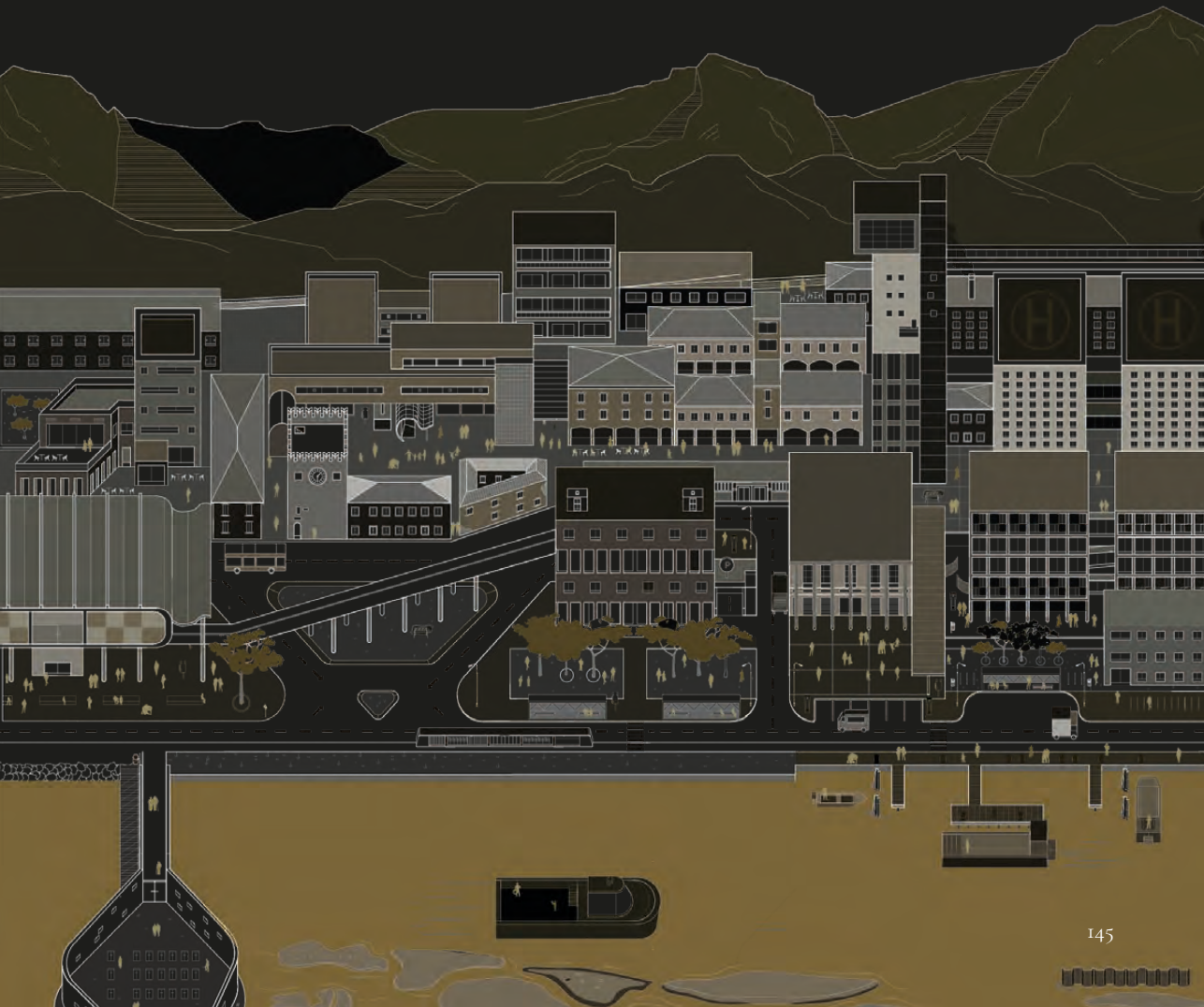
day only water vapor is emitted.

Alvise has studied it at school, so asks his grandfather about this wonderful world made of liquids and technology and thinks about where all the energy which powers the big city and moves everything comes from: the trains, the cars, the many boats on the waterfront, and also the tram they are travelling on, a water steam tram. Partly because of journalistic simplification, Alvise does not know that in Marghera, in reality, for years hydrogen energy has been used only for heavy



industry, such as the shipyards that produce floating giants exported all over the world and for the transport in Great Venice. These are the so-called 'hard-to-abate' sectors, where widespread forms of renewable energy can do little. For the rest, the model based on micro-production and distributed generation from biomass and photovoltaics still powers homes and buildings extensively.

The Hydrogen Valley of Marghera arose in the first half of the 21st century thanks to the enormous fund-



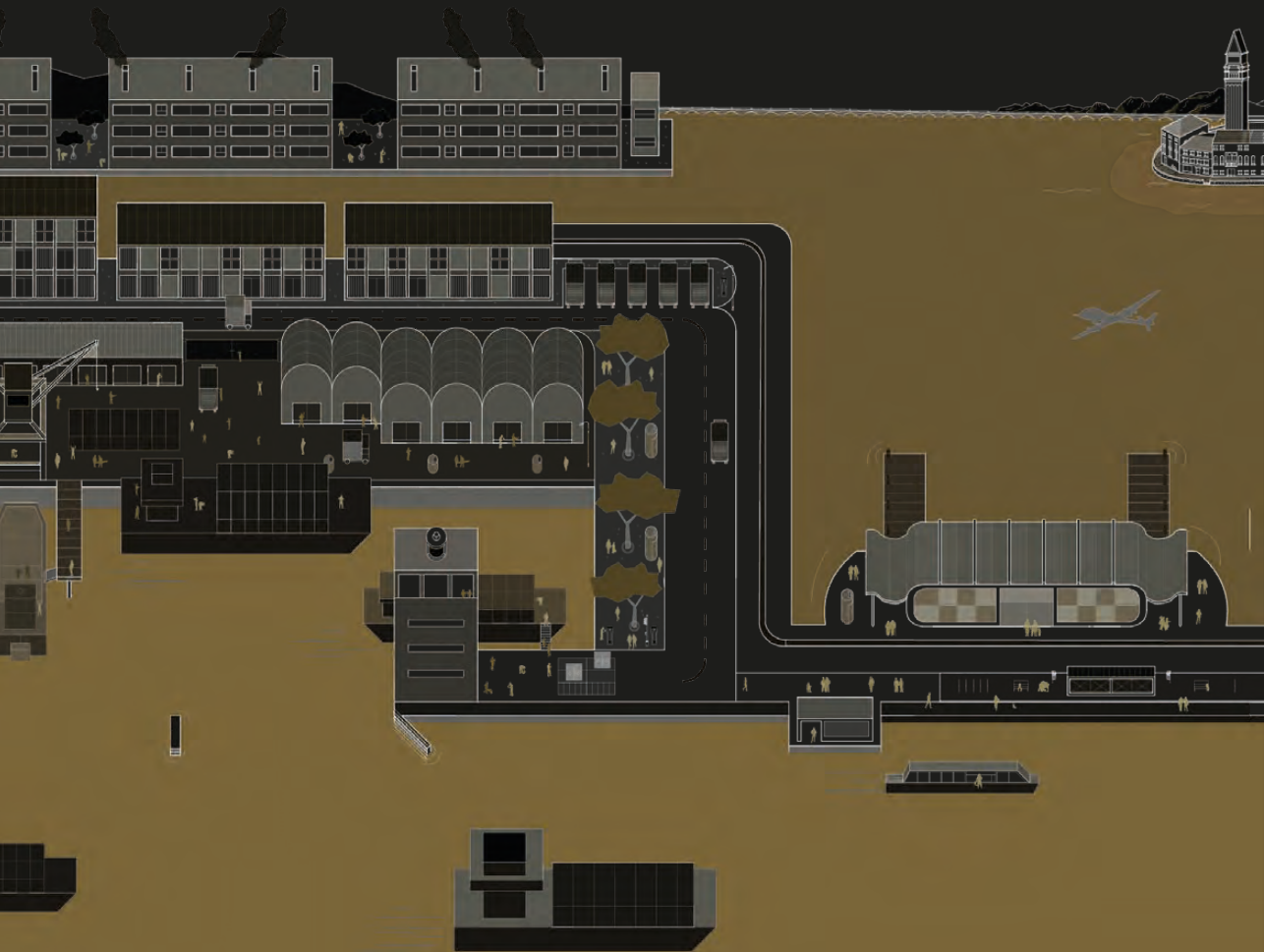
ing provided to counter the economic crisis and the damage caused by the global pandemic. Released from COVID-19 and plunged into the energy crisis in 2022, the money passed from Europe to the government, then to the Region, finally landing in the city in the Hydrogen Valley as a substantial part of the larger project called ‘Venice, world capital of sustainability’. His grandfather explains to Alvisè how in reality hydrogen, despite being everywhere in the universe, must be extracted to be used for energy purposes, sep-



arated by force from its indissoluble connection with other elements. An unnatural separation that costs effort, money and above all, a lot of energy... Thus, at the beginning the hydrogen produced in Marghera was 'black': it was extracted from the water using the current produced by an oil-fired power plant; then it became 'blue' by extracting the hydrogen from fossil hydrocarbons and conveying the anhydride carbon dioxide resulting from the underground production process, as an extreme attempt to raise the water ta-



ble and combat climate change. Finally, but for limited quantities, it has finally become ‘green’, extracted from water using the electricity produced by a power station powered by renewable energy. Much of the renewable energy needed to produce green hydrogen today still comes from what remains of the large hydroelectric basins located in the Venetian Alps after the melting of the Dolomite glaciers. The grandfather explains how the idea on which the Hydrogen Val-



ley project is based takes up the original vocation of the industrial area, and with it the territorial myth that was promoted more than two centuries earlier by Count Giuseppe Volpi di Misurata. Founder in 1902 of SADE, the *Società Adriatica di Elettricità* (Adriatic Electricity Company), Volpi foresaw the sea crossed by oil tankers and the mountains where the great hydroelectric basins of the Dolomites were located connected to the industrial port of Marghera. Today, due to the intermittent availability of water caused by climate change, the massive production of microalgae has become essential to power the electrolysis plants from which hydrogen is extracted. While the tram slows down, the grandfather shows Alvise the columns of photobioreactors saturated with emerald-green algae, the ones his mother studies to find the essences most efficient at absorbing CO₂ and then transforming it into biogas through very complicated anaerobic digestion devices. When the tram reaches the HUB located on the embankment that separates the lake of Venice from the southern lagoon, the view opens clearly on the immense pools of water cut by the spring sunlight.

‘Alvise look !!’

‘What grandpa?’

‘Venice!’

Defining Venice

Where is Venice

Affirming –or wondering– where Venice is may seem banal, or even provocative. Yet, the question is the subject of the interest and studies of specialists and public figures who have talked at length about the definition of where Venice is –and consequently *what* Venice is– writing stories, discussing policies, and producing visions for the future.

Recently a group of scholars led by Paolo Costa published a report in which four Venices are recognized: historic Venice, lagoon Venice, everyday Venice, metropolitan *civitas* Venice. The study –still in progress– concerns in particular this last metropolitan dimension, the ‘daily urban system’ (Fondazione di Venezia 2019, p. 18) which would include the functional urban areas of Venice, Padua, and Treviso. A vision for the future of a metropolitan *civitas* Venice as a response to tourist monoculture, which becomes a reference area for services and transport –thanks to the presence of the port, the airport and the interport– of the quadrilateral made up of the cities of Milan, Bologna, Ljubljana, and Munich. While this intellectual and planning effort is based on the recent debate on Italian metropolitan areas and the definition of the European MEGA (Metropolitan European Growth Areas), the conceptual and spatial complexity of the Venetian case gives rise –according to the same members of the research group¹– to a series of problems, theoretical and operational, not yet resolved, or solvable.

The operation of recognizing multiple Venices, both in spatial and temporal terms, given the coexistence in the collective imagination of synchronic and diachronic Venices, is typical of various disciplines. It is found, as we have seen, in the context of strategic studies on a territorial and continental level, and it is equally recurrent in the historiographical field. The historian Gherardo Ortalli, in the essay *Storia e miti per una Venezia dalle molte origini* (*History and myths for a Venice with many origins*), lists at least three different Venices, partly coexisting with each other, which have followed one another and overlapped over the centuries: the original Venice as a large mainland area included in the Roman Ordinator system, the coastal-lagoon Venice from Grado to Cavarzere which later constituted the *Dogado*, and the urban Venice that de-

►1 We refer in particular to the online conference at Università Iuav di Venezia *Venezia Civitas Metropolitana. Population and spaces in transformation from yesterday's urbs to tomorrow's civitas* held on 15 May 2020 by Corinna Nicosia, researcher and member of the group who wrote the report published by Fondazione di Venezia.

veloped around the nucleus of *Rivoalto* (Ortalli 2003, pp. 86–87). If Ortalli's reflections concern a remote temporal dimension with uncertain outlines given the strong influence of mythologies artfully constructed by the Serenissima in relation to its origins, the research coordinated by Guido Zucconi, collected in the volume *La grande Venezia. Una metropoli incompiuta tra Otto e Novecento* (*The Great Venice. An incomplete metropolis between the 19th and 20th centuries*) tells of the attempt made by the entrepreneurial and political class that led the city between the 19th and 20th centuries to make Venice the heart of a great metropolis, spread over a vast territory that included leisure –the Lido– and industrial –Porto Marghera– poles, with the latter undertaking requiring an administrative reorganization that extended the boundaries of the Municipality of Venice to the mainland.

Zucconi points out that the lagoon does not allow 'natural expansion processes' but only 'topographically discontinuous forms of expansion' (2002, p. 12), the same discontinuity that today represents an important conceptual and operational obstacle for the research group directed by Costa. This geographical condition meant that at the end of the 19th century a neo-insular tendency of development spread, often experienced as a constraint. 'The lagoon holds us back' stated the Mayor of Serego Alighieri. A neo-insular trend which was largely opposed by the driving force given by the development of Porto Marghera. A thrust that seems to run out in the mid-Sixties of the 20th century and crystallizes in 'a complex system of physically separate but functionally linked nuclei as parts of a single metropolitan entity' (Zucconi 2002, p. 12). A system in which the historic centre is spatially straddling the leisure centre, from the Gardens of Sant'Elena to the Lido, and that of work on the mainland. Key moments in the establishment of this system are on the one hand the new administrative perimeter in 1926, and on the other, the construction of the automobile bridge, parallel to the railway bridge of the mid-19th century and designed by engineer Eugenio Miozzi in 1933.

Suspended modernization

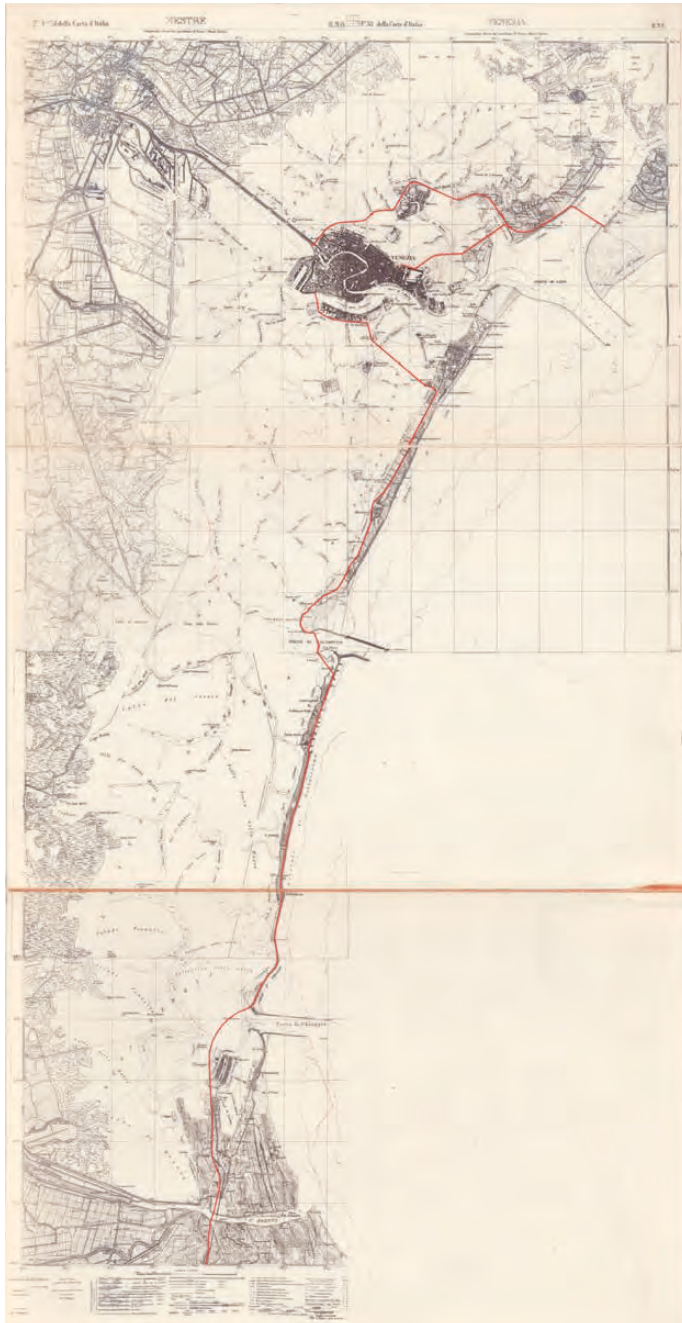
Costa's study for a Venice that in the future detaches itself more and more from its lagoon, expanding to coincide with an extended dimension from Padua to Treviso again, brings us back to the theme of metropolisation and modernization of the lagoon city.

Costa's image is not new, already in the 1970s *Progetto 80* (*Project 80*) identified in the area between Padua, Venice, and Treviso a 'reticular urban structure' to be strengthened in the internal cohesion and complementarity of the individual settlements (Renzoni 2012). In the 1990s, studies on the Veneto '*città diffusa*' (*diffuse city*) highlight the characteristics of a metropolitan system characterized by settlement dispersion that extends into the quadrilateral between Padua, Venice, Treviso and Castelfranco Veneto (Indovina 1990). More recently, the acrostic of PaTreVe has been proposed to indicate a metropolitan system of about 2.7 million inhabitants between the three cities. In this metropolitan dimension, however, the island of Venice always struggles to assume a strategic location, also due to its condition of delivery terminal within a system of relations and flows, that on the mainland is instead widely consolidated and of a reticular nature. Throughout history, however, there has been no lack of alternative images that try to reposition the historical island within a wider system of metropolitan relations.

Eugenio Miozzi was a key player in the process of modernizing the island of Venice in the 20th century, shaping strategic infrastructures for the city, and imagining unconventional solutions to its growing environmental problems. In addition to the design and construction supervision of the automobile bridge –Ponte Littorio, today Ponte della Libertà, parallel to the railway bridge built in the mid-19th century by the Austrians– which crosses the lagoon, shortly afterwards he completed the Ponte degli Scalzi, the pedestrian bridge that crosses the Grand Canal in front of the train station.

An unrealized project by Miozzi himself—a road of national interest along the coast of the Adriatic Sea, passing through Chioggia, Pellestrina, Lido and Cavallino— could have radically changed the destiny of Venice. First conceived in the 1930s (Miozzi 1934) and then continuously refined over the decades until the 1950s, the engineer was firmly convinced that this road would guarantee the city a future of metropolitan interest, adding a key element to the maritime and rail terminals. Miozzi attributed to this road connection a catalytic value in order to definitively activate the 'chemical reaction' which would translate into an effectively metropolitan dimension of the city.^{►2} This road would have balanced the expansion on the mainland towards Mestre and transformed

►2 'Questa città ha ormai, per volere di Eminentissimi suoi cittadini e per sapienza di governo, una serie di fattori efficacissimi per la sua rinascita; ne cito alcuni: porto industriale, nuovo ponte sulla Laguna, la stazione turistica del Lido; a questi fattori cittadini se ne aggiungono altri delle contrade circostanti: le grandi bonifiche del Polesine e dell'Alto Ferrarese già realizzate, l'autostrada Venezia-Padova. Ma tutti questi fattori hanno un valore che sarebbe non del tutto improprio ritenere allo stato potenziale; occorre il catalettico che trasformi questi valori potenziali in valori effettivi. Questo catalettico sarà la strada Venezia-Chioggia' ('This city now has, at the behest of its Eminent citizens and for the wisdom of government, a series of very effective factors for its rebirth; I will mention a few: an industrial port, a new bridge over the Lagoon, the tourist resort of the Lido; to these city factors are added others of the surrounding districts: the already completed major reclamation of the Polesine and the Alto Ferrarese, the Venice-Padua motorway. But all these factors have a value that it would not be entirely improper to consider in the potential state; a catalyst is needed to transform these potential values into actual values. This catalyst will be the Venice-Chioggia road', auth. trans.) (Miozzi 1934, p. 4).



Eugenio Miozzi, Study for the road of national interest between Ravenna and Venice designed in the 1930s
Detail of the possible lagoon route. Università Iuav di Venezia, Archivio Progetti, Fondo Eugenio Miozzi, pro/023.

the lagoon and the city at its centre from an infrastructural *cul de sac* into a vibrant hub for a vast region that stretched from Trieste to the Polesine marshes recently reclaimed by the Fascist regime. Only at the beginning of the 1950s, after the dramatic period following the fall of Mussolini and the establishment of the Italian Republic in 1946, Miozzi was able to reflect again on his proposal for a new road that would redesign the metropolitan area of Venice. A first variant conceived in 1952 (Miozzi, Croff, and Miozzi 1952) abandoned the idea of a coastal road and provided only for the connection of Tessera on the mainland with Murano through a path on floating docks parallel to the Ponte della Libertà. From Murano the road would have continued towards Sant'Erasmus, with a branch to reach the island of Vignole, and the Cavallino peninsula.

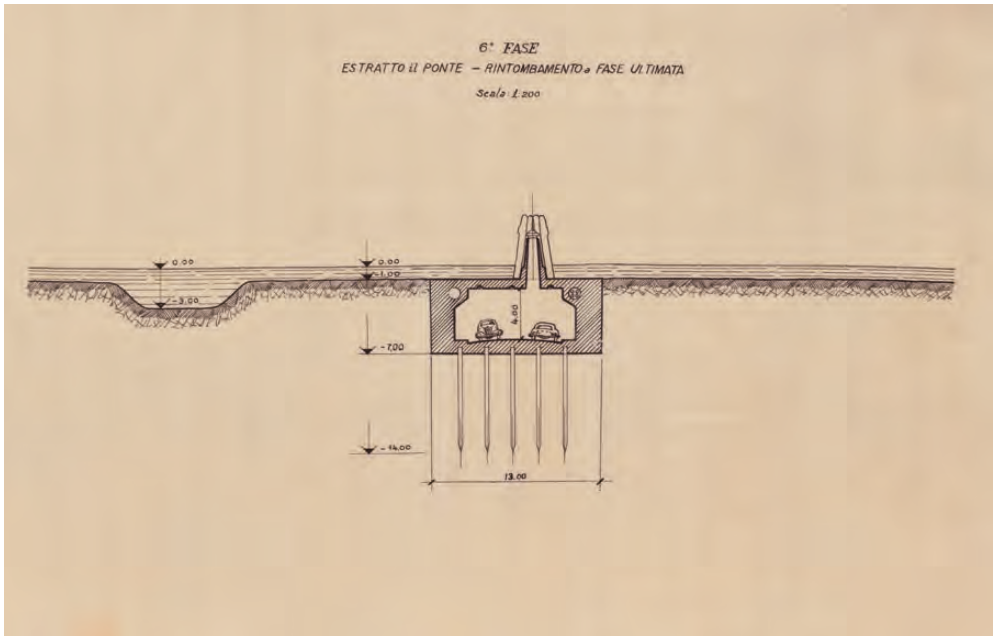
Eugenio Miozzi, alternative route proposed in 1952
Università Iuav di Venezia, Archivio Progetti, Fondo Eugenio Miozzi, pro/023.





Eugenio Miozzi, Study for the Lido-Ponte Littorio section for the first version of the road of national interest designed by Miozzi in the 1930s
Università Iuav di Venezia, Archivio Progetti, Fondo Eugenio Miozzi, pro/023.





Eugenio Miozzi, sectional detail of *briccole* masking the air recirculation intakes and the evacuation of exhaust fumes from the underwater tunnels (1953)
 Università Iuav di Venezia, Archivio Progetti, Fondo Eugenio Miozzi, pro/023.

Subsequent changes to the project –such as the one presented in 1953 (Miozzi, Croff, and Miozzi 1953) and entitled *Progetto di massima per la metropolitana sublagunare* (Preliminary project for the sub-lagoon subway), where subway stood for the 110 submarine highway– envisaged replacing most of the route on pontoons with a route in an underwater tunnel, returning to the idea of a ring around the city. Although founded on a profound historical knowledge, Miozzi’s vision for the future of Venice was clearly modernist, the result of a precise idea of progress in which industrialization on the one hand and motorization on the other played a central role. It goes without saying that if the ambitious visions sketched by Miozzi had been completed, we would now find ourselves facing a radically different Venetian metropolitan area and lagoon landscape, where alternative life models and ‘slow’ tourism that can be experienced from the northern lagoon –from the Certosa to Sant’Erasmus islands– to Pellestrina would probably have disappeared completely.

Borders and floods

In 1966, a few years after Miozzi's proposals that resurfaced also in the *Piano Regolatore Generale* (General Zoning Plan) of the Municipality of Venice produced by Miozzi himself with Mario Baldin in 1959, the first catastrophic *aqua grande* (great flood) occurred, followed only, in intensity and duration, by the more recent event in 2019. Seven years later, in 1973, the first of the Special Laws for Venice –followed by those of 1984 and 1992– established that the city was of pre-eminent national interest and conferred decision-making primacy on the state authority in issues such as environmental protection, regulation of watercourses, protection of hydraulic and hydrogeological balance, reduction and regulation of tide levels, coastal defence works and protection from pollution. This orientation showed a significant break with respect to a centuries-old tradition that saw the highest authority on the matter in the local *Magistrato alle Acque* (Magistrate to the Waters). In the heated debate that anticipated and then followed the promulgation of the 1973 Special Law, the figure of the historian –and for a short time Councillor for Urban Planning of the City of Venice– Wladimiro Dorigo emerged. In the essay '*A favore*' di Venezia? ('In favour' of Venice?), subtitled *Saggio di analisi tecnica e giuridica sulla proposta interministeriale del disegno di legge per Venezia* (Technical and legal analysis essay on the inter-ministerial proposal of the Venice bill), Dorigo strongly questioned the appropriateness of the choice of territorial areas included in the district plan developed in the context of the law on the protection of the city of Venice and its lagoon following the flood of 1966, raising doubts about the 'poor technical-scientific reliability of the chosen delimitation and therefore lack of clarity about the objectives' (Dorigo 1971, p. 19).

Reporting both examples of municipal territories such as those of Jesolo and Quarto d'Altino largely unrelated to the presence and management of the lagoon and criticisms from prominent leaders of the Veneto Region, who recognized that a merely binding logic, not linked to a planning rationality, was at the basis of the delimitation made, Dorigo peremptorily stated that 'the territory identified by the law therefore constitutes [...] a scientifically unreliable and operationally irrational aggregate' (Ibid, p. 20). Dorigo therefore complained of too wide a perimeter of the territorial areas included in the district plan for the protection of the city

of Venice and its lagoon, which met administrative criteria –the municipal boundaries– and not morphological and environmental ones, such as the effective extension of the lagoon and of the areas contiguous to it.

Starting from the end of the 20th century, also thanks to debates such as the one triggered by the Venice flood of 1966, the awareness of the need to control and possibly reverse climate change and its consequences has grown exponentially, as well as the need to think and act in terms of complex ecosystems rather than through single-disciplinary approaches. In this framework, as already mentioned, Venice has been recognized as a planetary metaphor that embodies the prospects for our planet (Bevilacqua 2009). A city –and a region in general, from the Adriatic Sea to the Alps (Fabian and Viganò 2010; Fabian, Secchi, and Viganò 2016)– at the forefront of the process of adapting our mentality and lifestyle, and subsequently territories, in face of the global challenge of climate change.

Beyond continuity

The examples and reflections reported above, from the Middle Ages to the present day, identify from time to time an area of different extension in relation to where and what Venice is, almost always going beyond the clearly defined boundaries of the historic centre and also the mutable ones of the lagoon itself. Despite their diversity, however, they are always united by a concept, that of territorial continuity and contiguity, even if made problematic by the presence of the lagoon waters.

This concept, which seems unavoidable for thinkers, historians, and designers of the 20th and 21st centuries, was actually overcome both from a conceptual and operational point of view by the Serenissima. With an administrative act of the Republic of Venice dated 1 April 1406, the city of *Cologna Veneta*, in the centre of a thriving agricultural area south-east of Verona, was spun off from the recently conquered Veronese district and established as an autonomous *podesteria*, ruled by a *podestà*. Not only that, *Cologna Veneta* was then united with the *Dogado*^{►3} to put an end to the claims of the Veronese and Vicentines who had aims on the town: ‘Retinuimus super iurisdictione nostra civitatis Venetiarum pro non displicendo communitati Verone nec communitati Vicentie, quarum utraque petebat ipsam’, were the exact words

►3 The Venetian term *Dogado*, corresponding to the English ‘duchy’, was one of the three administrative areas into which the Republic of Venice was divided, together with the *Stato da Mar* (Maritime territories under the Venetian rule) and the *Domini di Terraferma* (Terrestrial territories under the Venetian rule). The *Dogado* included the coastal strip between the mouths of the rivers Po and Isonzo –including the ancient Duchy of Venice– and starting from 1406 the territory of *Cologna*.

reported by the official document (Chiappa 2005, pp. 10-11). In 1408 the Venetian Senate confirmed to the *podestà* Maffeo Donà how the territory of Cologna Veneta had become part of the *sestiere* (district) of Dorsoduro –in contravention of any principle of territorial continuity– and that civil and criminal justice was administered for the citizens of Cologna as for those of the city of Venice: ‘secundum ordines, et consuetudines civitatis venetianum regere, et gubernare, et propterea ius, et iustitiam’ (Chiappa 2005, pp. 26-27).

This act once again demonstrates the extraordinary pragmatism and resoluteness of the Venetian ruling class in its heyday. Cologna Veneta was not simply under Venetian control, like many colonies of the *Stato da Mar* (Maritime territories under the Venetian rule) scattered around the Mediterranean, from the Dalmatian coast to the Aegean islands. It was to all legal and juridical effects part of the Dogado, of the Dorsoduro district. A part of Venice without islands and canals, far from the lagoon. A part of Venice in fact in the middle of the fields, over a century before Alvise Cornaro’s theses.

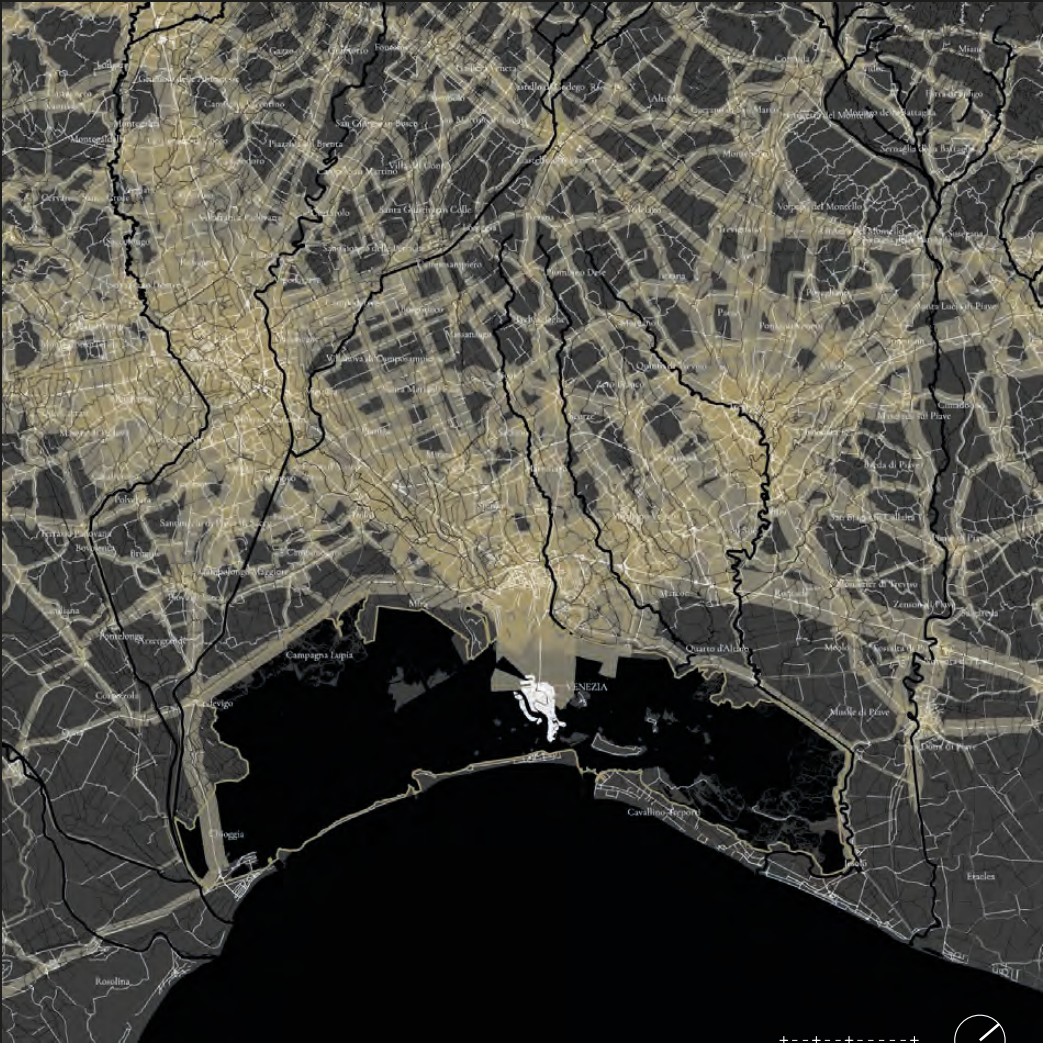
The same act resonates today in relation to widespread themes that become extreme in Venice, such as the tension towards homogeneity for ever larger administrative entities or the management of transport of a discontinuous settlement system (De Marchi, Iuorio, and Pace 2022, p. 37). Thus, alternative models to the monocentric city re-emerge, alternative to the idea of a modern city that makes the relations between its parts homogeneous. Alternative models –such as Colin Rowe’s and Fred Koetter’s collage city, Oswald Matthias Ungers’ archipelago city or Willem Jan Neutelings’ patchwork metropolis– which take on new meaning even in the face of recent events such as the pandemic that have opened up new perspectives on crucial issues such as the relationship between residential spaces and workplaces, mobility, and permanence. In this sense, Venice, its lagoon, and metropolitan area again represent a fundamental place for experimentation and innovation.

Elements / Key concepts

Venice, Venices

There are many Venices. There is a Venice that coincides with the historic city and the islanders, a Venice extended to the islands and the entire lagoon, a political Venice coinciding with its administrative limits, a metropolitan Venice from Padua to Treviso, a Venice diffused in the central Veneto Region, a Venice that extends to the territory of the entire drainage basin of the lagoon. They are all legitimate Venices, conveyed by multiple and different visions, histories and interests, whose rationalities are not always consistent with each other and at times appear to be driven by conflicting interests.

Venices



A.

The first Venice coincides with the historical island that often overlaps and only apparently coincides with the icon of the city that is conveyed, dreamed about, and reproduced all over the world. However, inside the island there is also the Venice of the Venetians, the natives by blood or by choice, the few resistant citizens who, despite the difficulties linked to the increase in costs and environmental fragility, have decided to stay and live on the historic

island. Then there is a Venice extended to the lagoon and other islands, an internal Venice in which the pressure of mass tourism suddenly becomes less intense, but relations with water, fishing and the rhythms dictated by the tides sharpen considerably. There is a Venice extended to its administrative borders and therefore to relations with Mestre, Porto Marghera, the port, and the industrial area. Then there is metropolitan Venice, defined by the daily



B.



C.

A. Venices

Opposite page: historic Venice (in white), the traffic flows that define metropolitan Venice (in gold), the hydrographic network that defines the water basin of the lagoon (in black).

B. Venice and its lagoon

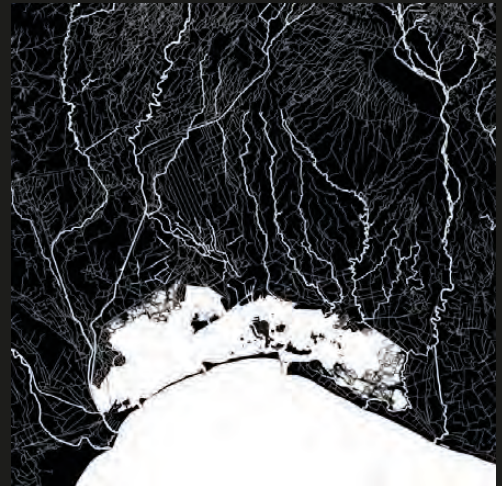
The historic island of Venice (in white) and the *conterminazione lagunare* (in gold).

C. Metropolitan Venice

Traffic flows between Padua, Venice, and Treviso (in gold) and the mobility network (in white).

D. The metropolis of the drainage basin

Rivers and drainage basin network (in white).



D.

flows of millions of citizens who move in an area extending from Padua to Treviso for work, study or leisure. A Venice defined by a territorial hierarchy that is strongly anchored to the main mobility infrastructures, such as the motorway and the Padua-Venice railway, the Mestre road link. There is the “diffuse city” that goes from Venice to Treviso and Castelfranco Veneto to define the quadrilateral of the Veneto central area. A Venice where homes, small

historic centres, agricultural fields, and industrial warehouses overlap within an expanded and isotropic urban fabric. Finally, there is a Venice related to the hydraulic rationality of the lagoon which finds its conceptual reference territory in the hydrographic network of the drainage basin that extends up to the foothills.

What-If

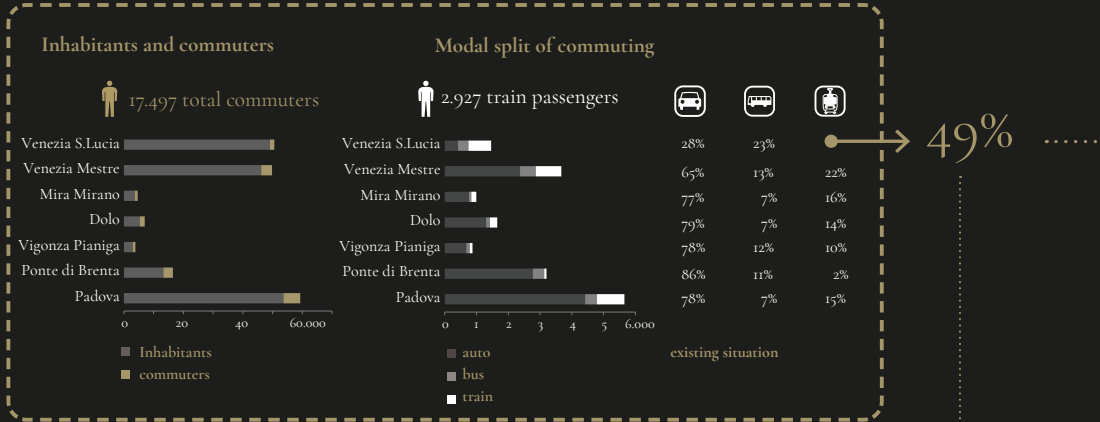
An accessible metropolis?



In the perspective of a metropolis extending from Padua to Venice and Treviso and a future scenario without the use of fossil fuels, it is necessary to devise an efficient public transport system that can be independent of the private car.

Venice, a historic city, has always been a city without cars and whose public space is entirely pedestrianized. Also due to this exceptional condition, today 49% of citizens commuting to and from Venice use the train. What would happen if we assumed the urban space and the modal distribution data of commuters relating to the island of Venice as benchmarks for modeling a metropolis in the lagoon? What and how much urban space should we pedestrianize? How many new passengers could we reach? With what consequences for the design of equipment and public spaces, infrastructures, and railway spaces?

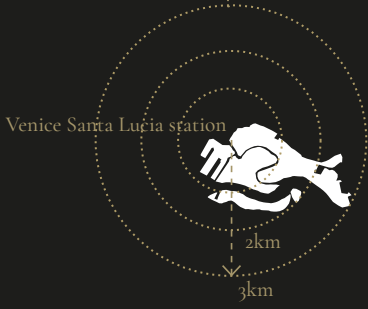
An accessible metropolis between Padua and Venice



○ = 2km = 10 min

🚲 = very high accessibility

49% are commuters residing on the island of Venice who choose the train for their daily extra-urban journeys. What would happen if we rethought the urban space between Padua and Mestre, taking the island of Venice as a model?



- 🚊 railway
- 🚌 bus and cycle path
- 🚋 tramway
- 🌊 PD-VI Waterway
- 2 km isometric
- 3 km isometric
- 4 km isometric

