MODERNISM AND WATER ENGINEERING AS DEVELOPMENT STRATEGIES: THE CASE OF VENETIAN INLAND WATERWAYS IN THE NEW ITALIAN STATE (1866-1966)

MODERNISMO Y INGENIERÍA HIDRÁULICA COMO ESTRATEGIAS DE DESARROLLO: EL CASO DE LAS VÍAS NAVEGABLES DEL VENETO EN EL NUEVO ESTADO ITALIANO (1866-1966)

Francesco VALLERANI[1]

ABSTRACT

Surface freshwaters system management can be considered as one of the most relevant issues in an effectual organization of modern States. It follows that specific technocratic rhetoric have been spreading in order to promote the governance of a hydrographic network and water drainage and reclamation actually had the leading role in reinforcing the growing nationalism in all of Europe from the end of XIX century. Since late Middle Age the Veneto region was affected by Venice's increasing interests in achieving a new hydraulic policy focusing on an overall fluvial network amelioration and in this perspective the improvement of navigation was undoubtedly one of the main goals. During the first decades of the Italian Kingdom (particularly since 1866) the expansion of larger and larger reclamation plans had fruitful relationships with water transport and irrigation improvement. At the end of XIX century, the Italian inland navigation became one of the pre-eminent issues of the national economic development, and particularly it was maintained that a good management of Venetian waterways could help lowland drainage and the reclamation of wetlands. Modernization operations actually began at the end of the Nineteenth century and developed even further after the first world war, in an atmosphere characterized by extensive plans of urban regeneration involving many Italian towns. During the second world war most of Italian infrastructures were heavily damaged and in the second post-war period, the economic recession did not allow a continuous and efficient maintenance of the waterway system in the Venetian inland. The decline of the waterways transports was followed by a functional decadence of some fluvial and canal landscapes, implying besides the loss of the symbolic and memorial values of Venetian waterscapes too. It was only during the last decades of the Twentieth century that a more mature consideration of the historical and cultural meaning of fluvial and urban landscapes developed. We are now dealing with a well defined hydrographic heritage and current times are actually ready for broadening the awareness of waterways with regard to their touristic and recreational value.

[1] Professor of the Department of Economics, Università Cà Foscari di Venezia, Itália. E-mail: ramusa@unive.it.

Key-words: waterways, water engineering, modernism, national improvement, landscape management, inland navigation, heritage, minor rivers

RESUMO

A gestão do sistema de águas doces de superfície pode ser considerado como uma das questões mais relevantes na organização eficaz dos Estados modernos. A retórica tecnocrática específica foi-se espalhando, a fim de promover a governança da rede hidrográfica e drenagem de água e recuperação que tinha papel de liderança no reforço do nacionalismo crescente em toda a Europa a partir do final do século XIX. Desde o final da Idade Média, a região do Veneto (Itália) foi afetada por interesses crescentes de Veneza em conseguir uma nova política hidráulica baseando-se em uma melhoria geral da rede fluvial para o que a melhoria da navegação era, sem dúvida, um dos objetivos principais. Durante as primeiras décadas do Reino Italiano (particularmente desde 1866), a expansão dos planos de recuperação, ações cada vez mais presentes, tinha relações frutíferas com o transporte de água e a melhoria da irrigação. No final do século XIX, a navegação interior na Itália tornou-se uma das questões proeminentes do desenvolvimento da economia nacional e, particularmente, sob a perspectiva de que uma boa gestão das vias navegáveis de Veneza poderia auxiliar a drenagem da planície bem ocmo a recuperação das zonas húmidas. As operações de modernização, na verdade, tiveram seu início no final do século XIX, tendo-se desenvolvido ainda mais após a primeira guerra mundial, em uma atmosfera caracterizada pela proliferação de extensos planos de regeneração urbana que envolvem muitas cidades italianas. Durante a Segunda Guerra Mundial, a maioria das infra-estruturas italianas foi fortemente danificada e, no segundo pós-guerra, a recessão econômica não permitiu a realização da manutenção contínua e eficiente do sistema de hidrovias nos espaços do entorno de Veneza, a grande metrópole do nordeste italiano. O declínio dos transportes por vias navegáveis foi seguido pela decadência funcional de algumas paisagens fluviais e de canais, implicando na perda dos valores simbólicos e memoriais das waterscapes venezianas. Foi somente durante as últimas décadas do século XX que se considerou, de maneira mais profunda, valorizar o significado histórico e cultural das paisagens fluviais e urbanas. Atualmente, estamos lidando com uma herança hidrográfica bem definida e, ao mesmo tempo, estamos prontos para ampliar a consciência da relevância dos cursos de água em relação aos seus valores turístico e recreativo.

Palavras-chave: vias navegáveis, engenharia de água, modernismo, melhoria nacional, gestão de paisagem, navegação interior, herança, rios menores

1. INTRODUCTION

Nowadays we are dealing with deep evolutionary processes that have been determining a general situation of environmental degradation, involving not only natural landscapes, but also most of the inhabited territories where human actions have displayed in past centuries a deep transformative strength of the earth's surface. As a matter of fact, the relentless success of utilitarian strategies are rising urgent and highly motivated apprehensions regarding cost-

benefit analysis and environmental risks. Mostly it is the increasing demand for good quality fresh water, for fertile cultivable soils, for mineral resources, for energy and finally for everything that is connected to the infrastructural network that allows more efficient flows of both people and goods. In the global geopolitical arena an extraordinary grouping of interests is driving economic forces and social evolution well beyond the usual boundaries of single States, actually fostering the powerful strategies of the larger transnational companies (COLLIER, 2010; RODRIK, 2012).

It's well known how surface freshwaters system management can be considered as one of the most relevant issues in an effectual organization of modern States (COSGROVE, PETTS, 1990; SWYNGEDOUW, 2015), especially when it affects complex interventions in natural hydrography, nearly always demanding close interactions among scientific knowledge and military and political authorities. It follows that specific technocratic rhetorics have been spreading in order to promote the absolute certainties of mechanistic paradigms, thereby denying or lessening the anguishing damages from negative externalities, whether those social or ecological. The process of hydraulic modernization concerns above all the governance of a hydrographic network and historically the first step should have been to consider a surface runoff regulation in order to allow both inland navigation and irrigating cultures as was the extraordinary territorial improvement of low plains surrounding the Venice lagoon (CIRIACONO, 2006).

. Afterwards, thanks to the advancements in water engineering, larger schemes were set up following the general vision of an overall transformation of lowlands in the Western world. Water drainage and reclamation actually had the leading role in reinforcing the growing nationalism in all of Europe from the end of XIXth century, even if the truest triumph of hydraulic technocracy lays on big dams construction with the consequent availability of electric power, perhaps one of the most strategic industrial assets in international competition.

During the first decades of the Italian Kingdom (particularly since 1866) the role of hydraulic engineering improved and enhanced what had already been acquired in the management of water in the early modern period in many Italian regional contexts. According to the awareness of that time, the Promethean attitude of the gigantic project was part of competing nationalisms, further enhancing the prestige of the engineer. In the new Italian State the expansion of larger and larger reclamation plans could take advantage of the increasing spread of more efficient water pumps propelled by steam and afterwards by electricity, and consecutively produced in new hydroelectric power plants that had been built in some isolated Alpine valleys.

The Italian model is therefore an interesting example of hydraulic modernism because the late political unification of the peninsula could make use of a still fragmented heritage of skilled hydraulic expertise that in previous centuries had reached extraordinary levels of technical efficiency (Lombardy and Venice Republic). This essay will attempt to highlight the complex evolution of the geo-cultural landscapes of water in the geographical context identified as the Venice Mainland (*Terraferma*), undoubtedly a strategic area where relations between environment and water management have marked durable technical acquaintances which subsequently proved very useful in defining the modernization of the new Italian State.

2. WATERSCAPES AND GEO-HISTORICAL EVOLUTION IN VENETO REGION

Fluvial morphologies of the Veneto region, the former Venetian *Terraferma*, comprise two main typologies: rivers descending from the Alps and shorter streams originating from the springs line extending along the border between the high and low Venetian plain. The former are rivers characterized by markedly different seasonal runoff, with frequent floods in autumn and springtime and stretching southward with a considerable gradient until the springs line, while the latter shows constant regimes flowing slowly towards the shoreline, without carrying significant sediment loads. These minor rivers did not force riverine population into elaborating any water engineering device to protect fluvial dwellings. On the contrary, most of these short rivers offered the opportunity of multiple exploitations, not only as a water supply for human and agricultural needs, but also as water power for pre-industrial factories (PITTERI, 1988; SELMIN, GRANDIS, 2008; SOTTANI, 2012).

Inland Veneto urban development from the XII to the XV century was subdivided into restricted territories controlled by major independent city-States, like Padua and Verona, whose political power was barely displayed by both civil and military building activities. It is worth pointing out that the achievement of an effective defensive architecture had to consider the management of local hydrography as an essential issue, not only in order to duplicate with deep artificial moats the walled urban border (Fig. 1), but also to maintain the strategic importance of mooring banks and fluvial harbours, well connected with main inland waterways flowing in the whole Venetian inland (MANCUSO, MIONI, 1979). Before *Terraferma*'s complete conquest, Venice was increasingly interested in the control of the morphological dynamics of its lagoon. A more lasting protection of this acquatic environment should have requested an overall management of most of the Veneto plain and this goal encouraged fourteenth century Venetian expanding politics.

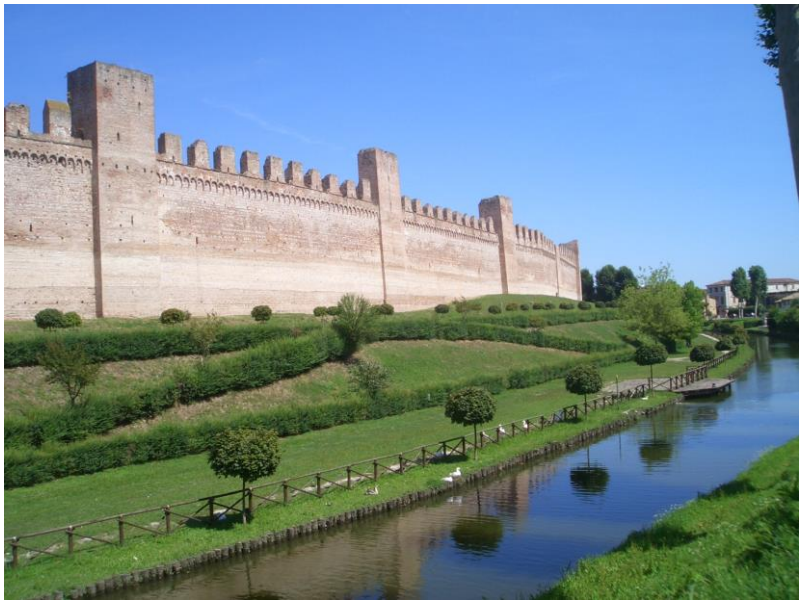

Figure 1 - Walled cities and hydrography: the Cittadella's stronghold with its moat fed by Brenta river
Source: F. Vallerani.

It follows that since 1484 a large territory, approximately corresponding to the present day Veneto and Friuli regions, had become the inland possession of a mighty seafaring city-State (Fig. 2). The well known shift from sea trades pre-eminence to Terraferma agricultural and pre-industrial activities (Lane, 1978), obliged the Venetian Government to face with a deeper technical competence the large amount of water management problems. The new hydraulic policy was first devoted to lagoon conservation, promoting hundreds of field researches and consequently elaborating skilful projects, mostly involved in sending major regional rivers away from the Venetian lagoon (BEVILACQUA, 1998; D'ALPAOS, 2011).

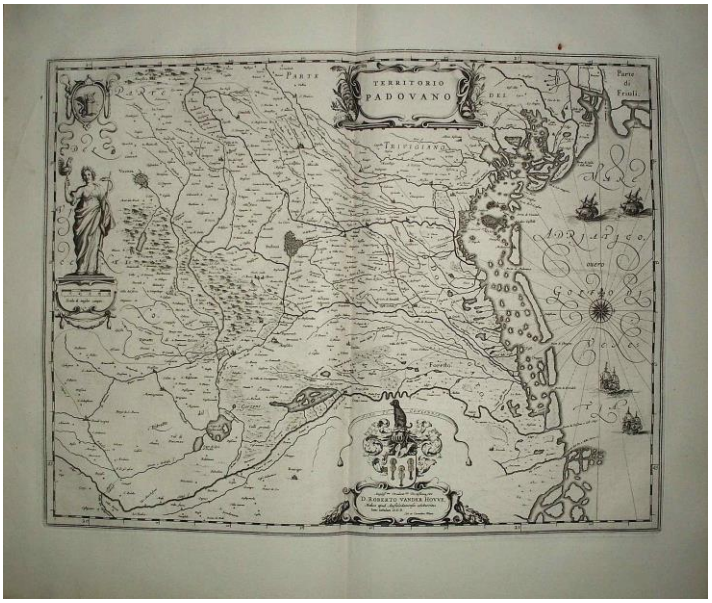

Figure 2 - Venice mainland and Paduan territory in Willem Blaeu 1667 map.
Source: private collection.

Later on rivers and channels were carefully surveyed and managed as essential to regional economic development and it is during the Seventeenth century that *Magistrati alle Acque*, the main government technical board devoted to water management, promoted an overall fluvial network amelioration and in this perspective the improvement of navigation was undoubtedly one of the main goals. The geography of Veneto waterways was narrowly related to urban network and to economical and cultural context of the Venetian State where the improvement of inland navigation had the further consequence to keep a close watch on hydraulic dynamics, especially rivers and channel beds sedimentation. But since the second half of the Seventeenth century the economical weakness of Venetian administration has meant that only irregular dredging has taken place along fluvial itineraries (VALLERANI, 2004). The widespread and daily utilization of mainland waterways by the Veneto population, gradually expressed the successful increase of a new vision of the role of Venice. The decay of its maritime tradition, strongly forced by the peculiar natural site of the city, caused a large vacuum in seafaring attitudes. The Sixteenth century philosophical debate on the separation of land and water (Cosgrove, 1993) definitely stated the relevance of water as a natural element, whose usefulness could be enhanced only by a well organized hydraulic network.

The hydraulic situation of the Veneto plain surrounding Venice lagoon undoubtedly was an hard heritage to manage for the Governments ruling that territory after the end of the

Serenissima (very popular way of defining the Venice Republic) in 1797. Despite the short time domination, many projects and surveys were worked out during the Napoleonic Government (DONÀ, 1981; BIGATTI, 1992). As a matter of fact several pernicious floods had affected the flat plan crossed by Adige, Brenta and Piave rivers, while the regularity of inland navigation was serious damaged by the decrease of efficacious dredging.

During Austrian domination (1815-1866), a vivid interest for the Veneto waterways encouraged further surveys and studies (VENTUROLLI, 1832) whose aims were related to the goal of an overall management of the complex regional hydrography. But the traditional pre-eminence of inland navigation, so evident in the flat plain here considered, still affected by serious drainage problems and by floods damaging the road network, was remarkably restricted after the carrying out of railway connection between Padua and Venice in 1842. Despite this manifest novelty, at that time Austrian Government was anyway involved in fostering a widespread navigation in Lombardo-Veneto territories, without any justified worry about the competition between railway and water transport (SILLANO, 1989).

In this political context, it s worth mentioning the contribution of Carlo Cattaneo, for sure one of the most influential European cultural leader of the period, whose sound pragmatic attitudes succeeded in working out really efficacious territory management strategies (COLOMBO, DELLA PERUTA, LACAITA, 2004). His original idea of *Patria Artificiale* (artificial Fatherland), meaning a geographical unity that has been transformed by long time human activity, allows him to display the fundamental role of technology. He therein mentioned the case of Lombardy, one of the most significant examples of artificial territory, extolling the practical and formal effects of lasting improvements of technology. The Cattaneo's practical point of view was widely spread over the countries through the pages of *Il Politecnico*, the review he founded in 1840. Most of the contributors belonged to engineering, architectural and agronomic ambits and their writings faced practical issues in order to get a skilled management of the artificial Patria. Among these topics, inland navigation had a meaningful place in this vivid concern for the applied sciences (LACAITA, 1990). According to this interest a great care was devoted in studying the clashing relationship between water transport and irrigation. It followed thereafter that water engineering was improved as well and consequently many sound papers in *Il Politecnico* and handbooks were issued dealing with fluvial hydrology and hydraulic buildings and artifacts (Cattaneo, 1841). In that period one of the main goals to achieve was the amelioration of water connection between Milan and Venice, regulating the seasonal unsteadiness of the Po river runoff and digging new canals.

3. THE REGNO D'ITALIA AND THE PRACTICAL GOALS

The last years of Austrian domination of Veneto region were characterized by a considerable decay of navigation in the regional waterways. Such decreasing exploitation of local hydrography was due not only to the competition with the extended railway connection between Milan and Venice, but also to the increasing strategies for a more reliable control of floods. The digging of new drainage canals revealed the coeval dominance of reclamation interests, causing meaningful conditions of territorial strives. A good example of these environmental conflicts can be considered the *Naviglio del Brenta*, that is the former waterway connecting Padua to Venice: if on one hand the complete digging in 1858 of a new large canal (called *La Cunetta*) connecting the above mentioned waterway with the Adriatic sea, and therefore moving most of Brenta river floods (and its sediment depositions) far from the lagoon around Venice, on the other hand it caused strong complaints among boatmen, traders and riverside dwellers seriously damaged by the remarkable shortness of flow in the *Naviglio del Brenta*. This is probably one of the first cases where the modern improvement of water engineering, widely extolled as national pride since the beginning of Regno d'Italia, actually detached the practical bound between riverside population and the main waterways (VALLERANI, 1995).

The noteworthy development of Veneto railway network was carried out by the Italian Government after the annexation of that region in 1866 (LANARO, 1984). The same aim to improve terrestrial connections was pursued all over the country and according to this preminent goal the inland navigations problems were seriously neglected. Only in 1878 the Ministry of *Lavori Pubblci* (Public Infrastructures) worked out a detailed report on the condition of the Italian inland navigation (MINISTERO LAVORI PUBBLICI, 1878). The large size volume, with up-to-date maps and statistical tables, was produced at the International Exhibition of Paris in the same year. In addition to a detailed description of all Italian waterways, this report can be considered the first official document of a new political and economic trend, approaching fluvial navigation as an important national issue. The Italian hydrography has been therefore depicted through rhetoric patterns as, for example, "natural gifts" or "glorious heritage of ancient technology" (MINISTERO LAVORI PUBBLICI, 1878, p. IX).

In another text of the period you can read that the navigable network of the Padana plain flows in "one of the wealthiest, in one of the most industrious and in one of the most beautiful valley of the world" (MATTEI, 1886, p. 103). Such an extolling statement expresses the common awareness to possess profitable chances for a good national development , echoing the wealthy

economies of water based city-States as Renaissance Milan, Mantua, Ferrara and Venice. Once more a technical report on the inland navigation problems evokes the narrow links with the vision of a vaguely paramount and mighty past, in order to get a more vivid contrast with the modern decay of national waterways. The generic rhetoric of the "glorious ancestral traditions" is obviously connected to the building of the new Italian State national identity as well.

The sound research of Emilio Mattei was considered a milestone of the Italian renewed interest in fluvial navigation and it was widely quoted in many subsequent studies until the out break of first world war. He carefully pointed out the main causes affecting national water transports; one of the most manifest problems was paradoxically the above mentioned technical continuity of the "glorious" city-States nautical traditions. As a matter of fact, both the territorial infrastructures, mostly unchanged since their pre-modern former building, and the floating means clearly showed their lack to face the commercial competition with railway carriage. According to this problem, Mattei emphasized that every river and channel in the Padana plain had its own boating typology, whose size and feature were strictly related to local fluvial morphologies.

Such a backward nautical technology caused a relevant slowness of water transport as it was not always easy to find animals for the towage in the upstream navigation; the same problem arose when descending flat plain rivers and channels. The use of sails could be anyway helpful in favourable weather condition (Fig. 3). The variable seasonal runoff was furthermore considered another remarkable environmental issue affecting the regularity of fluvial navigation. The social and economic conditions of lighters were not satisfactory as well; Mattei in fact described them as "miserable boatmen, without any capital and means, and without any knowledge of modern boating techniques." (MATTEI, 1886, p. 118). As far as the usefulness of inland navigation is concerned, Mattei pointed out many profitable chances dealing with both economical and land management issues. First of all, an effectual improvement of this activity should foster a more careful management of fresh water resources, ameliorating the hydrographic network dug for agricultural needs. From an economic point of view, fluvial transports could be profitable to convey heavy, encumbering and low value goods; its spread could furthermore increase the commercial role of Venice harbour. Finally, a skilled management of waterways could be useful either to rescue riverside dwellers during dramatic floods or to convey troops and food supplies in case of war.

Figure 3 - Traditional barges with sails along a canal stretch flowing towards Venice lagoon during the Thirties.
Source: Museo della Navigazione Fluviale di Battaglia Terme.

A relevant section of the Mattei's research besides dealt with the new propulsion methods, in order to improve the traditional cruising, propelled, as above mentioned, by sails, rows, poles and animal haulage. Such a modernist aim was strengthened considering the novelties coming from Northern Europe rivers, where the nautical engineering was, for example, valuating the exploitation of electricity in mechanical towing. So, at the end of the Nineteenth century the Italian hydraulic engineering afterward showed a new interest in the fluvial navigation, encouraged by the national wide debate on the building of the "New Italy", where the most profitable exploitation of the natural resources of the country has to be the strategic goal to achieve.

4. THE ROLE OF VENETO INLAND NAVIGATION IN THE NATIONAL ECONOMIC CONTEXT

Comparing Italian inland waterways with those in other European countries, the former markedly allowed short connections whilst making a wide use of the natural hydrography of the Po Valley. Despite the highly relevant Medieval and Renaissance tradition of inland boating, along with a surprisingly dense river and canal system showing a very peculiar waterscape, only few hydrographic infrastructures were regularly navigated at the beginning of the Italian

industrial development. As a matter of fact, a great number of short canals and rivers lost their original importance, thus starting an unceasing decay of local waterways. The fairly recent Italian national unity favoured the development of a home market, thus ending local trade practices based on river navigation, clearly not keeping up with the latest technological innovations. Hence, the increasing use of more capacious motor-boats brought about by modern inland navigation caused an extensive reduction of those waterways routes rated not convenient in terms of economy (SPIAZZI, ZUCCONI, 2004).

At the end of XIX century, the Italian Government worked to catch up with the more advanced economic level both in agriculture and industry of other European countries. Financial and above all industrial State intervention was strongly supported by the entrepreneurial middle classes in northern Italy and favoured by the protectionist tariff established in 1887 which abolished foreign competition and allowed a striking industrial development, mainly centred around Turin, Milan and Genoa, rich poles of the new "industrial triangle" (COVA, 2002).

In this context inland navigation became one of the pre-eminent issues of the national economic development. It followed that from 1888 to 1901 many private initiative directed towards the amelioration of river and canal navigation in a modern sense, making a wide use of steam engines, improving both traditional boating and hydrographic connections. These private initiatives envisaged the realization of carefully planned government intervention involving the establishment of a National Committee in 1900. The activity of this Committee resulted in a three-year extensive analysis of the overall topic, with the final publication of nine volumes on the matter in 1903 (MINISTERO DEI LAVORI PUBBLICI, 1903). This research can be considered an official State action towards a peculiar economic issue, mainly fostered by Venetian Members of Parliament. By reading the National Report, it emerges an outstanding euphoria deriving from the coeval national industrial expansion and resulting in technological improvement in almost every sector of production. This led to a new, widespread attitude marked by a confident territorial control in order to achieve the above mentioned idea of Cattaneo's *Patria artificiale*. The full adherence to modern concepts brought to extensive plans involving the strengthening of inland navigation, whose economic goal was also supported by an ideological design which implied Italy catching up with other European countries (COSGROVE, PETTS, 1990).

Despite the publication of the mentioned Report (1903), Venetian political authorities were barely involved in encouraging both regional river and canal navigation and effectual connections between Venice and the western regions of the Po Valley (mainly Milan inland harbour). In those years, Leone Romanin Jacur, Venetian Member of Parliament and 1903

Committee's leader, held lectures on the advantages of improving natural hydrography and drew attention to the prevailing role of the railway system, whilst making a complaint to the Government pointing out the lack of coordination with the existing waterways (ROMANIN JACUR, 1903; VALLERANI, 2004, pp. 109-113). During an international congress that took place in Milan in 1905 much stress was put on river navigation and in 1908 a Trust for Inland Navigation, approaching the problem from three different points of view – economic, urban planning and national military defence- was established. Besides, it was maintained that a good management of Venetian waterways could help lowland drainage and the reclamation of wetlands. On the occasion the Italian Touring Club arranged a boat race from Piacenza, a city on the right bank of Po river few miles southward Milan, up to Venice along the Po and other canals, following main inland navigation routes (ROMANIN JACUR, 1908).

More than 20 years after Emilio Mattei's above mentioned analysis of the Italian inland navigation, boating technologies and waterways amelioration have quite improved. The interest in the modernization of traditional boating had no practical effects, whereas hydraulic engineering was successfully applied to the Veneto water regulation mainly concerned with hydroelectric, flood protection and land reclamation issues (ADAMI, LIPPE, 1983). Since 1908 a quinquennial course of hydraulic engineering had been operating at Padua University and a course of "Inland Navigation" was established in 1911. The role of university along with classes teaching hydraulics arranged by the "Scuola di Applicazioni" at Padua, proved fundamental both to the modernization of waterways and training of an increasing number of technicians that the new situation required (MARZOLO, 1954). The problematic conditions of Venetian hydrography (Averone, 1914] were widely outlined by local politicians to the central Government, applying for the set up of a specific technical board acting in the regional context. This request was promptly accepted with the establishment of the *Magistrati alle Acque* in 1907, thus recalling the name of a similar board which operated in the former Venetian State.

The modernist conception existing in Italy during the early years of the Twentieth century tallied with the strong trend towards nature control. Hydrography represented a suitable ground on which to build specific technological skills. The main aim was the overall control of hydric fluxes thanks to improved hydraulic manufactures. In this light, river navigation became a territorial issue strictly linked with the flood control, drainage and irrigation management, whose connecting line with regard to industrial development was represented by the rational use of agricultural resources (VALENTINI, 1911).

5. NATIONALISM AND WATERWAYS (1915-1940)

The large diffusion of political and cultural initiatives to promote inland navigation did not have any relevant practical aftermath. The modernist euphoria only produced challenging hydraulic projects which involved an increasing number of sector of the national technocracy. It is worth pointing out that almost all publications on inland navigation showed a strong nationalistic attitude which revealed itself through the celebration of waterways as infrastructures narrowly to an utilitarian idea of nature, being rated as a "God's gift" that have to be exploited for the sake of national development.

As largely pointed out in the former debate on the improvement of national inland navigation, one of its main tasks should have been to support the military defence of north-eastern borders. Such a strategic role revealed its extraordinary importance during World War I, when rivers and canals of the lowland in Veneto and Friuli were used to transport food and weapons (CUCCHINI, 1924). Special attention has to be paid to the *Litoranea Veneta*, an inland navigation route stretching from the Venice lagoon to those of Marano and Grado in Friuli (Fig. 4). It has been excavated by Venetians during the Sixteenth century so as to provide an easier access route than the traditional sea-routes to the eastern border with the Austrian Empire. After centuries of decay, this water itinerary was ameliorated during the first decades of Regno d'Italia not only in order to recovery navigation but also to help reclamation, thus using the *Litoranea* as an important drain of the marshlands in low plain between Veneto and Friuli. Due to its multiple functions, the *Litoranea* gained a relevant operational importance for the Italian inland navigation. Its economic as well as strategic roles (namely the above mentioned strategic support to the Italian troops during WWI) were also emphasized in many technical publications during the Fascism.

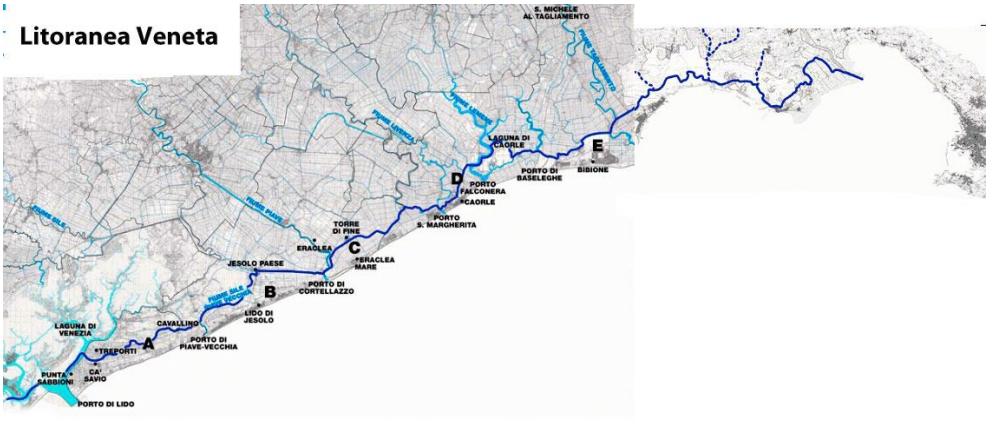

Figure 4 - The Litoranea Veneta: map of inland navigation route

Source: Map drawn from a project on "River Tourism" directed by Francesco Vallerani in 2004

In the reviewed wide bibliography of the period, *modern*, *modernity* and *modernization* are undoubtedly the more often used words when referring to the improvement of national fluvial transports. If significant results were not achieved until 1918, it was during the first post-war period that a successful overall water regulation of the Venetian inland took place (CAVALLO, 2011). The fast and effectual modernization of the *Litoranea Veneta* was a sound example for further waterways management, especially when a successful maintenance of inland navigation had to face the multiple effects of natural hydraulic dynamics. The amelioration and control of the fluvial network, both in mountainous and plain areas, was often defined as a "struggle against Nature" (DE STEFANI, 1925). In this way, a waterway can be provided a modern structure when its natural features are altered and modified by technical improvement. The waterways flowing in the Venice mainland were therefore considered a basic target of technocratic management, whose control of water dynamics (namely a control over nature itself) depended upon the complex modernization of original river landscapes. The progress in hydraulic engineering resulted in the visible craved development in the Veneto region lowlands, implying the construction of hydraulic manufactures, such as locks, quays, to promote the navigation of bigger barges.

A relevant aspect of the traditional relationship between inland navigation and territorial reorganization during the Fascism is the amelioration of inland harbours. A large number of the fluvial harbours in the Venetian mainland still made use of old structures dating back to the Sixteenth century. Modernization operations actually began at the end of the Nineteenth century and developed even further after the first world war, in an atmosphere characterized by

extensive plans of urban regeneration involving many Italian towns. The guidelines for this urban improvement included inland harbours, railways, industrial areas, slums and roadway amelioration. Besides, the importance of inland navigation during the Regime was further enhanced by its assessment as "The most autarchic means of transport".

In Veneto region, the city of Padua with its complex waterway network was considered a place of national and local strategic importance (Fig. 5). The urban development plan of the city included an increase of inland harbour functions also promoted by the new connection with Porto Marghera, the industrial and commercial area of Venice (CHINELLO, 1979). In those times, great relevance was given to the installation of modern navigation sluices and the meanders straightening of the above mentioned *Riviera del Brenta* ship-canal, an old waterway connecting Padua with the lagoon as from the Roman age. The ambitious plan to transform this old waterway in a modern straightened canal with an anchorage depth allowing the navigation of 300 ton gross tonnage boats was carried out on the name of "progress" (COLOMBO, 1927). The optimistic attitude of the Regime's technicians towards the topographic and hydrographic conditions of Padua, revealed an idea of nature that can be modelled and transformed so as to become a benign environmental background, where is prevailing a shared vision of usefulness involving quay reclamation, the development of huge commercial and industrial sites and finally efficient railway and road connections.

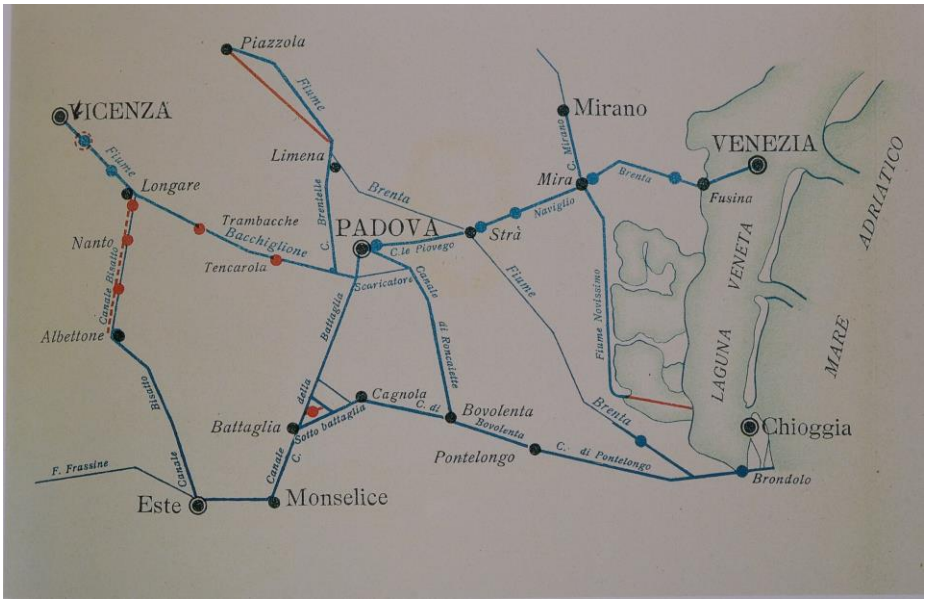

Figure 5 - Waterways network in Veneto low plain between Vicenza and Venice during the early twentieth century.

Source: Grandis, 2008, p. 249.

Treviso was another important city in Venetian mainland and its fluvial harbour, dating back to the Renaissance too, had been moved away from the town centre during the second half of the Nineteenth century (BREVEDAN, 1913). Along the Sile river, considered one of the best waterways in the region in terms of navigation (thanks to its regular flow and riverbed width), many agricultural villages were set up during Venice domination, each with its own mooring banks. During the Fascist period the Sile river knew the increase of fluvial traffic, mainly regarding the transport of gravel and sand extracted from its riverbed, along with the development of many industries along its course which allowed easy connections with the Venice harbour.

6. THE END OF VENETIAN INLAND NAVIGATION: DEATH OF A LANDSCAPE

During the second world war most of Italian infrastructures were heavily damaged. As to the Veneto waterways system, heavy bombardment mainly struck the Sile navigation route downstream Treviso, the Litoranea Veneta and the canals between the Po and the Venice lagoon, along with some sluices regulating the Brenta ship-canal flow. The reconstruction of many hydro plants eventually began at the end of the 40's and in June 1949 the first National Congress on Inland Navigation took place. Its aim was to work out an evaluation of the actual condition and future prospects of inland navigation after the end of the war.

In the second post-war period, the economic recession did not allow a continuous and efficient maintenance of the waterway system in the Venetian inland. The development of the national car industry was paralleled by political efforts aimed at promoting a further amelioration of the railway system and the construction of new motorways reduced the importance of waterways. Fluvial navigation entrepreneurial activities were gradually abandoned as they could no longer compete with the newer system based on railway and road transports. The decline of the waterways transports was followed by a functional decadence of some fluvial and canal landscapes. The realization of a general cultural detachment between the people living in the Po valley and its watercourses implied the loss of the symbolic and memorial values of Venetian waterscapes too.

This new attitude was very manifest in Padua historical centre regeneration after the second world war; it involved the ultimate decline of the Roman and Medieval fluvial network running within the ancient medieval city walls. This decline consisted in an overall reduction of the water fluxes of the urban waterway system, mainly during summer dry periods. The

unpleasant sight and smell of long stretches of the urban waterways deriving from the hydric shortage of some canals, brought to the realization of the need to inter these watercourses which, at the same time, had been losing their function in commercial navigation. It follows that in 1954 the project for interring the historical canal flowing to the Roman age urban mooring bank was carried out and a relevant point of the plan consisted in the creation of a new road above the canal. This roadway was rated as essential for the solution of the problems of the urban traffic system.

In the early 1960s, following work carried out on the canals, the Medieval district of "dei Conciapelli" (the tanners) was cleared, thus launching a period of intense building speculation. At the same time, recreational activities (such as swimming and boating) carried out along the canals of Padua's historic town centre were moved some kilometres upstream along the Bacchiglione river. The town's river harbour, along with most of the inland fluvial routes in the Veneto, ceased to be used at the end of the 1960s.

The definitive cultural detachment from what it could be defined as "fluvial sense of place" is strongly symbolized by the disastrous effects of the large flooding in November 1966, which seriously damaged the historic centres of Florence and Venice. To some extent the causes of the disaster are the outcome of a semantic vacuum in the ways of considering the relationship between the physical environment and society, thus showing a manifest delay in the evolution of the Italian cultural debate about nature, landscape and environment. Scientific explanations produced during the calamitous flood of 1966, in addition to elaborating comprehensive analysis of the events, with the support of an extensive collection of objective data, also focused on the negative role played by humans not only in mountain basins but also along riverine stretches in lowlands. After these serious upheavals, academic engagement opens to the consideration of human daily practices, especially when wrong and irresponsible: "We more and more worry about new errors that are affecting our environment with increasing intensity. These are by now errors committed against nature and against men: it follows that researchers should point out these errors and tenaciously work because they shall be known in an objective manner: this is the first step to eliminate them. "(CASTIGLIONI 1974, p. 35).

The extremely rapid economic growth of Italy and the radical change in its economic structure during the 1960s' would have required a clear proactive approach by public organizations, especially as regard environmental impacts. On the contrary, the negative consequences involved by unplanned development have been faced by very ambiguous reactive responses, when given. It is possible to say that during the Italian economic boom (until the late sixties) environment was regarded as a stock of resources to be exploited and as a simple

geometric space to be organized according to increasingly mobile flows of goods, people and information.

It was only during the 80's that a more mature consideration of the historical and cultural meaning of fluvial and urban landscapes developed, as a result of a new social approach influenced by positive environmental attitudes to protect and preserve the natural environment. In this light, the importance of waterways today shifts from a mere economic frame of reference to wider cultural and recreational contexts, and the waterway proves essential to any intervention of environmental planning. This new and increasingly shared sensitivity has been emerging from the need to retrieve the quality of the environment and to re-evaluate specific geo-historical landmarks. This new approach has equipped itself with tools that are critical not only for coping with the relentless erosion of cultural heritage, but also for engendering an awareness of the extraordinary interest evoked by the morphological and cultural contexts pertaining to water landscapes in Venetian mainland.

The impressive extent of the hydrographic network in this area soon revealed the valuable potential for a successful renewal of land development dynamics, which led only in part to an actual improvement of urban quality in the widespread status of "sprawling city". Despite the undeniable lack of an effectual urban planning in Veneto region, there have been anyway significant episodes of conscious and durable recovery of large fluvial stretches to the extent that being defined as a "water town" is now deemed a prestigious award by several municipalities. In this respect, action has been applied along not only urban hydrographic stretches, but also fluvial waterways connected to prestigious buildings, as well as rural villages and setting not overly compromised by too heavy land use.

The current consolidation of new perceptions and assessment toward lesser known and popular landscapes also involves local administrator, who have been increasingly more attentive to the identifying features of waterscapes in Venetian mainland. We are now dealing with a well defined hydrographic heritage and current times are actually ready for broadening the awareness of waterways with regard to their touristic and recreational value. In countries such as Britain, Belgium, France, Germany and Holland, the established practice of tourist travel along inland waterways has stimulated the recovery of almost all of the built elements such as locks, water mills, bridges and piers with mooring for touristic navigation. The growing importance of leisure time is another essential point of reference within the framework of a changing post-modern popular perspective, increasingly aware of environmental issues.

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