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The Fluvial City: Change and Representation

Case of Dora Riparia.

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This paper looks at the changing relationship between the city and the river, particularly, how the river influences the development of the city and how the development of the city controls the life of the river. At the heart of this matter is a paradox; cities are man-made intentional constructs. Rivers begin as natural phenomena until the city intervenes. The biography of any river flowing through a city will be an unhappy one; expect crude surgery, amputations, peremptory diversions, gentle meanders straightened, courses shortened. This subject must be approached from a multidisciplinary perspective. Geography, geology, anthropology, sociology and economics are each forms of representation. A multidisciplinary approach must, however, set a hierarchy of disciplines; in this study the relationship between Geography and Architecture is our focus.

Keywords: River, Geography, Settlement

1. Preface

The focus of research, which this paper summarises, is the relationship of the city and the river, both in concept and in practice. In particular, the enquiry is the manner in which the river influences the development of the city and the way in which the development of the city constrains and controls the life of a river. At the heart of this matter is a paradox; cities are man-made, are intentional constructs, rivers begin are natural phenomena. Cities are planned; rivers evolve as part of an independent natural process, until cities intervene.

2. Introduction

The territory is a set of conditions, being continuously generated in reaction to one another. The territory is anchored by a series of permanent elements, however, by means of which, the thread of human activity with its physical knots in the form of settlements is held in time. Even when the expanding urban agglomerates consume settlements, the pattern can be traced through its geographically routed manmade footprints.

Cartographic images, whether they are intended to serve as actual accounts or project visions, are essential in reconstructing the logic of the sequences of transformation within a complex settlement process,

reflecting aspirations and the human desire to achieve and accommodate them. Geographical conditions predetermine various long-term patterns in the built up fabric and help us understand the distribution of human activity, reliant on the use of natural resources, largely defined by the interrelation of land and the waterways.

3. The Crisis: Of the Idea and of the City.

Everywhere the city is in crisis. Population growth and rapid economic change are creating larger and larger cities, massive urban sprawls which, if planned at all, are done so on an *ad hoc*, add-on basis. This can be exemplified in the terminology of the 'old centre'. Many cities now have an old centre, frequently a place of coming together in a public space, with one or more new centres constructed elsewhere to accommodate a greatly enlarged geographic and demographic spread. The notion of a city with more than one centre seems contradictory; it implies fragmentation within the city. Meanwhile, other cities are in decline, shrinking within their borders, unable to retain population, relying largely on state subsidy to slow their decline. The original economic activities, which many cities were planned around, are also being unpredictably superseded by new activities. Many have become visitor theme parks, which can be seen as a way of preserving the city, but can feel artificial.

Behind this lies a deep intellectual crisis over the concept of the city. We struggle to match reality to the ideal. The history of ideas is filled with a number of versions of the ideal city elaborated by a variety of philosophers, moralists, theologians and architects. The genealogy of thought can be traced through the ideas of Vitruvius, Alberti, Filarette, Scamozzi, Howard, Geddes, Rossi, Le Corbusier, Soleri, Koolhaas, who were all concerned with the idea of the city. Some versions of the ideas of the city are more prescriptive than others (Rosenau H., 1959). One line of thought is for the city to be conceived as rigid design. Others are more adaptable to geographical conditions. For instance Alberti, referring to the treatment of streets, suggests that those can be laid out "in the manner of rivers", following an angulating pattern. Adaptation of site to needs, the 'commoditas', remains relevant through time.

Why should the notion of an ideal city be of such interest to such a diverse group of thinkers? The answer lies at least partly in the notion that the ideal city is a metaphor for a desired state of human relations. This desired state varies widely. This might be a state where ideal city dwellers live in static harmony, or live in perfect equality regulated by a universal set of rules, and are able to take part in a perfect democracy and so on. An ideal city may encourage virtues or eliminate vices, provide public venues for beneficial interaction, or provide public parks, which offer a controlled version of the natural world. The permutations are endless.

Au fond, these various versions of the ideal city are based either on the view that the design of the city can improve human nature or better accommodate it as it is. But in all cases, a very strong emphasis is and continues to be placed on the role of reason in design. Indeed, most if not all treatises on the design of a city are based around the use of geometrical forms and diagrams. In all these versions, the city is designed to be permanent or semi-permanent and therefore to shape and to channel the way in which the human interactions take place within its limits.

The narrative of a city becomes apparent not only in the city's production phases, manifested in a substantiation of its constructed presence but also in its un-constructing episodes and the resulting voids or the formation of undefined areas. These occurrences of unconstruction are significant in the temporal process and should not be seen as negative. They activate future potential responses to the present urban conditions (Young J., 2013).

The most recent condition of merging of the regional edges and polycentric sprawling, is seen as a new form of territorial organization, born in between urban and rural, remains ill-defined for it is neither one

nor the other, hanging on to both. We are urged to embrace this condition in an attempt to adapt urgently to these changing dimensions. We are now operating in a digital framework, so perhaps the need for the physical projection is less critical. Adapting to conditions but also adapting conditions per se, is what humanity has been practicing by means of architecture for as long as it has been trying to control the territory.

How does one approach the subject so complex as the city?

A subject as complex and multi-layered as that of the city has to be approached from a multidisciplinary perspective. Geography, geology, anthropology, sociology, engineering, ecology and economics all need to be taken into consideration. Architecture as a multidisciplinary discipline along with planning aims to bring all these elements together. Geology, for instance, sets limits on the natural course of the river but also the possibility of building depending on whether subsidence or flooding take place in a particular location. Geography and economics are pleated into this symbiosis. For instance, until the advent of the steam engine, cities required an economic hinterland capable of providing the city with fresh food produces. The scientific Hydrology & Hydro-geology, which study the ground water movement, allow understanding of the chain-like processes and cycles, triggered by moving water. Contemporary cities are more and more facing the problem of flooding; rainwater management is becoming an important concern directly influencing the urban design. "The pipe is dead", declares James Hitchmough, "…the future of the cities will be driven by how we manage water." (Hitchmough J., 2013).

A multidisciplinary approach must, however, set a hierarchy of disciplines, used in a given analysis, while noting where these overlap to keep them distinct. Taking a historical perspective the set of disciplines taken as relevant has evolved and expanded.

4. The River.

Rivers run through cities for a reason. Until the XX century one would struggle to find a city without a river. Rivers provide fresh water, waste disposal, transport, means to generate energy, and much else. There is an on-going contradiction that lies at the heart of the relationship between the city and the river: even an ideal city needs a river. A river is a natural phenomena and nature cannot be completely controlled. Rivers may be dammed, diverted, canalised, their banks artificially reinforced to become 'permanent', they may be forced underground, built over, bridged, dredged (deepen or widen) or allowed to silt up, but they remain a force of nature. It is not by chance that so many designs for the ideal city specify the use of canal systems to replace natural rivers; systems to be drawn using geometry, according to a rational plan. The real life biography of any river flowing through a city is likely to be an unhappy one; expect crude surgery, sudden amputations, peremptory diversions, gentle meanders straightened, courses shortened.

The "natural" processes, such as meandering of a river have their causes. It is not only human who is constantly taming the stream, the reluctant soil, rejecting the river, forces the stream to find its course where geomorphology permits.

5. Dora Riparia. Its Geographical Context.

River Dora crosses Piedmont, which lies in the ancient sea basin known as the Padana Plain or the Po Valley, and cover an area of approximately 46,000 sq. km. The basin is theoretically divided into the lower (humid) and the upper (dry) parts. The terraced nature of the terrain is a result of a complex overlay of the so-called Alpine thrust belts and fluvial conoids. Essentially it is a glacial make-up that forms the primary component of the geomorphological sediment holding the course of Dora Riparia (Pavia G., Giardino M.,

Lucchesi S., 2011). The territory lies on a sloping site, dropping down from the Alps towards River Po. The drop of levels just within the inner city of Turin, between Porto Susa and river Po is of approximately 33 meters. The alluvial fan folds, which cover the plain in a web-like pattern, have urban significance. It takes a strong river to manoeuvre to find its way and survive by meandering to eventually join river Po at the end of its 125 km journey across the Susa Valley.

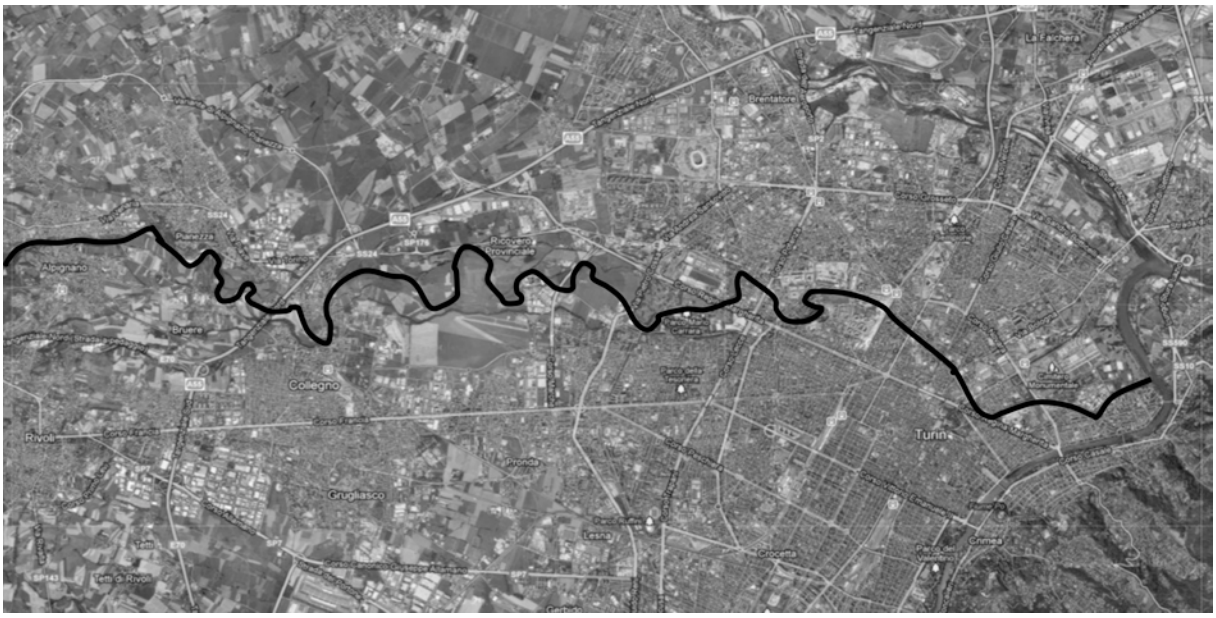


Figure 1. *The present-day course of river Dora Riparia traced over Google Map extract covering the stretch between the confluence with River Po and up to Pianezza.*

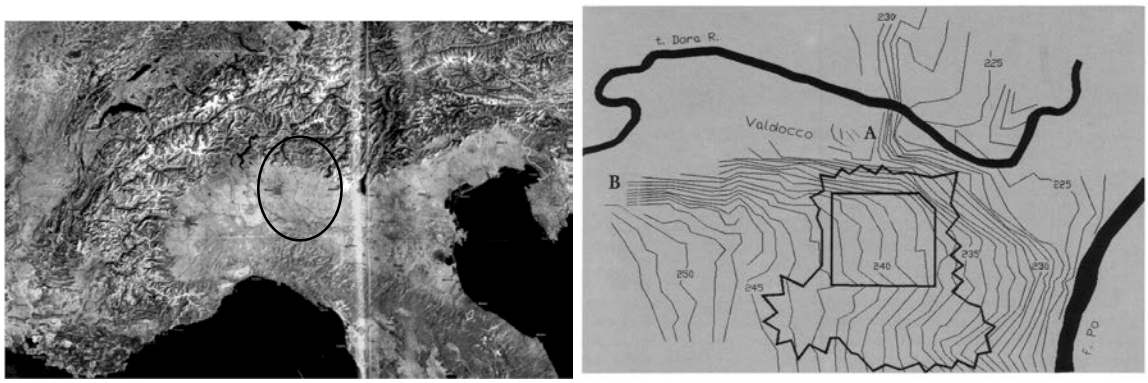
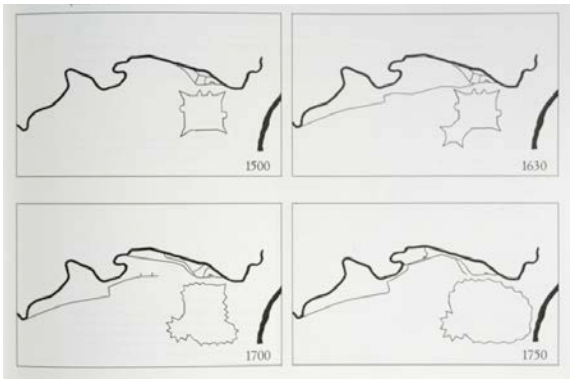


Figure 2. *The Tectonics of the Alps. Source: Goddard Earth Sciences Data & Information Services.*
Figure 3. *The terraced topographical setting of the city of Turin, at the confluence of the River Po and Dora Riparia. The quarter of Valdocco nests adjacent to Dora Riparia.*

Turin in its pre-settlement presence is set out by a definitively favourable topographical condition. The location of the future city is found on the confluence of a major river, river Po with one of its principle tributaries – river Dora Riparia, confined by the Alps arching from the North to the West and the Apennine complex stretching Southeast.

The territory, whose favourable condition was first recognized by the early Celtic settlements, later was chosen as the location for a Roman military camp. The Roman regular grid became the formalising of the city, which capitalised all the favourable strategic characteristics of the location.
And although through the middle Ages the city undergoes a number of radical and rapid stages of expansion, prompted by shifting social currents and political regimes, these stages get superimposed as layers and are merged in, weaving into the existing anchoring roman structure. The walled city is the epitome of security and autonomy, further reinforced by a series of earth fortifications in the XVI c, which complete the defensive military model. The city then starts to stretch in an almond shape extending parallel to Dora Riparia, approximating it at the same time (Marchis V., 1988).



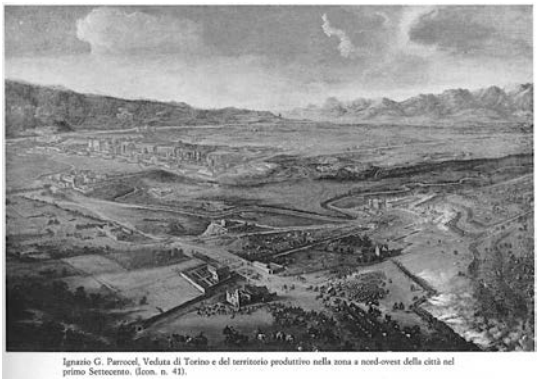


Figure 4. *Turin. The Key Stages of Expansion and Canalisation. ASCT.*
Figure 5. *Ignazio G. Parrocel. View of Turin of the north-west with Dora Riparia in the forground. First half of the XVIII c. Collection of ASCT.*

The city establishes its power and affirms itself as the seat of the Duchy of Savoy between 1416-1860, succeeded by the dynasty of Savoia-Carignano 1831-1861.
The city is then programmed through a series of models. Following a number of proposals for expansion, most notably those of the XVII c, the city progressively stretches towards Dora and across it. By the end of the XIX c Dora Riparia is firmly held and controlled by the city.
The majority of the canals in Turin and the adjacent communities were constructed to branch and feed off Dora Riparia to supply the productive activity. Dora, a minor-scale river by the general standards, nevertheless offered sufficient opportunity for this. The earliest canals date back to the XV c. when they were designed to serve the first mills. Later and up to the XIX c the river consumption spectrum included mills, farms, textile (and other) factories, forges and an arsenal. [7] Throughout its history, Dora is not so much a boundary, but rather a trigger and a mechanism in the operation of the territory. During that time the river and the canals are often rerouted to accommodate more diverse activity. [8]

Even the adjacent communities, such as Collegno are being absorbed into the conurbation of wider Turin. The boundaries get blurred; occasional mega commercial inserts are planted at a contrasting scale, to the existing civic space. The advance of mobility is mainly responsible for alterations to the perception of space. These processes reflect cultural imagination and the productive potential of places. What one may see as the making of a place is also likely to be seen as the unmaking of a place (Young J., 2013).

The cartographical images, such as figure 9, blend together reasonably accurate representations of physical geography conveyed through several filters of interpretation. These are communicated using the topography and architecture as the basis, representing an implied social order, a view of the local economy and of the local politico-military strategy. The maps are symbolically charged (Motta G., Ravagnati C., 2009).

Figure 6. *The territory of Turin and beyond in the 2-nd half of the XIX c. showing the canal network.*
The industrial flourishing is superseded by a period of neglect and decline, but by this point the territory is already in the heart of Turin. Over the last two centuries we see larger units emerging within the urban and rural fabric. The medieval compact density is still there but the layers are added on and are amalgamated. We see a dramatic and imminent transformation when the city's walls get demolished in the 1800, during the Napoleonic occupation. The city becomes open and exposed for over half a century only to reinstate in 1853 the new boundary of defence, delineated by the introduction of tollgates. In the meantime the canals are being continuously modified, improved and updated.

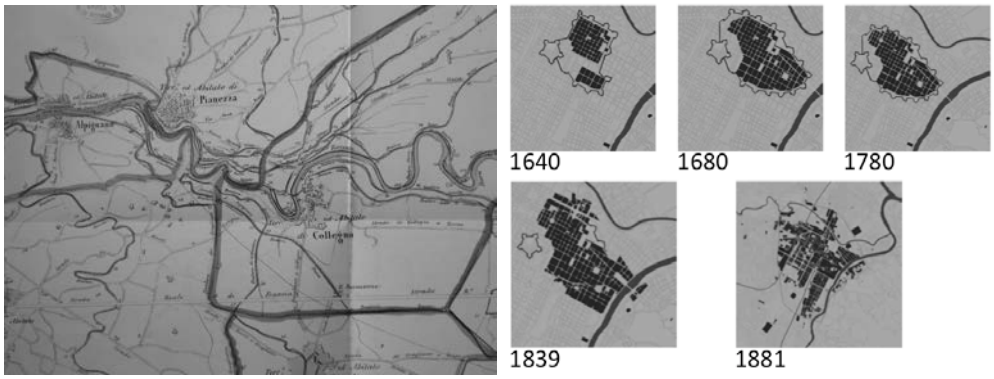


Figure 7. *The designs for modifications to the canal network in the XIX c.*
Figure 8. *The Key Stages. Torino; Story of the City.*

6. Conclusion.

The purpose of this analysis is to prepare a well-informed basis and lay ground to further interpret and reignite local interest in geography and productive history of the territory; to counteract areas of neglect and those in danger of being eroded as well as suggest locations for developing potential to bring economic benefits for the area. This paper is a setting out of preliminary groundwork survey of the subject, to provide a narrative of what's happened over the centuries to the territory along Dora Riparia. There is a need to emphasise and understand territorial processes from a geographical perspective. Geography lies at the core of human activities. A settlement is not accidental. The river's role may have changed drastically but there is a role that remains and needs to be updated.

We are relying on different technologies now. Advances such as electricity have taken away the river's primary industrial role. River is no longer the engine of production in these locations, but it continues to serve and offers multiple new forms of use. The permeability - connectivity network is of an increasing demand. River is a means to connect communities and people want to regain the pedestrian dimension.

The recognition of the river's long-term value calls for regular re-evaluation and tentative informed proposals for enhancement. The economical revival is pressing. Improved ecological and accessibility schemes will attract recreational activity and use to these locations. There may well be an opportunity to revive some traditional businesses.

Torino durante l'assedio del 1640 (Icon. n. 333).
Nella precisa descrizione del territorio foraneo di Torino si individua l'andamento della «bealera dei Mulini», con inizio e termine nella Dora, e gli opifici su di essa che subirono in quella circostanza seri danni.
I mulini di Dora sono stati «sbattuti a terra dagli assedianti», ma anche la polveriera è resa inagibile.

Figure 9. *Turin during the siege of the 1640. Collection of the ASCT.*

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