Fragile and Resilient Cities on Water

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Perspectives from Venice and Tokyo

Edited by

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FOREWORD

ROSA CAROLI AND STEFANO SORIANI

The onset of modernization, especially during the twentieth century, has brought about dramatic changes that have first and foremost impacted coastal cities and cities on water. The push for efficiency and functionality has profoundly affected coastal and urban landscapes, and gigantism in the port industries have contributed to the degradation and depletion of environmental resources and habitats; modernization processes have marginalized local cultures and historical community-based values, thus causing original features and local specificity to disappear from the majority of historical waterfronts. In the last few decades, however, a reverse trend has also gradually emerged with the restructuring of port and industrial activities, along with the growth in the leisure and tourism sectors and an increasing attention towards environmental conditions. This convergence of factors has led to the "rediscovery of water" and to the design and implementation of new urban policies aimed at redeveloping urban waterfronts. In this perspective, cultural characteristics along with local history and identity are being re-discovered and valued as fundamental assets for future development. New approaches, based on the concept of working with—and not against—ecosystems, are currently re-orienting environmental management approaches in coastal areas and cities, in the attempt to increase social and environmental resilience.

Against this background, however, the intrinsic fragility that characterizes cities that live on water becomes most apparent, due to the technological, economic, social and environmental dynamics affecting the urban structure and landscape. A crucial challenge that urban policies have to deal with is how to transform *fragility* into *resilience*—the capability to proactively adapt to changes and challenges. Resilience requires new forms of planning, novel approaches to environmental governance, as well as new initiatives in urban policy through effective involvement of both economic and social actors, in order to harmonize top-down and bottom-up approaches and projects. Whereas traditional top-down, centralized and state-directed approaches have historically driven the economic growth of many cities on water, these dynamics are no longer appropriate. New bottom-up, more inclusive and place-based initiatives are needed to

improve livability and resilience of communities and cities on water.

Water is the central player in this landscape, but its role is intrinsically ambivalent, as it is both a vital resource and a potential threat. For cities on water this element is profoundly dualistic in nature, as it functions simultaneously as an isolating and a connecting element between places both in a physical and in a symbolical sense. Water sustains urban life but it is also a potential threat to it, especially in an age of climate change.[1] Issues surrounding water are becoming high stakes in the relationship between urban policy and local communities, particularly those living in fragile and liminal spaces between land and water. Indeed, the necessity to reconsider the link between water and the city has become even more urgent in the face of the challenges brought about by climate change and the resulting increase in vulnerability and risks. As a consequence, cities on water have to identify and implement effective actions aiming at strengthening the risk governance capacities at the local, regional and national levels. This requires not only an improvement in technological expertize and capital investments, but also new attitudes towards the economy of the cities, their culture of the environment and the very way in which the political process is designed—its capacity to involve the social, economic and cultural actors in search of a shared vision of the future. At the same time, it is worth pointing out that the re-discovery of a more balanced and sustainable use of water can represent a driving force for the economy of cities on water allowing them to both attract new investments and promote new jobs. The safeguard of water and land are closely linked, as both define character, identity and memory, thus contributing to resilience itself. Overcoming the traditional barriers between water management and land governance, and finding added value in the multi-dimensional character and complexity of the relationships between the city and water lead to a paradigm shift with respect to the traditional relationship conceived during the modernization phase of cities on water, when a land-centered perspective rapidly took over, and coastal areas were converted into industrial and residential lands, thus serving new uses and users. This also implies a re-evaluation of waterfront spaces both from an historical and environmental viewpoint, thus giving back to water its central role and opening up new ways of governing, living, and imagining it.

Representing paradigmatic cases of the reciprocal link existing between water management and urban planning, namely between water

[1] Cf. Terje Tvedt and Terje Oestigaard, eds., *A History of Water: Water and Urbanization* 1, series 3 (London: I.B. Tauris, 2014).

and land governance, of the peculiar and deep relationship linking water and society, as well as of the challenges that urban governance in cities on water has to deal with, Venice and Tokyo well exemplify the complex relationship that exists between fragility and resilience and, at the same time, offer interesting insights on feasible options and actions to address such a complex relationship. Despite the differences in size, population, age and origins, the history of Venice and Tokyo is that of two capital-cities, which developed in an intimate relationship with water, where the latter molded the urban fabric and vice-versa, thus creating articulated and complex functional and landscape structures, and typifying their world wide image.

In both Venice and Tokyo, flood control and water management played a formative role in their development and their resemblance as water capitals was perceived by foreign travelers who visited Tokyo in the second half of the XIX century.[2] The cities share common features and problems and face similar challenges and opportunities. The presence of water made—and still makes—space a rare commodity in both the cities, and analogous techniques were employed to claim water for land use by using timber floating in rafts down the rivers to be pilled into the mud and sand as the initial foundation for solid spaces in the two cities. Similar flood management strategies were adopted to divert major rivers flowing into the Venetian lagoon and the Tokyo bay and for the construction of embarkments of different heights, while a water administration system was established to prevent flooding, which was—and still is—a requirement for safety, economic activities and quality of life, and thus a main concern for governors and citizens of both the cities. The prosperity of Venice and Tokyo (called Edo until 1868) widely relied on water as an important element for strategic defense, a means to transport goods and pursue trade, and an engine for their commercial dynamism. Both the cities developed fishing industries and hosted prominent fish markets around which entertainment, recreation and pleasure activities developed. They issued precise rules to regulate the times and places where fishing could take place, as well as regulating the size of nets and the equipment to be used. They invented techniques to cook and preserve fish the legacy of which still characterizes their respective local food cultures. City dwellers'

[2] For example, Douglas Sladen (1856-1947), who was in Japan between the late 1889 and July 1890, noted that "busy quarters of the town which centres around the Nihon-bashi […] which is considered the hearth of the capital and the hearth of the country […] has the same hog's-back bridges, the same busy water life" of Venice, and came to realize "how Venetian Tokyo is." Douglas Sladen, *Queer Things About Japan* (London: A. Treherne, 1904), 338.

movement and leisure activities along aquatic routes, as well as seasonal events, festivals and processions on water, gave rhythm to local life and specific features to the townscape, thus testifying to the deep relationship between water and society. The central role played by water in the lives of both Venice and Tokyo is apparent in the ways it has shaped political, social and cultural institutions, forged religious practices, written and visual production, collective images and imaginations, all attesting to how water is reciprocally interwoven with human activities and attitudes.

Massive landfill projects and the development of a network of rail and road in modern and postwar Tokyo have often removed a discontinuity between water and land that still typifies Venice's landscape. Nevertheless, despite the varying role that water has played in the history and evolution of Venice and Tokyo, the various forms of technological interventions in water management and usage, and the changing means of participation and perception of water, the latter still remains a constant presence in their townscape, as well as a threat which continues to challenge these cities and their governance. Not differently from other cities on water, crucial issues for Tokyo and Venice thus include how to define a broad strategy to integrate risk reduction and resilient approaches and initiatives into sustainable urban planning schemes; to raise awareness about the relevant role of cultural heritage in the building of resilient communities; to harmonize efficiency and functionality with livability and sustainability in urban transport and port-maritime activities; to implement robust but flexible adaptation strategies to climate changes; to better integrate water, in all its historical, social, political, economic, environmental and cultural dimensions, into the contemporary urban fabric; to preserve and manage ecosystem services; to recover the complex nature of the relationship between the city and its surrounding aquatic spaces which has been strongly 'simplified' during the XX century's modernization; to revitalize and re-qualify tourism and leisure industry in a sustainable way; to bring water and water-related recreational activities back to the local citizens. These observations demonstrate the legitimacy of a comparative approach to the study of the two cities on water, however such studies are more widespread and popular in Japan rather that in Italy—probably in part because of Venice's worldwide claim to fame as the water capital.[3]

[3] Cf. for example Hidenobu Jinnai, *Tokyo: A Spatial Anthropology* (Berkeley: University of California Press, 1995); original edition in Japanese (Tōkyō: Chikuma shobō, 1985). Yutaka Takahashi, *Toshi to mizu* [City and water], (Tōkyō: Iwanami, 1988); Hosei Daigaku-Eko chiiki dezain kenkyūjo, ed., *Future Vision no keifu. Mizu no toshi no miraizō* [Genealogy of future vision. Future images of a

This volume aims to contribute to identifying the critical issues concerning the relationship between city and water in these two capital cities, in a comparative, multidisciplinary and inter disciplinary approach, in an attempt to understand how fragility can be translated into resilience. In doing so, this volume places special attention to the various implications of living with water in Venice and Tokyo, where natural risks and social and economic vulnerability are particularly high, and where the process of re-interpretation of water is re-orienting—although at a different level—urban policy and governance, as well as social attitudes and values towards the presence of water and its use. As Hidenobu Jinnai argues in the Introduction to this volume, the necessity to reevaluate waterfront spaces in order to increase self-reliance requires a reconsideration of the importance of cities on water "from the viewpoints of history and environment, overcoming the theory of land that has explored efficiency and functionality using massive energy, and reexamine cities from oceans and rivers in order to restore richness of nature to our environments." In this perspective, the volume addresses the different functions that waterfronts have played and still can play in the urban fabric, as well as the different responses that these two cities offer to the old and new problems and challenges deriving from the presence of water, providing some insights for the analysis and management of similar issues in other cities on water.

With respect to the case of Venice, the volume pays particular attention to some relevant issues related to fragility and resilience: the imposition and impact of mass tourism in the city's fabric and the problem arising from this in both social and environmental terms; the complex and difficult relationship between the city and the port activities, which have represented for centuries the engine driving urban and environmental transformation; the growing role that bottom-up initiatives are playing in the design of new resilience strategies.

Since the 1980s tourism has represented one of the most important levers to counteract the economic decline the Venice area experienced as a

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city on water] (Tōkyō: Kajima shuppankai, 2006). Comparative studies on Tokyo and Venice as cities on water also appear in the series *Suitogaku* (Water Cities Studies), edited by Hidenobu Jinnai and Masahiko Takamura, and published by Hōsei daigaku shuppankyoku (2013-). In Italian, cf. Rinio Bruttomesso, "Acqua e Città. Venezia e Tōkyō: il paradigma e le eccezioni", in *Atti del XXXI Convegno di Studi sul Giappone*, ed. Rosa Caroli (Venice, 2008), 9-38; Hidenobu Jinnai, "Città d'acqua: l'immagine di 'Venice' riflessa nella città di Tokyo", in *1968. Italia Giappone: intrecci culturali*, ed. Rosa Caroli (Venice: Cafoscarina, 2008), 87-114.

result of the crisis of port-industrial activities in the lagoon over the past decades. The city has strengthened its touristic appeal and has become one of the most famous destinations on the global market. Both the historical city in the lagoon and the entire urban functional areas around Venice have greatly benefited from this development, in terms of jobs, income and investments. At the same time, the case of Venice illustrates all too well how growth in tourism, if not properly managed, can represent a threat to a balanced territorial, economic and social development. Today, about 28 million visitors a year reach the city on the lagoon, while the city's population has declined to less than 60,000. Congestion, transport inefficiency, increasing costs of living and crowding-out are the most important negative consequences brought about by such distruptive and exploitive forms of tourism.[4] Not surprisingly, in 2006 the former director of the Association of Venice Hoteliers, Marco Michielli, argued that "Venice will end up being crushed by swarms of 'eat and run' tourists, long before it is flooded by high water."[5] Against this background, Jan van der Borg's chapter analyzes the theoretical aspects of the process of "Venetianization", namely the negative impact produced by a dramatic growth in terms of the number of visitors on the social, economic and even environmental urban structure. Van der Borg analyzes the different implications of this process, that many historical cities have recently started being affected by, as well as the main consequences of the "tourism dictatorship" on Venice's urban system. What emerges from his analysis is the need for a coherent strategy for the management of tourism, based on a mix of technological, economic and organizational tools.

With regards to the evolution of the relationship between the port and the city, it is useful to remember that the port and associated maritime activities have always played a fundamental role in the transformation and management of the Venetian lagoon. For centuries, the lagoon was maintained in a form that ensured navigability. The port and its maritime activities were the real engines that inspired the way the lagoon was transformed and managed. The city experienced an important modernization process during the XIX century; however, it was the industrial development of the XX century that took place in the interior edge of the lagoon with the realization and development of Porto Marghera leading to

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[4] Cf. Harry Coccosis and Alexandra Mexa, eds., *Challenges of Tourism Carrying Capacity Assessment* (Aldershot: Ashgate, 2004); Jan van der Borg, *Tourism and Urban Development* (Amsterdam: Thesis Publishers, 1991).

[5] Cit. in Stefano Soriani, "Networks and Trust in Venice: the Port as a Social Agent," in *Social Capital and Urban Network of Trust,* eds. Jouni Häkli and Claudio Minca (Farnham: Ashagate, 2009), 151.

a period of dramatic environmental, economic and social change. In the 1960s, Venice's port and industrial area constituted one of the largest coastal industrial regions in the Mediterranean Sea. The 1970s and 1980s marked a period of economic decline and environmental degradation. UNESCO and other private committees launched the "save Venice" campaign, which mobilized public attention and private funds. At the same time, the national legislation for Venice started to pay greater and greater attention to the need to restore and preserve the lagoon ecosystems, whose dynamics strongly suffered from industrial transformation throughout the XX century.[6] In such a context, port and industrial activities experienced a period of deep distrust and found increasing problems in terms of social legitimacy. Port and industrial activities were more and more regarded as the only factors responsible for the degradation of the lagoon. This perception developed and strengthened alongside with the dramatic growth in the flux of tourism into the city of the lagoon. Not surprisingly, Porto Marghera was considered a very important port and industrial area, but situated in the "wrong place". This situation changed during the 1990s, thanks to the increasing dynamism of the commercial sector of the port and the growth of the cruise market. These elements worked together to rejuvenate the local port industry and contributed to improve the port's image in the local political and cultural context. The port was increasingly being depicted as "a safer and a clearer port", in comparison to the old Porto Marghera's specialization.

Moreover, the so-called "new port" came more into favor starting in the mid-1990s as a potential lever to counteract the negative social and economic effects brought about by the "tourism dictatorship". The situation has since changed and any gains obtained in improving the relationship between port and city are once again under question - a new phase marked by conflict is coming to the fore. The dynamism of the commercial port risks being undermined by the trend towards gigantism in the container sector, which is posing new threats to many regional ports, such as Venice. Another serious threat is the entering into operation of the MOSE project—the system of mobile barriers to protect the city against flooding and rising sea levels—slated for 2019. Finally, the dramatic increase in the size of the cruise ships is questioning the very future of cruising activities in the lagoon. These points underscore the fact that the combined effects of market trends, restructuring processes in the port and

[6] Stefano Soriani, "The Venice Port and Industrial Area in a Context of Regional Change," in C*ityports, Coastal Zones and Regional Change: International Perspectives on Planning and Management*, ed. Brian Hoyle (Chichester: John Wiley and Sons, 1996), 235-48.

maritime industries, along with technological changes all pose new threats to the port-city relationship. These can only be effectively addressed through new approaches to governance, new initiatives and tools. At the local level the port industry is looking for solutions, which are mainly based on the realization of new infrastructures and up-scale programs.[7] Stefano Soriani's chapter analyzes the most important trends driving the evolution of the port-city relationship. It points out that solutions to the most important problems the city and the port sector are currently experiencing require above all new organizational schemes, new entrepreneurship, a more transparent and participatory decision-making process, and the capability to design and develop new partnerships and new development coalitions, through networking approaches. The case of Venice illustrates very clearly that the definition of the spatial scale is a crucial aspect: problems and opportunities can be properly addressed, thus transforming fragility into social and economic resilience, only if they are analyzed through a multi-scale approach. Multi-scale approaches are essential not only to find solutions but also to correctly define the very nature of the problems and opportunities that have to be addressed.

The definition of effective adaptation policies to climate change and forecasted rising sea levels[8] is addressed in Giovanni Cecconi's chapter who examines how in the Venice context, new botton-up approaches are being designed and implemented to address the issue of building and increasing resilience. The chapter reports the recent experience of the Venice Resilience Laboratory and underlines that resilience cannot rely exclusively on top-down approaches and Government-driven plans and projects, but requires the concomitant effective involvement of both citizens and social groups, through actions aimed at linking local-embedded networks with global initiatives.[9] The underling belief is that citizens cannot expect the State and the "formal" politics to solve all problems. Coastal communities must be involved in the definition of new approaches to "adaptive co-management in the form of a friendly exploration of territories", with the active participation of "artisans and artists", which Cecconi defines "a special sub-set of society

[7] It is worth noting that Venice is one of the Mediterranean ports considered by the Chinese Government as an important node of the *New Maritime Silk Road*.

[8] On this regards, cf. Karen O'Brien, Bronwyn Hayward and Fikret Berkes, "Rethinking social contracts: building resilience in a changing climate," *Ecology and Society* 14, 2 (2009): 12
[online] URL: http://www.ecologyandsociety.org/vol14/iss2/art12/.

[9] Laura Elsler, *Venice Ventures: Modeling social-ecological co-evolution for resilience* (Stockholm: Stockholm Resilience Center, MA Thesis, 2015).

which is usually deeply concerned about the custody and cultivation of nature". New initiatives for sustainable cooperation have to be identified, based on the acknowledgement that "*trust* between individuals and organizations is the dominant factor" required to transform fragility into resilience. Interestingly, the chapter points out how the development of new methods of adaptive co-management can also contribute to increased social and economic resilience, through the exploitation of local expertise and values, capable of counterbalancing the negative effects of mass tourism. To this aim, the Author argues that new demonstration projects are needed, which are locally driven but included within a global network of initiatives designed by the coastal cities which are the ones most likely to suffer from climate change and sea level rise. In particular, these projects should aim at developing new "green and blue" infrastructures, for the beneficial reuse of every by-product, in line with the principles of the circular economy.

With respect to the Japanese case, the revaluation of water as a constitutive element in Tokyo's urban fabric involves different aspects: the rediscovering of both water and its cultural dimension as a lever for tourism development; a greater attention paid by urban policies to the relationship between citizenship and water-based recreational activities through plans, projects and initiatives aiming at re-conciliating land and water by re-opening rivers and canal banks to public uses; the potential of water transportation in conceiving a more sustainable city also for tourism purposes; the revaluation of water as a magnet for new metropolitan marketing strategies, also in the context of the design and promotion of "small and big" events. At the same time, this revaluation also contributes to develop more integrated environmental management strategies, better suited to cope with the potential implications of climate change and expected sea level rise, through the involvement of local communities and the rediscovery of the complexity of water landscapes which were concealed by the modernization process.

A new strategy to build resilience with respect to the increased risks associated with both climate change and metropolitan development is provided by Nobuyuki Tsuchiya's chapter, who points out the importance of adopting new flexible and reversible approaches to water management. This includes recovering waterways that were gradually transformed through landfill operations, drying and covering up of river beds for transport infrastructure development, and the artificialization of river and canal banks. Reaching these aims implies the incorporation of technological principles into a new environmental strategy better able *to imitate how ecosystems work* by promoting *building with nature*

approaches and initiatives. It also entails increasing citizens' awareness of the importance of recovering water ecosystems, also through "hydrophilic" projects and initiatives such as water parks.

The social, political and cultural implications of the paradigmatic change in the way ecosystems are managed in Tokyo—a city so exposed and vulnerable to hazards, including "water disasters",[10] and characterized by "a human ecology of great fragility" —are considered by Paul Waley's chapter. After considering the evolution of the planning framework that accompanied the urban transformation in the postwar decades, the Author pays particular attention to the changes in urban policy since the 1970s, starting from a greater attention given to the greater engagement with local residents in "more community-based planning", and to activities aimed at bringing back "citizens into contact with water", based on a "new ethos" for both water use and water control.[11] Considering the several implications of this renewed approach to the relationship between water and urban governance, means to reaffirm the multifaceted nature of the concept of resilience, which can be properly addressed by emphasizing the link existing between ecosystem and society.

There are important economic implications to this social and cultural rediscovery of water both in terms of its role in urban development and composition, and as an element that is central to redefining the concept of public space. This rediscovery is becoming a key element in the metropolitan area's marketing, where new water parks, the recovery of rivers and canals, and the re-use of waterways for urban transportation contribute to define a new water landscape. New recreational activities and new cultural services for the metropolitan population are developing, thus contributing towards diversifying the functional profile of Tokyo. Against this background, the chapters by Yusaku Imamura and Iwao Takamatsu confirm how the above elements, combined with the emergence of new environmental governance approaches, stand central in the metropolitan development vision.

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[10] Cf. Shigeo Takahashi, "Social geography and disaster vulnerability in Tokyo," *Applied Geography* 18, 1 (2008): 17–24; Ian Davis and David Alexander, *Recovery from Disaster* (London; New York: Routledge Taylor & Francis Group, 2016).

[11] Robert B. Olshansky, ed., *Urban Planning after Disasters: Critical Concepts in Built Environment* (Abingdon, Oxon; New York, NY: Routledge, 2017); Paul Waley and Martin Purvis, "Sustaining the flow: Japanese waterways and new paradigms of development," in *Exploring Sustainable Development: Geographical Perspectives*, eds. Martin Purvis and Alan Grainger (London: Earthscan, 2004), 207–29.

Moreover, this gains relevance in the marketing of urban events, not only for the small and middle size ones, but also for big events such the 2020 Olympic Games, which will be mostly concentrated in waterfront areas. Even from different perspectives, both the Authors illustrate the fundamental role that a new water landscape can play in improving Tokyo's touristic attractiveness on a local, national and global scale. This represents a further demonstration of how policies aimed at increasing resilience can contribute to a more diverse economic structure in the metropolitan area and improve its competitiveness. Together with a new water landscape, a new transit and mobility system emerges for people and for metropolitan logistics. This contributes not only to reduce the environmental impact of land transportation, but also to stimulate new strategies for land-water transport and economic integration.

When it comes to considering the best strategies to build resilient communities, a central point is to raise citizens' awareness about the potential of cultural heritage. In this perspective the safeguarding and promotion of cultural heritage represents not only an engine to propel new economic development processes, but also a lever to raise a communities' identity and resilience. Although the worldwide image and perception as a gargantuan postindustrial megalopolis, Tokyo still contains a few but significant examples of the fertile relationship that can exist among cultural heritage, community identity and resilience. As Hidenobu Jinnai's chapters shows, revitalization of the waterfront requires both the implementation of sustainable strategies for urban development and the preservation of the characters of diversity, or better a "dynamic diversity" able to overcome the stereotypical model that has too often driven urban policies on waterfronts.[12] Building the future of our water cities on local values and community identities is crucial. The shift back to a water-based perspective is essential to regain what was mostly lost with the modernization processes. The case considered in Rosa Caroli's chapter confirms the importance of conjugating urban development with diversity: although rarely recognized as both a man-made island and a rare heritage site, Tsukudajima offers an example of the values that have to be maintained in order to contribute to building resilience in social, economic and environmental terms. Here, the engagement of the local community has proved to be fundamental in maintaining Tsukudajima's distinct character based on diversity, and in opposition to the homogenization

[12] Rinio Bruttomesso, ed., *Waterfronts. A New Frontier for Cities on Water. The International Dimensions of Waterfront Redevelopment* (Venice: International Centre for Cities on Water, 1993).

process characteristic of market-driven tendencies in the real estate industry.

The volume collects most of the papers presented at the international conference on *Fragile and Resilient Cities on Water: Perspectives from Venice and Tokyo,* held at Ca' Foscari University in Venice in January 2015. The Conference brought together scholars and experts on cities on water with different backgrounds, and represented a further step towards consolidating the tradition of scientific, academic and cultural cooperation between Ca' Foscari University and Japanese universities and research centers. This conference, organized by the Department of Linguistics and Comparative Cultural Studies and the Department of Economics of Ca' Foscari University of Venice, was made possible through the generous support of the Toshiba International Foundation-TIFO, to whom we express our sincere gratitude.

CHAPTER ONE

INTRODUCTION: PROPOSING SUITOGAKU— TOWARDS A COMPARATIVE STUDY OF CITIES ON WATER

HIDENOBU JINNAI

Over the past four years, our study group at Hōsei University, Tokyo, has been engaged in a research project titled, "A Comparative Study of Water Cities from an Historical and Environmental Perspective" (2011–15), which has been funded by Grant-in-Aid for Scientific Research (S) by JSPS (Japan Society for the Promotion of Science). As part of this project, we are proposing a new discipline, "The Study of Water Cities (Suitogaku)."[1] Let me begin by giving an overview of the academic background and the purpose behind our research.

Most water cities are located along the coast or beside rivers, where economic activities and the distribution of goods, using ship transportation, have ensured prosperity, thus fostering original landscapes and colorful cultures. However, with the onset of modernization, especially during the twentieth century, in every country, city, and territory, urban development has been promoted and beautiful coastal areas have been transformed into industrial or port zones.

With this in mind, it is necessary to reconsider the value of water cities from the viewpoints of both *history* and *the environment*, transcending previous studies of land which have mainly focused on efficiency and functionality, through the harnessing of large amounts of energy.

Our study will: a) outline and clarify the historical characteristics of individual spatial structures from a typological point of view; b) consider

[1] Jinnai Hidenobu and Masahiko Takamura, eds., *Suitogaku I* [The Study of Water Cities, 1] (Tōkyō: Hōsei University Press, 2013).

the environmental transformation arising from both urban/architectural engineering and economic/industrial policies; and c) combine a) and b) to propose a methodology and framework of research on water cities based on history and the environment that is suitable for the twenty-first century.

Here, I would like to highlight several important points on the methodological approach used for the study of water cities (Suitogaku) in this comparative study of Tokyo and Venice.

In the study of water cities, the two main criteria used for comparison are the original location and the type of natural environment in which development took place.

For Venice, a distinctive environment within an extended shallow stretch of lagoon was formed by both its west and east sides. On the west side, many rivers running through the hinterland (*terraferma*) carried soil and sand into the sea, forming shallows, while the east side was characterized by the surging waves of the Adriatic Sea. An intricate network of waterway canals meanders through the lagoon, making boat navigation possible. Furthermore, the twice daily movements of the rising and falling tide cleanses the water in the lagoon. Without a doubt, the construction of Venice was conceived in the water and developed through its deep ties with water.[2] This type of delicate topography was explicitly drawn on many maps of the sixteenth century[3] (Fig. 1).

Tokyo Bay, on the other hand, is not a closed inland sea—a lagoon. However, its delicate natural conditions were also similar to those of a shallow stretch of water. Boat navigation was limited to deep waterways that were called Miosuji (navigable water routes). In Edo (Tokyo was called Edo until 1868) too, maps showing the sea conditions and coastal regions were formulated during the mid-nineteenth century[4] (Fig. 2).

It is also necessary for us to study the hinterland, the backbone of the water city, in order to understand how construction work was carried out to protect the water city from natural disasters, such as floods and epidemics, and to build a navigational network. In Venice, when the sand and soil carried by the rivers collected at the mouth of the lagoon, this

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[2] Piero Bevilacqua, *Venezia e le acque. Una metafora planetaria* (Rome: Donzelli, 1995). For Venice's history and development as a city on water see Eugenio Miozzi, *Venezia nei secoli: La città* 1 (Venice: Il Libeccio, 1957); Guido Perocco and Antonio Salvadori, *Civiltà di Venezia* 1–3 (Venice: Stamperia di Venezia Editrice, 1973–77).

[3] Giovanni Caniato, Eugenio Turri and Michele Zanetti, eds., *La Laguna di Venezia* (Verona: Cierre, 1995).

[4] Hidenobu Jinnai and Masahiko Takamura, eds., *Suitogaku III* [Study of Water Cities, 3] (Tōkyō: Hōsei University Press, 2015).

often led to the outbreak of disease. For this reason, after the sixteenth century, flow channels were built along the major rivers, such as the Brenta, Sile, and Piave rivers, to henceforth direct the sand and soil away from the lagoon for drainage into the Adriatic Sea.[5] This waterway was also used for boat transportation.

In Edo, it was originally the river Tone that drained the soil and sand into Edo Bay (Tokyo Bay). Here too, a flow channel was built on the east side. Rivers in Japan occasionally flood, so this channel was built to protect Edo from water disasters. Also, another major objective was to secure a boat navigation route from the Tōhoku region, which entered at Chōshi and followed the river Tone, to safely reach Edo[6] (Fig. 3).

These two cities developed as land reclamation progressed.[7] It is important to understand the similarities and differences between the two land reclamation processes.

Both cities were built over a foundation of soft soil. This prompted the development of a method of construction in which timber piles were hammered all the way down into the hard ground, beneath the soft foundation, onto which buildings were then constructed. Although Venice is well-known for this technology,[8] it has also been used in Tokyo since the Edo period (1603–1867). Piles were often hammered into the stone walls of castles. Also, many types of modern, western-style architecture from the Meiji period (1868–1912) to the early Shōwa period (1926-89) also used pile foundations.

Hence, a scheme to procure the necessary lumber for these piles was very important. It is interesting to note that in both Venice and Edo the timber from felled trees in the mountains was rafted along the rivers to the cities[9]

Another aspect that needs to be considered is the role of the hinterland (*terraferma*). The produce from the hinterland was transported

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[5] Vito Favero, Riccardo Parolini and Mario Scattolin, eds., *Morfologia storica della Laguna di Venezia* (Venice: Arsenale Editrice, 1988).

[6] Noboru Kawana, *Kashi ni ikiru hitobito* [People who live on the river banks] (Tōkyō: Heibonsha, 1982); Kyōsuke Namba, *Edo-Tokyo o sasaeta shuun no michi: Uchikawa mawashi no kioku o saguru* [Navigation route for Edo-Tokyo: Research for the memory of inner water connection system] (Tōkyō: Hōsei University Press, 2010).

[7] Masao Suzuki, *Edo no kawa, Tokyo no kawa* [Rivers in Edo, rivers in Tokyo] (Tōkyō: Nihon hōsō shuppan kyōkai, 1978).

[8] Giorgio Gianighian and Paola Pavanini, *Venezia come* (Venice: Gambier Keller, 2010).

[9] Antonio Bondesan, Giovanni Caniato, Francesco Vallerani and Michele Zanetti, eds., *Il Piave* (Verona: Cierre, 2004).

on the river, either by rafts or boats, to the waterside cities, Venice and Edo/Tokyo. In Venice, the lumber which was rafted on the river Piave was stored in Fondamente Nuove, while the lumber that was carried on the river Brenta was stored in Zattere. In Edo/Tokyo, a huge timber yard was built in the Kiba district of Fukagawa.

Furthermore, both cities were blessed with natural resources which were able to support their growing populations.[10] Both also had a robust fishing industry and a fishing area rich in species and quantity. In Venice, from early on, many fish farms (*valle da pesca*) were built in the water close to the mainland of the lagoon.[11] In Edo/Tokyo several fishing villages developed along the bay. Even today, religious festivals are held at waterside shrines, such as the Sumiyoshi Shrine at Tsukudajima and the Ebara Shrine at Shinagawa, demonstrating the closeness of community life.[12]

Unlike Venice, where salterns were built near Chioggia, the saltern in Gyōtoku played a major role in Edo's history. In Venice, vegetables were grown on many lagoon islands, such as Sant'Erasmo, and were delivered to the Rialto Market by boat.[13] In Edo/Tokyo, small, hand-drawn, two-wheeled carts were used to transport vegetables from nearby farming villages on the west side. From the northeast, they were transported by boat on the river Onagi to the urban areas around Fukagawa.[14]

Let us now turn our attention to the close connection between these water cities and their hinterlands.

On the one hand, water is a blessing. Yet, for human beings, it can also be a destructive force, causing many disasters. In Venice, floods have been a common phenomenon since the Middle Ages. Thus, to prevent flooding from the Adriatic Sea, an embankment was built by piling up

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[10] Nobuyuki Yoshida, *Toshi: Edo ni ikiru* [Live in a city: Edo] (Tōkyō: Iwanami shoten, 2015).

[11] Antonio Fabris, *Valle Figheri: Storia di una valle salsa da pesca della laguna veneta* (Venice: Filippi Editore, 1991); Paolo Rosa Salva and Sergio Sartori, *Laguna e pesca: Storia, tradizioni e prospettive* (Venice: Arsenale Cooperativa Editrice, 1979).

[12] Hidenobu Jinnai, *Tokyo: A Spatial Anthropology* (Berkeley: University of California Press, 1995); original edition in Japanese (Tōkyō: Chikuma shobō, 1985).

[13] Donatella Calabi and Ludovica Galeazzo, eds., *Acqua e cibo a Venezia. Storie della laguna e della città.* Exhibition catalog, Venice, September 26, 2015 to February 14, 2016 (Venice: Marsilio, 2015).

[14] Junzō Kawada, *Haha no koe, kawa no nioi* [Voice of mother, smell of river] (Tōkyō: Chikuma shobō, 2006).

rocks called *murazzi*.[15] Yet, despite this, it continued to be difficult to protect the city from floods. In Tokyo, in the early seventeenth century, the small and medium-sized rivers flowing from the north were engineered to converge, and the flow channel was altered to run in an eastward direction. This flood control work, which directed the drainage into the river Sumida, proved effective for preventing further water disasters. It also served as a waterway for the transportation of goods, while the dredged sand was used for reclamation projects. Attempts were made to keep the overflow upstream during heavy rain to prevent water from suddenly gushing into the city center. Thus, embankments were built along the branched network of mid- and up-stream waterways on the river Sumida.

Hence, both Venice and Edo/Tokyo relied on human invention to protect themselves against flooding and as a result of such inventiveness they witnessed their splendid water-city culture flourishing. In both cities, water carried out many diverse and significant roles. In particular, in Edo/Tokyo, water was used for drinking, in agriculture, for fishing, in navigation and commercial activities, in religious festivals and rituals, for recreational purposes such as the theater, in tourism, for amenities, and in the landscape.

The water city developed around the market, built beside a major river or canal, which served as the commercial center. Rialto, at the center of the major Canal Grande, and Nihonbashi, at the center of the river Nihonbashi, both served as activity hubs for leading merchant families and acted as transportation centers.[16] Also common to both cities was the major role of the fish market. Another similarity was the birth of the playhouse and an area uniquely used for entertainment, which grew up around these markets.[17]

Let us now examine the spiritual significance of water. Since time immemorial, the spiritual quality of water has been of great importance in Asia and Japan, and rituals such as bathing in water to purify one's body are common. In Tokyo, there has been the tendency for Shintoist shrines to be built near the water, to facilitate prayers for prosperity and protection

[15] Nelli-Elena Vanzan Marchini, *Venezia da laguna a città* (Venice: Arsenale Editrice, 1985).
[16] Nobuyuki Yoshida, ''Ryuiki toshi Edo" [Waterside City Edo], in *Mizube to toshi* [Waterfront and City], eds. Takeshi Itō and Nobuyuki Yoshida (Tōkyō: Yamakawa shuppansha, 2005).
[17] Roberto Cessi, *Rialto: L'isola, il ponte, il mercato* (Bologna: Nicola Zanichelli Editore, 1934); Donatella Calabi and Paolo Morachiello, *Rialto: Le fabbriche e il ponte* (Turin: Einaudi, 1987).

from floods. All over Tokyo, we can find sacred areas, sanctuaries, which were built either facing, or backing onto, the sea or a river. There is a certain myth surrounding Mokuboji Temple in Mukōjima, which is about a thousand years old. On the anniversary day of Umewakamaru, who died as a child, worshippers journey by boat from one bank of the river Sumida to the other to partake in the ceremony.[18]

A similar religious ceremony is held at Il Redentore, a church built in the late sixteenth century on the island of Giudecca in Venice. Boats float horizontally in the water to build a makeshift floating bridge that enables the worshippers to reach the church on the other side of the bank.[19] Here, too, we sense the spiritual value of the water, and see the similarity between the two water cities.

Venice has no fishing community towns *per se*. On the other hand, until about 1960, Tokyo had several fishing towns where inhabitants engaged almost exclusively in fishing. Tsukudajima and Fukagawa appeared in the early Edo period,[20] while the fishing town of Shinagawa grew during the Middle Ages. Even today, a *mikoshi* (a portable shrine) is carried on a boat, accompanied by a procession, to the inlet of Odaiba Marine Park. There, people perform a traditional ritual in which the portable shrine is immersed in water (Fig. 4).

It is thought that this water procession has similarities with a religious ceremony called *Sposalizio del mare* (marriage with the sea), a Venetian tradition held in April[21] (Fig. 5). The origins of this ceremony are thought to lie in the ancient pagan traditions from before the days of Christ.

Water was also indispensable for the existence and prosperity of theaters. Major theaters in Venice needed to be located on the canal front. Not only were the canals used to transport stage equipment, but also to bring the audience, the nobility and the affluent, who rode in their gondolas to the theater water entrance.[22] In Edo too, the wealthy journeyed to the theater in their boats.[23]

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[18] Hidenobu Jinnai, ed., *Edo-Tōkyō no mikata shirabekata* [How to observe and study Edo-Tokyo] (Tōkyō: Kajima shuppankai, 1989).
[19] Bianca Tamassia Mazzarotto, *Le feste veneziane* (Florence: Sansoni, 1961).
[20] Shinji Nishimura et al., eds., *Edo-Fukagawa jōcho no kenkyū* [Study on sentiment of Edo-Fukagawa] (Tōkyō: Fukagawa kushi hensankai, 1925).
[21] Edward Muir, *Civic Ritual in Renaissance Venice* (Princeton: Princeton University Press, 1981).
[22] Nicola Mangini, *I Teatri di Venezia* (Milan: Mursia, 1974).
[23] Yukio Hattori, *Ōinaru koya: Edo kabuki no shukusai kūkan* [Grand theater: Festive space of Edo kabuki] (Tōkyō: Heibonsha, 1986).

Many of the water cities are port cities. A key point in this comparative study is the historical geographical shift of the port from the old town center to the area outside the center. It is also important to observe how the old city, once it had lost its function as a port, adopted different roles. With this in mind, let us compare Venice, Amsterdam, London, New York, and Tokyo.

In Venice, the logistics of transportation were spread out from Schiavoni, San Marco, Canal Grande, all the way to the *rio* (small canals). Thus, the entire old city served as a port. In modern times, a large harbor space was built in one corner of the newly reclaimed west side of the city (Fig. 6). Thus, although parts of the old town have maintained their original transportation function, carrying daily commodities to the city center for consumption, fully fledged logistical function was lost. A new use was found for the canal front and lagoon front, transforming them into a leisure space for inhabitants and tourists. For example, waterfront banks called *fondamenta*, which used to be used for cargo hoisting, are now lined with restaurants and outdoor cafés. Furthermore, the terraces that protrude onto the water, a unique feature of the hotels facing Canal Grande, actually date from the 1930s.[24]

Turning now to Amsterdam, we see a similar story. The space alongside the canals, like Venice, also lost its boat-hoisting activities, enabling it to be used as a modern waterfront. Outdoor cafés were built with many houseboats moored along the banks—today this offers a charming spectacle and has become one of Amsterdam's many tourist attractions.

In London during the nineteenth century, many locks were built along the Thames, a river with a large tidal range, so that the river could be more efficiently used for transport (Fig. 7). Optimizing the charm of this unique waterfront, docklands were redeveloped for modern use, building offices and residences, and space for cultural and entertainment purposes. The water city of London has, thus, been rejuvenated.

New York developed greatly during the modern era, eventually becoming a global port city. Many piers lined the waterfront of Manhattan, creating the typical scenery of an American port city (Fig. 8). With the logistics revolution, the construction of container wharfs moved beyond the port, leaving behind derelict space. However, the massive warehouses, factories, and suchlike that filled this area were renovated and converted

[24] Aya Hiwatashi, "A study on hotels located along the waterfront and construction of overhanging terraces on the canal in Venice," *Journal of Architecture and Planning (Transactions of AIJ)* 80, 709 (2015): 755–63.

into venues for art, culture, fashion, and industry, emitting a whole new charm.

In the same way as Venice and Amsterdam, Tokyo, which developed from the hub of Edo, had an impressive transportation network of inland canals that were lined with warehouses. After the Great Kantō Earthquake (1923), the warehouses were moved to the banks of the river Sumida and Tokyo Bay. At the same time, land reclamation flourished, leaving the canal network between Shibaura and Shinagawa intact. Along the canals, blocks of warehouses were built. In the same way as during the Edo period, cargo was transferred from large ships to small boats and, until the 1970s, these were transported to the warehouses that faced the inland canals (Fig. 9). The question we are now faced with is how can we convert the waterfront space along the canals, which has lost its original function, into something creatively useful?[25]

In Tokyo, there are very few major waterfront development projects that have been initiated by an administrative entity. This is very different from western cities. Yet, in Tokyo, there are various types of waterfront spaces associated with rich topographic conditions. At the same time, Japan has a cultural tradition which is deeply entrenched in water.[26] Optimizing these conditions may lead to the creation of a water city that is unique to Tokyo, one that may become world-famous. Thus, in this comparative study of water cities it is necessary to begin by highlighting the many diverse ways in which water has been actively used, in fishing, transport, religion, and amusement, until the beginning of the twentieth century, when water was most closely linked to the lives of the people.[27] Secondly, it is important to understand the characteristics of the form and structure of the urban waterfront space, which sets the stage for these activities. Thirdly, it is also relevant to discuss the unique structure of the modern harbor space that was shaped throughout the nineteenth and early twentieth centuries, when water still held importance for boat transportation and industry.

After the 1960s, with the advent of the logistics revolution and the transformation of the industrial sector, the waterfront space became obsolete. It was left abandoned. However, recently, all over the world we have been witnessing the revival of this space into something quite different, something charming. The revived modern waterfront space can

[25] Hidenobu Jinnai, *Mizube toshi: Edo-Tōkyō no wōtāfuronto tanken* [Water City: Adventure of waterfront of Edo-Tokyo] (Tōkyō: Asahi shinbunsha, 1989).
[26] Hidenobu Jinnai, ed., *Mizu no toshi Edo-Tokyo* [Water city Edo-Tokyo] (Tōkyō: Kōdansha, 2013).
[27] Jinnai, *Tokyo: A Spatial Anthropology*.

take various forms, which is appropriate considering the originally diverse nature of the port city.[28] The most important thing is to ensure that the waterfront is rejuvenated into a charming, cultural space by optimizing its history, cultural characteristics, and identity, which will all differ from country to country, and from region to region.

The following volume on water cities (Suitogaku) aims to explore these topics in greater depth.

Fig. 1) Lagoon of Venice, 16th century (Archivio di Stato di Venezia, 35/2017, Savi ed esecutori alle acque, Disegni, Diversi, n. 128/3)

[28] Franco Mancuso, Stella Mancuso and Christophe Carraud, eds., *Venise est une ville* (Paris: Éditions de la revue Conférence, 2015).

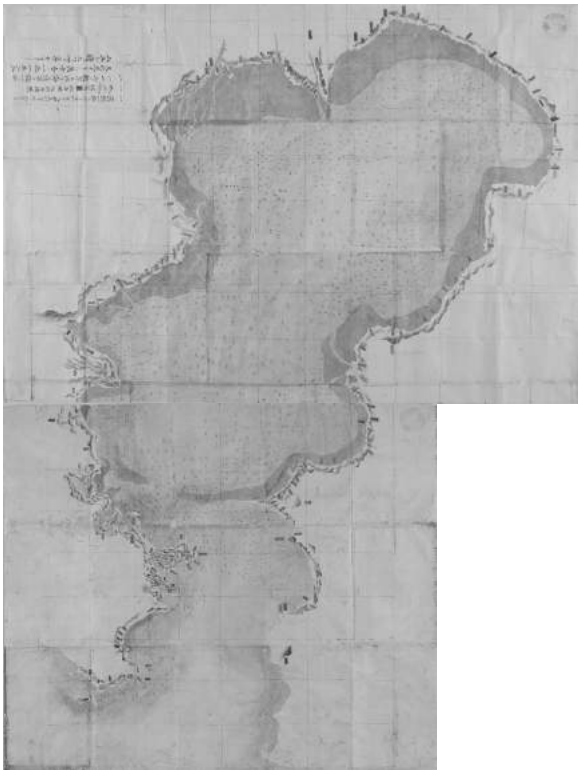

Fig. 2) Edo Bay in a map of the end of Edo period (Tokyo Metropolitan Central Library, Special Collection Room)

Fig. 3) Water route map of Kantō Region, 18th century (Funabashi Municipal Library)

Fig. 4) Procession in the water with portable shrine (Laboratory of Regional Design with Ecology, Hōsei University)

Fig. 5) Sposalizio del mare (marriage with the sea) (Photo by Aya Hiwatashi)

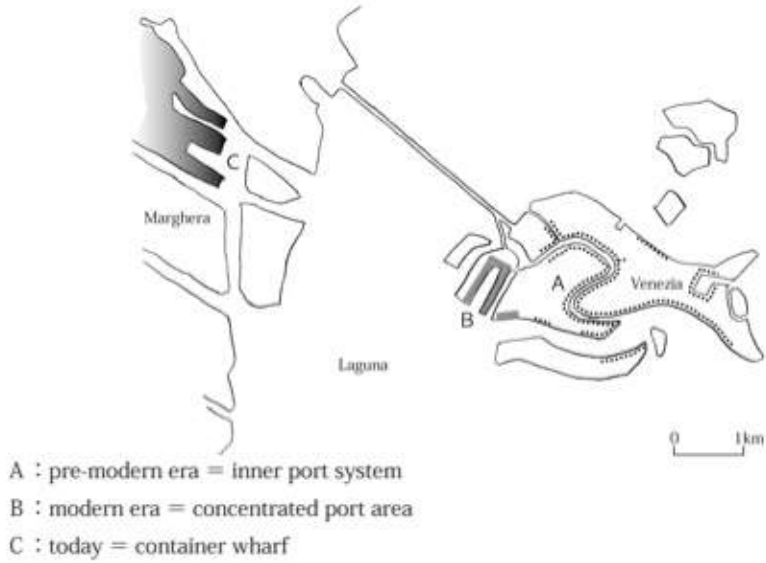

Fig. 6) Historical shift of the port functions in Venice (by H. Jinnai)

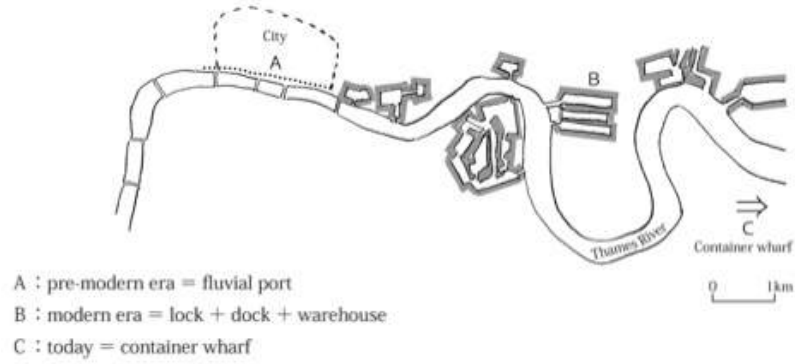

Fig. 7) Historical shift of the port functions in London (by H. Jinnai)

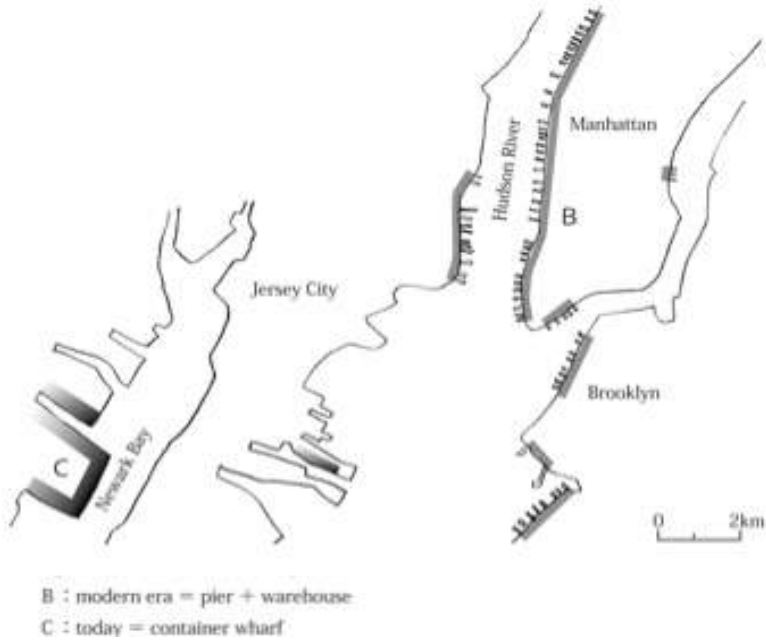

Fig. 8) Historical shift of the port functions in New York (by H. Jinnai)

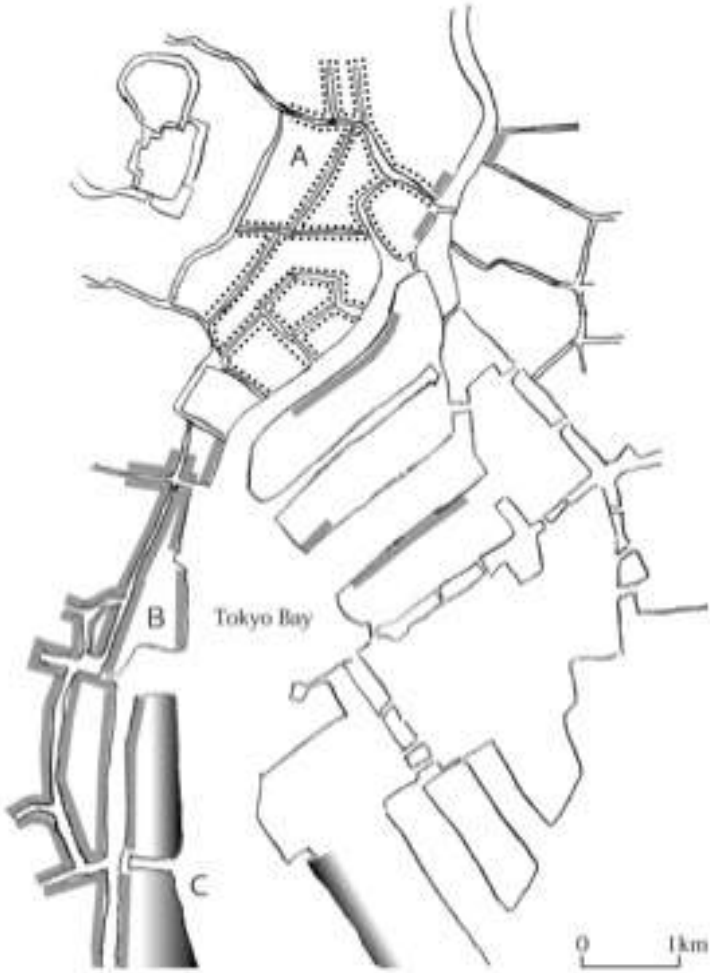

Fig. 9) Historical shift of the port functions in Tokyo (by H. Jinnai)

CHAPTER TWO

SUSTAINABLE TOURISM IN VENICE: WHAT LESSONS FOR OTHER FRAGILE CITIES ON WATER?

JAN VAN DER BORG

Introduction

Venice is an urban tourism destination *par excellence*. It is a UNESCO world heritage site and counts numerous monuments and museums. Photographs of the city can be found on the cover of virtually every city tour catalogue produced by tour operators all over the world;[1] moreover, it provides the scenery for numerous movies, and the background stage for many crime novels, and some of Venice's most iconic buildings have been reconstructed in full-scale to give some artistic flavor to casinos, exhibition areas, and theme parks. Venice's uniqueness and continuous media exposure have turned the city into a must-see-attraction with few rivals.

Unsurprisingly, the number of visitors the city yearly receives is enormous: the most recent official estimate is around 28 million visitors a year, of which only 4.3 million arrivals are residential tourists who, having an average duration of 2.33 nights, generate almost 10 million overnight stays in registered tourism accommodation. There have been ups and downs over the last decades, but the trend is decisively upwards. However, of the two main segments that form the Venetian tourism market, day-tripping (or excursionism) is much more dynamic than residential tourism. That the number of people who visit Venice is incompatible with the needs of the city as a whole has become a serious issue, and not only among Venetians.

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[1] Jan van der Borg, "The Demand for City Trips in Europe: Tour operators' catalogue," *Tourism Management* 15, 1 (1994): 66–69.

This is not a new concern for those who have been studying the city of Venice before or since the first signs of excessive tourism pressure appeared.[2] But the idea that cities might also experience such a phenomenon, which until very recently was supposed to be exclusively true for natural environments (e.g. the existence of a limiting factor on tourism development), is still not very widespread. With an increasing number of cities, especially in Europe but also in other parts of the world, experiencing the Venetian phenomenon (well-known examples today are Amsterdam, Barcelona, Berlin, Bruges, and Prague), and given the tourism market that has known some radical changes since the nineties, it seems worthwhile to take up the emblematic case of Venice once again to see whether some new lessons can be learnt concerning the management of medium-sized cities of art.

This chapter will revisit the case of Venice, first of all by illustrating how tourism development can lead to unsustainability if left to improvisation and short-term private interests. Reference will be made to the rather basic concept of the tragedy of the commons, to Butler's life cycle theory of the tourist area, and to a model of a destination's carrying capacity. In a later section, a description will be given of tourism development in Venice since the early nineties, against the background of global and local changes in the tourism market. In this section the symptoms of "venetianization" will be listed and discussed. Last but not least, several solutions to the problems regarding excessive tourism that the city of Venice is currently experiencing will be presented and their possible implementation in other cities discussed.

The process of "venetianization": A number of theoretical considerations

The (macro) tourism product is incredibly complex. It is, in fact, a composition of an infinite number of micro-touristic products, products that run from attractions to accommodation facilities, from catering services to entertainment, from intermediation to transportation.

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[2] See for example: Jan van der Borg, *Tourism and Urban Development* (Amsterdam: Thesis Publishers, 1991); Stephen Page, *Urban Tourism* (London: Routledge, 1995); Antonio P. Russo, *The Sustainable Development of Heritage Cities and their Regions: Analysis, Policy, Governance* (Amsterdam: Thela Thesis, 2002); Bernadette Quinn, "Performing Tourism," *Annals of Tourism Research* 34, 2 (2007): 458–76.

A common distinction that is made to simplify this is that between primary tourism products and secondary tourism products. While the first are all the goods and services that attract people to a place, the secondary tourism products are those that allow visitors to enjoy the primary tourism products. Although secondary tourism products are an essential ingredient of the macro-tourism product, the primary tourism products remain, because of their uniqueness and close relationship with the places they are located in, the core of any tourism system. This is especially true for any tourism destination, and for a particular type of tourism system, which offers a package of unique attractions to those who have decided to visit them. Moreover, since the primary tourism product is, in itself, an important ingredient of the reputation or the brand of a destination, the decision to travel to a place is often based on the perception people have about the attractions that they will be able to visit once arrived at their destination.

Most primary tourism products are not only extremely unique and, consequently, hardly reproducible, they are also often public goods and, thus, non-exclusive and non-excludable and, as such, common goods. This, obviously, is not only true for natural resources (beaches, forests, lakes, wildlife, and so on), but also, and maybe even more frequently so, for cultural-historic resources (churches, gardens, palaces, town squares, and so on). Some cities of art, and Venice is a very good example, are monuments in their totality.

This gives rise to the risk that destinations can fall victim to what is called the *tragedy of the commons*.[3] In Hardin's article in *Science* he describes a pasture that is "open to all." He asks us to imagine the grazing of animals on a common ground. Individuals who aim to increase their wealth are encouraged to add to their flocks. Yet, every animal added to the total contributes to the degradation of the commons, not just marginally but significantly. Although the degradation caused by each additional animal is small relative to the gain in wealth for the owner, if all owners were to follow this pattern the commons will ultimately be destroyed.[4] And, assuming that all actors wish to maximize their wealth, each owner continues to add to their flock:

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[3] Garret Hardin, "The Tragedy of the Commons," *Science* 162, 3859 (1968): 1243–48.

[4] Raymond De Young, "Tragedy of the Commons," in *Encyclopaedia of Environmental Science*, eds. David E. Alexander and Rhodes W. Fairbridge (Dordrecht: Kluwer Academic Publishers, 1999), 601–02.

> Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit – in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own interest in a society that believes in the freedom of the commons.[5]

Hardin's insight was far from new (De Young argues that it was Plato who previously mentioned this devastating mechanism in his writings), but it was Hardin who demonstrated that the concept of the tragedy of the commons can apply in principle to environmental problems at large. In many of these, the problem lies in the fact that perfectly reasonable individual behavior can cause long-term damage to the *common good*, to *others* and, eventually, to *oneself*.

The problems associated with a tourist destination are even more complicated. Not only are local inhabitants, local tourism firms, and individual visitors competing for the unlimited use of the destination's amenities, but multinational tourism firms are also directly or indirectly using them without a corresponding fee that expresses the intrinsic value of the amenities.

In effect, while one's cultural heritage is a scarcity in an absolute way, because of its uniqueness and unreproducibility, the fee which the non-locals are paying for using the heritage is often equal to zero or, in any case, not at all in line with its use-value or the costs linked to its conservation. The absence of some kind of a market (or pricing) mechanism as an implicit and automatic instrument of regulating the use of heritage means that tourism development, in the end, tends to become unsustainable: since visitors are not paying (enough) for using the cultural-historic assets or, as indeed is the case for Venice, for the city of art as a whole, they will never perceive the scarcity of these assets and the demand for them will continue unabated. Once total effective tourism demand has reached the destination's capacity to absorb these visitors, negative externalities, such as wear-and-tear, congestion, pollution, and gentrification of inhabitants and economic activities, will rapidly emerge and make the destination unattractive for inhabitants, commuters, residential tourists, and, in the end, even foreign visitors themselves.[6]

There is a strong connection between the sustainability of tourism development and the stages of tourism development as introduced by Butler in his classic article on the tourist area life cycle theory published in

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[5] Hardin, "The Tragedy of the Commons," 1244.

[6] Jan van der Borg, *Toerisme en Erfgoed: Zijn er Grenzen aan Toeristische Ontwikkeling? Lessen voor de XXI eeuw* (Leuven: KU Leuven Press, 2015).

1980.[7] Butler modified the product life cycle into a destination life cycle, arguing that the number of visitors a destination receives changes over time. In the initial stage, the number of visitors is marginal and it is only in the stage of growth that tourism numbers grow exponentially. In the maturity stage, numbers are still rising but the pace of growth is slowing down. After having reached some sort of a maximum affluence, the number of visitors starts to fall rapidly and the destination enters the stage of decline, in which in particular the tourism industry is hit very hard. Van der Borg[8] added a qualitative dimension to Butler's life cycle, showing that not only does the number of visitors change over the cycle, but the composition of the flow of visitors also changes.

Van der Borg demonstrated that during the *first stage* of tourism development of the destination tourism hardly contributes to the local economy. This stage is characterized by a relatively strong, yet almost unused, primary tourism product. Those who visit the place are mostly day-trippers, who spend very little money because the secondary product is fairly underdeveloped. In this stage the first investments are being made, especially those that render the destination accessible, and only after this crucial infrastructure has been put in place will people start to come *en masse*.

The net effect of tourism for the local economy is certainly positive in the *second stage* and the first part of the *third stage* of the cycle. The destination is now complete, its reputation very strong, and residential tourists are thus eager to visit it, spending their conspicuous holiday budgets on everything the tourism industry can offer during their stay that, by definition, lasts more than twenty-four hours. Tourism is now one of the pillars of the local economy, contributing strongly to the income of the locals, to the number of jobs available, as well as to some essential facilities (airports, cultural facilities, exhibition centers, stations, and so on) that are used by visitors and locals alike. Inhabitants and all local firms perceive tourism as beneficial for, respectively, their wellbeing and their profits.

The situation changes in the *third stage*. Although demand continues to rise, albeit much more slowly than before, the number of residential tourists is already diminishing, a decline compensated for by a rise in day-trippers. This means that the benefits generated by the visitors might very well decline, notwithstanding the continuous expansion of total tourism demand. Moreover, since it is probably in that precise moment that the

[7] Richard W. Butler, "The Concept of a Tourist Area Cycle Evolution: Implications for the Management of Resource," *Canadian Geographer* 24, 1 (1980): 5–12.
[8] Van der Borg, *Tourism and Urban Development*.

tourist carrying capacity is reached and surpassed, the already mentioned negative externalities will rise exponentially. The net impact of tourism on the local economy is now most likely to be negative. This development was confirmed by Russo.[9]

The negative externalities will have a devastating effect on the non-reproducible touristic "commons" and quality tourism will shift its focus away from the destination in question to more attractive alternatives, leaving the destination with an increasingly poorer and, in the *fourth stage*, even declining number of excursionists. Again, the balance between benefits and costs generated by tourism is negative.

Evidence of the existence of these processes in seven European cities of art has been gathered by van der Borg, Costa, and Gotti for UNESCO and has indeed shown empirically that the dynamics of tourism more or less fit into this extended theory of the life cycle of the tourist destination.[10] Furthermore, Venice, during the nineties, already seemed to be ahead in this process, showing the first signs of what we have called the "venetianization" of the destination.

In 1988, Costa and van der Borg developed a simple model to explore the limits of tourism development.[11] The tourism carrying capacity, however, is still a controversial concept. Although it seems evident that the capacity of a destination to absorb visitors without running into trouble has some sort of a *plafond*, not many researchers have linked this limitation to urban environments. They have, instead, preferred to apply it to natural environments and, in particular, to natural parks.

As van der Borg has shown, the tourist carrying capacity is indeed a complex phenomenon.[12] First of all, it is multidimensional in the sense that it has a physical, an environmental, an economic, and a socio-economic dimension. The physical carrying capacity is the system of physical limitations of a destination. This has to do with the availability of physical space, and it is linked to the externalities that arise from the lack of it, such as congestion, wear-and-tear, and crowding. The environmental carrying capacity is the system of environmental restrictions that a

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[9] Russo, *The Sustainable Development of Heritage Cities and their Regions: Analysis, Policy, Governance*.

[10] Jan van der Borg, Paolo Costa and Giuseppe Gotti, "Tourism in European Heritage Cities," *Annals of Tourism Research* 23, 2 (1996): 303–21.

[11] Paolo Costa and Jan van der Borg, "Un Modello Lineare per la Programmazione del Turismo," *CoSES Informazioni* 32/33 (1988).

[12] Jan van der Borg, "Tourism Management and Carrying Capacity in Heritage Cities," in Harry Coccosis and Alexandra Mexa, eds. *Challenges of Tourism Carrying Capacity Assessment* (Aldershot: Ashgate, 2004), 163–79.

destination's ecosystem imposes. Once the environmental carrying capacity is surpassed, externalities such as pollution and damage to the biodiversity emerge. The economic carrying capacity is related to the quality of the visitor's experience and therefore to the success of the destination on the global tourism market. Too many visitors may damage the quality of the visitor's experience, the propensity to make return visits, and, eventually, the economic performance of tourism firms. The social-economic carrying capacity is linked to the quality of life of the locals, that is its inhabitants and commuters, and non-tourist firms, and its violation leads to externalities such as crowding, gentrification, intolerance, and a rise in the cost of living.

The relevance of each of these issues differs with regards to the type of destination. Big cities will have less problems with the physical carrying capacity than smaller cities. Natural parks will most likely be confronted by the physical and the environmental issues rather than by the economic or socio-economic ones. Heritage cities and sites will probably be more sensitive to the socio-economic carrying capacity.

Furthermore, in order to determine the carrying capacity the territorial scale seems to matter. In some destinations the capacity to absorb visitors is limited to a very small subsystem, e.g. a particular museum, a famous square, an archaeological site, a particular scenic spot, within the tourism system. In others, such systems as historical centers, national parks, and so on, have problems in accommodating visitors. Again, before engaging in establishing the carrying capacity of a system, a thorough analysis of the nature of the problem ought to be made.

In 1988, Costa and van der Borg constructed a very simple linear programing model that allows heritage cities and cities of art to establish what has become known as their socio-economic carrying capacity.[13] The model they presented was flexible enough to be able to take care of the specific characteristics of the destination in question (Canestrelli and Costa presented an even more versatile, fuzzy version in 1991[14]).

The model works as follows. The starting point is the assumption that destinations would like to maximize the income from tourism. The income from tourism is uniquely linked to the number of visitors through their average expenditure. In other words, pushing tourism income means, in this simplified context, that either tourism numbers and/or their average tourism expenditure needs to be pushed. Without a tourist carrying

[13] Paolo Costa and Jan van der Borg, "Un Modello Lineare per la Programmazione del Turismo".

[14] Elio Canestrelli and Paolo Costa, "Tourist Carrying Capacity: A Fuzzy Approach," *Annals of Tourism Research* 18, 2 (1991): 295–311.

capacity, an infinite number of tourists becomes the optimum a destination should strive towards.

Alas, the carrying capacity of the destination limits the set of options a destination has in order to reach this theoretical maximum. The limitations in the model, formed by the linear restrictions that determine this suboptimum, can be identified by looking at the behavior of visitors while they visit the destination, and thus by selecting all those subsystems of attractions and facilities that are most frequently used by them. Classic examples of attractions are iconic squares, museums, monuments, streets, and so on. Examples of facilities are local public transportation, parking lots, hotels, restaurants, sewage systems, water supply systems, solid waste management systems, and so forth. When specifying the linear restrictions regarding the different subsystems that might be overloaded due to excessive tourism pressure one needs to know: (1) the total net capacity of these subsystems that is available to visitors (for facilities where visitors compete with inhabitants, commuters, and local firms their needs need to be subtracted from the total capacity) and (2) the average use visitors are making of these subsystems on a daily basis. Exceeding the capacity of the single subsystems automatically leads to the emergence of some sort of negative externality that is borne by the community.

Costa and van der Borg also identified two types of visitors in their model: residential tourists and day-trippers or excursionists. It is clear to see that residential tourists spend much more than day-trippers on a daily basis. Moreover, the average use that residential tourists are making of the different subsystems varies from that of the excursionists. Residential tourists use, for example, more water per day than excursionists, but excursionists tend to produce more litter because they often bring food and drinks with them.

The linear programing model that results from these considerations can then be formalized as follows:[15]

Objective Function:	*Max!* Tourism Income Destination = AVG EXP Tour x Tour + AVG EXP Exc x Exc
Subject To:	AVG Use Tour Facility 1 x Tour + AVG Use Exc Facility 1 x Exc <= Net Capacity Facility 1
	AVG Use Tour Facility 2 x Tour + AVG Use Exc Facility 2 x Exc <= Net Capacity Facility 2

[15] Van der Borg, "Tourism Management and Carrying Capacity in Heritage Cities," 163–79.

AVG Use Tour Facility 3 x Tour + AVG Use Exc Facility 3 x Exc <= Net Capacity Facility 3; and so forth.

In which: *AVG EXP Tour* represents the average expenditure per day per tourist, *Tour* is the number of tourists, *AVG EXP Exc* represents the average expenditure per day per excursionist, *Exc* is the number of excursionists, *AVG Use Tour Facility 1* represents the average use that tourists are making of facility 1 in a day, *AVG Use Exc Facility 2* represents the average use excursionists are making of facility 2 in a day, while *Net Capacity Facility 1* is the maximum capacity of facility 1 that can be used by visitors once inhabitants and other regular users have already been served.

The model explores the various opportunities it has to host tourists and excursionists, preferring tourists since the average expenditure of tourists per day tends to be up to four times as high as that of excursionists. One of the first restrictions encountered, especially in the case of a small or medium-sized heritage city, is that of tourist accommodation. Once the number of hotel beds is saturated, the model starts filling up the available capacity with excursionists, obviously until it encounters the next restriction. The resulting number of tourists and excursionists is but a first indication of the tourist carrying capacity of the destination. The two restrictions that determine the optimum carrying capacity are active ones, while the other restrictions are passive.

Restrictions are, in fact, also distinguished as manageable and not manageable. The manageable restrictions are those for which the net capacity can be easily changed, for example, by implementing a deliberate policy in that sense. Incentives can be given to entrepreneurs to build hotels, parking lots can be created, and the capacity of local public transport expanded. What, however, cannot easily be modified is the capacity of the unique cultural or natural attractions that lie at the core of the tourism system, because they are, by their very nature, non-reproducible. Through easing the various manageable restrictions, the optimal number of tourists and excursionists increases until the non-manageable restrictions become active. This, now, is *the* carrying capacity of the destination.

For Venice, as we will discuss later in greater detail, the model indicated in 1988 that the city could absorb approximately 10 million visitors. Since then, investments have been made in a number of subsystems, most evidently in that of local transportation, and the behavior

of visitors has changed, so today the carrying capacity has been enlarged to approximately 14 million visitors per year.

The model thus provides policy makers with a clear indication of the absolute limit to tourism development, that when disrespected will cause unsustainability of tourism development. It also tells them what the optimal mixture of the tourism flow should be in the optimal situation. Both indicators, e.g. the maximum number of visitors and the composition of the visitor flow, are important points of reference for the tourism policy of a destination.

The process of "venetianization" can now be defined more precisely. It starts with an uncontrolled growth in tourism demand sustained by an expansion of the supply of secondary tourism products in the euphoric second stage of the destination life cycle. If the total number of visitors surpasses the tourist carrying capacity of the destination and the share of excursionism in total demand starts to increase significantly, the emergence of negative externalities will not only push the net impact of tourism for the local economy into red figures, it will also stimulate excursionism even further and drive residential tourists away to other destinations, which offer quality for the money being spent.

Tourism development inevitably becomes even more unsustainable and unless a drastic policy with a visitor management strategy at its core is put in place, this process will persist. In the next section we will show how the case of Venice is indeed a perfect illustration of these perverse mechanisms that tend to push *all* destinations in a similar direction.

The "venetianization" of Venice and some suggestions for a truly "disruptive" tourism policy

In the late 1980s, the number of arrivals in the historical center amounted to 1.2 million persons, generating slightly less than 2.5 million overnight stays. The average duration of the stay was in line with that of today: 2.2 nights.[16] Over a twenty-five-year period, residential tourism has quadrupled. The number of day-trippers was estimated to be around 5 million in 1988. At present, the number of excursionists is supposed to amount to almost 24 million, almost five times as much as in 1988. The share of excursionism in total demand has recently been declining, after a steady rise in the 1980s and 1990s: from 81% in 1988 to 84% in 1992,[17] and back to 82% in 2014.

[16] Van der Borg, *Tourism and Urban Development*.
[17] Van der Borg, Costa and Gotti, "Tourism in European Heritage Cities," 303–21.

The determination of the number of excursionists is a very delicate one. Official statistics only exist for residential tourism. Some inaccuracies aside, for example due to tax evasion, the figures that are provided by the local administration are fairly reliable. With the help of surveys (a major survey was undertaken in 1988 by Ca' Foscari University on behalf of the City of Venice; in 2012, a similar, but less extensive, visitor survey was organized by the same university, again, at the request of the City of Venice) the share of excursionism in total demand was reconstructed and with this information the number of day-trippers calculated.[18] Obviously, the number of excursionists, and therefore the total number of visitors, depends on the accuracy of the estimation of the share of day-trippers in total demand. This also means that the discussion around the number of people who visit Venice on a yearly basis has become an infinite one.

As far as the principal structural characteristics of tourism demand in Venice is concerned, much has happened over the past twenty-five years. These changes are influenced by a number of fundamental developments in tourism, some of which have happened on a global level, others on a European or even Italian level. These developments include:

- ✓ the emergence of *low-cost airlines* that allow more people to engage in city tripping. This has certainly positively influenced the number of people who visit heritage cities in general and Venice in particular. Moreover, in the case of Venice, it has allowed people to come from further away, and the dominance of the Austrian, Swiss, and German markets, observed in the 1980s and explained by their proximity, has been quickly undermined;
- ✓ the diffusion of the *internet* as an indispensable instrument for tourists to inform themselves, reserve tourism products, and share their experience with others;
- ✓ the shift of the *economic barycenter* towards Central Europe, Asia, and South America. In fact, Brazilian, Chinese (the sixth market for Venice), and Russian clientele have gained importance and their contribution to total tourist expenditure has grown considerably during the last decade;
- ✓ the increasing popularity of *cruise tourism*, that finds in Venice an attractive port of call, and since cruise ships have been growing

[18] Città di Venezia and Dipartimento di Economia dell'Università Ca' Foscari, Venezia, *Conoscere la Qualità del Visitatore e della Domanda Turistica Oggi per Garantire l'Utilizzo Ottimale della Risorsa Venezia Domani* (Venice: Città di Venezia and Dipartimento di Economia dell'Università Ca' Foscari: 2012).

bigger and bigger, its impact on Venice's relationship with tourism at large has truly become disturbing;

- ✓ the diversification of the *supply of accommodation*, from the year 2000 onwards, with the rise in the number of B&Bs, and more recently, of private apartments that are offered and reserved through dedicated web portals like *Airbnb*, and of "couches that can be surfed". This emergence of cheaper forms of accommodation has probably stopped the further expansion of the excursionist market at the expense of the residential tourism market and has, to a certain extent, enabled the locals to have their part of the Venetian tourism cake.

This has without any doubt profoundly changed the profile of the visitor to Venice. The already mentioned survey undertaken in 2012 of approximately 2,500 visitors over the year, organized by the Department of Economics of the Ca' Foscari University of Venice, revealed a number of consequences of these developments for tourism in Venice.

Residential tourists in the historical center in 2012 had an average age of 39 years and traveled (large groups excluded) in the company of 2.8 persons. Fifty-six percent traveled in couples, 15% with family, 23% with friends, and 7% in groups of, on average, 23 persons. Hotels and pensions were chosen by 64% of the residential tourists, while 14% slept in private apartments (therefore excluded from the official statistics). Furthermore, 12% slept in B&Bs and just 4% in a youth hostel. The average duration of their stay was equal to 4.3 nights, almost twice the official figure.

As far as provenance is concerned, based on the same survey, 24% of residential tourists were Italian, 52% European, and 24% intercontinental, an increase of 7% (predominantly from the USA) with respect to 1988. The principal motive given to visit Venice was leisure (89% of the respondents), 6% visited family or friends, and only 2.5% visited the city to participate in a particular event. Most residential tourists ate in restaurants or pizzerias (46%), while only 6% brought their own food.

In line with national and international trends, 72% of those who slept in Venice used the internet before, during, or after their visit. Sixty-five percent used the internet to inform themselves about Venice, while 35% booked at least one of the tourism services they used during their visit online. Seventy percent of the residential tourists made use of local public transport services. Half of them bought a special transportation ticket for tourists, while the other half used single tickets that cost 7.5 euros for a single ride on a *vaporetto*.

Sixty-four percent were visiting Venice for the first time, while 36% were repeat visitors (most of them for the second or third time). Almost nobody considered an alternative destination before coming to Venice and 91% declared they would like to visit the city again in the future. The activities mentioned by the residential tourists as important were "walking around" (100%), "visiting churches, monuments, and museums" (81%), "shopping" (49%), "island hopping" (44%), and "participation in cultural events" (14%). An average of 547 euros was spent per stay for themselves and the people for whom they were responsible. This resulted in an average of 220 euros per person overall (223 euros during the months of low season and 218 euros during the months of high season) and, hence, of 169 euros per person per day. Most of the money was spent on hotels and restaurants.

As far as excursionists were concerned, the average age was in line with that of the residential tourists, but they travelled in groups of approximately 3.4 persons: 34% travelled in couples, 20% with family, 32% with friends, and 14% in groups. Twenty-nine percent of day-trippers were Italian, 50% were European, while 22% came from other continents. Eighty-three percent of the excursionists declared that relaxation was the principal aim of their visit. Study and work was the main motive for 7% of the excursionists, 5% visited friends and relatives, while the remaining 5% came for a cultural event. Fifty-five percent of the excursionists consumed take-away or fast food, while 18% ate food they brought with them.

Only 50% of the excursionists used the internet before, during, or after their visit, principally to gather information. Half of the excursionists reached Venice by train, but consistent numbers came by bus or car. Only 39% used local public transport, with 63% of them purchasing a single ticket. Fifty percent were visiting Venice for the first time and 90% intended to come back. 95% had just strolled around in Venice not visiting anything in particular. Fifty-eight percent of the excursionists declared they also "visited churches, monuments, and museums" and 29% did some shopping while in Venice.

According to the survey, excursionists did indeed spend much less money than residential tourists: 124 euros per visit, per nucleus. This translates into an average expenditure of 40 euros per person per day, only a quarter of the amount spent by residential tourists.

As far as the sustainability of tourism in Venice is concerned, a first indication of the excessive pressure of tourism on the local environment is obtained when one calculates the number of overnight stays per inhabitant within the historical center and compares it with other city trip destinations. Hodes argued that Amsterdam is one of the most intensively

visited cities in Europe, with 13.0 overnight stays per inhabitant. Lisbon follows closely with 12.6 overnight stays per inhabitant, while Prague (10.3), Zurich (9.7), Stockholm (7.5), and Athens (6.4) follow in quick succession.[19] The same indicator for the historical center of Venice for the year 2014 amounts to 173.2 overnight stays per inhabitant, a confirmation of the fact that Venice is indeed an example for other destination cities not to follow.

Moreover, the results obtained implementing the linear programing model of the carrying capacity that Costa and van der Borg developed for Venice, confirmed the tensions that continue to exist between the city's tourism development process and the necessities of the city's inhabitants and non-touristic economic activities. In fact, with an overall carrying capacity of around 10 million visitors per year of which, in 1988, 45% were residential tourists and 55% excursionists and, after a quick update to 14 million visitors per year equally distributed among tourists and excursionists, taking into account investments in local public transport, the management system of solid waste and, in particular, the expansion of the number of beds in tourist accommodation, it is evident that the actual number of visitors is incompatible with the city's socio-economic needs. Moreover, the actual composition of the visitor ratio, 20% of tourists to 80% of excursionists, is far from the optimal one of 50:50.

The quantitative and the qualitative mismatch, as analysed by the carrying capacity model, between tourism demand and supply in Venice and the excessive pressure experienced by the local inhabitants (as expressed by the ratio of overnight stays to inhabitants) are the reasons why the overall costs that tourism generates are superior to its benefits. Moreover, and maybe even more importantly, the people who benefit from tourism are often merely free riding on the primary tourism product and do not at all, or just marginally, contribute to the costs incurred, while those who pick up the bill are in many cases not, or just very indirectly, benefitting from tourism.

Stopping the process of the further "venetianization" of Venice is therefore not some kind of snobbish wish of the Venetian elite to curb the number of mass tourists who zombie around the old town, thus keeping Venice to themselves. It is a fundamental ingredient of a deliberate urban strategy to economically and socially revitalize the city so that it can become strong enough to proudly conserve itself, as well as being of benefit to the people who wish to visit this world heritage site in the

[19] Stephan Hodes, ed., *Amsterdam: Anticipating the Future* (Amsterdam: Architectura, 2015).

future. And as Butler implicitly suggested in his life-cycle theory of the tourist area, without this deliberate, disruptive tourist policy, the path to destruction is clearly traced. This is the essence of Venice's tragedy of the commons. Let us have a look at the various components that might form such a "disruptive" tourism policy.

- ✓ First of all, a buffer of terminals ought to be created around the historical center to intercept the flow of visitors before they mix with the flow of commuters, both endeavoring to arrive in the historical center. Dividing the incoming and outgoing visitor flow from the commuter flow allows the local transportation company to avoid congestion, thus reducing capacity costs, and, moreover, to diversify access points away from the Santa Lucia train station and the bus station at Piazzale Roma, terminals that especially in the height of the tourism season frequently collapse. Locations for these terminals might be at Fusina, to intercept visitors arriving from the south, at Tessera, close to the airport of Venice and, moreover, able to intercept visitors arriving from the north, together with a terminal at the feet of the bridge of liberty which connects the historical center to the mainland. This last terminal might serve those arriving by train and from Padua, Vicenza, Verona, Brescia, and Milan. Punta Sabbioni is already being used as a terminal from which visitors coming from the beach resorts north of Venice are departing. Obviously, together with the terminals, transport facilities to and from the historical center also need to be offered. The system that results is very similar to that implemented successfully by the city of Salzburg in the 1980s.
- ✓ Secondly, a reservation system for visiting Venice should be put in place. Not only would such a system make *all* visitors, that is, also the day-trippers, aware of the scarcity of the product of Venice and therefore force people to plan their visit rather than improvise, but it might also interrupt the automatism with which quite a large number of excursionists come to the historical city. Using the reservation system would not be mandatory, but Venice would prove to be difficult and very expensive without a reservation, and easy and relatively cheap for those who plan in advance on coming. For those who use the system, fast lanes would be created and a package of discounts would become available, not only for public transport and museum entry, but also for private facilities such as hotels, restaurants, and shops. Restricted access to Piazza San Marco, as some are now suggesting, might be the killer application

that determines the success of such a system. What would be anti-constitutional would be to close all access to Venice and ask for an entrance fee.

The idea of a reservation system was tested with some success between 2002 until 2005. After just three years, the municipal company in charge of the project had issued 180,000 Venice Cards and succeeded in breaking even, showing it to be on the right track. Since then, the opportunities that innovative technologies are offering, such as social media, smart phones and tablets, and electronic payment platforms, have grown exponentially and make it only easier to construct or consolidate such a smart reservation system. In fact, the difficulties that the implementation of such a reservation system might encounter will not be of a technological but of an organizational nature. Bringing the local public and private stakeholders together, as well as involving the non-local tourism industry, will certainly not be an easy task. Furthermore, notwithstanding the existence of such a reservation system, there might still be acute problems dealing with excessive demand during particular moments of the year, month, week, or day. Today, the City of Venice sells slightly more than 30,000 of the recently introduced *Venezia è Unica* card. It is obvious that this project needs an extensive overhaul if it wishes to intercept visitors and become a motive for using the reservation system. One of the biggest challenges is to find the so-called killer application, a service that everybody thinks they need during their visit to Venice. Access to Piazza San Marco might just be this card's exclusive ingredient.

- ✓ Thirdly, and especially in the case of such acute problems, new technologies might be used to manage internal visitor flows more effectively. Reading the images provided by security cameras that can be found all over Venice, in combination with the results of an analysis of the data that is collected through the cells that facilitate the use of mobile phones, might allow a sort of central control room to feed suggestions of alternative modes of transport, terminals, and routes in real time, thus helping to anticipate congestion problems and solve them well before they arise. Again the solution lies in the organizational sphere rather than in the technological one.
- ✓ Fourthly, the City of Venice has started very timidly to promote alternative routes under the label "Detourism." In 2014, it spent 7,000 (yes, seven thousand) euros on the project, and in 2015 the

budget was doubled to 14,000 euros. Peanuts, and an indication of the weight local policy has been giving to tourism.

- ✓ What should be avoided at all costs is putting an explicit cap on the development of tourist accommodation, as Barcelona is currently considering. This was tried in Venice in the 1970s and 1980s and instead of stopping the process of gentrification it merely boosted excursionism. Entrepreneurs immediately turned to the areas close to Venice to continue to construct hotels and hostels and by offering very competitive prices with respect to the historical center[20] were able to fill the rooms they had created, transforming residential tourism into, what has been labelled by van der Borg, "false excursionism."[21] In an unpublished paper, Prud'homme argued that the process of gentrification can be stopped not by brutally obstructing the growth of the tourism sector, but simply by facilitating all those activities that offer an alternative to tourism, for example, by fostering non-touristic economic activities or by subsidizing housing.[22] Also, the introduction of a tax on overnight stays incentivizes excursionism and penalizes residential tourism and should be reconsidered. A tax on all the movements to and from the historical center should take its place. Cruise tourism should be regulated and restricted with determination. It is a form of tourism that possesses the same characteristics as false excursionism, and therefore it contributes but marginally to the destination's economy.

If a heritage city finds the courage and the means to put a tourism policy, as outlined above, in place, the process of "venetianization" can either be avoided or even reversed.

Conclusions

If Venice, in the nineties, experienced an extreme case of excessive tourism pressure and, hence, unsustainable tourism development, nowadays the number of cities that feel they are "venetianizing" is rising rapidly. This makes reviewing the case of Venice an interesting subject to both academics and policymakers alike.

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[20] Maurizio Rispoli and Jan van der Borg, "Più lontani, più cari," *CoSES Informazioni* 32/33 (1988).
[21] Van der Borg, *Tourism and Urban Development*.
[22] Rémy Prud'homme, *Le Tourisme et le Developpement de Venise* (Mimeo, Paris: Université de Paris, 1986).

Tourism in cities similar to Venice responds to what economists have come to know as the tragedy of the commons: a common good used by many individuals trying to maximize their individual return of the use of the good, which in the end leads to the destruction of the good itself and, consequently, to their means of subsistence.

In fact, as Butler's theory of the life cycle of the tourist area already predicted, in the absence of deliberate and adequate anti-cyclical tourism policies, a destination always heads, after three stages of growth, towards decline. Already before tourism demand declines, somewhere halfway through the stage of maturity, the net impact generated by tourism is negative due to the negative externalities that multiply after the number of visitors, composed of in particular day-trippers, exceeds the destination's tourist carrying capacity. These externalities cause the non-reproducible primary tourism products to deteriorate rapidly and permanently. The attractiveness of the destination for quality tourism has now definitively been compromised.

Venice finds itself in an advanced stage of tourism development that immediately precedes the stage of decline. Tourism hinders rather than stimulates social and economic development. It has become a source of social and economic inertia and of frustration for the inhabitants and companies that are still living and producing in the city center.

Only through an adequate and innovative tourism strategy can this process be stopped and eventually reversed. The ingredients of such a policy, which ought to have visitor management at its core, have been discussed earlier: (1) reorganizing the incoming and outgoing tourism fluxes by constructing a system of terminals in the outskirts so that visitors can be distinguished from the other flows of people who enter and exit the historical city; (2) installing a smart system that allows visitors, tourists, and excursionists alike, to reserve in advance their visit to Venice in exchange for a package of discounts and facilitations; (3) intelligent signposting; and last but not least (4) putting a cap on cruise excursionism.

The City Council of Venice has already been discussing for thirty years whether or not to implement such a disruptive tourism policy. So far, isolated experiments have been made and, whatever the results obtained, abandoned. However, it might very well be that, thanks to the fear of "venetianization" that has now struck the city councils of other heritage cities, others might, simply by building on Venice's persistent failures, be able to stop this devastating process in their cities in time. This will be to the benefit of the locals and the visitors, but in the long run also to the benefit of the local tourism industry itself.

CHAPTER THREE

RESILIENCE AMIDST FRAGILITY ALONG TOKYO'S WATERWAYS

PAUL WALEY

The competing demands of waterways

The Japanese archipelago is famously fragile, and nowhere is more so than the country's capital city, Tokyo, which stands at the center of the world's largest conurbation. There can surely not be a city in the world in which "defence against disaster" (*bōsai*) is more prominent in the popular consciousness, and in the official policy book and publicity media. A glance at the Tokyo Metropolitan Government's website reveals the range of disasters against which measures are taken, as well as the projects and events that are planned.[1] While earthquakes and subsequent fires have tended to occupy a central place in the dystopian disaster imagination, in recent years flooding has once again become a major cause for concern. The particular fragility, or vulnerability (I will use the terms alternately), of Japanese cities can be attributed in part and inevitably to their location, on a major geological fault line and, most of them, on alluvial flood plains at the mouth of a major river. But it also stems from patchy planning, the use of wood in construction, the prevalent congestion in urban areas, and the density of population, although this latter factor is now falling rapidly.

As elsewhere in the world, it tends to be the poor and marginal groups in Tokyo and other Japanese cities who are hardest hit by disasters.[2] This was evident in the Great Kantō Earthquake of 1923 and in Kobe in the powerful earthquake that hit the city in 1995. Floods are more

[1] See *Tōkyōto bōsai hōmupēji* [Disaster Prevention Website], http://www.bousai.metro.tokyo.jp/ (English version in: http://www.bousai.metro.tokyo.jp/foreign/english/index.html).

[2] Shigeo Takahashi, "Social geography and disaster vulnerability in Tokyo," *Applied Geography* 18, 1 (2008): 17–24.

arbitrary in the areas they affect, but it is indicative that most of the worst historical floods in Tokyo have hit the poorer parts of the city, many of which lie below sea level. These and other parts of Tokyo, as well as other Japanese cities, remain characterized by wooden housing interlaced by narrow lanes. It has long been recognized that these are particularly vulnerable, a vulnerability compounded by the fact that many of their inhabitants are elderly, often living on their own.

Like all Japan's major conurbations, much of Tokyo and its surrounding urban area is located in an alluvial flood plain at the mouth of a large river. It is therefore particularly prone to flooding, with flood waters flowing down from heavily dammed upstream areas, as well as flowing upwards, as a result of tidal surges from Tokyo Bay. But in recent years, the most significant danger is seen to come from torrential downpours (*shūchū gōu*), whose intensity and frequency have increased considerably in recent years. Experts believe that these storms may be attributable to the concentration of high-rise buildings; the consequent flooding is exacerbated by the extent of the urban area largely covered in concrete with little possibility for water to drain into the soil. With parts of Tokyo lying below sea level, the city is highly susceptible to flooding—a human ecology of great fragility.

Through much of the twentieth century, the long-standing policy in the face of this fragility has been one of demolition and construction in concrete. For sub-standard wooden housing, this meant replacement with high-rise concrete apartment blocks. Houses were to be protected from flooding by tall concrete embankments that obscured waterways from view. The rivers themselves were one by one encased in concrete banks and beds and had their flow interrupted by barriers in the form of dams, weirs, and barrages. Concrete banks and tetrapods reinforced the coast line against the sea. Roads and railway lines had their banks reinforced to prevent landslides. The resort to concrete was massive, and it is ongoing.

From around the mid-1970s, however, a new direction came to the fore, in reaction, at least in part, to the catastrophic pollution cases of the period and the ruling party losses in local government elections. This manifested itself in a number of ways but primarily in a questioning of the primacy of concrete and a greater attempt to engage with local residents. That there were limits to traditional forms of planning that rely on structural measures was increasingly understood. Local government began to introduce more community-based planning, known in Japanese as *machizukuri*. Alongside this came a new recognition of the value of the well-organized and disciplined community organizations that existed throughout urban Japan, but particularly in those older parts of town

vulnerable to disasters. Neighborhood associations became especially important in this context as they were involved in annual disaster awareness drills (as they still are) and liaised regularly with local government. *Machizukuri* came to stand for a new ethos, but it was programmed from on top and bolted into government even though it was reliant on the energy and enthusiasm of local residents.

Very much the same process has occurred with rivers and other waterways. Doubts were cast on the efficacy of riparian work reliant on concrete. Government became aware that it needed support and participation from local residents in order to counter the threat posed by flooding. Various policies were initiated over a period of years that recognized the importance, as a minimum, of awareness of waterways in the landscape and, at best, some sort of activity that brought citizens into contact with water. However, such activity remains dominated today by a top-down ethos, and community-based organizations can be hard to disentangle from government. In these ways, the authorities in Tokyo, both metropolitan and national, have attempted in broad terms to counter the city's vulnerability—its fragility—with policies of structural and social resilience, even if they have not couched their measures in these terms.

Resolving the competing demands of safety, access, landscape, and ecology has provided the authorities with a dilemma that ultimately cannot be resolved. In this chapter, I set these competing demands within a longer time frame, examining the course of policy throughout the twentieth century. In looking at resilience and fragility in the context of Tokyo's waterways, I will use a set of terms that are more or less entrenched in the Japanese-language historiography, and will suggest that policy and practice have moved from water use (*risui*) in the nineteenth century and earlier to a reliance on water control (*chisui*) through much of the twentieth century to competing claims from the advocates of varying forms of, what is best translated as, affection for water (*shinsui*) in recent decades, an approach that evolved out of the earlier *risui* tradition of water use. These are terms that can be traced back to ancient Chinese texts.[3] One of the great legendary figures, Emperor Yu, founder of the Xia dynasty, is supposed to have saved the country from terrible floods, a first and momentous act of *chisui*. The concepts relate to Confucian traditions of a careful and utilitarian stewardship of the environment, expressed in terms such as *kaibutsu* (literally, the opening up of things), which "as it evolved in late Tokugawa and early Meiji Japan [mid-nineteenth century], implied

[3] Frances Bray, *The Rice Economies: Technology and Development in Asian Societies* (Oxford: Blackwell, 1986), 68.

that the most perfect nature was the nature most thoroughly improved by human beings."[4]

The *chisui* of the modern age involves an underlying reliance on a technocratic engineering approach, an amalgam of policies that together represent a program of exploiting water to the maximum and then ejecting it into the sea as fast as possible. Set against this, and with a much longer history, has been the *risui* tradition of using rivers for transport and leisure, exploiting their symbolic value as landscapes of recreation and relaxation. In more recent years, a growing disaffection with *chisui* measures has led to a search for other remedies. An attempt was made to "bring waterways back into the city" by making them more accessible in both visual and physical terms and creating a pleasing water landscape. This *shinsui* ("affection for" water) approach was then extended and somewhat transformed into an attempt to strip concrete off river banks and beds and create environments that would be more favorable for local ecologies but also, in the long term, more effective in mitigating the damage caused by flooding.

There is no clear-cut transition from *risui* to *chisui* to *shinsui*, and there is much overlap along the way. In contemporary conditions, a compromise has to be found, for example, between holding water back behind dams during the summer months, which bring the greatest likelihood of flooding, and releasing water for irrigation and power generation, for both of which peak demand is in summer. The danger of transferring these Japanese terms into an English-language context is that they become in a way Orientalized. They do, however, translate quite well into a set of more familiar concepts and terms. Thus *chisui*, water control, is pursued, at least from the turn of the last century onwards, through hard engineering techniques that can be equated with structural resilience. *Shinsui* is premised on a higher degree of community participation in maintaining the well-being of local waterways. It can, therefore, be considered as a manifestation of social resilience, but eco-friendly *shinsui* might also be equated with ecological resilience.

There is, by now, a considerable, not to say voluminous, literature on the meaning of resilience in a social context. It has become a policy buzzword, alongside sustainable development. It is not my intent in this chapter to examine this literature, nor the use of the concept in the context

[4] Tessa Morris-Suzuki, "Concepts of nature and technology in pre-industrial Japan," *East Asian History* 1, 1 (1991): 95.

of social theory.[5] Suffice it to say that the concept is borrowed from ecology and the natural sciences. Adapting the terms employed by Pelling, who refers to structural responses and social vulnerability, I differentiate between structural and social resilience.[6] Structural resilience refers here to the capacity to enhance human safety through the use of engineering and technology to create physical barriers to the risks posed by so-called natural events, such as landslides, floods, or fire. Social resilience involves all sorts of human cooperative activity that serves to strengthen society's capacity to respond to and overcome the impact of large-scale "external" events. Alongside these terms, I refer too to ecological resilience, not in the sense in which it is used in the literature, but simply as an expression of attempts to create greater ecological resilience, healthy biotopes along river banks that also soak up flood waters and create effective "non-structural" sponges.

In the pages that follow, I discuss ideas and practice in river management in terms of an unfolding but not always strictly chronological shift from a *chisui*-based approach, which can be equated with structural resilience, through a landscape-oriented *shinsui* approach (social resilience), to an ecology-based *shinsui* approach (ecological resilience). From time to time I use examples from Tokyo, but just about all of what follows is relevant to other large Japanese cities and, indeed, to urban areas in Japan and the waterways that flow through them, more generally.[7] The chapter is based largely on material that I have written over the last fifteen years, but relates this work to the concepts of resilience and fragility, which formed the underpinning of the conference and from which the chapters in this book are drawn.

Reliance on structural *chisui* measures

The era of water control begins when, after long struggles over water resources between local lords and associations of water users, rivers were brought under the ownership of the state in response to pressure from

[5] See Simin Davoudi, "Resilience: A bridging concept or a dead end?" *Planning Theory & Practice* 13, 2 (2012); and the papers by other contributors to this special themed issue on resilience as a concept.

[6] Mark Pelling, "Assessing urban vulnerability and social adaptation to risk: Evidence from Santo Domingo," *International Development and Planning Review* 24, 1 (2002): 59–76.

[7] For a more detailed account, see Fransje Hooimeijer, "History of urban water in Japan," in *Urban Water in Japan*, eds. Rutger de Graaf and Fransje Hooimeijer (London: Taylor & Francis, 2008), 17–88.

landowners faced with growing incidence of flooding. The promulgation of the first River Law in 1897 represented a pronounced shift away from *risui* towards control of water, *chisui*, in order to combat flooding. Ownership of banks and beds passed to the state. But central government pushed onto prefectural governments the cost of riparian work, a very heavy burden for many prefectures, and it was unclear whether it was the Ministry of Home Affairs or the Ministry of Agriculture and Commerce who had authority and responsibility. This led to longstanding conflicts.[8]

Around the turn of the nineteenth century, Japan was beginning to industrialize. Factories were located along the banks of rivers, from which they could extract the water they needed for their steam-powered machinery. Among early examples in Tokyo was the Kanegafuchi Bōseki mill, built on the banks of the city's main river, the Sumida, in 1887. Other textile factories followed suit, as did factories producing footwear, cement, and paper, to the point where the whole of the east and northeast of Tokyo with its many waterways was turned rapidly into an industrial zone. Other factories were built along waterways in the flatlands to the north of the city. Taken together, this rapid process of industrialization had the predictable consequence of leading to widespread flooding. The floods of 1907, 1910, and 1911 were particularly devastating, flooding wide swathes of the east and northeast of the city. It was after the 1910 flood that work was begun on the creation of a new artificial outlet for the Sumida; this was a huge engineering project, one that was only completed thirteen years later, ironically just at the time when the city was largely destroyed by the Great Kantō Earthquake of 1923.[9]

During the first three decades of the twentieth century, artificial outlets were built for most of Japan's main rivers, and this for a while served to lessen the incidence of flooding on alluvial plains. But, at the same time, as Yutaka Takahashi points out, the higher levees and wider

[8] On issues introduced in this paragraph, see (in English) Philip Kelly, "Water control in Tokugawa Japan: Irrigation organization in a Japanese river basin, 1600–1870" (working paper, East Asia Program, Cornell University, Ithaca, NY, 1982); Martin Lewis, *Becoming Apart: National Power and Local Politics in Toyama, 1868–1945* (Cambridge, MA: Harvard University Asia Center, 2000). In Japanese, see Shigeki Matsuura, *Kokudo no kaihatsu to kasen: Jōrisei kara damu kaihatsu made* [Rivers and the development of the national territory: From the jōri system to the construction of dams] (Tōkyō: Kashima shuppankai, 1989); Kazuko Uchida, *Kindai Nihon no suigai chiiki shakaishi* [A social history of the flood-prone areas of modern Japan] (Tōkyō: Kokon shoin, 1994).

[9] For a review of the industrial history of Tokyo, and especially the northeast of the city, see Paul Waley, "Distinctive patterns of industrial urbanisation in modern Tokyo, c. 1880–1930," *Journal of Historical Geography* 35, 3 (2009): 405–27.

beds "gradually put a distance between rivers and their residents. It took more time to reach a river and, as a result, laundry was no longer done at rivers, and carrying water became inconvenient, since a water supply was still not widespread in the 1930s."[10]

The urbanization of its alluvial flood plains was the great central change in Japan's landscape in the twentieth century, and it lasted throughout the century, with a hiatus in the 1940s and a tailing off in the last decades of the century. The significance of this process cannot be underestimated. It caused a precipitous decrease in area of water retention and infiltration and a concomitant increase in impermeable surfaces. And, of course, it created a material and human infrastructure prey to damage and destruction.

When one adds to this litany of misfortunes the disappearance of riverside shrubs and trees and the neglect of the upkeep of river banks, especially during the period of militarization and the immediate aftermath of the war, it is hardly surprising that the post-war years witnessed frequent and devastating floods followed by a period of acute water shortages. Ironically, these floods were greatly exacerbated by the flood protection works that had been undertaken in the earlier decades of the century, which served to augment peak flood discharges in downstream areas to a point where they could no longer be contained by the levees. During the post-war years, typhoons caused severe flooding in coastal cities. Tokyo was hit by Typhoon Kathleen in 1948, when one-thousand people lost their lives and many more houses were destroyed.

To counter the danger of flooding, so-called razor blade embankments were built along the banks of many urban rivers, while other urban rivers and streams were buried in culverts or obscured behind ever lower and steeper concrete banks. In Tokyo and surrounding cities, local residents became ever more separated from their rivers, most of which were by now neither accessible nor visible. Even the river Sumida had suffered the ignominious fate of being hidden behind razor blade

[10] Yutaka Takahashi, "Public-private partnership as an example of flood control measures in Japan," *International Journal of Water Resources Development* 20, 1 (2004): 100. Takahashi is the most prominent scholar working on river management in the twentieth century. See also Takahashi, "Ryūiki kara mita kawa to shakai" [Rivers and society seen from river basins], in *Ryūiki no jidai: mori to kawa no fukken o mezashite* [The era of river basins: Aiming for a rehabilitation of forests and rivers], eds. Tsutomu Ōuchi, Yutaka Takahashi and Jun'ichi Shinmura (Tōkyō: Gyōsei, 1995), 27–70; Yutaka Takahashi, "History of water management in Japan from the end of World War II," *International Journal of Water Resources Development* 25, 4 (2009): 547–53.

embankments, cutting it off completely from the surrounding city. This was the golden age of *chisui*, of a structural approach to the creation of resilient societies. It was a policy led by engineers and bureaucrats, a nucleus of people from government, universities, and construction companies, applying classic engineering solutions involving exploiting water to the maximum for power and irrigation, and transporting the water out to sea as fast as possible.

The search for new approaches

It was not until after severe flooding in 1972 that residents first brought lawsuits against river administrations. With other large rivers breaking their banks in urban areas, including the river Tama, which flooded houses in Tokyo in 1974, court cases proliferated.[11] These took place against a backdrop of protests against pollution, of citizens' movements (*shimin undō*) formed to fight specific projects, and of victories for reformist parties in local government elections. And it was these court cases that prompted a fresh think about river policy in contemporary Japan.

Despite the hard engineering measures of the post-war decades, flooding had intensified, and lawsuits were lost by the state. Leading government advisers began to advocate a different approach to combating floods. In 1976, the ministry's advisory council on rivers recommended a comprehensive policy on *chisui*. The council published an interim report the following year. For the first time they proposed a series of "soft" policies to limit (rather than eliminate) the damage caused by flooding as part of a "comprehensive *chisui* strategy" (*sōgō chisui taisaku*), a concept similar to the integrated river basin management that came to occupy center place in river management policy in Europe.[12] New directions were sought, but there were inherent contradictions from the start, as some were reliant on concrete while others were hostile to old-style hard engineering. This represented a clash of philosophies found throughout central and local government, academia, and the engineering profession, which now included environmental engineers. Nevertheless, a new era had begun, one in which flowing water was brought back slowly into the lives of the citizens of Tokyo and of other major Japanese cities.

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[11] Takashi Ōkuma, *Kōzui to chisui no kawashi: suigai no seiatsu kara jūyō e* [A river history of flooding and water control: From suppression to absorption of flood damage] (Tōkyō: Heibonsha, 1988), 232.

[12] P.H. Nienhuis, R.S. Leuven, and A.M. Ragas, eds., *New Concepts for Sustainable Management of River Basins* (Leiden: Backhuys Publishers, 1998).

The move towards a new set of policies did not mean that hard engineering techniques were abandoned. Nor was there a consensus on the most appropriate methods to introduce. River bureaucrats began to think and work in terms of comprehensive river management plans, which looked at a whole catchment area and brought local residents into the planning process, if only in a rather peripheral way. The emphasis was no longer on eliminating flooding in specific locations, which merely aggravated the situation further downstream, but rather on mitigating the damage that flooding might cause. There was new thinking on how gentler but deeper, more substantial embankments might improve access to rivers while providing a better defence against flooding. These were called super embankments (*sūpā teibo*), and one or two pilot projects were carried out along the banks of the Sumida and other rivers in the east of the city. Ambitious plans were announced to promote the construction of super embankments more widely. Progress, however, has been very slow. With weak laws of government expropriation through public purchase, it has proved time consuming and expensive, where it has been possible at all, to buy up the houses and land alongside the banks of rivers. This is all the more so in low-lying, flood-prone districts, where land holdings are frequently small and highly fragmented.

A new landscape idiom for urban waterways

By this time, the 1980s, the struggles over the harmful consequences of rapid industrialization had been left behind, and renewed economic growth culminating in Japan's reinforcement of its position as the world's second largest economy brought growing cultural confidence. A new sense of the value of Japanese traditions emerged, including prominently a rediscovery of the Japanese landscape and the pleasures of immersion within it. In terms of urban waterways, this led to widespread criticism of the harsh landscape features of the *chisui* regime of encasement in concrete and a number of programs and experiments were launched to provide inspiration for a new aesthetic of river landscaping. This was the start, or, arguably, the return to a much earlier, pre-modern, landscape-oriented *shinsui* approach, one that helped encourage a greater degree of social resilience.

The government initiated a number of programs with names like My Town My River designed to enhance rivers as foci of local community by endowing them with aesthetic appeal. The tourism and leisure sectors took advantage, with companies offering new (or reintroduced traditional) boating ventures along the Sumida and other urban waterways. At a more general level, the media and a raft of newly published travel books, nature

books, and memoirs helped to create a celebratory sense of "river culture" (*kawa no bunka*) closely aligned with promotion of the notion of "hometown" (*furusato*) and the innocent pleasures of a childhood spent in rural hometown areas splashing around in rivers.[13] The appeal of this narrative of landscape reflected the fact that Japan had become, within a generation, a largely urban society. For an older generation, the memories of carefree days as a child exploring the natural surroundings were still present. Children could be inducted "back" into these innocent pastimes.

Alongside this narrative of landscape, a number of experiments were undertaken that helped to create a new aesthetic of urban design. One of the earliest and most successful examples is Komatsugawa Shinsui Kōen ("affection for water" park), a narrow, four-kilometer long, landscaped stream in Edogawa ward in the east of Tokyo.[14] Like much of the rest of the suburbs of Japan's major cities, urbanization came relatively late, in the post-war decades, to Edogawa ward. All the normal infrastructure was put in place, save for a waste water system, which only came some time later. This put pressure on the many streams and waterways, some of which had served as irrigation ditches but which now found themselves carrying household effluent, often from washing machines, down to major rivers. Edogawa ward was typical in this respect, but unusually a consultation exercise was undertaken with local residents as a result of which the decision was taken to convert at least some of these streams into strips of greenery. Komatsugawa water park was the second such experiment, and certainly the most successful. In essence, it is a small stream, seldom more than a meter in width, that meanders through the unexceptional houses and backstreets of suburban Tokyo, with greenery on either bank providing shade and a number of landscape features that give it its special attraction. There are bamboo thickets, clumps of rocks, and cascades of water that suggest, in a vague sort of way, some of the country's most celebrated landscapes. The water park rapidly became a favorite playground for children, while the paths along its banks provided a walking and jogging route for local residents, and its benches became a location for neighborhood sociability. Summer festivals have been held along its banks, while voluntary associations were formed to help keep the park clean. Some houses have even been rebuilt to

[13] For a brief discussion, see Waley, "Following the flow of Japan's river culture," *Japan Forum* 12, 2 (2000): 199.

[14] For more detail on the water park, see Waley, "What's a river without fish: Symbol, space and ecosystem in the waterways of Japan," in *Animal Places, Beastly Spaces: New Geographies of Human-Animal Relations*, eds. Chris Philo and Christopher Wisbert (London: Routledge, 2000), 159–81.

overlook the stream, but there is no evidence of the sort of gentrification that would have accompanied such a project in many other cities of the world. The water park won a number of competitions, and received visits from interested parties in Japan and, indeed, from around the world.

The Komatsugawa water park was designed and constructed by local government officials under the direction of one of the contributors to this volume, Nobuyuki Tsuchiya. The original water course was "buried" while over it flows the water of the new landscaped stream. Because the land here lies below sea level, the flow of water is controlled by gates and pumps, but in addition there are a number of treatment plants, treating the water with sterilizing agents and eliminating animal life from the stream. This arrangement was subsequently criticized by a number of ecologists and other experts who objected to the artificial nature of a water course without animal life. The ward office responded by building a new water park whose water was not cleansed and purified although pumps were still needed because of the lack of gradient. Fish and invertebrates were introduced into this new landscaped stream. While equally popular with local residents, for many ecologists this was still a heavily landscaped environment and one to which they remained hostile.

The Komatugawa and other water parks of Edogawa ward are representative of an approach to rivers and streams that became popular in the 1980s and has retained its popularity since, despite the criticisms. It has been replicated in urban areas throughout the country, in some places on a smaller scale, in others on a much larger one. It has served as a springboard for all sorts of recreational and educational activities for children. Even some of the many culverted suburban streams have been turned into green walkways (*ryokudō*), of which many are evident in the southwest of Tokyo. All of these initiatives represent compromises of one degree or another, but they form an important component within attempts to make Japanese cities both more livable and more sustainable. They form a first and important, if compromised, stepping stone away from the engineering-led *chisui* approach towards a landscape-oriented *shinsui* approach, with elements of *risui*, such as the river boating ventures, involved too.

Bringing nature back to river banks

This landscape-oriented approach to the relationship between rivers and urban settlements contains several major drawbacks. Firstly, it does little or nothing to help mitigate the damage caused by flooding. Secondly, it is expensive and difficult to implement other than in small "showpiece"

stretches of waterways. Thirdly, it ignores the importance of creating a riverine environment that is eco-friendly, that helps create vibrant healthy ecosystems. It is perhaps not surprising, therefore, that at the same time as the landscape-oriented *shinsui* approach was developing, and partly as a critique of it, what might be termed an ecology-oriented *shinsui* approach evolved, generating greater ecological resilience. This has become a central plank of river-related policy and activities in Japan in the last twenty-five years or so, although it has not displaced engineering-led *chisui* measures, nor the landscape-oriented *shinsui* approach. It shares with the latter an emphasis on community involvement but is built primarily around a belief in the moral correctness of ensuring ecological health as far as possible, coupled with an equally firm insistence that the closer one can get to a "natural" environment for rivers, the more likely it is that floodwaters can be adequately absorbed into permeable surfaces. This is an approach that can be seen to have both domestic and international influences. Domestically, many of its proponents had been environmental campaigners in the 1970s, people who then felt resistant to the hubris of the 1980s, when the Japanese economy appeared to be all-conquering. Internationally, they were engaging with the enthusiasm engendered by the 1992 Rio Summit and all that that brought with it in terms of a much greater environmental awareness.

The approach that I am referring to here as an eco-friendly *shinsui* came to be called *tashizen kawazukuri*, which translates literally as "multi-nature river building," but which has been given the English-language name of Nature-Oriented River Works (NORW). This approach has come to have considerable and sustained resonance in Japan, in large part thanks to the energy and enthusiasm of a small number of officials and environmental activists who have campaigned over many years, linking up with colleagues and communities in all parts of the country. While it has unquestionably raised environmental awareness and made rivers a focus of environmental attention among lay people, as well as experts, it is doubtful how effective it has been in winning support among lower ranks in the rather hierarchical Japanese land and water-related bureaucracy nor, indeed, how efficacious it could ever be in playing a widespread part in countering flooding. Close equivalents in other countries are the river restoration movement, sometimes also referred to as river rehabilitation, and green engineering. *Tashizen kawazukuri* falls more or less between the two with elements of both, as can be seen in the following definition: "a movement away from the hydraulically smooth, hard-lined canals having a very artificial appearance, towards the creation of waterways that appear

and function more naturally but have similar or improved flood capacity."[15]

As with so much that is new and innovative in Japan, the earliest experiments in *tashizen kawazukuri* were conducted in Yokohama in the 1980s by a small group of local government officials and enthusiasts. They carried out an experiment in nature-oriented river work on a short, 2.8 kilometers stretch of the Izumi River in the Yokohama suburbs.[16] Others soon became involved, including an official of the Ministry of Construction named Masakazu Seki. Seki's visionary enthusiasm played an important part in publicizing and propagating *tashizen kawazukuri*. In 1990, he drafted an official policy according to which all riparian works were to involve some element of nature restoration. Others took up his call, and inspection visits were organized to look at models around the world and, in particular, in Switzerland and Germany.[17] They then spread information about techniques for river restoration back in Japan through the holding of seminars, festivals, and media events.

A number of pilot projects were initiated in which attempts were made to rediscover traditional techniques, for example, in the support of river banks using natural materials, and to test the effectiveness of techniques used in Switzerland elsewhere. River channels were modified to promote the development of local biotopes, and fish ladders were put in place to help fish negotiate various barriers. Pilot projects, including several in Hino in the west of Tokyo, tended to be both expensive and small in scale.[18] Despite the proliferation of nature-oriented river works, it has been difficult to surmount problems of expense and, thus, of scale too. Despite these difficulties, *tashizen kawazukuri* remains a focus of policy. A dedicated research station, the Aqua Restoration Research Center, has

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[15] Christopher Gippel and Shubun Fukutome, "Rehabilitation of Japan's waterways," in *Rehabilitation of Rivers: Principles and Implementation*, eds. Louise de Waal, Andrew Large and P. Max Wade (Chichester: Wiley, 1998), 307.

[16] Ulrika Åberg, "At the confluence of people, environment and ecology: Assessing river rehabilitation in Japan and the UK" (PhD dissertation, University of Leeds, 2010).

[17] Masakazu Seki, *Daichi no kawa: yomigaere, Nihon no furusato no kawa* [Rivers of the earth: revive, rivers of Japan's countryside] (Tōkyō: Sōshisha, 1994).

[18] For details, see Nobuyoshi Sasaki, "Mizu ni seitaikei o: Hino shi ga susumeru mizube gyōsei" [Water ecosystems: Waterside management as advanced by Hino City], in Hōsei Daigaku Eko Chiiki Dezain Kenkyūjo [Laboratory of Regional Design with Ecology, Hosei University], ed., *Mizu no gō Hino: nō aru fūkei no kachi to keishō* [Water country Hino: The value and legacy of an agricultural landscape] (Tōkyō: Kashima shuppankai, 2010), 132–33.

been set up near Nagoya, where work is conducted on issues relating to flow and sediment and the conditions for sound biotopes.

The *tashizen kawazukuri* movement has been driven forwards as a result of the devotion and energy of a small number of campaigners. Several of these double up as both government officials working in central ministries or local government, and as "weekend campaigners," making it difficult to establish to what extent the movement should be seen as centrally imposed.[19] They have worked together with campaigning academics, environmentalists, and other activists, organizing events and competitions, teach-ins, and campaigns in all parts of the country. They have supported the formation of all sorts of local river-related groups, to the point where rivers have been the central preoccupation of environmental activists in Japan to a level that is probably unparalleled in the world.

However, despite genuine (and partially successful) attempts to involve a wider public, the movement remains built around a core of activists and officials at organizations designed to promote *tashizen kawazukuri*, primarily the Aqua Restoration Research Center and the Japan Riverfront Research Center in Tokyo. Further issues have been identified in terms of deficiencies in assessment and evaluation of projects and in the transmission of information and techniques to river engineers. This latter criticism, which appeared in an official ministry report in 2008, is particularly telling; river managers, with a solid background in civil engineering, have had little or no training in freshwater ecosystems. Consequently, they have not been properly conversant with the use of soft engineering materials to create river habitat diversity.[20] This is not only a problem of training; many government engineers remain deeply wedded to the use of concrete and suspicious of soft or green engineering. The extent and significance of public participation has also been questioned. In a picture that is common in many other countries, there has been a tendency to involve local residents merely for the purposes of the propagation of information and to organize local activities and campaigns as a way of galvanizing support around a centrally framed program. Finally, it is very hard to assess the extent to which *tashizen kawazukuri* has been effective in mitigating flood damage. As we saw at the outset, flash floods resulting from heavy downpours have continued to cause considerable, if localized, damage in recent years, and it is hard to see how *tashizen kawazukuri*

[19] This is discussed in more detail in Waley, "Ruining and restoring rivers: The state and civil society in Japan," *Pacific Affairs* 78, 2 (2005): 195–215.

[20] For more on the report and other issues related to *tashizen kawazukuri*, see Paul Waley and Ulrika E. Åberg, "Finding space for flowing water in Japan's densely populated landscapes," *Environment and Planning A* 43, 10 (2011): 2321–36.

could result in a noticeable reduction in damage caused by this type of flooding.

In sum, therefore, it is hard to reach a definitive conclusion about the achievements of this movement. But it is surely the case that it represents a new understanding of what resilience can mean in the Japanese riverine context and how best to introduce policies of resilience.

Fragility and the construction state

The nature of resilience and fragility is clearly open to debate, but over the century and a half of industrialization in Japan, the Japanese archipelago has become a more fragile place, and its inhabitants much more susceptible to disasters of various kinds, including flooding. This is as true in Tokyo as it is in other major cities or, indeed, anywhere else in the country, as was borne home by the earthquake, tsunami, and nuclear disaster of March 11, 2011. But of course the population density in major cities raises their level of vulnerability and, hence, fragility. An ageing population exacerbates the difficulties that disasters entail.

The revised ecologically aware *shinsui* approach to river management, known as *tashizen kawazukuri*, is a long way from having won favor among mainstream politicians, bureaucrats, and engineers. There was a period in the 1990s and into the 2000s when it seemed as if the "construction state" (*doken kokka*), a ruling "iron triangle" of industrialists, politicians, and bureaucrats had lost some of its power. A number of new signals were sent and measures adopted that suggested a change in direction. These included the already mentioned revision of the River Law in 1997 but also measures introduced in the same year to help the ground infiltration of rain water through the use of permeable surfaces.[21] The long-serving populist prime minister Jun'ichirō Koizumi (2001–06) attempted to curb the power of the construction lobby and the amount of funding going to public works, but the impact of his challenge to the public works system appears to have been limited.

It would seem, however, that public works retained their place at the heart of the Japanese post-war political compromise, supported not only by political, bureaucratic, and business elites but also by a sizeable slice of the general public.[22] Soon after becoming prime minister for a

[21] Ōkuma, *Kōzui to chisui no kawa shi*, 109.

[22] Takayoshi Igarashi, "'Kasenhō' to shisutemu kaikaku" [The river law and system reform], in *21 Seiki no kasen shisō* [River thought of the twentieth century], ed. Reiko Amano (Tōkyō: Kyōdo tsūshinsha, 1997), 98.

second time in 2012, Shinzō Abe returned Japan to its traditional nostrum of economic growth through spending on public works. The March 11 Triple Disaster has done little to disabuse faith in remedies in concrete. On the contrary, the government, with help from the relevant local authorities, is busy constructing substantial concrete coastal defences that are likely to have a severely detrimental effect on local habitats and create a barrier between people and the sea that replicates the divisive impact of razor-blade embankments in cities. This is happening despite local opposition in some quarters.[23] While the stricken coast of northeast Japan might seem a long way from Tokyo, the increased frequency of summer downpours with the consequent danger of flash flooding has served as a reminder of the continued fragility of the nation's capital.[24] While it is earthquakes and attendant fires that are the greatest reminders of Tokyo's fragility, the dangers posed by floods are a source of concern, and ongoing and large-scale mitigating works, including the construction of huge underground reservoirs for storm waters.

Resilience: Space and sociability

It would be a mistake to dwell solely on fragility, and what might be seen as the contribution of the industrial-political-bureaucratic nexus to this fragility. In this concluding section, I return to some of the concepts with which I started the chapter, primarily that of social resilience. I am here translating the language of waterways and their management in Japan into the parallel terminology of resilience. *Chisui* is not a translation of structural resilience; the two terms are not strictly equivalent. Nevertheless, the repertoire of methods used to ensure control over flowing water (*chisui*) is designed also to enhance structural resilience. Similarly, *shinsui* in its meaning of landscape-based river management can be seen to contribute to greater social resilience, while in its extended sense of an eco-friendly approach it encourages greater ecological resilience. *Tashizen kawazukuri*, Nature Oriented River Works, is based on a recognition of the flexibility and adaptability of ecosystems, adapting to

[23] Winifred Bird, "Post-tsunami Japan's push to rebuild coast in concrete," *Asia-Pacific Journal* 11, 21, 1 (May 26, 2013), http://japanfocus.org/-Winifred-Bird/3945/article.html.

[24] Philip Brasor and Masako Tsubuku, "Tokyo readies for the rise of the 'guerrilla rainstorm'," *The Guardian*, July 7, 2015, http://www.theguardian.com/cities/2015/jul/07/tokyo-guerrilla-rainstorms-japan-resilience.

the changing possibilities that are opening up for them through sympathetic design techniques.

In these final paragraphs, I will outline some of the ways in which rivers and smaller waterways contribute to an enhanced social resilience in Tokyo. There are at least three ways in which this happens, depending on the nature of the waterway. First, there are the broad banks of rivers—the Arakawa, Edogawa and Tamagawa—most of them flowing down artificial courses to the sea. These waterways are several hundred meters broad. Their banks are often at least 100 meters in width, providing space both for sports pitches and for the natural growth of river-bank flora. On the far side of the bank is a raised levee with, almost invariably, a footpath or track running along it, used among others by joggers and dog-walkers. Many other major cities have the same type of artificial course, used in the same way as those in Tokyo, generally built through agricultural land in the pre-war period. Space was readily available. This same space today provides a wonderful opening up of vistas, space for the body and the soul after the cramped denseness of most of the rest of the city. Crucially, in the context of social resilience, these open spaces provide necessary refuges in case of disaster (*hinan basho*).

Many of the city's waterways are heavily concretized, but this does not necessarily deprive them of their function as a recreational resource. Some of Tokyo's "least landscaped" canals, in the eastern wards of Kōtō and Sumida, have been converted into attractive social spaces, into paddling pools for children, into ponds for anglers, and into ecologically aware gardens. These all contribute to the city's social resilience, not least because they are located in the disaster-prone east of the city, and they too can provide refuge space.

Thirdly, there are the streams, some culverted some converted, that meander through Tokyo's suburbs. Most of these are to be found in the west of the city, Setagaya ward having a notable number.[25] While they may not be designed with the care of Komatsugawa water park in eastern Tokyo, they all contribute a space for walking and socializing that appears as spontaneous and random as the course of any stream. These quirky corridors of green are both spiritually uplifting and socially invaluable. They too make their contribution to the city's social resilience.

What, however, is the overall impact of these riparian landscapes and the greater resilience they bring with them? It is well beyond the

[25] *Setagaya* [Setagawa City], http://www.city.setagaya.lg.jp/miryoku/1307/1312/1314/index.html.

capacity of this short chapter to attempt an assessment.[26] Nonetheless, what can be said is that it is only through a combination of approaches and methods that the varied aims of ensuring safety, promoting accessibility, improving the landscape, and engendering healthy ecosystems can be met. At the same time, new approaches need to be constantly sought, as the nature of the risks posed by flooding and other events is always changing.

[26] For some further thoughts, see Paul Waley and Martin Purvis, "Sustaining the flow: Japanese waterways and new paradigms of development," in *Exploring Sustainable Development: Geographical Perspectives*, eds. Martin Purvis and Alan Grainger (London: Earthscan, 2004), 207–29.

CHAPTER FOUR

THE SUMIDA RIVER RENAISSANCE: A NEW POLICY FOR THE DEVELOPMENT OF THE RIVER

YUSAKU IMAMURA

The Sumida River Renaissance

The Sumida river is one of the most important centers of old Tokyo. Since the completion of the highest radio tower in the world, Tokyo Skytree, in 2011, this area has undergone significant change and revitalization. Firework displays over the Sumida river are famous and have been one of the most important forms of entertainment in the city since the nineteenth century (Fig. 1).

In 2011, the Tokyo Metropolitan Government launched the "Sumida River Renaissance."[1] This was a new strategy, initiated by former governor Shintarō Ishihara, aimed at developing the river Sumida and its waterfront. The Sumida River Renaissance was orchestrated as a platform for the discussion of the future of the Sumida, as well as for sharing information and knowledge with wards and stakeholders along the river. This kind of platform had been much needed for a long time. However, it was not responsible for drawing up plans for future development, but was merely a platform for sharing information and ideas, and initiating experimental projects. The uniqueness of this strategy is that it has brought together many different governmental departments, from urban planning and river control to cultural and tourism promotion, as well as including many other different city departments along the Sumida river. Platform

[1] *Sumidagawa Renesansu* [Sumida River Renaissance], Bureau of Construction, Tokyo Metropolitan Government, http://www.kensetsu.metro.tokyo.jp/kasen/sumida/

discussions have been varied, ranging from issues such as regulation to cultural promotion.

In Japan, it is not easy to draw up a master plan for a public sector. The master plan may take many years to formulate, and be accompanied by much political consideration. The amount of property owned by the government is quite small in Japan compared with Europe. Many developments are run by mainly private and corporate initiatives. During the period of rapid economic growth in Japan, many large developments were led by private initiative. After the collapse of this long period of successful private initiative, the so-called "bubble economy," government initiative became more important.

The Sumida River Renaissance was established based on the experiences of a similar enterprise, the "Canal Renaissance" (2004), which concerned itself with the revitalization of the canals[2] (Figs. 2–3). It was a remarkable initiative which attempted to reduce the regulation of canal usage by the private sector. As result of this policy, floating architecture was built on the canals, a good example being the "waterline" in the Tennozu Isle area.

The former governor's initiative was also strongly inspired by the words of Eiichi Shibusawa[3] (Figs. 4–5), one of the most important business figures from the beginning of the Meiji era (1868–1912), at the dawn of modern Tokyo. He built his Venetian Gothic-style residence along the banks of the river Sumida, at the heart of the new finance center. This area is in front of the Tokyo Stock Exchange, and is still the finance center today. Shibusawa's dream was "to make Tokyo like Venice." This vision was a source of great inspiration to former governor Ishihara, who began to recognize the importance of the development of Tokyo's waterfront.

Tokyo Vision 2020

The election of a new governor, or the commencement of a new term of governorship, usually signifies the creation of a new "vision" for the city's

[2] *Unga Renesansu* [Canal Renaissance], Bureau of Port and Harbor, Tokyo Metropolitan Government, http://www.kouwan.metro.tokyo.jp/kanko/runesansu/

[3] Eiichi Shibusawa (1840–1931) is known as the "father of Japanese capitalism." He founded the first modern bank in Japan, the First National Bank (Dai Ichi Kokuritsu Ginkō, now Mizuho Bank), which was based on joint-stock ownership. Shibusawa also founded the Tokyo Stock Exchange and the Japanese Chamber of Commerce and Industry. He was also involved in founding hundreds of corporations.

future development. In 2011, after the Great Tōhoku Earthquake and the Tsunami of March 11, Ishihara was re-elected for his fourth term and began to actualize his own vision for Tokyo's future. It came about at the same time as the bidding for the 2020 Olympic Games. Its main aim was to demonstrate Tokyo's intention and suitability to host the Olympic Games, by aligning Tokyo's future with an Olympic plan. Tokyo had already bid, unsuccessfully, for the 2016 Olympics and was determined to make a more successful attempt for the 2020 Olympic Games. Thus, the master plan for a future Tokyo was made alongside the bid to become an Olympic host, and the resulting vision was called "Tokyo Vision 2020."[4]

The Sumida River Renaissance was one of the key pillars of this new policy. A major part of the plan was to make Tokyo an ecological and sustainable city (Fig. 6). Tokyo had decided that the only way to move forwards was to establish more green areas and to revitalize the waterfront.

Shintarō Ishihara was Commissioner of the Environment, of the Japanese National Government, before he became the governor. Since his appointment as governor, he has always focused on environmental issues. His most famous public policy was the regulation of exhaust fumes of motor vehicles in Tokyo, especially the fumes of fuel oil used by trucks. This severe regulation brought about a dramatic reduction in air pollutants. The regulation of exhaust fumes began in 1999, and was followed by new legislation in 2000 and 2003. In 2006, three other neighboring prefectures followed Tokyo's lead. Exhaust fumes, along with other air pollutants, have contributed to the contamination of Tokyo's environment, causing a major pollution problem with associated negative health issues. There was a very high incidence of asthma amongst people living beside main roads used by heavy traffic. When Ishihara first introduced the idea of such a regulation, the business community was completely opposed; however, it was eventually forced to accept his decision. Since this regulation was established, Tokyo's air has undergone a complete transformation. Ishihara's next challenge in the environmental arena was the creation of green spaces and the revitalization of the waterfront.

[4] Tokyo Vision 2020 was created by the governor's office of the Tokyo Metropolitan Government in 2012. See *2020 nen no Tōkyō keikaku* (Tokyo Vision 2020), Tokyo Metropolitan Government, http://www.koho.metro.tokyo.jp/koho/2012/02/12year.htm.

The implications of Tokyo's new cultural policy

When the Sumida River Renaissance policy was initiated, I was asked to become its facilitator. As I was a graduate student in Architecture, I was familiar with, and impressed by, the words of Eiichi Shibusawa, "To make Tokyo like Venice." I had the opportunity to inspire and influence Governor Ishihara's activities through these words. He was very impressed with them and they seem to have triggered his interest in the waterfront projects. Public policy regarding the river and the waterfront, at that time, was from old legislation made during the era of modern industrial expansion. The greater part of this policy was based on both the prevention of flooding and the limitation of usage by the private sector. The river was to be controlled but it was not conceived as being important to the city's environs. The policy made a distinct separation between the city and the river, between the citizen and the river. Moreover, during the period of rapid, economic growth during the 1960s and 1970s, rivers were used as wastewater channels for waterside factories. This contributed to isolating the waterfront due to contamination and unpleasant smells. Policy has been changing slowly, and is now geared towards making the river a friendlier place for the citizen. However, in Japan, many old policies still remain, often reflecting the demands of the old days, even though time has changed and new approaches need to be designed and promoted. However, it is not easy to change and replace these old policies all at once.

This situation is quite similar to cultural policy. When I was appointed advisor to the governor in 2001, cultural policy at that time involved "providing good quality culture to the citizens of Tokyo." Unfortunately, there was no strategy, timeline, or action plan accompanying this directive. To actualize such a policy, a clear objective, strategy, and timeline are very important. However, it is not easy to achieve such an objective within Japan's political agenda. Before finalizing a new policy, it is very important to create more awareness and understanding among the people, regarding the arts and culture. Governor Ishihara and I decided to promote cultural awareness, rather than implement major policy change. Thus, Tokyo Wonder Site[5] was established to facilitate a new stream of Tokyo culture, mainly by supporting the next generation and through international cultural exchange. It was conceived as a forum for the experimentation of public policy. When it was established, it was very

[5] Tokyo Wonder Site was established in 2001 by Governor Ishihara and Director Yusaku Imamura. See *Tokyo Wonder Site*, http://www.tokyo-ws.org/english/index.html.

small and the total program budget was only about 1 % of other museums' budgets.

The Tokyo Wonder Site experience was very fruitful and was used as feedback in cultural policy discussions. It became a good example of the importance of making a platform for cultural policy within the city's government. It was a breakthrough, but the city still needed an appropriate discussion platform for cultural policy-making. It took another five years before this could be established. In 2006, the Tokyo Council for the Arts[6] was set up as a discussion platform for new policy-making and strategies for Tokyo arts and culture. This Council was responsible for proposing new strategies and pilot projects. To facilitate its establishment, Tokyo's code of cultural promotion needed to be changed. Today, the Council holds a unique position because not only is it an advisory body for the governor of Tokyo, but, at the same time, the governor has to respect its proposals. It is not simply an evaluation or consulting council, and its independence is quite exceptional in Japanese politics.

As a result of this Council, the first new community art projects run by the Tokyo Metropolitan Government were launched. And after years of discussion, finally Tokyo established the first arts council in Japan, Arts Council Tokyo,[7] which provides funds for arts' activities and nurtures the next generation through its so-called "arm's length" policies—giving a degree of independence to artists through distancing them from government control.

This has all come about through a "ripple" effect. Instead of starting from a main master plan, small experimental and pilot programs were initiated and the results of these small programs could then be transferred to larger projects, eventually leading to new policy-making. This same methodology was applied to the Sumida River Renaissance. It was initiated as a means of facilitating a larger future vision, through organizing pilot projects including art projects, coffee shops, a riverside farmer's market, and a lighting trial. These small pilot projects become interconnected and expand, eventually leading to the development of a wider cultural arena. This is one example of how new policies and

[6] The Tokyo Council for the Arts was established by the Tokyo Metropolitan Government. It is a council for cultural policy. See *Tokyo Council for the Arts*, Bureau of Citizens and Cultural Affairs, Tokyo Metropolitan Government, http://www.seikatubunka.metro.tokyo.jp/bunka/hyougikai/

[7] Arts Council Tokyo was established in 2012 by the Tokyo Metropolitan Government and was the first arts council in Japan. See *Arts Council Tokyo*, https://www.artscouncil-tokyo.jp/en/

strategies can help change the existing infrastructure into a new urban landscape.

The importance of pilot projects

Without sufficient knowledge and experience, it is impossible to draw up the beginnings of a master plan. It also takes years to have a master plan finalized and approved. Pilot programs, as small experimental projects, are invaluable for providing useful experience. Through such experience, a new master plan can be created and executed more carefully. Pilot projects have the advantage of finding any problems or obstacles inherent in a scheme, as well as locating appropriate stakeholders with whom to work. This facilitates new urban networks. Diverse stakeholders with differing opinions contribute in a positive manner to its design and can help develop new initiatives in the sphere of public policy. The pilot program encourages collaborative work between diverse stakeholders, thus finding out who the key players are.

In the bidding file for the 2016 Olympic Games,[8] the Tokyo cultural program was described as "Thousands of Knots." The idea behind such a title is the image of thousands of points, representing projects, which connect with each other creating a new network of collaborative relationships. Points make lines and lines make surfaces (Fig. 7). Crossing points are like tied knots. These points, lines, and surfaces make many knots, each connected with each other. If we can make as many knots as possible, like a thousand, this has the potential to become just as large, or even larger, than one monolithic institution. Instead of one big institution, representing the master plan, a network of small projects can create a much more sustainable and controllable platform. Such an idea can be likened to an energy supply, and a comparison between one large energy plant and the energy created by many small individual solar panels.

One such pilot project was the Sumida River Renaissance. The budget for this project was very limited and a logo design to promote the project needed to be created. The famous producer and scriptwriter Kundo Koyama, who won an Oscar, was a member of the professional committee which effected the design of the new logo (Figs. 8–9). He used his TV program to help choose the logo design, appealing to the general public to take note that a new cultural movement was being set up along the river Sumida waterfront.

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[8] *Tōkyō 2016 rikkōho fairu* [Tokyo 2016 Candidate City, Olympic bidding file], http://www.shochi-honbu.metro.tokyo.jp/digest_version_jp.pdf.

The second pilot project to be initiated was a lightscape trial. It was noticed that after the Great Tōhoku Earthquake in 2011, many areas around the Sumida were without illumination in order to save energy. This was a concern to us. Unfortunately, the lighting had not been well-planned alongside the Sumida river, as it was primarily used for security purposes. Changing all the light fixtures was no easy matter so we decided to commission a famous Japanese professional designer, Kaoru Mende, who had worked on Clark Quay in Singapore. His proposal, part of a pilot project, was realized in a small area of the river Sumida (Figs. 10–12). After two years of discussion and planning, a major event was enacted along the riverfront as part of the Sumida River Renaissance. It was called "Tokyo Hotaru" (*hotaru* means "firefly" in Japanese); 30,000 LED light balls were allowed to float down the river, resembling a riverine firework display (Figs. 13–14).

A third pilot project involved serving coffee from a boat on the river (Figs. 15–16), while a fourth one was the establishment of a café on the riverfront. Previous laws forbade such activities; however, a change in government regulations currently allows such enterprises to take place. Taitō City, located within Tokyo Metropolis, subsequently put forwards a proposal to build a riverside café. And two more proposals, for the installation of a café and restaurant in the scenic Tokyo Skytree, have since been approved (Figs. 17–18).

A fifth pilot scheme was the introduction of a farmer's market, and it is hoped this will stimulate riverside activity (Figs. 19–20). We also brought *mikoshi* to the river, portable shrines made by students of Tokyo University of the Arts for their festival. We asked the students if we could bring them to the river Sumida as part of a festival, together with music and other entertainment. The role of such activities is to help create and promote further artistic and cultural events along the riverfront.

"Pilot projects" and "platform" methodologies are still underestimated in today's public-policy making. However, with the rising importance of "inclusiveness," both methodologies are becoming more important. They are "process-oriented" methodology. The process of decision-making is also becoming more important.

Tokyo Olympics 2020 and the future of the river Sumida

While I was working on my submission for the Tate Modern competition at Arata Isozaki's office in 1994, I was aware that the south side of the river Thames was undeveloped. The competition organizer required "jetty stops" to be installed along this side of the Thames. However, after the

opening of Tate Modern in 2000, there were many boats on the river. The redevelopment of this undeveloped area of London was an important event and led to London's invitation to host the 2012 Olympic Games (Figs. 21–22).

Former Mayor of London Ken Livingston focused on the development of East London in much the same way as the Centre Pompidou facilitated the redevelopment of a problem area in Paris. The Olympic Games can actively promote redevelopment, if used in the right way. London's example shows just how successful a development plan, motivated by the Olympic Games, can turn out to be. When I visited the city after it had been selected for the 2012 Olympic Games, there were many tower-cranes in evidence, something I had never seen before in Europe. Before being chosen to become the Olympic host city, London had been seeking a good reason to revitalize the city (Figs. 23–24).

Due to a desire to host the 2020 Olympic Games, new development projects in Tokyo have been initiated. It is important to continue to use this opportunity to redefine a new Tokyo Metropolis, to become a more sustainable, historical, and community-based city.

In 1964, when Tokyo hosted its first Olympic Games, new modern infrastructure, such as highways and high-speed trains, came into being. The second Olympic Games to be held in Tokyo has the potential to show off a new contemporary metropolis (Figs. 25–27). It is hoped that the waterfront in Tokyo, which began its transformation as a result of the 2020 Olympic Games, will continue to be successfully developed. The river Sumida is the perfect place to showcase old and new Tokyo. With the coming of the Olympic Games, it is an excellent opportunity to engage with and encourage tourism (Figs. 28–29). We should use this opportunity to regenerate Tokyo and set the stage for the next step in the evolution of the Metropolis, not simply as a sustainable urban infrastructure, but also as a center for new public-policy methodology.

Fig. 1) Summer Firework Festival at Sumida river (courtesy of the Sumida city)

Fig. 2) Tenoz Ayle by Canal Renaissance (photo by Yasuyuki Miyake)

Fig. 3) Building at Canal Renaissance area (courtesy of Mizbering Project)

Fig. 4) Eiichi Shibusawa House (courtesy of the Shimizu Corporation)

Fig. 5) Landscape including Eiichi Shibusawa House in “View of Yedobashi and Yoroibashi” (courtesy of the Bank of Japan, Currency Museum)

Fig. 6) Master plan along side Sumida river (Tokyo Metropolitan Government website)

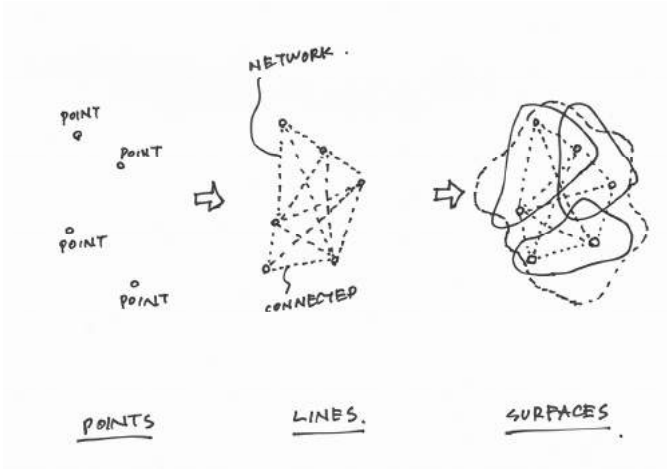

Fig. 7) Point, line, surface (drawn by Y. Imamura)

Fig. 8) Logo of Sumida River Renaissance (Tokyo Metropolitan Government website)

Fig. 9) TV program work with Logo of Sumida River Renaissance

Fig. 10) Experimental lighting project along Sumida river side (courtesy of Tokyo Metropolitan Government)

Fig. 11) Current lighting at Sumida river side (courtesy of Tokyo Metropolitan Government)

Fig. 12) Experimental lighting at Sumida river side (courtesy of Tokyo Metropolitan Government)

Fig. 13) Tokyo Hotaru (courtesy of Tokyo Metropolitan Government)

Fig. 14) Tokyo Hotaru (courtesy of Tokyo Metropolitan Government)

Fig. 15) Café on board (courtesy of Tokyo Metropolitan Government)

Fig. 16) Café on board (courtesy of Tokyo Metropolitan Government)

Fig. 17) Café at Sumida river side (courtesy of Mizbering Project)

Fig. 18) Café at Sumida river side (courtesy of Mizbering Project)

Fig. 19) Farmers market alongside Sumida river (courtesy of Tokyo Metropolitan Government)

Fig. 20) Farmers market alongside Sumida river (courtesy of Tokyo Metropolitan Government)

Fig. 21) Jetty Ferry on Thames river, London (Tate Boat website)

Fig. 22) Jetty Ferry on Thames river, London (TimeOut website)

Fig. 23) Bird's eye view of London Olympic 2012 venue (Wikimedia website)

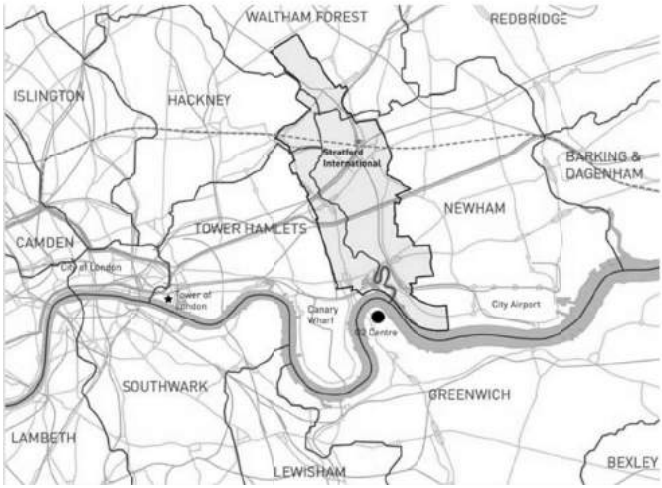

Fig. 24) District of London Olympic 2012 venue (source: EDAW)

Fig. 25) Monorail built in 1964 in Tokyo for Tokyo Olympics 1964 (courtesy of Kyodo News)

Fig. 26) The Shinkansen bullet train, built in 1964 for the 1964 Tokyo Olympics (courtesy of Kyodo News)

Fig. 27) Haneda Airport built in 1964 in Tokyo for the Tokyo Olympics (courtesy of Kyodo News)

Fig. 28) Master Plan of Green Corridor, Tokyo Metropolitan Government (Tokyo Metropolitan Government website)

Fig. 29) Bird's eye view of Mater Plan for 2016, Tokyo Metropolitan Government (Tokyo Metropolitan Government website)

CHAPTER FIVE

CONFLICT AND SYNERGY IN THE PORT-CITY RELATIONSHIP: CRITICAL ISSUES AND PERSPECTIVES IN THE CASE OF VENICE

STEFANO SORIANI

Port and maritime activities have always acted as a basic driver in the transformation and management of the lagoon of Venice. Through the re-meanderings of the lagoon's channels, the diversion of major rivers to avoid siltation, and the fortification of the *lidi* to protect the city from the sea, *La Serenissima* maintained the lagoon in a form consistent with the need for ensuring healthiness, security, and economic prosperity. For centuries the relationship between port and maritime activity, on the one hand, and city development, on the other, was characterized by a strong symbiosis. Moreover, it was the goal of maintaining navigability that successfully opposed the natural dynamic toward the "continentalization" of the lagoon.

The picture changed dramatically during the first decades of the twentieth century, when the *core* of the port of Venice shifted to the mainland. Through the reclamation of about 500 hectares of wetlands, and the realization of the port and industrial area of Porto Marghera, Venice entered into a new era of modernization in the twentieth century; this brought about dramatic territorial and environmental changes that deeply affected the evolution of the port-city relationship, which had up to this point been of a symbiotic nature.[1]

[1] Stefano Soriani and Gabriele Zanetto, "Environmental management and economic restructuring in the government of Venice," in *Italy's Sea: Problems and Perspectives* (Rome: Società Geografica Italiana, 1998), 221–34.

Change and growth: The dawn of a new industrial era and the main impacts on Venice's waterfronts

The realization of the first industrial zone in Porto Marghera in 1917 propelled the port of Venice, up until then a commercial port, into a port-industrial complex. As a result of the development plans of the 1950s, Porto Marghera (covering an area of about 2,000 hectares) became one of the most important areas of coastal industrialization in Italy, according to the spatial, economic, and technological tendencies that drove, in the same period, the establishment of *Maritime Industrial Development Areas* (MIDAs) in the most industrialized countries.[2] Oil, chemical, petrochemical, metallurgy, energy production, and shipyards became the main industries to be developed in the area.

When it comes to evaluating the reasons behind the success, from an economic point of view, of the twentieth century's industrial experience in the Venetian lagoon, we must briefly recall the importance of the following points:

- ✓ The realization of Porto Marghera was the result of a long debate over the problem of how to meet the demand for port expansion. For the continued success of the port, finding new areas within which to expand, and pursuing up-scale programs were basic necessities, if the port was to maintain a major role in a period characterized by the increasing importance of raw materials in international trade.[3] Against this background, the realization of "the new (industrial) Venice on the mainland," was regarded by most of the economic and political leaders of the time, both at a local and national level, as the only chance the city had to accommodate the requirements of a new phase in port development.[4]

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[2] Gabriele Zanetto, "Le ragioni economiche-geografiche dell'industrializzazione costiera," *Terra* 2 (1989): 5–14; Andre Vigarié, "Maritime Industrial Development Areas: Structural Evolution and Implications for Regional Development," in *Cityport Industrialization and Regional Development: Spatial Analysis and Planning Strategies*, eds. Brian Hoyle and David Pinder (Oxford: Pergamon, 1981), 23–37.

[3] Gianni Toniolo, "Cento anni di economia portuale a Venezia," in *Il porto nell'economia veneziana*, ed. Paolo Costa (Venice: COSES, 1972), 33–74; Adalberto Vallega, *Geografia delle strategie marittime* (Milan: Mursia, 1997).

[4] Cesco Chinello, *Porto Marghera 1902–1926: Alle origini del "Problema di Venezia,"* (Venice: Marsilio, 1979); Giovanni Volpi, *Venezia Antica e Moderna* (Rome: Tipografia Parlamento, 1939); Gabriele Zanetto, "Primo Lanzoni, ovvero

- ✓ At the same time, the construction of Porto Marghera was also regarded as a necessary step for preserving the city in the lagoon. In fact, to build the new port infrastructure in reclaimed areas in the internal edge of the lagoon was regarded as the basic precondition to ensure the physical survival of the "ancient city".[5] No attention was given, at that time, to the potential implications of Porto Marghera's development on the lagoon environment.[6]
- ✓ At the beginning of the XX century Veneto Region was characterized by an economic structure strongly based on agriculture, and by high emigration. In that context the development of Porto Marghera was considered and promoted by its developers as an important opportunity to foster the regional modernization process, through large-scale industrialization.
- ✓ The realization of Porto Marghera meant that Venice's port was transformed into a *gateway* for raw materials and an industrial hub, with the aim of sustaining Italy's late modernization process. From this perspective, the lagoon was considered to be a homogeneous space, able to be transformed according to the tendencies that were restructuring the economy and the territory of north Italy during the first half of the twentieth century. Even though this process of territorial change and economic growth was clearly dependent on the increasing role of international maritime transportation in the organization of industrial spaces, the underlying logic was essentially continental.

During the 1960s a new phase of expansion was seen as necessary, and planned for accordingly. The underlying belief was that the Venetian lagoon had the capability of becoming the largest industrial port in Italy,

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l'economia come antitesi all'ambientalismo nel pensiero geografico ottocentesco," *Ricerche Economiche* 1 (1985): 70–103.

[5] Associazione Industriali della Provincia di Venezia, *Interventi tenuti in occasione delle cerimonie per il Cinquantenario di Porto Marghera* (Venice: Associazione Industriali della Provincia di Venezia, 1967).

[6] Only in the 1970s it was widely acknowledged the basic role played by Porto Marghera in the upsetting of the lagoon environment (pollution, morphological simplification, flooding). Stefano Soriani, "Port development and implementation challenges in environmental management: The case of Venice," in *Ports in the Twenty-first Century: Economy, Technology and the Environment*, eds. Brian Slack and David Pinder (London: Routledge, 2004), 214–16.

stretching over an area of 4,000 hectares.[7] This project was soon abandoned as a consequence of the dramatic high tide that occurred on November 4, 1966, and the subsequent spreading of the "save Venice" international campaign.[8]

From the early 1970s to mid-1990s: A period of economic crisis and social conflict

As happened in many other European port and industrial zones, the 1970s meant also for Porto Marghera the end of an impressive twenty-year wave of territorial change and economic growth.[9] During the 1980s the industrial pole experienced a severe crisis and a difficult restructuring process was initiated. When one considers the most important features of the period, the following issues should be highlighted:

- ✓ Porto Marghera has experienced, since the mid-1970s, extensive restructuring. Jobs decreased from 35,000 in 1969 to 29,000 in the late 1970s, and further fell to 17,000 in the early 1990s. Today, the industrial pole is home to about 11,000 jobs. Together with the dramatic loss of jobs came also the abandonment of hundreds of hectares of polluted industrial land.[10]

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[7] *Consorzio obbligatorio per il nuovo ampliamento del porto e della zona industriale di Venezia-Marghera* [The development area of the commercial and industrial port of Venice] (Venice: Fantoni, 1965).

[8] UNESCO, *Rapporto su Venezia* (Milan: Mondadori, 1969); Stefano Soriani, "The Venice Port and Industrial Area in a Context of Regional Change," in *Cityports, Coastal Zones and Regional Change: International Perspectives on Planning and Management*, ed. Brian Hoyle (Chichester: John Wiley and Sons, 1996), 235–48.

[9] Vigarié, "Maritime Industrial Development Areas: Structural Evolution and Implications for Regional Development," 23–37; David Pinder, "Le principali implicazioni del cambiamento delle funzioni portuali per gli ambienti costieri," in *Porti, città e territorio costiero: le dinamiche della sostenibilità*, ed. Stefano Soriani (Bologna: Il Mulino, 2002), 185–98.

[10] Ilda Mannino, Stefano Soriani, Gabriele Zanetto and Francesco Zanini, "Bonifiche ambientali e riqualificazione delle aree portuali-industriali: I casi di Anversa e Porto Marghera," *Rivista Geografica Italiana* 111, 1 (2004): 201–31; Marco Ostoich and Stefano Soriani, "Il disinquinamento dei suoli e delle acque sotterranee nei megasiti industriali contaminati: Il caso di Porto Marghera," in *Politica e gestione dell'ambiente*, eds. Monica Camuffo and Stefano Soriani (Bologna: Pàtron Editore, 2015), 91–112.

- ✓ The crisis of Porto Marghera coincided with important socio-economic changes that occurred within both the Venetian area and the Veneto Region. As regards Venice, it has experienced, since the early 1980s, a dramatic development in tourism and related activities. Moreover, during the 1980s, Central Veneto became one of the most dynamic areas in Italy, thanks to the development and consolidation of small and medium-sized firms.[11]
- ✓ During the 1980s the port failed to react to containerization and intermodality, both for infrastructural and organizational reasons. In the same period, the *interporto* (inland port) of Padua, located about twenty kilometers from Venice, became increasingly important in the national and international transport system, by fueling the activity of the Tyrrhenian ports (above all, Genoa and La Spezia) and, to a minor extent, the north European ports (such as Rotterdam, Antwerp, and Hamburg), thanks to the organization of *minibridges*[12] (new railway services that connect inland ports and seaports).

Against this background, the steadily decreasing role of Porto Marghera in the evolution of the Venetian area, the rise of new economic specializations on Venice's mainland and in Central Veneto, the impressive growth of tourism, the international echo of the quarrel on the protection of Venice, have all combined to emphasize the social perception of Porto Marghera as a hard legacy inherited from the large-scale industrial development in the lagoon, an experience that has left behind severe social, economic, and environmental problems.[13]

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[11] Stefano Soriani, "Problems and opportunities for future development: new prospects for the Veneto region", in *Development strategies in the Alpine-Adriatic Region*, ed. Gyula Horváth (Pécs: Centre for Regional Studies and Hungarian Academy of Sciences), 109–41.

[12] Ariel Van Klink, "The port network as a new stage in port development: The case of Rotterdam," *Environment and Planning A* 30 (1998): 143–60; Gabriele Zanetto, Stefano Soriani, Roberto Roson, and Gilberto Dall'Agata, "Medium size ports and inland transport nodes' development in a context of regional change: The case of the Veneto region," *Rivista Geografica Italiana* 106, 2 (1999): 311–34.

[13] Soriani, "The Venice Port and Industrial Area in a Context of Regional Change," 235–48; Stefano Soriani and Alessandro Calzavara, "Dinamiche globali e determinanti locali-regionali nella riqualificazione delle aree portuali e industriali: Il caso di Porto Marghera," *Rivista Geografica Italiana* 123, 2 (2016): 177–98.

From the mid-1990s onwards: The port, the city and the lagoon – towards a new synergy?

The 1980s represented a period of deep distrust within the port sector, with Porto Marghera increasingly being perceived as a very difficult problem to be managed. The picture changed in the mid-1990s, when the importance of the port as one of the main driving forces behind territorial transformation was "rediscovered."

From this period onwards, the commercial port began to demonstrate great dynamism. The main reasons for this were[14]: firstly, the increasingly important role played by the Mediterranean Sea in the maritime system, through the globalization of economies and expanding trade between East Asia and Europe; secondly, the technological and organizational changes that occurred within the Mediterranean transport system, of particular importance being the organization of *hub and spoke* systems, based on trans-shipment activity. This innovation meant that *feeder services* became more important, thus allowing many small and medium-sized ports, such as Venice, to play a dynamic role as regional *gateways*. Thirdly, also of importance, was the privatization of port organization, thanks to national law no. 84/1994, which introduced the *landlord model* into the Italian port system and also helped the port of Venice to regain competitiveness.

Another fundamental driver of change in the port's activity was the dramatic development of the cruise market. Thanks to its geographical position, good continental accessibility, and the city's historical and artistic value, Venice has today become the main port in the Adriatic corridor and the East Mediterranean area, and one of the most important Mediterranean *home ports* (origin and/or destination of cruise itineraries). Venice had 240,000 passengers in 1995. The number rose to 890,000 in 2006, and to 1,580,000 in 2015.[15]

Furthermore, the mid-1990s ushered in a period of genuine cooperation between port and city authorities. A Protocol Agreement in 1997, between the Council of Venice and the Venice Port Authority (VPA), foresaw the expansion of port activity in abandoned industrial areas in Porto Marghera, and the parallel specialization of the Marittima

[14] Stefano Soriani and Gabriele Zanetto, "Portualità e dinamiche sostenibili: Il caso veneziano," in *Porti, città e territorio costiero: le dinamiche della sostenibilità*, ed. Soriani, 255–85; Giovanni Ridolfi, "Rotte oceaniche e servizi feeder: Il nuovo ruolo del Mediterraneo," cit. 93–112.

[15] Stefano Soriani, Stefania Bertazzon, Francesco di Cesare and Gloria Rech, "Cruising in the Mediterranean: Structural aspects and evolutionary trends," *Maritime Policy and Management* 36, 3 (2009): 235–51.

sector (the port sector in the historical city) in cruise activity (see Fig. 1).[16] The *modernizing-in-situ* option (to provide the port with new land by reusing obsolete port and industrial areas) was regarded and promoted at that time by both the city and the VPA as the most pragmatic solution to the port's need to obtain new space for sustaining its dynamism. For the city, this meant the "retreat" of commercial port activities from the Marittima sector and their relocation to abandoned industrial sites in Porto Marghera.

As a result, in little more than a decade both the spatial and functional structure of Venetian waterfronts were profoundly modified. Porto Marghera has become more and more "colonized" by distribution, logistic, and service activities related to the commercial port function, while the Marittima sector has been restructured to become a modern port for cruise activity. Many technical reports, widely covered by the media, underlined the important economic impact of the "new port"; moreover, these reports contributed to reinforce the belief that the renewed dynamism of Venice's port rested, above all, on activities (commercial traffic and passengers) that were considered to be more "environmentally friendly", in comparison to the "old Porto Marghera".

In this way, after a period of deep crisis within the port industry and of eroding social legitimacy of port activity, the port was once again perceived and portrayed by the economic and political systems, as well as by the media, as a dynamic force in the economic and social revitalization of Venice; moreover, the functional transformation that the port experienced in the 1990s was considered to be a fundamental contribution to the attempt to improve the port-environment relationship, which up to this point had been characterized by strong conflict. [17]

Today, and beyond: The future of the commercial port, and the project for an *offshore* container terminal

As argued in the previous section, the increasing dynamism of the commercial port sector since the mid-1990s has played an important role

[16] Stefano Soriani, "Networks and Trust in Venice: The Port as Social Agent," in *Social Capital and Urban Networks of Trust*, eds. Jouni Häckli and Claudio Minca (Farnham: Ashgate, 2009), 147–69.

[17] COSES, *Analisi della funzione portuale veneziana* (Venice: COSES, report no. 20, May 1998). Stefano Soriani, ed., *L'importanza della crocieristica per Venezia* (Venice: Centro IDEAS, Università Ca' Foscari Venezia and Risposte Turismo, February 2006); Soriani, "Networks and Trust in Venice: The Port as Social Agent," 147–69.

in improving port-city relations.[18] Today, however, new threats are challenging the future of the port.

The first challenge comes from the never-ending process of gigantism. The increasing size of container vessels represents a factor that is contributing to ever increasing port competition, on a variety of levels. This means that the port of Venice, because of its limited nautical accessibility,[19] is expected to be confronted by severe limiting factors which may hamper its future activities. The second threat concerns accessibility problems that are likely to compromise port activity when the MOSE system is brought into operation.[20] Moreover, because of the increasing size of vessels the port is at risk of becoming less attractive to liners, particularly in the container sector, which is more "footloose" in comparison to conventional general-cargo ships.

In order to cope with these threats, the VPA has recently designed a project for the construction of a new *offshore* port terminal.[21] The chosen site is about eight nautical miles from the coast (see Fig. 1). This open-sea terminal will be defended by a 4.2 kilometer outer breakwater. It will house an oil terminal, connected to Porto Marghera by a pipeline, and a container terminal, with a 1.2 kilometer bank. The depth of the sea in the chosen area is about twenty meters. It is planned that the oil terminal will be able to handle an annual traffic of about 6.5 million tonnes of crude oil, 770,000 tonnes of oil products, and 2.3 million tonnes of diesel oil. The container terminal will have a wharf 1,000 meters in length and 200 meters in width, with an overall surface area of 200,000 square meters and a capacity of about 2,000,000 Teu (twenty-foot equivalent unit). The *offshore* terminal will be connected to a new *onshore* container terminal, located in Porto Marghera, through *lash vessels*, which are designed to carry barges without motors or crew and which can carry 320 containers each (called *cassettes*). The cranes have been designed in such a way as to

[18] The total port throughput in 2014 was 24.35 million tonnes (mt): liquid bulk (oil and chemical products) 9.9 mt; dry bulk 6.5 mt; container 4.3 mt (446,000 Teu: twenty-foot equivalent unit); ro-ro (commercial ferries) 1.2 mt; conventional general cargo 2.4 mt.

[19] According to existing planning regulations, the maximum depth of port channels in Porto Marghera is 12 meters.

[20] MOSE is the system of mobile barriers aimed at protecting the city from high tides. Consorzio Venezia Nuova, *Measures for the Protection of Venice and its Lagoon, Report* (Venice: Consorzio Venezia Nuova, 1997). The realization of the project has suffered from many delays; it is expected to enter into operation in 2018.

[21] Paolo Costa and Maurizio Maresca, *The European Future of the Italian Port System* (Venice: Marsilio, 2013).

guarantee a fast turnaround, provided administrative procedures will be carried out at the *onshore* terminal. While oceanic vessels can operate at the *offshore* terminal, the *lash vessels* and the *cassettes* are designed to be compatible with the actual depth of lagoon channels.[22]

When one considers the main arguments in favor of this project, the following issues deserve attention:

- ✓ In the VPA's view, this project aims to facilitate the most recent trends in gigantism. The *offshore* container terminal is meant to allow the port of Venice to accommodate the most recent trends in the maritime industry, thus improving its position in the container market.
- ✓ The offshore project would allow the port to improve its operations despite the introduction of the MOSE system.
- ✓ The realization of the *offshore* terminal will make it easier to manage the environmental issues of the lagoon. In fact, it entails the relocation of oil facilities outside the lagoon, as prescribed by the 1973 special law for Venice; moreover, by relocating the *core* of port activity outside the lagoon, it has the potential to harmonize port activity and environmental concerns, within the lagoon. From this perspective, the APV sees and promotes the project as a "win-win solution."
- ✓ This up-scale project has the potential to enhance, together with other expansion projects in other North Adriatic ports (such as Ravenna, Trieste, Koper, and Rijeka), the competitiveness of the North Adriatic range at a European level, thus balancing the European transport system that is today dominated largely by north European ports.

The project also contains some adverse elements that can be summarized as follows[23]:

- ✓ The project is very costly,[24] particularly in the present climate of economic crisis and financial instability. Moreover, the willingness

[22] Technical details are available at www.port.venice.it/it/piattaforma-daltura.html and at the blog, offshore.port.venice.it.
[23] Soriani and Calzavara, "Dinamiche globali e determinanti locali-regionali nella riqualificazione delle aree portuali e industriali: Il caso di Porto Marghera," 177–98.

to help finance such an infrastructure by private companies, who should benefit from its realization, is not explicit. Recently, some large Chinese investors have expressed their interest in the project.[25]

- ✓ The project is innovative from a technological and organizational point of view. However, in terms of the technical and organizational efficiency of trans-shipment operations in the *offshore* terminal, it remains a very complex project.
- ✓ Even though, in the last few years, an attitude of cooperation has arisen among the North Adriatic ports, as the establishment of NAPA (North Adriatic Port Association) confirms,[26] the project has opened the door to confrontation among these ports, as regards the allocation of (steadily decreasing) public funds. This point underlines the need for greater coordination in port governance in the North Adriatic area. It should also be remembered that other North Adriatic ports are, likewise, in the process of planning up-scale programs, and the fact that all these projects may not be successful should be borne in mind. This does not mean that new infrastructure is not needed; if North Adriatic ports wish to increase their competitiveness within the market this is certainly of relevance. Rather, this simply means to underline the fact that the different projects for infrastructural development should emerge from a real North Adriatic vision, shared and supported by the most important actors involved in the problem. The decision-making process should, therefore, take into consideration, from the very beginning, the North Adriatic angle.
- ✓ The project reflects a strong supply-side attitude, meaning that it aims to meet the requirements of the maritime industry through new and ever-larger infrastructure. This approach tends to underestimate the importance of strategic, marketing, and organizational aspects in port competition. From this perspective, one of the most important priorities in the North Adriatic is to improve coordination and cooperation between the different agents

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[24] Estimates vary from 2.1 to 2.8 billion euro. Costa and Maresca, *The European Future of the Italian Port System*.

[25] In recent years the attention given to Eastern Mediterranean ports by large state and private Chinese investors has increased considerably, in the context of the so-called *New Maritime Silk Road* vision.

[26] Stefano Soriani, "Natura e forme delle iniziative di *co-opetition* tra porti: Evidenze, questioni aperte e rilievi critici nel caso alto adriatico," *Rivista Geografica Italiana* 118, 1 (2011): 457–520.

involved in port affairs, and, accordingly, to design new port and transport *clusters* and *networks*.

- ✓ The North Adriatic Sea is one of the more fragile coastal and marine environments in the Mediterranean. In order to avoid increasing conflict with other sea users, through the construction of an *offshore* terminal, new Integrated Coastal Zone Management (ICZM) plans and Marine Spatial Planning (MSP) initiatives must be designed and implemented.[27]

To conclude, such a project would have the potential to open a new phase of synergy between the port and the city. It could meet both the demand for Venice to improve its position as a competitive port, as well as the need to "decouple" the issue of local port development from the issue of environmental management of the lagoon. However, the future of the project is unclear as it remains highly controversial. Costs are exorbitant, and the "development coalition" needed to support its realization is currently still lacking.

The future of cruise activity

The development of cruise activity in Venice has been, in recent years, dramatic indeed. In 2007 the port registered 987,000 passengers, and in 2013 more than 1.8 million. The port of Venice is today one of the most important *home ports* in the Mediterranean.[28]

A principal element that has characterized the Mediterranean cruise market in recent times is the utilization by major multinational shipping lines of increasingly larger vessels.[29] Today, the mass market is dominated by vessels of more than 100,000 GT (gross tonnage).[30] In many

[27] From this perspective, it is important to remember that in Italy the management of the sea is still at an embryonic stage. Fabrizia Buono, Stefano Soriani, Monica Camuffo, Marco Tonino and Andrea Bordin, "The difficult road to Integrated Coastal Zone Management implementation in Italy: Evidence from the Italian North Adriatic regions," *Ocean and Coastal Management* 114 (2015): 21–31.

[28] Stefano Soriani and Stefano Marchiante, "Sviluppo della crocieristica nel Mediterraneo ed evoluzione delle relazioni città-porto: Fattori critici e questioni aperte nel caso veneziano," *Rivista Geografica Italiana* 117, 2 (2010): 423–48.

[29] Soriani, Bertazzon, di Cesare and Rech, "Cruising in the Mediterranean: Structural aspects and evolutionary trends," 235–51.

[30] In April 2013 the ship MSC Fantasia called for the first time at the Port of Venice. The ship is 333 meters long, just under 38 meters wide, and about 67

Mediterranean urban ports it is evident that gigantism is posing severe threats due to the risk of accidents, the problem of water and air pollution, and the congestion caused by huge numbers of daily visitors. Venice is paradigmatic of such threats.

The debate (and the concern) on the sustainability, in the case of Venice, of such a development, based on ever-increasing vessel size, is not new. However, it has been exacerbated by the Costa Concordia disaster (January 13, 2012) in the waters surrounding Isola del Giglio in Tuscany.

The most important issue is the transit of these "giants of the sea" through the San Marco Basin. These ships are completely "out of scale" with respect to the urban environment and scenery (see Figs. 2 and 3). Even if navigation is strictly monitored and regulated, the risks associated cannot be eliminated. Another important problem is air pollution, as the port facility is *in* the city (the Marittima, where the cruise ships moor, borders the urban quarter of Santa Marta). Regarding this aspect, recent reports have registered that the situation has improved, thanks to voluntary agreements adopted by cruise companies to reduce pollution, in particular with respect to the content of sulfur in fuels. The issue remains, however, highly controversial. At the same time, it has been suggested that the transit of ever-larger vessels can exacerbate erosion. This aspect is debatable, and different pro and con arguments have been raised by various scholars.

In recent years, the issue has acquired great popularity thanks to the *Comitato No Grandi Navi – Laguna Bene Comune*. It argues that the large cruise vessels should not enter the lagoon; it believes that the problem can be solved only through the realization of a new cruise port outside the lagoon; it opposes any projects concerning the excavation of new navigable channels in the lagoon (which would allow even the largest vessels to continue to operate in the Marittima sector without passing through the San Marco Basin); it maintains that urban policy is not as concerned with the protection of the fragility of the city as it should be; and it opposes the "commodification" of the historic city from mass tourism[31] and gentrification.

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meters high, with a GT of 137,000. The ship can accommodate 3,270 passengers and has a crew of 1,370 people.

[31] In 2014 the historical city recorded about 26 million visitors, most of whom were daily excursionists (meaning an average of about 74,000 visitors each day). Mass tourism has an enormous impact on the city's life. The quality of living for dwellers is steadily decreasing due to congestion, low accessibility to services, and overcrowding; the cost of living and housing is one of the highest in Italy. It is worth remembering that population figures in the historical city continue to

The *Comitato* urges for a new right of citizenship in the decisions regarding the most important issues concerning the city and the lagoon. It organizes many public events and has developed, through a wide utilization of social media, the capacity to draw public attention to the quarrel over cruise activity in the lagoon (see Fig. 4).[32]

Soon after the Costa Concordia disaster, passage through the San Marco Basin of vessels exceeding 40,000 GT was banned (National Decree Clini-Passera, March 2, 2012). The entering into force of this provision, however, has been postponed until an alternative solution becomes available.[33] In 2013 a regulation from the local Maritime Authority established that only vessels not exceeding 96,000 GT were allowed to travel through the San Marco Basin. This regulation was then removed, as a result of legal actions brought by the company which manages the cruise terminal. Regardless of legal disputes, cruise companies have since decided, of their own volition, only to enter Venice's port with vessels not exceeding 96,000 GT.[34]

Due to such a complex and delicate situation, a real controversy has arisen in recent years regarding the economic importance of cruise activity to Venice. A survey commissioned by the VPA in 2013 confirmed the economic importance of the sector. According to this survey, about 3.2% of the Municipality of Venice's GP and about 4.1% of its jobs rely on cruise activity. Interestingly, the survey has calculated that the negative effects of the application of the Clini Decree on local industry would be highly relevant.[35] These results were contested by another survey, which also attempted to value the externalities caused by cruise activity (air and

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decrease (in 2015 there were about 56,000 inhabitants, whereas in 1951 they numbered about 175,000). UNESCO and many distinguished scholars have pointed out several times in recent years the unsustainability of the demographic, social, and economic trends that are driving the evolution of the historical city. See Salvatore Settis, *Se Venezia Muore* (Turin: Einaudi, 2014). See also van der Borg in this book.

[32] Information regarding the *Comitato No Grandi Navi*'s activity is available on the web:http://www.globalproject.info/it/tags/nograndinavi/community, and https://it-it.facebook.com/comitatonograndinavi/. See also Silvio Testa, *Invertire la Rotta* (Venice: Corte del Fontego Editore, 2014).

[33] A decision about the above-mentioned "alternative solution" has not yet been taken, as of February 2017.

[34] As a consequence of such a decision, the number of passengers decreased from about 1,815,000 in 2013 to 1,580,000 in 2015.

[35] Cesare Dosi, Ignazio Musu, Dino Rizzi and Marco Zanette, *L'impatto economico della crocieristica a Venezia* (Venice: Autorità Portuale di Venezia, February 2013).

water pollution). The results of this survey concluded that the economic advantages were not as high as described in the first survey, and, more interestingly, that the externalities caused by the cruise sector outweigh such market benefits.[36]

The results of the above surveys must be considered with caution.[37] However, they received an important echo in the public and political debates over the cruise port and its relationship with the city and lagoon. The floor was offered to the different actors involved in the quarrel, giving them the opportunity to outline their own problem and a strategy for its solution. In support of the local cruise industry, the positive results of the first survey endorse the consideration that the Marittima has to remain at the core of cruise activity in the lagoon, thus opposing any solutions calling for the relocation of the cruise terminal to other areas of the lagoon or outside it. For their opponents, the results of the second survey demonstrated that the one commissioned by the VPA had overestimated the economic importance of the sector, thus misleading the decision-making process regarding the search for alternative solutions.

As regards possible solutions to the quarrel on the future of the cruise port, attention has focused in recent years on different alternatives (see Figure 1):

- ✓ The first one, supported by the port industry, entails the dredging of a new channel in the lagoon. Cruise vessels, even the largest ones, will continue to find a home in the Marittima sector, by entering the lagoon through the Malamocco inlet (instead of the Lido inlet), thus avoiding passage through the San Marco Basin. From the VPA's perspective, this is the only solution that can, at least in the short term, allow the port to retain its role as *home port*; alternative

[36] Giuseppe Tattara, "E' solo la punta dell'iceberg! Costi e ricavi della crocieristica a Venezia," *Economia e Società Regionale* 31, 3 (2013): 136–65. Giuseppe Tattara, *Contare il crocierismo* (Venice: Corte del Fontego Editore, 2014).

[37] In fact, these studies (Port Impact Studies, PIS) include a high degree of subjectivity (particularly in the definition of which port-related activities should be considered and measured); moreover, they often utilize different methodologies, with the consequence that their results are not comparable. See Peter Gripaios and Rose Gripaios, "The impact of a port on its local economy: The case of Plymouth," *Maritime Policy and Management* 22, 1 (1995): 13–23; Enrico Musso and Marco Benacchio, "Demaritimisation o remaritimisation? L'evoluzione dello scenario economico nelle città portuali," in *Porti, città e territorio costiero: le dinamiche della sostenibilità*, ed. Soriani, 199–254.

solutions could only be planned in the longer term. This solution is often countered with the argument that the excavation of a new channel in the lagoon might result in further morphological upset. The excavation of such a new channel is also strongly opposed by the *Comitato No Grandi Navi*, which portrays it as a new "offence" against the lagoon and the city.

Regarding the environmental issues surrounding the dredging of a new port channel in the lagoon, the main points of argument of the VPA in favor of the scheme are as follows: a) the mud dredged from excavating the new channel could contribute to environmental restoration of the lagoon, through morphological reconstruction; and b) any negative environmental impact could be reduced by environmental engineering and mitigation measures. In the APV's view, this solution, if carefully designed and monitored, would not worsen the environmental conditions of the lagoon or exacerbate morphological problems (e.g. high-tide erosion).[38]

- ✓ The second solution entails the realization of a new port outside the lagoon. The project foresees the construction of a new cruise terminal close to the MOSE infrastructure, outside the lagoon at the exit of the *Bocca di Lido* (Lido inlet). In this case, the Marittima would continue to perform its function as a maritime station for cruisers; after completing administrative and customs duties in the Marittima terminal, cruisers would then reach the largest vessels docked at the new cruise terminal outside the lagoon by small ships, powered by electric engines and designed to reduce the *moto ondoso* (wave-motion). In this way, tourists would continue to be able to transit through the San Marco Basin and enjoy the splendid view of Piazza San Marco. This alternative is supported by the *Comitato No Grandi Navi – Laguna Bene Comune* and opposed by the port industry. The former argues that only the realization of a new cruise terminal outside the lagoon can make cruise activity sustainable in the long term. On the other hand, the latter maintains that such a solution would make the *home* function of the port untenable, because of the difficulty in organizing an adequate logistics system for people and goods in the new terminal.
- ✓ Another possible solution would be the realization of a new terminal at Porto Marghera, in an abandoned industrial area that can be reached through the existing system of port channels. This

[38] Gabriella Chiellino, Francesco di Cesare and Caterina Frisone, eds., *A Venezia dal mare: le crociere* (Venice: Marsilio, Autorità Portuale di Venezia, 2012).

alternative has some points in its favor: it would not require the construction of new channels in the lagoon, since only adjustments in the already existing accessibility system would be necessary; it would contribute to the redevelopment and revitalization of an obsolete industrial area; it would allow the port to continue to play its role as a *home port*, thanks to the proximity of Porto Marghera to the most important transport facilities (highways, the railway station, Marco Polo international airport). However, the port industry maintains that this project is, at present, not compatible with the industrial specialization of the area. Moreover, the transit of cruise vessels through the "oil canal" may result in problems in the management of commercial port activities.

Regarding the cruise problem, it is important to note that a crucial aspect concerns the complexity of the decision-making process. Such a complex issue cannot be solved with a "first-best" approach. Rather, the solution would appear to rely on the promotion of a decision-making process capable of considering and making explicit the different political, economic, and cultural values and attitudes involved in the issue, as well as the different trade-offs associated with the various solutions. At the same time, one should be reminded that not only is it important "what" is to be decided (the solution adopted), but also "how" the decision is to be taken. From this perspective, it is clear that public participation, stakeholder involvement, circulation of information and data, and transparency have so far been important weaknesses in the decision-making process. Moreover, the experience of Venice confirms that fragmentation and poor coordination of competencies remain important conditioning factors for approaching such complex issues.[39] Against this background, it is hardly surprising that up until now no decision has been taken regarding this debate.

Conclusions

Venice's entry into a new era of industrialization in the twentieth century, which began with the development of Port Marghera, produced dramatic changes in the evolution of the port-city relationship. The re-functionalization of Venice's waterfronts, according to the geo-economic processes that

[39] Stefano Soriani and Gabriele Zanetto, "I grandi porti: piani portuali, policy portuale e territorio costiero," *Urbanistica Dossier* 8, 77 (2005): 16–18.

transformed the national economy during the first half of the last century, sustained a dramatic process of economic, social, and territorial development that lasted for more than fifty years.

The 1970s ushered in a period of crisis and decline, which became more pronounced during the 1980s. Essential to this direction was the intersection between economic and environmental factors. Porto Marghera's ability to sustain and polarize economic development steadily decreased, and it became one of the most problematic areas of industrial crisis in Italy. This process was occurring, moreover, while the city of the lagoon was increasing in appeal as a mass tourism market, and while the mainland was experiencing a development model based on the dynamism of small and medium-sized industrial firms.

The "promise" of a "new" port emerged during the mid-1990s. The underlying belief was that a "new" port could support once again the local economy while contributing to the sustainability of the lagoon's ecosystem. This "promise" gained popularity both within and without the port-industrial sector. After a period of distrust within the local port-industrial sector, and eroding social legitimacy associated with the crisis of Porto Marghera's industrial specialization and with the emergence of the quarrel on the protection of Venice and its lagoon, from the mid-1990s onwards Venice's port was once again regarded as a fundamental asset for the future evolution of the Venetian region.

Today, the situation is once again changing. Two elements have come to the fore: firstly, in the last few years port competition in the Mediterranean and European container markets has become much fiercer, due to gigantism and technological and organizational innovations in the transport industry; these changes are posing new threats to the port of Venice. Moreover, the MOSE system, designed to protect the city from high tides, is likely to further reduce the competitiveness of the port. As a consequence, the future of the commercial port appears to be highly uncertain. Secondly, the dramatic growth that the cruise sector has experienced in recent times is clearly unsustainable; gigantism and the sharp increase in the number of passengers cannot be accommodated by such a fragile city.

Regarding the first point, the VPA has recently designed an innovative project for the realization of an *offshore* port terminal. This project is meant to accommodate gigantism and to remedy the marginalization of Venice and other Upper Adriatic ports in the European container market. Moreover, the project would allow the port to continue to operate and develop without suffering from the effects of the MOSE system.

From the above arguments, it is clear that the realization of an *offshore* terminal would imply a revolutionary change in the port-city relationship. For the first time in its history, the port of Venice would experience a process of "blue-sea development," with the shifting of the center of gravity of port activity towards the open sea; the opportunity for the port to operate in deep water would increase its competitiveness at the Mediterranean and European level; moreover, the realization of the *offshore* terminal would make the environmental management of the lagoon easier.

The future of the project, however, appears uncertain. On one hand, it is an extremely costly project and it is not clear how such costs will be covered; on the other hand, the project is not fully supported at the political level, because of the different positions that the North Adriatic port authorities have regarding priorities to be pursued in order to increase the competitiveness of North Adriatic ports.

The situation is even more critical concerning the cruise sector, which today represents the port of Venice's most important specialization. Different solutions have been proposed in recent times to prevent ever-larger vessels from passing through the San Marco Basin. However, no decision has yet been taken; the local situation continues to be characterized by much conflict, and the political system, both on a local and national scale, is experiencing increasing difficulty in managing the issue.

At this stage, it should be mentioned that the various actors involved in the debate (the economic and political sectors and their leaders, local administrations with regulatory functions, environmentalists, private organizations that promote and support financially preservation measures in the historical city, international institutions, etc.) manifest very different cultural attitudes and beliefs regarding the way in which the lagoon should be managed. On one side is the position that considers it imperative to oppose all development that may further modify lagoon morphology, very often regardless of the social and economic values at stake. On the opposite side are those who maintain that the lagoon has always been shaped by the result of continuous and even radical intervention by the city, which has transformed it according to social, economic, and political arguments; according to this point of view, therefore, the goal of environmental management cannot be a "returning" to past configurations or a (supposed) equilibrium, but is to manage and regulate these complex transformations in a manner compatible to the area. Moreover, another argument coherent with this position is that the initiation of MOSE, expected to occur in 2018, will make the lagoon a

completely regulated environment. As a consequence, this position argues, it doesn't make sense to adopt a purely "conservative" approach to the lagoon question.

From the above "confrontation" a basic element is emerging. After almost fifty years of discussion over the protection of the city and its lagoon, the main issue needing to be addressed remains the same: the recognition that the lagoon has always been molded by the complex, and sometimes unintended, interactions between natural dynamics and societal needs, and the question, what kind of lagoon do we want in the twenty-first century, is ultimately at the center of the debate. This, in turn, leads to the question, why? What kind of "disequilibrium" is sustainable over time? And, consequently, what criteria need to inspire and feed environmental management? And who has to decide? And for whom?[40] In other words, the lagoon of Venice epitomizes the difficulty of translating into practice two of the principles from the "ecosystem approach": the fact that environmental management is a matter of societal choice, and the fact that changes in ecosystems cannot be avoided.

It must also be pointed out that the current situation of *empasse* is the result of the poor quality of the decision-making process, in terms of transparency, circulation of information, public participation, and stakeholder involvement. Moreover, it reflects the poor integration between port and urban policies. This element characterizes the whole national context, but it plays a crucial role in the case of Venice.

Finally, the current difficult phase that the port-city relationship is experiencing can also be regarded as the outcome of a missing strategic approach to tourism development in the city. Paradoxically, many strategic planning exercises that have been promoted over the past few years focused, above all, on the goal of attracting new "post-industrial and knowledge-based activities" (almost always defined in a very broad manner), instead of paying attention on how to strategically manage the only real activity that characterizes Venice today—tourism.

This argument can also be referred to the case of the cruise industry. After all, gigantism and the powerful role of environmentalism in affecting public perceptions and attitudes cannot be regarded as an unexpected novelty: environmentalism as a global discourse has been a driver of change in port-cities since the 1980s, and gigantism started to be

[40] Andrea Rinaldo, "Equilibrio fisico e idrogeologico della laguna di Venezia," in *Venezia sostenibile: suggestioni dal futuro*, ed. Ignazio Musu (Bologna: Il Mulino, 1998), 101–46.

acknowledged as a fundamental threat for urban cruise ports in the early 2000s.[41]

From this perspective, it is questionable whether the only strategy urban ports can pursue is to simply accommodate the emerging trends (above all, gigantism) that are shaping restructuring processes in the global maritime industry. A key element for their future will also be the ability to find out new and different economic roles, even in the maritime and tourism spheres. Adopting a mixed approach—in which economic instruments (taxes and incentives) and planning provisions are combined with strategic approaches aimed at exploring the different opportunities offered by global markets—can represent, for the most fragile urban ports, the only path towards ensuring sustainable forms of tourism development.

Discussing port competition in the container sector, a leading scholar in port and maritime studies, Brian Slack, has argued that ports today are just "pawns in the game"—a game where nature and scope are becoming more and more global, but which concentrates social and environmental costs on a local level.[42] This appears to also be the case, today, for the cruise industry. If this is true, entrepreneurship for exploring new markets and products, thus avoiding the dictatorship of the mass market, will play a fundamental role in the future of many urban ports. This can be regarded as a key element in transforming fragility into resilience. It goes without saying that Venice will continue to be seen in terms of an important ongoing experiment, concerning this issue, in the near future.

[41] Pinder, "Le principali implicazioni del cambiamento delle funzioni portuali per gli ambienti costieri", 185–98; Soriani, Bertazzon, di Cesare and Rech, "Cruising in the Mediterranean: Structural aspects and evolutionary trends," 235–51.

[42] Brian Slack, "Pawns in the Game: Ports in a Global Transportation System," *Growth and Change* 24 (1993): 579–88; Brian Slack, "Globalizzazione e trasporto marittimo: Competizione, incertezza e implicazioni per le strategie di sviluppo portuale," in *Porti, città e territorio costiero: le dinamiche della sostenibilità*, ed. Soriani, 67–83.

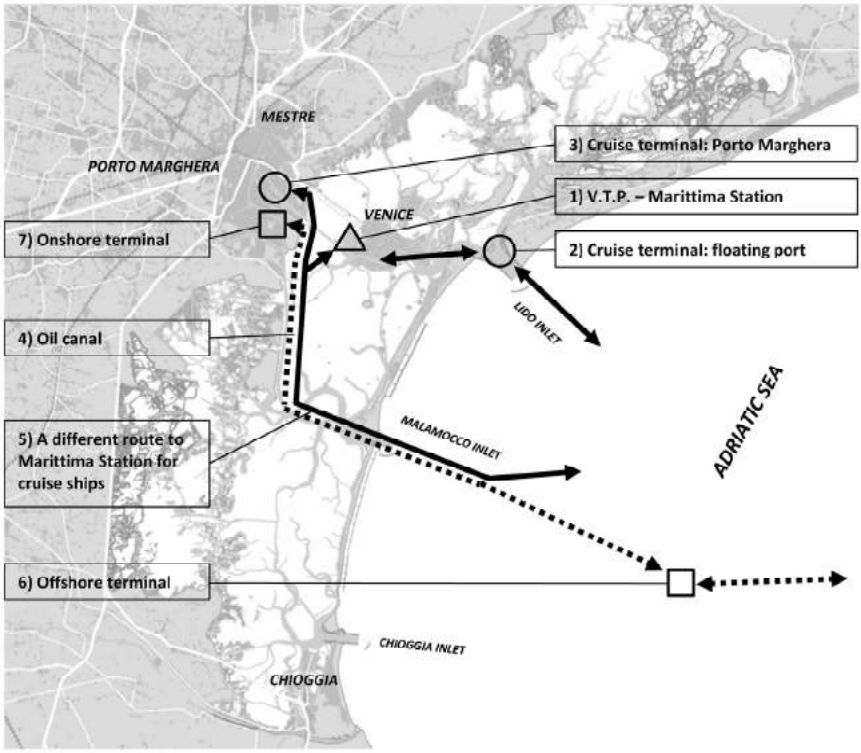

Fig. 1) Port layout: The current situation and future intervention projects concerning accessibility and port infrastructure in the lagoon of Venice (Map by Alessandro Calzavara and Stefano Soriani)

Key for Fig. 1

1) Current situation: All cruise ships enter the lagoon through the Lido inlet and arrive at the Marittima Station, in Venice's historical city center, through the San Marco Basin (black arrow).

2) Alternative project for cruise traffic: The construction of a new cruise terminal (floating port) in the Lido inlet, facing seawards. In this proposal, large cruise ships would not enter the lagoon. In this solution, passengers in transit, after disembarkation at the floating port (black arrow), would reach Venice's historical center using small electric-powered motorboats. Cruisers starting their itinerary at Venice port (Marittima station), would reach the floating port (where large cruise ships dock) using small electric-powered motorboats.

3) Alternative project for cruise traffic: The construction of a new cruise terminal in the abandoned industrial areas of Porto Marghera. In this proposal, cruise ships

would reach the new cruise terminal through the Malamocco inlet and the "oil canal" (4) (black arrow), thus avoiding the transit through the San Marco Basin.
4) The "oil canal".
5) Alternative project to reach the Marittima Station: The Marittima terminal would continue to allow the largest cruise ships to dock, but the terminal would be reached through the Malamocco inlet and the "oil canal", thus avoiding the transit of vessels through the San Marco Basin. This proposal would require a new port channel to be dredged in the lagoon, in order to connect the "oil canal" to the Marittima Station (black arrow). Nautical improvements in the "oil canal" would also be required in order to make passenger and commercial traffic compatible.
6) Project for an offshore port terminal to be constructed for commercial traffic (liquid bulks and containers) (dotted arrow). Lash vessels would connect the offshore terminal to the onshore terminal (7) in Porto Marghera.
7) The onshore terminal in Porto Marghera.

Fig. 2) A 92,600 GT cruise vessel sails through the Giudecca Canal. It has just left the Marittima Station and it is approaching the San Marco Basin (by S. Soriani)

Fig. 3) A 92,600 GT cruise vessel passes through the San Marco Basin (by S. Soriani)

Fig. 4) A popular protest against the passage of large ships in the Giudecca Canal, organized by the *Comitato No Grandi Navi – Laguna Bene Comune*, Fondamenta delle Zattere, Venice, September 25, 2016 (by S. Soriani)

CHAPTER SIX

CONSIDERING THE REDEVELOPMENT OF THE TOKYO BAY AREA FROM THE BASICS

HIDENOBU JINNAI

Introduction: Deciphering the history of the development of the Tokyo Bay area

I have always thought of the waterfront space as having something akin to a mirror-like presence that acutely reflects the changes in values over time. The Tokyo Bay, in particular, has undergone major changes in its role over many generations, as it has traveled through the pre-modern, modern, and post-modern eras.

During the period of high economic growth, the waterfront had no time for reflection, but was forced relentlessly forwards. Today, Japanese society has reached a degree of maturity. It once rose to become an economic, world, superpower and, later, watched its growth waning. Now, I feel, is the time for us to make the effort to dig deep into our past experiences, exploring our many layers of history, so that we can try and predict what may come to pass in the next era.

If we are only able to focus on the short-term demands of time, construct space, and facilities, simply to fulfill our objectives according to the past conventional concept of the economic growth period, we will not be able to create a bay area that befits a high-quality city in a mature society.

Currently, Tokyo is preparing for the 2020 Olympic Games. Once again, the Tokyo Bay area is ready to undergo a major change, as most of the sports stadiums and grounds will be concentrated in this area. This is why we need to have a vision based on the history and culture of our city, one that takes into account the future of the bay area, which is an important part of the waterfront city of Tokyo.

The difference between Tokyo and American waterfront cities

In March, 2014, I traveled to New York and Boston for the purpose of conducting a survey. These two cities are known to be leading, progressive, waterfront cities, not only in the United States but also worldwide. Their urban form took shape with the acceleration of colonization from the eighteenth century onwards. Rows of jetties and piers sprang up, creating an endless stretch of logistic space. However, in the 1960s, with the advent of the logistic revolution, container wharfs were built close to the sea while the port zone, home to the jetties, wharfs, and suchlike, adjacent to the cities, was abandoned and torn down. Even the crime rate was affected, taking a downward spiral. It is in New York and Boston that these waterfront areas were targeted for urban redevelopment, and which witnessed a splendid and strategic revival. Their achievements are an impressive sight. In comparison, Tokyo seems to have been completely left behind.

However, during the phase preceding the logistic revolution, New York and Boston had very little waterfront culture. Skipping this phase entirely, a large number of logistic facilities were built along the waterfront. Today, having lost their original function and significance, these buildings are meeting current needs. They have been transformed into a cultural space where both residents and the city's population at large are able to relax.

How does Tokyo's waterfront history compare with that of New York and Boston? The bay area has had a history of land reclamation since the start of the Edo period (1603–1867). During this historical phase, and even before, the city had already been transformed into a major, modern-day, logistic space, where people were engaged in various activities. These activities have either been passed on to become the basis for today's enterprise, or else, form a layer of nostalgic memories associated with the area. Thinking about the waterfront area of Edo-Tokyo in such a way instantly stretches our memories.[1] If we could inherit these genes of the past, we would be able to realize a much more creative method of urban planning. Simply building a modern waterfront space from zero over the previously abandoned site is not the answer. Instead, we should be reviving and re-evaluating past experiences and memories, and putting them to use for the future.

[1] Hidenobu Jinnai, ed., *Mizu no toshi Edo-Tōkyō* [Water city Edo-Tokyo] (Tōkyō: Kōdansha, 2013).

The Bay Area: Where nature and human beings coexist

Due to its shallow waters, which serve as an excellent fishing area, many fishing towns developed along Tokyo Bay. In the olden days, Asakusa was also a fishing town and many other areas, such as Fukagawa, Tsukudajima, Shibaura, Shinagawa, Omori, and Haneda, have the same spirit today.[2] The spatial structure of densely populated, residential areas, distinctive to fishing towns, can be visibly captured even in today's cityscape.[3]

As for religious festivals, common rituals include carrying a portable shrine (*mikoshi*) across the water on foot or by barge. In Tsukudajma, until the concrete embankment was built in the early 1960s, a portable shrine was carried across the sea on foot.[4] Since the relatively recent development of River City 21 and the construction of the super embankment, the portable shrine is now carried across the sea on a barge. For humans to carry the portable shrine on foot, the water needs to be shallow. At the Ebara Shrine in Shinagawa, people used to carry a portable shrine across the sea on foot. Called Kappa Festival, this religious ritual was held along the shores near the mouth of the river Meguro, in the local area of Shinagawa.[5] However, with changes in the river flow and the loss of shallow waters due to land reclamation, the ritual was moved to the shores of Haneda, and the inlet of Odaiba Marine Park. The religious ritual continues to be held to this day (Fig. 1).

Regarding the fishing industry, in the early 1960s, the fishermen of Tokyo were paid to relinquish their fishing rights due to the pollution of the sea and industrial development. Nevertheless, even today, the offshore waters of Haneda are said to be rich in fish. Many people go fishing there and sell their catch to the market. Boat keepers are a continued presence in what used to be fishing towns. One of Tokyo's main attributes is that it serves as a base for both fishing and pleasure boats. The congregation of

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[2] Nihon kagakusha kaigi, ed., *Tōkyō wan* [Tokyo Bay] (Tōkyō: Ōtsuki shoten, 1979).

[3] Ōta kuritsu kyōdo hakubutsukan, ed., *Kieta higata to sono gyogyō. Shashin ga kataru Tokyo wan* [Gone are the tidelands and the fishing. Photo history of Tokyo Bay] (Tōkyō: Tōkyōto Ōta kuritsu kyōdo hakubutsukan, 1989) Exhibition catalog.

[4] Jordan Sand, Mayumi Mori and Ichirō Ozaki, *Tsukuda ni watashi ga atta* [When there was a boatcrossing to Tsukuda] (Tōkyō: Iwanami shoten, 1994).

[5] Hidenobu Jinnai, *Tokyo: A Spatial Anthropology* (Berkeley: University of California Press, 1995); original edition in Japanese (Tōkyō: Chikuma shobō, 1985).

pleasure boats along the inlet of Odaiba Marine Park is a splendid sight, which can be enjoyed from various directions.

Tokyo Bay is a shallow sea and large boats can travel only along the ebb water route. In particular, the land near the mouth of the river had to be continually dredged. The dredged soil and sand were then used for land reclamation purposes. Studying the water-depth measurement illustration of Edo Bay during the Edo era, we note the delicate state of the sea[6] (Fig. 2). The feudal lords panicked at the sight of Perry's black ships entering Edo Bay in 1853, and ordered the construction of a series of embankments. It is interesting to note that the location of these embankments is drawn in the exact same place as the Tokyo Bay frontier.

The offshore waters of Shinagawa and Edo Harbor, near the vicinity of Tsukuda, served as key moorage sites for the Tokyo boat transport system during the Edo era (Fig. 3). The unloaded cargo was transferred onto barges to be transported along the roadside canals.[7]

The waterfront and land reclamation

Edo-Tokyo history can be said to be the history of land reclamation itself. This is quite obvious if we compare several maps that were drawn during the Edo period (Fig. 4). The stretch of reclaimed land expanded with the emergence of the modern era. After the war, land reclamation once again accelerated, increasing the area of available land (Fig. 5).

The river Sumida needed constant dredging to maintain the sand and soil pile. This pile was used to construct Tsukishima and reclaim the land in the Shibaura vicinity. A look at a map from the seventeenth year of the Meiji era (1884), preserved by the survey section, General Staff Office, shows that while Tsukudajima served as a fishing town, the adjacent island called Ishikawajima had been a labor camp for homeless vagabonds and exiles (*ninsokuyoseba*) since the end of the eighteenth century, and then became a shipyard (the future IHI Corporation). The map furthermore shows that Ishikawajima later served as a jetty. Based on the plan from the twenty-fifth year of the Meiji era (1892), the land of Tsukishima was reclaimed and a townscape consisting of orderly streets was formed. Today, it is a popular area, known as Monja Street. The

[6] Yokohama toshi hatten kinenkan and Yokohama kaikō shiryōkan, eds., *Minato o meguru nito monogatari. Edo-Tōkyō to Yokohama* [A Story of two port cities: Edo-Tokyo and Yokohama] (Yokohama: Yokohamashi furusato rekishi zaidan, 2014) Exhibition catalog.

[7] Nobuyuki Yoshida, *Toshi: Edo ni ikiru* [Live in a city: Edo] (Tōkyō: Iwanami shoten, 2015).

endless straight streets run parallel to one another, serving as the axle for the modern grid plan, which covers a wide area (Fig. 6). However, the method of building street-facing townhouses, with orderly alleys behind the front face of the streets and back rows of tenements, replicates the merchants' quarters of the Edo period. The Meiji era is, in fact, known not for its blind alleys but for its alleys (Fig. 7). In such a way, many of the modern rows of houses and alleys were conceived. Today, together with Nishinaka-dori Avenue, they have become the gourmet center of Tokyo, and home to the famous Monja, a Japanese-style, savory, flat pancake.

As the country struggled to develop industrially, the inner areas of the island served as the living space for the majority of the populace, the laborers of modern Japan. The outer perimeters of the island, facing the sea, took advantage of their geographical benefits and became port land. With its rows of warehouses and factories, the island also served as a logistic center that formed an industrial zone.[8] However, at the end of this area, where it protrudes into the sea, the newly built 3-*chōme* (block 3) of Tsukuda offers a scenic view over Tokyo Bay. And with the construction of second homes, people have begun to use this area to sunbathe.

From the late Meiji era, land reclamation expanded to Shibaura and, later, to Shinagawa. During the early days of land reclamation, large homes with gardens were built on this land in Shibaura. Geisha quarters also developed in the area (Fig. 8). Thanks to the diligent activities of conservation organizations, the splendid architecture of geisha call offices, characterized by a Chinese-style pediment, is being preserved. Until very recently, it was possible to view this magnificent architecture from the monorail. The area in Shinagawa and Ōmori leading all the way to Haneda was home to amusement quarters, also built on reclaimed land. A typical modern Japanese waterfront, it served as an industrial zone and also housed the amusement corridor for the people working there.[9]

The amusement corridor moved from Nezu to Fukagawa and the Suzaki Amusement Quarters were subsequently designed and built on reclaimed land. It seems fitting that a type of fantasy world, an escape from the real world, should have been built on reclaimed land near the sea.

[8] Hidenobu Jinnai, *Mizube toshi: Edo-Tōkyō no wōtāfuronto tanken* [Water city: The waterfront adventure of Edo-Tokyo] (Tōkyō: Asahi shinbunsha, 1989).
[9] Ibid.

The mechanism behind a modern, Japanese-style, logistic space

Tokyo's history as a modern port is interesting. The foreigners who sailed to Japan at the end of the Edo period wanted to open a port in the city. However, the Edo government opposed the idea, giving the reason that the port was too small for large ships. In the end, a port was built in Yokohama. However, Ukichi Taguchi (1855–1905) and Eiichi Shibusawa (1840–1931), who were considering transforming Tokyo into an international city of trade, incorporated the port-building plan into the city's reformation plan, which was part of the Meiji era urban planning project.[10] The proposals that were presented were realistically not possible, taking into account the state of the port. Sand and soil were inclined to collect at specific locations where large wharfs protruded. The plan was scrapped with the result that, until today, Tokyo has never had the kind of protruding port similar to the pier in New York, and the wharf in Boston. Yokohama, on the other hand, unlike Tokyo, had no major river so conditions there were much more beneficial for port construction. Thus, an American-style, modern, port space was partially realized, which included a large pier.

Partly due to Yokohama's opposition, it was not possible to construct a modern port in Tokyo for many years. However, in the aftermath of the Great Kantō Earthquake, which struck the Tokyo metropolitan area in 1923, boats were used to transport relief goods on water and this proved an effective means of transport. This is how the three wharfs at Hinode, Shibaura, and Takeshiba came to be built during the period 1932 to 1934, and how the base of Tokyo port was constructed.[11]

Let us now turn to the mechanism of logistics. Many of the older port cities in the world had port functions within their cities. This is true of cities with water networks such as Venice, Bruges, Amsterdam, Bangkok, and Suzhou. Even Hamburg, an inland river port able to handle a large amount of cargo, was a lively urban port during the middle to modern era, with inland port space along its riverfront. However, with the advent of the nineteenth century, circumstances changed and a specialized logistic area with rows of large warehouses was constructed along the

[10] Terunobu Fujimori, *Meiji no Tōkyō keikaku* [Town planning for Tokyo in the Meiji era] (Tōkyō: Iwanami shoten, 1982).
[11] Yokohama toshi hatten kinenkan and Yokohama kaikō shiryōkan, eds., *Minato o meguru nito monogatari. Edo-Tōkyō to Yokohama*.

river Elbe, outside the city. This is how Hamburg became a globally renowned port city. Then, from about 1960, with the advance in container logistics, warehouses were no longer needed. Today, Hamburg is the center of worldwide attention due to its HafenCity redevelopment.

Tokyo experienced a similar history. During the Edo period, cargo was transferred onto barges in the waters of Tsukudajima (Fig. 3). The barges created an endless stream of traffic along the roadside canals inside the city, mainly around Nihonbashi, as they transported the cargo to the warehouses that lined the embankments (Figs. 9–10.). This is referred to as the "inner port system." However, with the arrival of the Meiji era, the logistic center moved beyond the port where there was more space. This resulted in the development of the area around Sagachō in Fukagawa where boat transport was possible. During the early Shōwa era, there were rows of splendid modern warehouses along Ōkawabata. From the early 1980s, these obsolete warehouses were converted into art galleries and other cultural venues. This was the beginning of the "loft" culture. Buildings such as the Food Provision Building (Shokuryō Birudingu) in Sagachō, and the Mitsubishi Warehouse (Fig. 11) in Ōkawabata, became very successful venues. Unfortunately, both were torn down during the subsequent period of development. In western cities, such buildings would more than likely have been transformed into lively cultural hubs to serve the next generation.

A fact not to be ignored is the construction of the Mitsubishi Warehouse at the foot of Edobashi, near Nihonbashi, during the early Shōwa era, and the ways in which cargo was lifted into the warehouse using a crane. Precious audio-visual records of such activity remain even today.

Unlike Boston, which underwent a major land reclamation project, land reclamation in Tokyo, from the late Meiji era to before the war in the Shōwa era, was implemented in a completely different way. In Tokyo, a spatial structure of a series of islands was built. Instead of building rows of jetties that opened up to the sea, several canals were left between the reclaimed lands. There were rows of warehouses on both sides of the canals and cargo was transported on barges.[12] This is how the familiar modern scene of rows of cranes came into existence. American ports would have fulfilled their function by constructing rows of protruding jetties all the way to the sea or river. Instead, Tokyo realized a logistic space that was akin to the modern redevelopment of the Edo era embankment along the canal.

[12] Hidenobu Jinnai, *Mizube toshi: Edo-Tōkyō no wōtāfuronto tanken*.

The other purpose of these canals was to enable fishing boats to gain access to the sea from their inland fishing towns. Thanks to the wisdom of the new and old schemes, many pleasure boats even today can navigate these modern canals to arrive in Tokyo Bay.

The inner port, which extends from Shibaura to Shinagawa (Fig. 12) and which was built in the above-described manner during the modern period, seems to have certain similarities with the canal route in the historic areas of Amsterdam and Venice. However, in terms of being a space which was used exclusively for logistics purposes, the inner port appears to be a valuable space for current urban regeneration, and it possesses very few similarities with the rest of the world. The water route is wider than that of the roadside canal which ran through the Edo center. This comfortably wide stretch of water has major potential as a modern water space. Yet, from an economic perspective, I find the common sight of high-rise apartment blocks to be problematic. I would appreciate seeing a greater diversity of cityscape function, both culturally and creatively. To this end, the existing warehouses are an extremely precious asset. The internal space is large and open and amenable to many different kinds of activity. The buildings themselves, in fact, narrate the necessity of maintaining their presence along the waterfront (Fig. 13). In my opinion, it might be a good idea to accelerate the process of converting warehouses and, additionally, build a boat-mooring area in front of the waterfront buildings. In such a way, we will be able to enjoy the scenery of boats traveling up and down the river.

The function of reclaimed lands during the industrial period

With the modernization of urban Tokyo, land reclamation greatly increased. Even before the war, it had already expanded to Harumi and Toyosu. These reclaimed areas were assigned various different roles over time, such as serving as a logistic space, as an energy base, and, later, as a garbage disposal center, as happened at Yumenoshima. Tokyo had drawn attention to itself for being a fantasy city on the sea when it campaigned to host the 1940 Olympics. Both the Olympics and the Expo, planned in celebration of the 2600th year since the mythical founding of Japan, were designed to be held on reclaimed lands. Midway through the planning stage, it was decided to move the Olympics site to Jingū Gaien, while Harumi and Toyosu were selected as Expo sites (Fig. 14). After construction began, the relationship between China and Japan deteriorated and eventually war broke out in 1937. As a consequence, the Expo was

cancelled and it fizzled out into nothing more than a phantom exhibition.[13] At that time, consideration was being given to use boats as the main transportation means to the site.

After the war, the bay area of Tokyo gained the important role of supporting Japan's industrialization and economic development. Already back in 1948, the Metropolitan Tokyo Government had engaged in a land reclamation and quay project in Toyosu, the transfer site of the Tsukiji Market. This was part of a major national construction project, and is how the coal wharf came to be built. Later, Toyosu became the energy center which was to facilitate the restoration of Tokyo. It served as a wharf exclusively for electricity, gas, steel, and coal, the base industries, reaching its heyday during the period of high economic growth. In the 1990s, it was targeted for redevelopment with the aim of transforming it into an urban space that offered new functions. On a large tract of land in Toyosu, which used to be the shipyard of the IHI Corporation, the campus of Shibaura Industrial University and a group of high-rise apartments were built, shaping a new kind of waterfront scenery. This is the result of redeveloping the abandoned facilities that supported the industrialization period.

At the same time, beyond Tokyo Bay, a huge stretch of land was reclaimed, built from the garbage and constructional soil created during the period of high economic growth. Called reclaimed land no. 13, it was intended to become the site for Tokyo's teleport town, planned by the Metropolitan Tokyo Government in 1986–88, during the period of Japan's "bubble" economy (Fig. 15).

With the bursting of the economic bubble, the Tokyo World City Expo was cancelled and the intention to create a teleport town failed. However, various events have continued to be held at Odaiba Marine Park, a comfortable setting which commands a scenic view over metropolitan Tokyo. The site has also gained popularity as a water banquet arena where pleasure boats congregate (Fig. 16). Tokyo Big Sight (Tokyo International Exhibition Center) has also played a key role in creating new activities in the Tokyo Bay area. It would seem that the allure of this futuristic, water-encircled city is capturing the hearts of its own people in different ways.

[13] Hidenobu Jinnai, ed., *Mizu no Tōkyō* [Tokyo as a water city] (Tōkyō: Iwanami shoten, 1993).

Tokyo's potential as an archipelago

Many reclaimed areas of land resembling islands were born after the Meiji era. These include Tsukudajima and Odaiba, which give us an insight into the area's history during the Edo period and the early modern era, including a glimpse of location theory. The islands vary in both shape and size (Fig. 17).

The concept of archipelago (a group of islands; a sea containing many islands) is beginning to be discussed in the regional economic stimulus arena. According to this concept, conceived by the Italian philosopher Massimo Cacciari, a previous mayor of Venice, each unique and autonomous island is linked to another, forming a territory (region) with potential. He used this conceptual model metaphorically to portray the image of autonomous and unique cities which are linked to each other in a network.[14] Art Setouchi, the much talked about project produced by Fram Kitagawa, is a true realization of this concept. Unique islands with different characters were connected to each other by boat. In the scheme, people traveled from one island to another using their five senses to enjoy art and nature.

Currently, many plans are under discussion for the Tokyo bay area as it prepares for the construction of the Olympics sports stadium. The building of a subway is perceived to be unfeasible, due to high costs and the relatively short amount of time remaining for construction work, while bus transportation is considered by many to be unreliable. This naturally leads to a high expectation regarding the use of waterways and boats. All over the world, cities such as Amsterdam, New York, and London are seeing the revival of boat transportation and this is contributing greatly to elevating the allure of a water city.

In the Tokyo bay area, on reclaimed land that used to be the industrial and harbor port zone, the residential population is increasing. It is my understanding that the affluent housewives who reside on the Shibaura islands are enjoying a stylish way of life. They are seen casually alighting the scheduled waterbuses which connect their islands with Odaiba and Toyosu Lalaport, where they socialize with friends (Fig. 18).

From the above, it is apparent that Tokyo, like Venice, cannot be separated from its connection with water. Furthermore, over time the bay area of Tokyo has continued to build a place of dynamic diversity for itself, from the Edo era to the present (Fig. 19). Thus, the area can be said to have exceptional inherent potential.

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[14] Massimo Cacciari, *L'Arcipelago* (Milan: Adelphi, 1997).

Our future potential lies along the waterfront

A recent examination of worldwide urban formation demonstrates that all cities on the water are moving in the direction of reassessing their allure as waterside cities. The number of such cities is countless, including the previously mentioned New York, Boston, and Hamburg, as well as Amsterdam, London, Liverpool, Dublin, Barcelona, Genoa, and Marseilles. In short, the waterfront is not merely creating lively touristic and commercial spaces. We are seeing top global companies seeking an attractive environment and opening their offices in such spaces. Creative businesses are also congregating in this increasingly fashionable area of renovated waterside warehouses and factories. It is amazing to witness the birth of this type of new economic foundation.

In New York, artists gathered in the Soho district of Manhattan in the 1960s and the loft culture was born. With the subsequent gentrification of the area, rents rose. When creative stimulation was lost, artistic bases moved to Chelsea, a meat-packing district (meat processing area) where waterfront warehouses proliferated, and, furthermore, to Red Hook, a crime-ridden area in south Brooklyn. In short, artistic endeavors chose to move to the districts where abandoned waterfront warehouses and factories were in good supply. These buildings were renovated and transformed into cultural hives of activity. They are, in fact, reviving the economy.

In Tokyo, on the other hand, there is still a strong inclination towards conventional development that focuses on high-rise apartments built by developers, and this is also apparent along the city's waterfront. However, an urban scape of rows of apartment towers runs contrary to the idea behind sustainable urban development, which will come to mean so much in the near future. Development with diversity, the kind that is able to transform itself as values change over time, will become highly sought after. We need to use existing warehouses and facilities to ensure functional complexity, diversification of residents and workers, and architectural diversity. My hope is that this diversity will overlap with the concept of archipelago, mentioned earlier, in order to build a new kind of urban space in the bay area. In this way, we will be able to take advantage of the natural blessings of Tokyo Bay and enjoy an Edo-style, gourmet, seafood, culture. We will see the realization of an amalgamation of both residential and business space, which will express the soul of Japanese culture, a place where the natural is blended with the man-made. Undoubtedly, the distinctive charm of Tokyo will appeal to the rest of the world. As we prepare for the 2020 Tokyo Olympics, it is high time to

consider the development of the Tokyo bay area from the basics. And this needs to be done before the existing mechanism-based style of development, prioritizing the economy, is re-ignited.

Fig. 1) Carrying the portable shrine across the sea, at Odaiba Marine Park (by H. Jinnai)

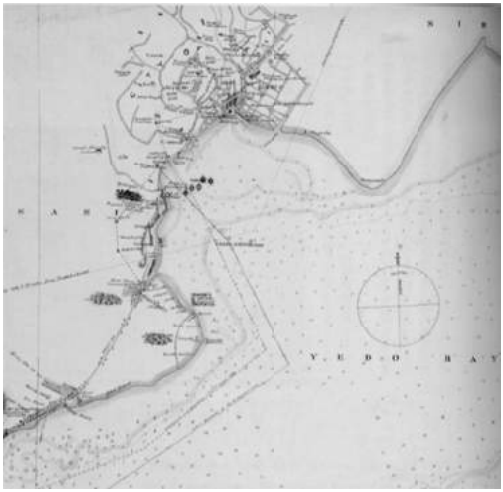

Fig. 2) Old map of Edo Bay made with English technology, 1864 (The British National Archives)

Fig. 3) Edo Harbor near the Tsukuda vicinity
Hiroshige Utagawa, "Eitaibashi zenzu" [A complete view of Eitaibashi Brigde], (Tokyo Metropolitan Central Library, Special Collection Room)

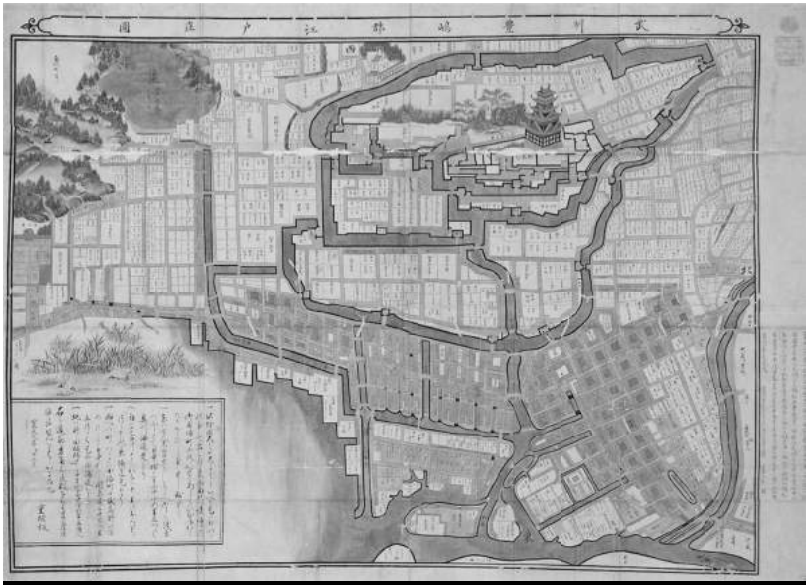

Fig. 4) *Bushū Toshimagōri Edo no shōzu* [Map of Bushū Toshima Area, Edo], the oldest map of Edo (ca. 1632) (Tokyo Metropolitan Central Library, Special Collection Room)

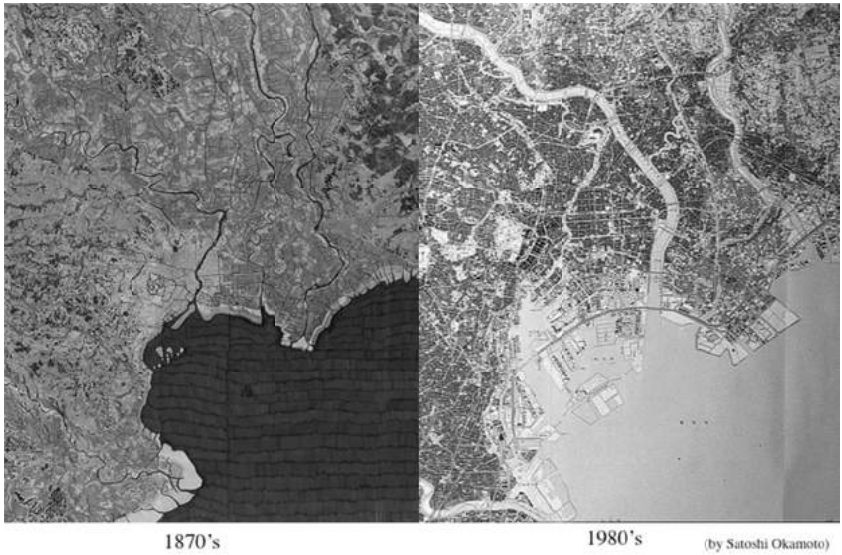

Fig. 5) Comparison of Tokyo between the 1870s and the 1980's (by Satoshi Okamoto)

Fig. 6) Map of Tsukishima of 1907

Fig. 7) Alleys and row houses in Tsukishima (by H. Jinnai)

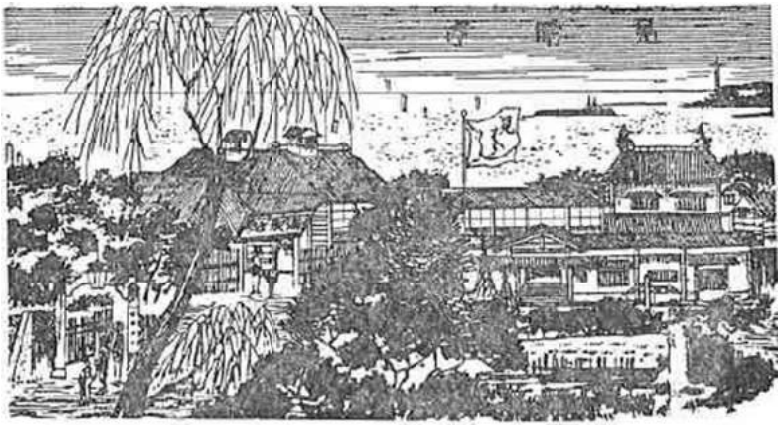

Fig. 8) Shibaura in Meiji era, from Okera Aisawa, *Tōkyō meisho kagami* [A mirror of famous places in Tokyo], Tōkyō: Tōgaidō, 1892

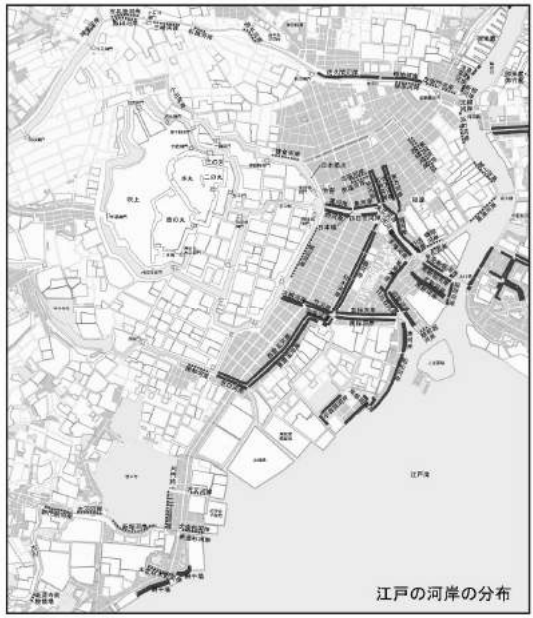

Fig. 9) Unloading embankments in Edo (by Satoshi Okamoto)

Fig. 10) Unloading embankments in Nihonbashi and Edobashi district (reprint of a map of 1884)

Fig. 11) Mitsubishi warehouse of Ōkawabata constructed in ca.1930 (by H. Jinnai)

Fig. 12) Shibaura and Shinagawa, ca. 1950

Fig. 13) Warehouse-converted restaurant along the canal in Shinagawa (TY Harbor) (by H. Jinnai)

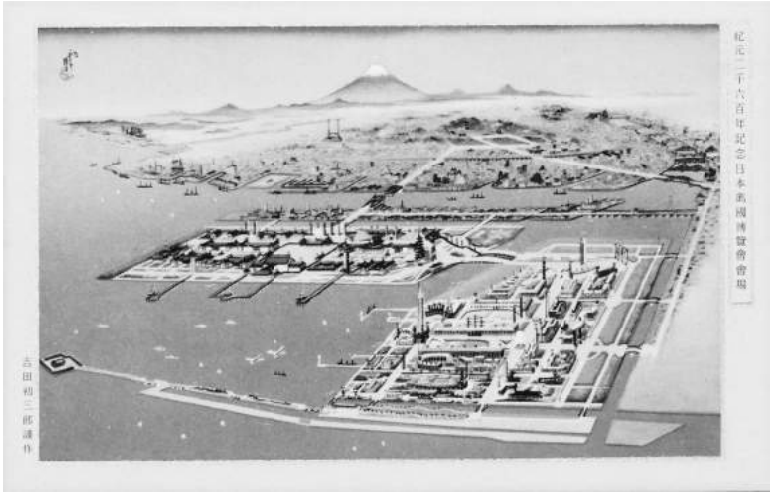

Fig. 14) Site View of the International Exposition of Japan, 1940 (Time Dome Akashi-Chuo Historical Museum/Planetarium, Chuo City)

Fig. 15) Plan for Tokyo teleport town, 1988 (Photo provided by Tokyo Metropolitan Government)

Fig. 16) Odaiba Marine Park as an important scenic place (by H. Jinnai)

Fig. 17) Tokyo Bay area as an archipelago (Photo provided by the Bureau of Port and Harbor, Tokyo Metropolitan Government)

Fig. 18) People ride the waterbus from Shibaura Island (by H. Jinnai)

Fig. 19) Regatta of rubber-boats in the Odaiba Marine Park in front of historic fortresses (by H. Jinnai)

CHAPTER SEVEN

LOSS AND RECOVERY OF LOWLAND RIVERS IN TOKYO

NOBUYUKI TSUCHIYA

Rivers and waterfronts in Tokyo have been baffled by economic development for the past 150 years. Many rivers, moats, and canals have been filled in and turned into roads, railroads, sewer channels, and construction sites for private buildings. As a result, we have lost the city's wealth of waterfronts and of the ways in which water transportation once operated. It is our belief that a knowledge of the historical background of the city can be used as a reference point by newly developing cities.

Japan is made up of approximately 73% of mountainous belts and hillside areas, about 11% of plateaus, and around 14% of lowlands. The latter are the areas at or below 100 meters above sea level, 70% of which have the tendency towards flooding. In these lowland areas live approximately 50% of the entire population of Japan and it is where 75% of gross assets are concentrated. Among such areas, Tokyo stands out with its Gross Domestic Products (GDP) rate extending beyond 90 trillion yen, ranking seventeenth place among all nations. Tokyo has been developed to such an extent that it is considered a nation.[1]

Tokyo's economic activities were facilitated by water transportation, which was developed along the existing network of rivers. However, during the rapid economic growth period after World War II, most of the rivers in the city disappeared, either being buried under concrete or vanishing underground. Recently, some projects have been initiated in an attempt to recover the richness of the waterfront environment. A discussion concerning the background history regarding the waterfront of Japan's capital city, Tokyo, is very important in order to develop ideas

[1] *Heisei 24 nendo kenmin keizai keisan* [Report on Prefectural Accounts, 2013] (Tōkyō: Naikakufu keizai shakai sōgō kenkyūjo, 2013), 35; see also IMF World Economic Outlook Database, April 2015.

about the significance of rivers, and appropriate measures needed to be taken in the future. A brief look at the history of how Tokyo lost its waterfront can help us to reflect upon how we may co-exist with rivers in the future.

The first step: The end of isolation policy and the start of modernization

Railroad construction and moat filling

Fig. 1 shows a pictorial map drawn at the end of the Edo period (1603–1867). It enables us to realize that Edo was a town that had been growing for 260 years, building water channels and filling seas, expanding in size. Edo's economy and its citizens' lives were supported by these man-made moats and rivers. About one million people lived in this area and rivers were the living arteries that supported their lives.

Tokyo's moats and rivers began to experience difficulties in the 1910s when part of them were filled in to provide land for the railroads. Indeed, Japan had planned railroads across the country since the start of modernization but, at that time, the government did not have enough money to buy land for their construction. Therefore, they planned to use filled-in rivers and moats on which to construct the railroads. Thus, water channels from the Edo period were routinely buried and elevated railroads constructed over them (Fig. 2).[2]

During this period vessels used for transportation were mainly small wooden boats carried by water. Thus, although river width was narrowed due to railroad construction, moats were not completely filled in and transportation by water was still maintained to some degree. Consequently, due to the availability of these moats in Tokyo, railroad construction proceeded over a relatively short period of time.

World War II and the disposal of debris

The second phase of the disappearance of rivers started at the end of World War II. The year before the end of the War saw an increased

[2] Kenji Nakamura, *Tōkaidōsen tanjō. Tetsudō no chichi, Inoue Masaru no shōgai* [The birth of the Tōkaidō line. The life of Masaru Inoue, the father of Japan's railways] (Tōkyō: Ikarosu shuppan, 2009); Katsumasa Harada, *Nihon no kokutetsu* [Japan's railways] (Tōkyō: Iwanami shoten, 1984); Hiroshi Kubota, *Nihon no tetsudōshi seminā* [Seminar on the history of Japan's railways] (Tōkyō: Guranpuri shuppan, 2005).

amount of air raids over Tokyo and incendiary bombs were dropped indiscriminately against both civilians and the military. One night, on March 10, 1945, an air raid killed approximately 100,000 people and most of Tokyo was burned to the ground (Fig. 3). The majority of buildings within an area of about 41 km^2 were turned into rubble. By the end of the War, an area of approximately 158 km^2 was leveled to the ground producing 4.7 million m^3 of debris.[3] Rivers and moats that had existed since the Edo period were filled in to dispose of this large amount of debris. The circumstances surrounding the above will be discussed by describing the history of the Sanjikkenbori moat, the last one to disappear from Tokyo.

Sanjikkenbori Miharabashi bridge, the last one to disappear

Miharabashi bridge was built over the Sanjikkenbori moat, which was excavated on the eastern edge of Edomaejima in 1612 (Figs. 4–5). When Ieyasu Tokugawa, who founded the Tokugawa Shogunate in 1603, moved to Edo in 1590, Sanjikkenbori was the point at which the water met the land. Further eastwards the land was filled in to facilitate expansion. The filled-in area was called Kobikichō. This area would have been later incorporated into the Ginza area, becoming Ginza west.

The Sanjikkenbori was a very busy canal as it became a transportation hub for various goods during Edo's development, and numerous platforms were built alongside the waterfront (Fig. 6). Running through the heart of Edo, it supported the whole city, as an artery supports the body. The Sanjikkenbori canal began at the crossing point between the Momijigawa, Kyōbashigawa and Hacchōborigawa (or Sakuragawa) rivers. Danseibashi bridge was built over the Kaedegawa river, Shirauobashi (Ushikusabashi) bridge over the Kyōbashigawa river, and Shinpukujibashi bridge over the Sanjikkenborikawa river. As a result, the three bridges came to surround the canal crossing point.

The scene in Fig. 7, taken from *Edo meisho zue* (*Illustrated guide book to Edo*, 1834–36), shows "Mitsubashi." After dividing itself at this crossing point, the Sanjikkenbori canal changes from a westerly to a southerly direction, merging with the Shiodomegawa river at Shiodomebashi bridge in Shinbashi, Ginza 8-chōme. The waters of the Shiodomegawa river were used to fill the outer moat of Edo Castle, the mouth of the river was filled in to facilitate the building of Hamagoten Palace (now called Hamarikyū Gardens), and the moat was extended to surround Hamagoten.

[3] Tōkyō daikūshū sensaishi henshū iinkai, ed., *Tōkyō daikūshū sensaishi* [Magazine of Tokyo raids and war damage] (Tōkyō: Tōkyō kūshū o kirokusurukai, 1973), documents 4–6.

Part of the canal, the western edge of the channel, was called the Shiodomegawa river.

The Sanjikkenbori canal was crossed by several bridges. As well as Shinpukujibashi bridge, there were the Kinokunibashi, Miharabashi, and Kobikibashi bridges. At the point where the river merged into the canal, Shiodomebashi bridge was built, which later changed its name to Hōraibashi bridge during the Meiji period. The moat and the bridge do not exist today, but the intersection of the roads in this area is named after the bridge.

The Sanjikkenbori was Edo's main hub for water transportation, with Otomichogashi, Asarigashi, Matsumurachogashi, and Higashitoyotama-gashi (Toyotama, Kobiki) platforms on the east side, and Shirauogashi and Nishitoyotamagashi platforms on the west side.[4]

Sanjikkenbori and Ginza

After Ieyasu Tokugawa won the Battle of Sekigahara in 1600, in order to take control of Japan's economy he established a silver mint within Fushimi Castle in Kyoto in 1601, and ordered the merchant Sakubei Yuasa to work at the mint, which was called Fushimi Ginza. The Tokugawa family granted Sakubei Yuasa the new name of Jōze Daikoku and, thereafter, Jōze Daikoku's family engraved "Jōze" onto their silver coins and controlled their engraving and wrapping. Thus, the wrapping provided at Ginza was called Jōze wrapping. Those managing the workmen at the mint, called "Ginzajin" or "people of Ginza," were granted four units of merchant residential land, encompassing about four hectares. This area was known as Exchange Town, where the Ginza Office, the Ginzajin people's houses, and the Jōze cuppelation site were built. Cuppelated silver, brought in from across the Japanese silver mountains, was purchased and exchanged for public silver, and as a result the town was called Exchange Town.

In 1606, Ieyasu Tokugawa established a silver mint (Ginza) in Sunpu Castle (today in Shizuoka city), where cuppelated silver was exchanged for public silver. In 1608, the above-mentioned Fushimi Ginza was moved to the Kyoto Exchange and in 1612 Sunpu Ginza was moved to the south of Edo's Torimachi Kyōbashi, which was granted four units of merchant residential land. This newly created place was called New

[4] Nariyuki Ishihara, "Tōkyō no kasen ni kakawaru kanri taisei to kaishū keikaku no keii" [General details concerning the maintenance and management of rivers in Tokyo], in *Tōkyōto doboku gijutsu shien –Jinzai ikusei sentā nenpō* [Annual report – Civil Engineering Support & Training Center, Tokyo Metropolitan Government] (Tōkyō, 2010), 169–84.

Exchange Town (Ginza), while Edo's gold mint (Kinza), which was already called Exchange Town, was renamed Main Exchange Town.[5] The Sanjikkenbori (Fig. 8) and the Toyotama platform became the key elements of the water transportation system in Ginza, which grew rapidly.

Disposal of debris from the War: "Reclamation plan for disused rivers"

Today, Tokyo no longer has a system of canals and rivers of which it can be proud, nor is it possible to call it a city of water. Yet, one can easily recognize in pictorial form from the Edo period a detailed maze of moats and rivers. Why have we lost our waterways?

Seiichirō Yasui, who was the governor for thirteen years after the war, wrote an essay called "Tokyo Private Notes" in 1960. It was published immediately after he retired from office. It has a chapter entitled "Filling the canals" and describes the background behind such a move:

> A war-burned area of 158 km^2 contained the debris of an estimated 4.7 million m^3—about 160,000 truckloads with a load capacity of 5 MT per truck—and the sheer volume meant that it could not be picked up and disposed of easily. The US Army Military Government in Japan, from both a military and sanitary point of view, urged and pressed the Tokyo government to get rid of this debris as soon as possible. One possible solution was to dump it into the ocean, but there was no available budget to undertake such a project and it was almost impossible to obtain trucks.[6]

He also wrote a chapter entitled "Not like Recovering from an Earthquake Disaster," where he stated:

> The great Kantō Earthquake of 1923 and the Pacific War were completely different from each other. After the war, tax paying companies had been almost totally destroyed and, at the same time, more and more people were demanding food. The reality was that even if one could come up with a perfect plan, nothing was going to be achieved. Therefore, I decided that it would be pointless trying to learn anything from the Earthquake Disaster. Recovery planners had experience in exaggerated large-scale recovery planning after the 1923 Great Kantō Earthquake, which later turned into a mini-scale recovery plan due to Tokyo's rapidly ballooning growth, and they themselves were determined, in the interests of not repeating the same mistakes again, to come up with a grand plan; but I turned my back and crushed these ideas.

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[5] Hirokichi Taya, *Kinsei Ginza no kenkyū* [Researches on modern Ginza] (Tōkyō: Yoshikawa kōbunkan, 1962).

[6] Seiichirō Yasui, *Tōkyō shiki* [Private records of Tokyo] (Tōkyō: Toseijin kyōkai, 1960), 34–40.

At that time Governor Seiichirō Yasui instructed Hideaki Ishikawa (later to become the construction bureau chief) to come up with a plan that would not incur any expenses. One idea that emerged was: "unnecessary rivers in war-affected areas, especially in downtown Tokyo, can be filled up without much expense, within a short time frame, and can solve the issue at once. Then, if we sell the land after it has been filled in, we could make a profit." Governor Yasui wrote, "I shook hands with Mr. Ishikawa firmly with thankfulness to this idea and with the feeling that we have all been saved from this grave situation."[7]

As a result, the "Reclamation plan for disused rivers," which would ultimately erase the waterway system from the Edo period, was started by Tokyo Horikawa reclamation works. Tokyo's river network had been built for river transportation. After World War II, the means of transport began to change from vessels to automobiles. Therefore, those rivers which no longer carried vessels were targeted for landfill. A series of landfill interventions began in 1947, scheduled to be completed by the end of 1950.

In 1948, the Sanjikkenbori canal began to be filled (Figs. 9–10) and, in addition, that same year saw the filling in of the Higashi Horidomegawa and Ryūkangawa rivers; the following year, the Hottabori near Yotsuya station, the lower reaches of the Sotobori near the Kajibashi bridge, and the Rokkenborigawa and Hamachōgawa rivers were all filled in. By the end of 1950 all newly created land was sold to the general public and advertized as Tokyo's best land.[8]

Seiichirō Yasui writes that:

> … the remaining 300,000 cubic meters of waste soil were disposed of by 1951 and finally the last remaining scars from the war were removed from Tokyo, and the face of the city had recovered. By these recovery efforts, hundreds of thousands of people found employment through landfill and metal recovery works. This is the whole story and I, myself, could not have come up with a better solution than this one.[9]

Continued improvements along Tokyo's canals

Based on this "Reclamation plan for disused rivers," it would appear that Tokyo's rivers were considered useless; but was this really the case? Let

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[7] Yasui, *Tōkyō shiki*, 50.

[8] Ichizō Kojima, "Tōkyōto Sanjikkenborigawa ta san kasen no umetate jigyō ni tsuite" [On reclaiming works of Sanjikkenborigawa and the other three rivers in Tokyo], in *Shin toshi* 2, 8 [New towns]: 25–27.

[9] Yasui, *Tōkyō shiki*, 51; Akira Koshizawa, *Tōkyō no toshi keikaku* [Tokyo's urban planning] (Tōkyō: Iwanami shoten, 1991), 234–35.

us take another look at the Sanjikkenbori river back in the Edo period. At that time, it was a crank-shaped stretch of water at the Mitsubashi bridges and as a result it was a little difficult to handle the loading and unloading of ships (Fig. 11). Therefore, the City Improvement Plan's "Ginza Brick Town Plan," drafted after Ginza's big fire in 1873, planned to connect the Sanjikkenbori with the Kyōbashigawa river, but the plan was cut back and never realized.

However, after the development of ship transportation, it was very difficult logistically for ships to move in the crank-shaped river so, in 1906, during repairs, it was realized how important it was to connect the Sanjikkenbori with the Kyōbashigawa (Fig. 12). At that time, the Mizutanibashi bridge was built and after the Sanjikkenbori was filled in, Mizutanibashi park was built. The moat was repaired and continued to be used.

How the underground towns beneath the bridges were born

After World War II, those coming back to the city were able to run a business on the street without much investment, so shops proliferated, up to 14,000 at one point. In August 1948, the GHQ (General Headquarters of the Supreme Commander of the Allied Powers or SCAP) instructed the governor of Tokyo and the Chief Commissioner of the Metropolitan Police to remove the shops immediately due to considerations of traffic safety, environmental sanitation, and the cityscape of Tokyo. Seiichirō Yasui, once again, requested the construction bureau chief, Hideaki Ishikawa, to draft a plan in order to resolve the issue, making the points that "this is an issue that is related to future city planning" and "our plan should not create suffering among the people and should not spend tax-payers money." The principles he outlined regarding the organization of street shops were as follows: "1. those who change or terminate their business will be eligible for mortgage from the national finance fund; and 2. those who transfer in groups or who wish to do so will be offered assistance in finding an alternative location and in taking out a mortgage for store construction."[10] All street shops on public roads within Tokyo were removed by December 1952.

Those businesses which moved in groups were allocated to a market inside a reinforced-concrete building. The alternative location for those moving from Hirokōji street shops was the area around Takamori Saigō's bronze statue in Ueno. The outcome was the building that today houses movie theaters and other establishments. Seiichirō Yasui adopted

[10] Yasui, *Tōkyō shiki*, 54–74; Kojima, "Tōkyōto Sanjikkenborigawa," 25–27.

Ishikawa's idea. However, the beautiful stone walls in the hills and green slopes around Ueno, land developed by the Capital Recovery project, would disappear as a result. These markets were developed in several places in Tokyo, such as Shinjuku, Ikebukuro, Yūrakuchō, Shinbashi, Hamamatsuchō, Ginza, and Kyōbashi. As a result, Tōkyū Shibuya underground town developed, and still remains a well-known place in Tokyo today. Miharabashi underground town was created beneath the crossing of the Sanjikkenbori canal and Harumi street (Fig. 13), but it no longer exists.

River-into-sewer plan

Advisory Report 36

During the period of rapid economic growth, many rivers in Tokyo were terminated and disappeared (Fig. 14). Many of them were turned into sewers based on a committee report submitted in Shōwa's thirty-sixth year (1961) and commonly referred to as Advisory Report 36. On October 17, 1961, then Tokyo Governor Ryōtarō Azuma approved a committee chair report entitled "Tokyo Urban Planning River and Sewer System Special Research Committee," later to be called Advisory Report 36. Excerpts from the report are as follows:

1. The rivers to be used for mainline sewers (underdrain) are all or part of the rivers: Nomikawa, Kuhonbutsugawa, Tachiaigawa, Kitazawagawa, Karasuyamagawa, Jakuzuregawa, Megurogawa, Shibuyagawa, Furukawa, Momozonogawa, Nagashimagawa, Maezekigawa, Komatsugawa Sakaigawa (Higashishisen), and Tagaragawa.
2. The area used above mainline sewers (underdrain) is noted in red separately (Fig. 15) and details will be determined according to both technical and financial perspectives.
3. The areas other than the above will be underdrain except in some cases where water transportation is required (Fig. 15, in yellow); for these areas, technical and financial perspectives are to be considered before taking a final decision.
4. The use to be made of land above the underdrain area shall be considered by the sewer management company, with public interest in mind.
5. The areas referred to in 2 and 3 above shall be given, in principle, discharge capability able to tolerate the rains of Kanogawa Typhoon without flooding […].

6. Until rivers are turned into sewers and underdrain work is completed, implementation and maintenance must be considered fully and individual rivers must be considered in such a way that flow will not be prevented.
7. From city environmental and sanitation perspectives, it is necessary to install and maintain facilities to prevent water pollution and keep water clean.[11]

Since most of the rivers in Tokyo had no headwater, they functioned as flow channels only when it rained. Therefore, when it was not raining rivers were forced to function as sewer channels. In order to keep the environment clean, the option of under-draining the river was chosen.

Tokyo City Sewerage Plan

In 1950 the "Tokyo City Sewerage Plan" was published. It was prepared in order to respond to Tokyo's increasingly worsening city environment, and provided that the city's twelve rivers were to be under-drained and turned into sewers. The most important points of this plan are as follows:

1) Solution to the issues of Tokyo's environmental sanitation and cityscape problems:

> The rivers within Tokyo's metropolitan area are generally channels filled with polluted water, except some locally managed rivers. The source of the rivers, when the weather is fine, is mostly from polluted water originating from households, industrial plants, and other facilities. In other words, if we decide to keep these rivers and install sewers in these areas, […] polluted water, in the sewer system, will be processed at a sewage treatment plant and, thus, rivers during the time of fine weather will be empty and will become a garbage dump. And it is easy to imagine that water left in the riverbed will become a source of attraction for mosquitoes and flies.
>
> If the sewage that currently fills the rivers was to flow instead in a newly installed sewer system, the rivers would be left empty and would fill with garbage, and this would not be appropriate from the point of view of sanitation and the cityscape.[12]

[11] Tōkyōtō, ed., *Tōkyōtoshi keikaku kasen gesuidō chōsa tokubetsu iinkai, Iinchō hōkoku* [Tokyo urban planning river and sewer system special research committee], October 17, 1961.

[12] Tōkyōto gesuidō kyoku, ed., *Tōkyōtoshi keikaku gesuidō* [The Tokyo city sewerage plan], 1958.

This was one of the main reasons given why the rivers needed to be turned into underdrain sewers.

2) Economic efficiency
Generally speaking, rivers and sewers run in separate channels. However, Tokyo's roads are narrow and there is no space for two channels to run side-by-side underground. Additionally, construction costs would have been higher for two channels; therefore, the option of using the rivers as sewers appeared more favorable.

3) Public opinion
The general public had a strong desire to see the rivers turned into sewers.

> To summarize the voice of the people […] it has come to our attention that most of them wish the rivers to be turned into underdrains […]. Based on their wishes, areas above the underdrain channels can be used for public roads, to help reduce traffic jams, as well as for protection from fire and from criminals; thus, we have much to gain.[13]

Due to the general public's demand for rivers to be turned into underdrains, it was realized that the city of Tokyo needed road construction, and in order to comply with the people's wishes, it was confirmed that rivers would be turned into sewers.

Project progress
Based on Advisory Report 36, medium to small-sized rivers in Tokyo were to be turned into underdrain channels but, in reality, only a part of this plan was realised. For example, the Shibuyagawa river was turned into an underdrain upriver from Shibuya station between 1956 and 1960. The lower part of the river was also scheduled to be converted, but only after Advisory Report 36 had been finalized and discussion between Tokyo's Bureaus of Sewerage had again discussed the appropriateness of underdrain channels. It was then decided to turn it into a rainwater collecting channel as part of the overall planning scheme for the city but, in the end, it was left as a river, which could be transformed into a sewer later, if necessary.

Improvement work implemented along the Shibuyagawa river between the Inaribashi and Shibuyabashi bridges, between 1986 and 1990, was designed according to the underdrain plan, and work was shared

[13] Tōkyōtō, ed., *Tōkyōtoshi keikaku kasen gesuidō chōsa tokubetsu iinkai, Iinchō hōkoku*, first Committee document.

between Tokyo's Bureaus of Construction, the Bureaus of Sewerage, and the City of Shibuya. The rationale behind dividing up the work was to share the cost and to distribute management tasks among the three administrative bodies. Although it was decided that rivers were to be turned into sewer channels, public opinion demanding that the rivers should remain as open channels was also strong. For this reason, discussion continued and it was finally decided that not all rivers were to be converted into sewer channels. After the project had started, an opposition movement sprang up among the general public against filling in the Tsukiji river, and the Ministry of Construction and the Tokyo government came up with a policy whereby "in principle, medium to small rivers would not be filled up from now on. Those small and medium rivers which were designated to be underdrain shall continue to be maintained as rivers while we revise the master plan."[14] This announcement effectively put an end to river termination policy.

To sum up, the reason Advisory Report 36 decreed that rivers should be transformed into culverts was due to the preconception that turning rivers into sewers was a necessity. The idea of river termination, which was regarded at that time as a natural choice, is today considered as a very extreme one; yet, at the time it met without objection. The idea that rivers should be used as underdrains led to the loss of many rivers in Tokyo. At that time, it was perceived that a river's sole function was the drainage of sewage and rainwater, and the whole point of the enterprise was drainage efficiency. Efficient drainage was *the* most important issue, and the decision to terminate rivers was considered unavoidable.

The Olympic Games in Tokyo and Metropolitan Expressway construction

The fourth main reason for the termination of Tokyo's moats and rivers was the 1964 Olympic Games. It was scheduled to be held in Tokyo only a few years after the end of the Allied Occupation (1945–52). A road infrastructure suitable to facilitate the arrival of athletic players and guests was completely absent. Thus, a decision was made to build a highway to connect Haneda airport to Tokyo's central area; however, due to a limited budget for obtaining lands for road construction, the expense-free river system was chosen as an easy answer to the dilemma.

[14] Shibuyagawa-Furukawa ryūiki kondankai, ed., *Shibuyagawa-Furukawa ryūiki kondankai no matome* [Round-table conference on Shibuyagawa and Furukawa: A summary], 1998.

Before hosting the Olympic Games, Tokyo's development had already experienced some dramatic changes. As a point of fact, during the late 1950s and early '60s, just as Japan was recovering from the war, the city was in need of increased infrastructure due to population expansion and the progress of motorization. The Olympic Games provided an opportunity to advance the city's development. Before and after the Games, highway and subway construction, the termination of street cars, and the widening of main roads were advanced all over Tokyo.

At the time of the Olympic Games, nine million people lived in Tokyo. In July 1964, automobile registration had reached one million vehicles and was increasing by 10,000 vehicles per month. It had been obvious since the mid-1950s that Tokyo's traffic system would face serious problems unless something was done. Therefore, taking advantage of the opportunities provided by hosting the Games, highway construction proceeded rapidly.

In August 1959, plans were initiated for the building of roads dedicated to automobiles without intersections with general streets, in order to cope with the volume of traffic coming from the suburbs to Tokyo's downtown areas. Tokyo's Construction Bureau established itself as the Metropolitan Expressway Public Corporation for the construction of highways. The plan envisaged building a total distance of 71 km of new roads, covering nine radially spread and loop highways by 1965. However, once the hosting of the 1964 Tokyo Olympic Games had been officially decided, the plan was to speed up the project by one year so that construction would be finished in time for the Games.

In 1961, at Nihonbashi Bridge, the originating center for all Japanese roads, pier work for expressway building was started (Fig. 16). They had only three years to complete construction and the work continued around the clock.

Sotobori, or outer moats, built throughout the 1600s in order to protect Edo Castle (now the Imperial Palace), and located between Yūrakuchō and Ginza, were filled in between the late 1950s and the early 1960s; above that area, about two kilometers from Shinbashi station north of Yūrakuchō, the first highway was constructed in Tokyo. Below the highway, parking areas and stores were built, which today are well-known as West Ginza department stores near Sukiyabashi bridge. Passing through this highway area is free and from it one can enjoy Tokyo's sights—it is said to be one of Tokyo's most famous areas from the 1950s and '60s (Fig. 17).

It was expected that the Olympic Games—the first to be telecast internationally—would attract a lot of visitors from all over the world

(with an estimate of seventy participating nations, including 10,000 athletes and other participants, and about 30,000 visitors alone), as well as an unknown number of nationals, particularly on the day of the opening ceremony.[15] Therefore, the plan was to alleviate the overflow from expected high volume traffic: out of the planned 71 km total of highways, those which covered a distance of 31 km were designated as "Olympic Highways," some of which included the one between Tokyo's metropolitan area and Haneda airport.

There was not enough time to acquire land for the construction of highways, with only four years given for the project. Around the center of Tokyo, where the recovery projects of the Great Kantō Earthquake of 1923 decreed that land be turned into public usage, such as roads and parks, a considerable number of people opposed the idea of using the land for the construction of highways.

Edo, the ancient Tokyo, covered seventy square kilometres with its population exceeding one million; at that time it was the largest city in the world. With the adoption of isolation policy in the late 1630s, the Tokugawa military government did not allow the building of "large vessels having two or more sails." Even if a large vessel had been able to sail into Tokyo Bay and up the Sumida river, Tokugawa filled the Hibiya inlet so that vessels were unable to approach Edo Castle. Therefore, Sotobori—the outer moats, connected to the ocean and rivers, which together with other canals defended Edo Castle—were limited in terms of width (about 22–27 meters), allowing only the passage of small vessels. These Sotobori and canals were the vital method of transportation for daily essentials, such as food, firewood, charcoal, wood-building materials, clothes, and tools. Water transportation was the only type available at that time; in order to expand and maintain convenient usage, rivers were constantly maintained by changing routes, filling in, excavating, and constructing ports and platforms alongside the courses. Edo was one of the world's largest cities with water channels. This is how Edo's water transportation system came into existence, with more than 7,000 vessels daily moving along its rivers and moats.

As mentioned earlier, these moats and rivers were used for the disposal of debris from the war, the land was then sold, and private buildings constructed. Concerning the land for the Metropolitan Expressway, the following principle was adopted: "In selecting the land for the construction of highways, areas with housing are to be avoided and

[15] Indeed, such a forecast proved to be greatly under estimated as on the opening day, the number of spectators in the stadium exceeded 85,000 people.

attempts are to be made to obtain free land, rivers, and canals, which would not pose issues for flood management and river usage." This clear principle led to the extermination of the moats and rivers from the Edo period. During the drafting and establishment of the principle, there was no respect or sympathy given towards the history and culture of Japan, cultivated over many centuries. What drove the process forwards was simply the fanatic obsession of completing the highways in time for the 1964 Olympic Games. Indeed, Tokyo, throughout the modernization period which started during the Meiji period (1868–1912), and even during the recovery period after the Great Kantō Earthquake of 1923, had maintained and developed itself as a city of water by adding and excavating canals and moats, and making them more convenient to use as the main method of transport. Against this background, the Olympic Games proved to have a devastating impact. In December 1962, a highway between Kyōbashi and Shibaura (4.5 km) was opened as part of the highway connecting Tokyo's downtown and Haneda airport. In late 1963, highways between Honmachi-Kyōbashi and Shibaura-Katsushima (total of 8.3 km) were opened. In August 1964, a highway between Katsushima and Haneda airport (4.6 km) was opened. All Olympic highways planned for opening prior to the commencement of the Olympic Games were opened by October 10, only nine days before the start of the Games.

The total highway distance constructed as part of highway building for the Olympic Games was about 30 kilometers. There were five highways and especially No.1 and 4 highways played important roles in transporting athletes and other participants during the Games. No.1 highway had 17 kilometers constructed between Edobashi and Haneda; it took fifteen minutes to travel from Ginza to Haneda, and was regarded as the pride of Japan. No.4 highway ran for 11 kilometers, from Edobashi to Hatsudai at the entrance to the Kōshū Road, connecting Olympic village with Jingū Olympic stadium, Akasaka Mitsuke, Chidorigafuchi, and the Imperial Palace, where one can enjoy the view of Tokyo's abundant green oasis. All main areas, such as Ginza, Marunouchi, Nihonbashi, and Shibuya, were connected by highways.

In Japan during the late 1950s and early '60s, there were no decent roads for automobiles. Paved roads were rare; if it rained roads became muddy and if the sun shone, dust blew everywhere. Beside the roads ran dirty rivers. Under such circumstances, highways were built over rivers due to land acquisition and other issues. The Metropolitan Expressway opened its first highway in 1962 and traffic volume averaged about 15,000 vehicles daily, but during the Olympic Games it reached an average of 75,000 vehicles daily.

The project of building an expressway over the Nihonbashi bridge, which since the Edo period had been the point from which all distances were measured, was the most controversial one, within a general context which saw about 42% of the metropolitan highway running over rivers. This point well illustrates the fact that there was no philosophy or ideal vision in the remaking of the urban fabric.

As a consequence of the above, some of Tokyo's rivers were dried, some were buried, some were covered, and almost all of them disappeared.

A new approach to river restoration: The "Hydrophilic River"

Against the disappearance of the rivers, in recent years, in 1997 river law was amended in order to recognize the importance of the necessity of various river functions, such as flood-control, domestic river-use, and safeguarding the environment. Against this background, the concept of river restoration is gaining more and more importance.

Water pollution

In this section we will discuss Tokyo's ward of Edogawa and introduce how the concept of water-to-human rivers was applied. The city of Edogawa is surrounded by large rivers, such as the Edogawa and Arakawa, and faces Tokyo bay in the south. About 80% of the city's 49.09 km^2 is low land, below high-tide levels. In the past, the total area of small and medium rivers was 420 km. For a long time, the Tone river brought nutrient-rich soil gathered from rainwaters, and children played around the waterside. As a consequence of the morphology of this area, when it rained, flooding damaged the city and it fought against flooding for many years.

The *History of Edogawa Ward*, written in the 1950s, described how the fishing of *ayu* (sweetfish) and *shirauo* (icefish), as well as recreation activities, were well developed and practiced by a large part of the local population.[16]

However, the situation changed considerably as new concentrations of population and urbanization began to emerge in the late 1960s. The rivers became tainted with industrial and household discharges of polluted water and the environment was quickly compromised (Fig. 18). People

[16] Tōkyōto Edogawaku, ed., *Edogawakushi* [History of Edogawa ward] (Tōkyō: Tōkyōto Edogawaku, 1955).

began to stay away from the waterfront and all of a sudden, rivers became a symbol of environmental distress, a far cry from their original position.

Water pollution was astonishing and according to surveys undertaken by the Tokyo government in the Arakawa, Edogawa, and Nakagawa rivers, the total amount of mercury, cadmium, and lead levels exceeded standards set in the 1950s. They even found high concentrations of chromium, arsenic, cyan, and organic phosphorus, all of which were without standards at that time. Against this background, the Honshū Paper Co. water pollution incident occurred. On April 1, 1958, Honshū Paper Co.'s Edogawa plant discharged a large amount of black water into the Edogawa river. It was water polluted by ammonium sulfate, a chemical produced during the production process of pulp, which was just then starting to be manufactured. This black water killed a large amount of shellfish and reduced larval *ayu*, or sweetfish, upstream. Fish cooperatives that were affected in Kasai, Jōtō, Fukagawa, and Urayasu protested. On June 5, Tokyo and Chiba governments' fishery bureaus released the results of damage surveys and on June 6, the Tokyo government issued a recommendation to the company to stop the discharge; however, the company ignored this advice and from June 9 once more began to discharge chemicals into the river. About 700 members of the fish cooperatives from Gyōtoku and Minami Gyōtoku went to petition the National Diet and Tokyo government, then went to the plant and confronted the company's representatives at the gate. Hostilities broke out and both sides sustained major and minor injuries: 100 members from the cooperatives, three from the plant, and thirty-seven policemen.

This bloody incident was not only echoed in Edogawa, but it became a hallmark for water pollution and water quality preservation. The incident became public, and the National Diet, the Tokyo government, the Chiba prefecture, and fishery organizations all took action, and on June 30, the "Water Pollution Prevention National Assembly" was held. In the end, the Clean Water Act and the law restricting discharges from factories were passed.[17]

River cleansing

Although the above laws were enacted, even in the 1970s industrial plant and household discharges continued, and garbage such as bicycles and old tires were thrown into rivers, brought from distant places by large trucks for the specific purpose of dumping (Fig. 19). There seemed to be no way

[17] Honshū seishi kabushiki geisha, ed., *Honshū seishishashi* [History of the Honshū paper company] (Tōkyō: Honshū seishi, 1966).

to stop river pollution, and rivers were unintentionally given a sewage function. In an attempt to stave off the further pollution of rivers, the "Bring in Clean Water Project" was initiated in 1972. The aim of this strategy was to replace with clean water the contaminated waters of the small and medium-sized rivers, those connected to the larger rivers, such as the Arakawa, Nakagawa, and Edogawa. These small polluted rivers had water gates at both the upstream and downstream sides. The plan was, first, to close the water gates at the confluence, where the river joined the open sea, at low tide; second, polluted water trapped between the gates was pumped out; and finally, by opening the most downstream water gate at high tide, clean water between the gates was reversed. Thanks to this measure, the Maesekigawa river, regarded as the most polluted river and functionally dead, was reborn in July 1972. This strategy was implemented in other medium to small rivers over a distance of 39 km in all, 135 times in total, and 523,000 m^3 of clean water was introduced. As a result, water transparency improved from 14 to 28 cm and, in some cases, offensive smells disappeared and water began to flow naturally again.[18] The flow-back method gradually restored the rivers; besides, once the water was clean again, people tended to keep it that way. This measure was implemented repeatedly until a sewer system had been completely installed.

Rebirth of the Furukawa river

The success of river cleansing by the introduction of clean water inspired an epoch-making water-to-human river plan. By incorporating technological principles by utilizing tidal effects, an attempt was made to create a new environment using water, light, and greenery. It is an impossibility for us to go back in time to the past wilderness of nature. While the rivers bring many benefits, they also cause flooding and can even take human lives. However, if one looks at the past, it is apparent that many civilizations flourished in floodland areas, and it is obvious that human beings would not be able to support themselves without rivers. To regain the lost rivers is to remind ourselves of the relevance of our relationship with water, which has been forgotten for a long time. Of basic importance to this was the improvement of our environmental purification technologies, which resulted from our own reflection on past mistakes in managing a waterfront environment during the period of rapid economic growth. It enabled us to regain a clean environment.

[18] Edogawa City, Civil Engineering Department, Contractors Record, 1975.

Within the Edogawa ward, there were about 130 rivers and water channels, measuring approximately 420 km in total length, which were considered obsolete with the instalment of the sewage system. Consequently, they were filled in, and roads and parking spaces built over them. However, it began to be apparent that if we continued to act in this fashion, we would lose our connection with nature. Those filled in rivers and natural green areas would never return. Moreover, in lowland areas, there was a widespread view that the rivers were needed to absorb rainwater during heavy rainfall. Thus, it was decided to keep some rivers and, based on the Meteorological Agency's rainfall data, thirty-one rivers covering about 51 km were chosen for the project.

The Furukawa river was a natural water course, but was regarded as effectively dead due to increased urbanization and dumping; factory and household toxic discharges ran into the river, contributing to the degradation of the quality of the environment. As a consequence, in December 1962, a project to revitalize the Furukawa river, according to the water-to-human (*shinshui*) river plan, was initiated. Water from large rivers, such as the Edogawa, Nakagawa, and Shin Nakagawa, was channeled, with the aim of recovering nature with "dreams of water, light, and greenery."[19] Sludge, which had accumulated close to one meter high, was removed and replaced with new soil; the river bottom was then dredged to make a slope so that the lowland flat-bottomed river could move its waters downstream more effectively. A new ditch for household sewage was also built so that waste water would not flow into the river. The river width, varying from 6 to over 10 meters, was reduced to two meters by spreading cobbles along the edges, and walkways and benches were built on both sides. By July 13, 1973, in the east portion of Tokyo's Metropolitan Circle Road No.7, about 467 meters of the Furukawa's total length of 1.2 km had been completed, and water from the Edogawa river was pulled in at Edogawa Inari Gate.

The depth of the river was 30 cm and flow speed about 20 to 30 cm/second; flow volume reached about 0.7 m3/second on average, and 0.25 m^3/second during high tide. Thanks to this project, the river environment gained in both quality and variety, with rapids, islands, bridges, and short falls; local children began to play in the area, swimming and rafting on rubber boats (Figs. 20–21). All of a sudden, a waterfront heaven had appeared and families from all over Edogawa city, as well as from other wards and prefectures, came to enjoy the scenery. The story of

[19] Until 1980, the budget was 3.5 billion yen.

the rejuvenation of the river was circulated among news media, and the success of the river parks became well-known throughout the country.

In April 1974, in the west portion of Tokyo's Metropolitan Circle Road No.7, the second phase of work, focusing on a stretch of river 458 meters in length, was finished and the first water-to-human project, with a budget of 137,000,000 JPY, was completed.

When the Furukawa water-to-human (*shinsui*) river work was finished, many people welcomed the project's completion. During that summer, 3,000 children gathered in the area, on the busiest day averaging over 700. For the parents watching their children, sun shades were installed and food stands erected. The Furukawa water-to-human project was highly prized among public-works projects and on May 31, 1974, the Japan Society of Civil Engineers presented it with the Japan Construction award. This award was generally only given to unique construction and superior projects and, at this time, other recipients included the Kanmon Bridge works and the Mount Fuji weather station project. Since its inauguration, it was the first time that the award was given to a local government project.

The story about the "reborn river" made headlines around the world and, in May 1974, it was introduced in a pamphlet at the World's Fair, held in Spoken, Washington, USA, under the theme, "Environment and Man." Moreover, in April 1985, it was printed as a front page pictorial on the social studies text book for the 3rd year class in a Japanese junior high school. Today, water-to-human plan no.1, "Furukawa hydrophilic river park," along with five other river plans totalling 9,610 meters in length, including river walks along eighteen rivers, totalling 17,680 meters in length, are finished. Furthermore, water-to-human river projects in Old Nakagawa and Shinkawa, encompassing 4,355 meters in length, were also completed.

It is intended that river parks and nature walks should facilitate the flow of natural water and the embracing of a green environment, so that people's lives can continue to be connected with water, even after the conventional function of the old rivers and water channels ended with the instalment of the sewer system.

It is also our intention to have a "soil-lined shore," in order for plants and fish to thrive, and a "shallow stream" so that waterfront vegetation can flourish. With the introduction of flowing natural water, aquatic species may once again enter the environment. At the riverside, stone layers and wooden piles are used, and river beds covered with gravel so that the waterfront is structurally life-friendly. Aquatic plants are grown

so that various organisms can sustain themselves within the habitat (Fig. 22).

The Ichinoe Sakaigawa hydrophilic water park is a good example of a near-nature type of water park, with the theme "recovery of the wild river." Tokyo's downtown used to have the excellent custom of washing the area in front of one's house. During the Edo period, outside a merchant shop, every morning, the front of the shop would be cleaned and splashed with water. This habit, in some places, continues and one can still see it to this day. As more hydrophilic waterfront parks and green-river walks were installed, more and more people have been encouraged to grow flowers and to use the park facilities with care. Such activities are expanding from individuals to groups, to the extent that large groups have now developed the initiative to preserve these parks and walkways. These activities were started voluntarily with the aim of passing the water parks and green-river walks on, intact, for generations to come (Fig. 23).

Moreover, such activities that bring "*wa*" (harmony) or friendly connection to people are not just for volunteers, but are also for various events related to hydrophilic water parks, green-river walks, water-to-human rivers, and other facilities. As these volunteer activities become firmly rooted in the region, they are becoming systematized as an Edogawa ward "adopt system." As part of these groups' activities, exhibitions and Adopt Exchange meetings are held (Fig. 24).

The above initiatives confirm, once again, the importance of rediscovering the culture of water within the urban fabric, which has been one of the most characteristic features of Japan's city development since ancient times.

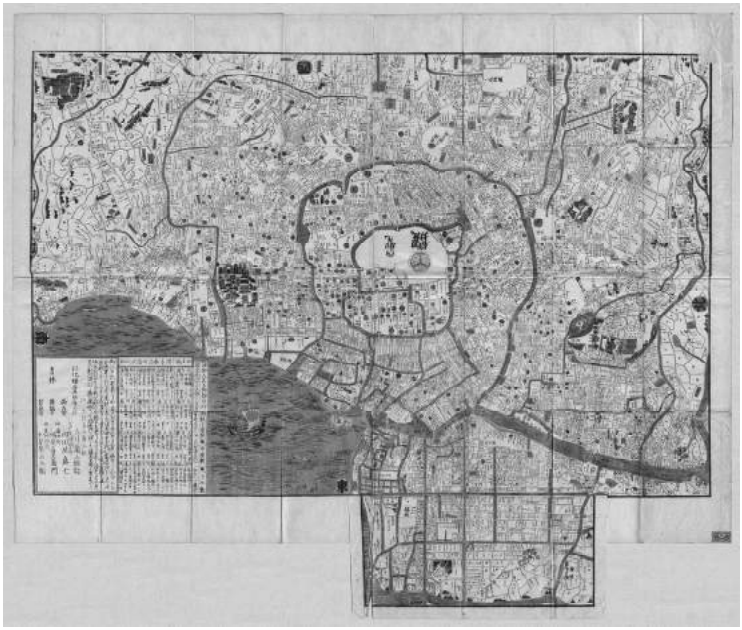

Fig. 1) Map of Edo of Kōka Era (1844-1848)
(Courtesy of the University of Texas Libraries, The University of Texas at Austin)

Fig. 2) Railway running on a buried canal (postcard of 1919)

Fig. 3) Great Tokyo Air Raid, 1945 (Photo provided by Tokyo Metropolitan Government)

Fig. 4) Miharabashi, bridged in the 8th year of Taishō (1919) (Chuo City Library)

Fig. 5) Miharabashi bridge immediately before being filled-up (Chuo City Library)

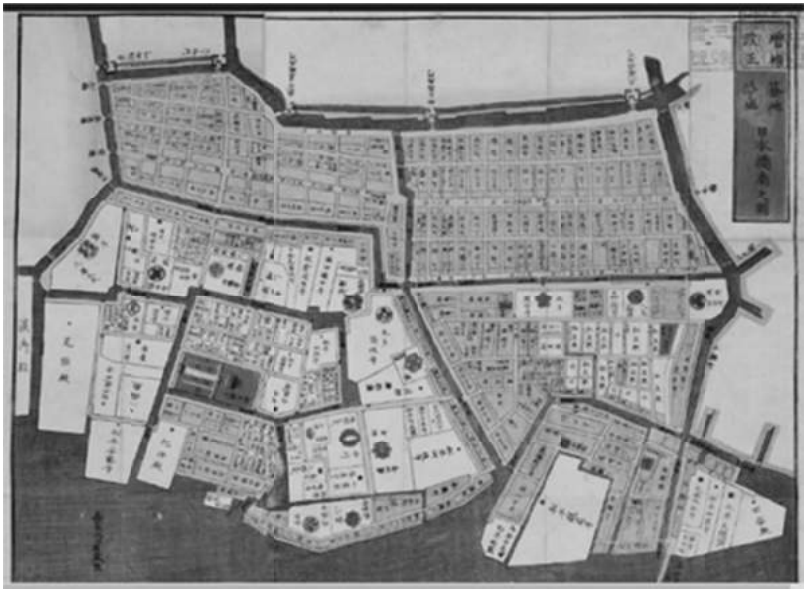

Fig. 6) South pictorial map of Tsukiji, Hacchōbori and Nihonbashi (National Diet Library Digital Collections)

Fig. 7) Mitsubashi from *Edo meisho zue* [Illustrated guide book to Edo, 1834–36] (National Diet Library Digital Collections)

Fig. 8) From *Edo kiriezu* [Detailed map of Edo, 1849-62], with Sanjikkenbori at the center (National Diet Library Digital Collections)

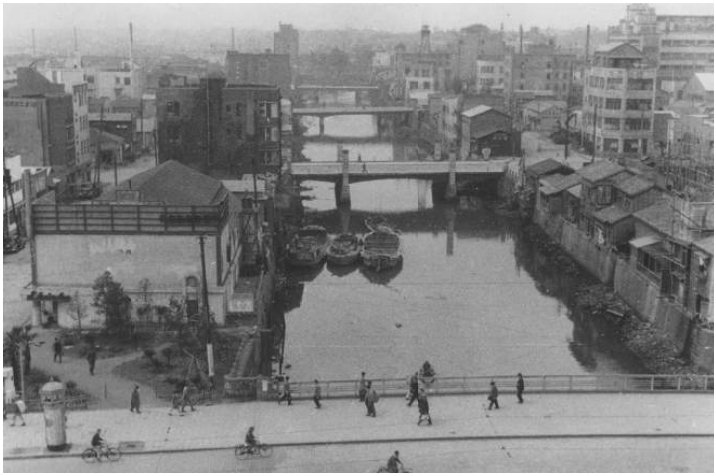

Fig. 9) Sanjikkenbori prior to filling (Miharabashi bridge in the foreground, followed by Kobikibashi, Furibashi and Izumobashi bridges) (Chuo City Library)

Fig. 10) Sanjikkenbori being filled (Miharabashi bridge in the foreground, followed by Kobikibashi, Furibashi and Izumobashi bridges) (Chuo City Library)

Fig. 11) Crank-shaped Sanjikkenbori (by N. Tsuchiya)

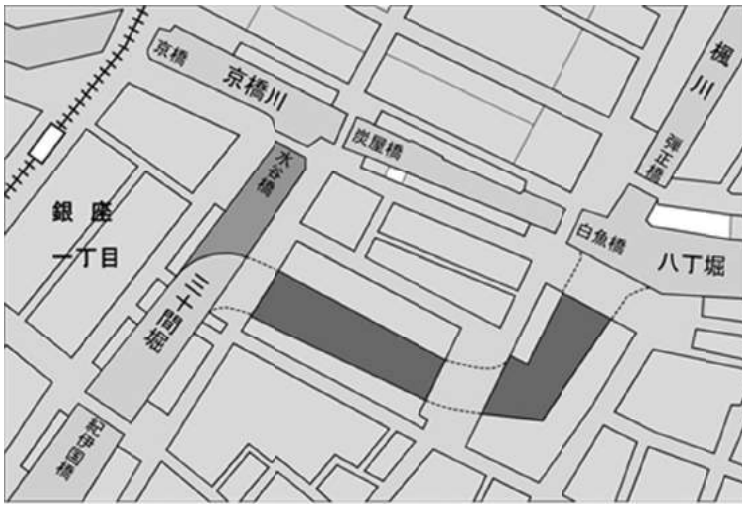

Fig. 12) Sanjikkenbori reshaped to run straight (by N. Tsuchiya)

Fig. 13) Shops built under Miharabashi bridge (by N. Tsuchiya)

Fig. 14) *Oedo ōezu* [Map of Edo, 1843] (Waseda University Library). Water channels disappeared from Edo period

Fig. 15) Landfill obtained rivers (by N. Tsuchiya)

Fig. 16) Piers that have been built in the river (Photo provided by Tokyo Metropolitan Government)

Fig. 17) It was built highway in the river (Photo provided by Tokyo Metropolitan Government)

Fig. 18) A polluted river with drainage of home and factory (Photo provided by Edogawa City)

Fig. 19) River was also dumped to waste (Photo provided by Edogawa City)

Fig. 20) Clean and returned river (Photo provided by Edogawa City)

Fig. 21) Children playing very pleased (Photo provided by Edogawa City)

Fig. 22) Played river of Nature Restoration (Photo provided by Edogawa City)

Fig. 23) Children to act on their own (Photo provided by Edogawa City)

Fig. 24) Adapt system by citizen (Photo provided by Edogawa City)

CHAPTER EIGHT

TSUKUDAJIMA: A MAN-MADE ISLAND IN EDO (TOKYO) BAY

ROSA CAROLI

The months and days are eternal wayfarers,
and so are the years that pass by
(Bashō Matsuo, *Oku no hosomichi*)

Standing on the world's most geologically unstable terrain, and made up by buildings traditionally constructed in wood, the urban space of old Edo and modern Tokyo has been repeatedly devastated by earthquakes and fires. Moreover, since its foundation at the end of the sixteenth century, changes to river and sea basins have altered the city's shape and limits, particularly after the start of modernization in the second half of the nineteenth century, while firebombing raids commencing in the autumn of 1944 burned entire quarters of the capital to the ground. What survived such transformation and destruction was later swept away by the "fever of construction" that preceded the 1964 Olympic Games, and which later characterized the so-called "bubble economy" period. The impact of these reiterated natural catastrophes and human interventions on Edo-Tokyo's urban space has resulted in a difficulty in finding current landmarks on ancient maps, with some rare exceptions. A well-known exception is the Imperial Palace standing on the site of the old Edo Castle, and considered to be the "empty center" of Tokyo, while a much less famous one is represented by Tsukudajima, a tiny, artificial island at the mouth of the Sumida river, which, when considering the urban landscape as seen from the water, assumes a central position (Fig. 1).

Tsukudajima was created during the first half of the seventeenth century by a group of fishermen who mainly came from Tsukuda village, in the area of present-day Osaka. These fishermen were allowed the responsibility of supplying seafood to Edo Castle, the residence of the Tokugawa rulers, in return for the right to fish off the Edo coast. Although

built before the great Meireki fire that destroyed nearly two thirds of Edo in 1657, Tsukudajima was only marginally affected by both the fire and the radical rebuilding of the city that followed it, and it still faithfully preserves the plan of the original site. The fishermen from Tsukuda village brought with them the cult of the deities of the Sumiyoshi Shrine, the protectors of seafarers, and transposed aspects of the idealized image of their native place to their new home. Although economically and strategically part of Edo, Tsukudajima's local customs and identity have maintained many aspects of a distinct nature. Over the centuries, it has been only marginally touched by earthquakes, fire, and war damage, has abstained from expanding in a vertical direction, and has also resisted high-rise redevelopment. Today, Tsukudajima is often unrecognized by inattentive visitors as being a rare heritage site, with a history that goes back to the early Edo period (1603–1867). Nevertheless, it can indeed considered as a unique case of man-made island in Tokyo where vivid traces of the original rural fishing village are preserved, descendants of its first residents still live, and a strong sense of community has survived for over four centuries.

The development of Edo and the beginning of coastal artificialization

Both the most populated and largest industrialized area in Japan, Tokyo Bay is just a small inlet of the Pacific Ocean formed during interglacials, when sea levels rose and an arm of the sea penetrated into the Kantō Plain. In the oldest written sources it is mentioned as the "sea of the running water" (*hashirimizu no kai*) since, at that time, it was not a bay, but a sea—or, at least, it was perceived as such by the people living there at that time.[1] While over the millennia changes in the shape of Edo-Tokyo Bay were due to natural processes, during the last four centuries they were mainly due to human intervention, which caused extreme alterations, and has made Tokyo today one of the largest metropolitan areas with reclaimed land.

The history of the artificialization of Tokyo Bay goes back to the time when Ieyasu Tokugawa, the warlord who unified Japan and founded the Tokugawa Shogunate, moved his headquarters to Edo in 1590. At that time, Edo (literally meaning "bay door") was little more than a village built on the marshy shore of an undeveloped region, and inhabited by a

[1] Toshio Kikuchi, *Tōkyōwanshi* [The History of Tokyo Bay] (Tōkyō: DaiNihon tosho, 1974), 80.

few thousand people. Yet, over the course of a century, it became the largest city in the world, where about one million people lived more or less permanently. Such fast development was due to the fact that, in 1603, Edo became the seat of military power under the Tokugawa clan, as well as the political center of Japan. However, the engine behind such fast development was actually due to the, so-called, "alternate attendance" (*sankin kōtai*) obligations that the Tokugawa government imposed on approximately two hundred fifty feudal rulers throughout the whole country. Extended to all feudal lords in 1635, the *sankin kōtai* obligations required them to move periodically between their fiefs and Edo, typically spending alternate periods in each place. During his journeys to and from Edo, a feudal lord was escorted by hundreds of people; however, in some cases processions numbered a few thousand.[2] Moreover, during his absence from the military capital, he was required to leave as hostages his wives, heirs, officials, and retainers in mansions that he was obliged to build, maintain, and—due to the high incidence of fires—often rebuild. Great changes happened after the great fire of 1657, which burnt down large areas of Edo and caused the beginning of a new town development plan, with radical reforms of its townscape and a massive expansion of its area. Furthermore, the risk of fire induced the Edo government to require each feudal lord to build at least three mansions in different parts of the city; however, the richest and most powerful lords sometimes owned ten mansions, many of which were composed of residences, storehouses, barracks, and gardens, and hosted a considerable population. The presence of this rich and demanding elite, which consumed without producing, increasingly polarized wealth, goods, and people in Edo, making it a megalopolis, as well as Japan's capital of consumerism.

Since Ieyasu's arrival in Edo, massive interventions on rivers and the seashore were started in order to facilitate flood control, create transportation network, ensure a reliable water supply, and assure the strategic defense of Tokugawa's castle, as well as take land from the sea. Such interventions deeply altered the original aspect of Edo and its coastline, significantly changing river courses (such as that of the Tone river which was rerouted to flow into the Pacific Ocean), creating a spiral

[2] For a detailed study of the different aspects and implications of the *sankin kōtai* see Constantine N. Vaporis, *Tour of Duty: Samurai, Military Service in Edo and the Culture of Early Modern Japan* (Honolulu: University of Hawai'i Press, 2008), where he states (page 3): "In terms of the volume of circulation and degree of geographic mobility created within a country's borders, alternate attendance is probably without parallel in world history."

network of canals, moats, and rivers to guard against attacks on Edo Castle, and linking the islands of the inner bay to the mainland.

Thus, although the term "island" generally evokes the idea of a separated and remote place, many isles and islets became an essential part of Edo's urban fabric, and the memory of their original insular nature preserved in toponyms ending with the suffix *shima* or *jima*, meaning "island." A few others were maintained as islands and enlarged by landfill, as was the case with Tsukudajima, on the left bank of the Sumida river, the largest waterway in Edo (Fig. 2). Indeed, until the Keichō era (1596–1615), Tsukudajima was a sand bar, one amongst those formed at the mouth of the Sumida by its detritus, sand, and mud. At that time, it was about three kilometers away from Edo Castle in a straight line, and about one kilometer from the coastline of Honchō in Nihonbashi.[3]

The origin of Tsukudajima's fishing community in Edo

The origin of Tsukudajima's community in Edo is said to go back to the time when Ieyasu Tokugawa chose this site as his seat of power and entered it on the first of August 1590. According to an 1889 chronicle of the history of the Nihonbashi fish market, the forerunner of Tsukiji fish market, six skilled fishermen led by Magoemon 孫右衛門, the headman of Tsukuda village, situated on an island in the Kanzaki river in ancient province of Settsu (now in Osaka), first arrived in Edo along with Ieyasu in 1590.[4] Indeed, the first encounter between Ieyasu and Magoemon happened in Osaka in 1582.[5]

> In the Tenshō era [1573–92], during a stay in the capital [Kyoto], Ieyasu […] was to visit the Sumiyoshi Shrine in Tada, but he found himself with no boat to cross the Kanzaki river. […] Magoemon of Tsukuda village

[3] Hideaki Shimura, *Tsukishima saihakkengaku*. *Machizukuri shiten de tanoshimu rekishi to mirai* [The rediscovery of Tsukishima: History and future as seen from an urban development viewpoint] (Tōkyō: Anika, 2013), 46.

[4] Uokaijo, ed., *Nihonbashi uoichiba enkaku kiyō* [The bulletin of the history of the Nihonbashi fish market], 3 vols. (Tōkyō: Nihonbashi uokaijo, 1889), reproduced in *Meiji kōki sangyō hattatsushi shiryō* [Historical materials about industry in the late Meiji period] (Tōkyō: Ryūkei shosha, 1997), 363: 12; all quotations and page references are from the latter edition.

[5] The date of 1582 is deduced by records of Ieyasu's visits to Kyoto between 1573 and 1592. Nobuo Okamoto and Kenjō Kido, *Nihonbashi uoichiba no rekishi* [History of the Nihonbashi fish market] (Tōkyō: Suisansha, 1985), 19. Ieyasu and Magoemon met again twice, in 1586 and 1588, before the latter's first visit to Edo. Ibid.

> was honored to receive the order […] to provide fishing boats and help Ieyasu and his attendants to cross the river. […] Later Ieyasu visited Magoemon at home […] Seeing three pine trees standing in Magoemon's garden, Ieyasu suggested to him the surname Mori 森 [a character made of three trees (木) which means "wood" or "forest"].[6]

The man who ordered Magoemon to help Ieyasu was Shigenobu Andō (1557–1621), alias lord Tsushima Andō, who came from the same town as Ieyasu and served the Tokugawa clan his entire life. He would have played a significant role in the Edo military government, as well as in helping Magoemon and his group to consolidate their position in Edo.[7]

There are different hypotheses concerning the arrival of these fishermen from Osaka to Edo. According to the famous *Edo meisho zue* (*Illustrated guide book to Edo*, 1834–36), thirty-four fishermen were summoned to move to Edo after Ieyasu defeated his major opponents. They were granted a special fishing license from Ieyasu on August 10, 1613, and were required to supply icefish (*shirauo*) and other seafood to the *shogun.*[8] The 1889 chronicle of the history of the Nihonbashi fish market states instead that Magoemon and more than thirty men followed Ieyasu when he entered Edo Castle in 1590.[9] Other sources agree on the arrival of only seven men from Tsukuda in 1590, with another thirty-four men coming to Edo in the summer of 1612, during the reign of the second *shōgun*, Hidetada (r. 1605–23), in favor of whom Ieyasu abdicated while retaining influence and power until his death in 1616.[10]

Indeed, it seems plausible to assume that initially, at least until Ieyasu won a major victory at Sekigahara in 1600, Magoemon's group was limited to seven individuals, which was the minimum number required to

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[6] Uokaijo, ed., *Nihonbashi uoichiba enkaku kiyō***,** 11–12.

[7] Uokaijo, ed., *Nihonbashi uoichiba enkaku kiyō*, 11; Okamoto and Kido, *Nihonbashi uoichiba no rekishi*, 24–25.

[8] *Shintei Edo meisho zue* [Illustrated guide book to Edo; new revision] (Tōkyō: Chikuma shobō, 1996), 1: 197. *Shirauo* is also translated as whitebait.

[9] Uokaijo, ed., *Nihonbashi uoichiba enkaku kiyō*, 1. For the different hypotheses about the date and the number of fishermen see also Rokurō Sahara, *Tsukudajima no konjaku. Tsukudajima no shakai to bunka* [The change of times in Tsukudajima: Society and culture in Tsukudajima] (Tōkyō: Sekkasha, 1972), 21–22.

[10] See, for example, *Tsukudajima nenpyō* [Chronological table of Tsukudajima] (Tōkyō: Tōkyōto Chūō kuritsu Kyōbashi toshokan, 1966), 3–4; Tōkyōto, ed., *Tsukudajima to shirauo gyogyō. Sono gyogyō funsōshi* [Tsukudajima and the icefish fishery: A history of its fish farm's disputes] (Tōkyō: Tōkyōto, 1978), 17–18; Okamoto and Kido, *Nihonbashi uoichiba no rekishi*, 28–33.

manipulate seine nets employed to catch icefish, with six men divided into two boats and one reserve man.[11] In the years when Ieyasu was not yet *shōgun*, they probably did not reside permanently at Edo, but stayed there only temporarily during the most propitious season for catching seafood, namely, from the eleventh to the following third month.[12] While in Edo, they stayed within the compounds of Andō, and they were likely also employed as keepers of the canals around Edo Castle. These seven fishermen must have moved to Edo between 1601 and 1603, and started to sell their excess fish in a shop opened by Magoemon's son, Kyūzaemon 九左衛門, at the latest in 1604.[13] Indeed, in the seventh month of that same year, the seven wholesalers supplied a great variety of fish for the baby-naming celebration of Ieyasu's grandson, Iemitsu (1604–51).[14]

The earliest fish shop was presumably opened on the bank of Dōsanbori (the first canal dug in Edo which ran beside a gate of Edo Castle), where the first residential district of townspeople developed. It was probably near Yokkaichi (the "market on the fourth day") where salted and dried fish had been sold every four days since before the opening of Kyūzaemon's shop.[15] Around 1607, after the reclamation of the Hibiya inlet, the merchants were moved from Dōsanbori to Hon-Odawarachō in Nihonbashi, which grew as the hub of commercial activities. The commercial districts of Edo were visited by the Spanish colonial officer Rodrigo de Vivero y Velasco (c. 1556–1636), who stayed in Japan in 1609–10, and whose curiosity was aroused by the fish market, which he described as "immense, and extremely neat and clean," with "more than a thousand different kinds of fish, sea and river, fresh and salt," and "[l]arge tubs [which] contained besides a vast quantity of live fish."[16] What Velasco described was possibly the area from Dōsanbori to

[11] Okamoto and Kido, *Nihonbashi uoichiba no rekishi*, 31. For the list of names of the seven fishermen see Uokaijo, ed., *Nihonbashi uoichiba enkaku kiyō*, 12–13.
[12] In the traditional lunar calendar, the months were numbered, and started from about 3 to 7 weeks later than the Gregorian calendar, which was introduced in Japan in 1873.
[13] See Tōkyōto, ed., *Tsukudajima to shirauo gyogyō*, 18; Okamoto and Kido, *Nihonbashi uoichiba no rekishi*, 24–25, 33–34, 41–43, 56, 607.
[14] Uokaijo, ed., *Nihonbashi uoichiba enkaku kiyō*, 13.
[15] Okamoto and Kido, *Nihonbashi uoichiba no rekishi*, 43.
[16] "Summary of a narrative by His Excellency Don Rodrigo de Vivero y Velasco ... of his residence in the empire: A.D. 1608–1610," in *Memorials of the Empire of Japan: In the XVI and XVII Centuries*, ed. Thomas Rundall (New York: Burt Franklin: 1963; 1st ed. 1850), 176.

the Nihonbashi river, the center of commodity shipping in Edo, where the fishmongers from Tsukuda carried out their trade.[17]

Indeed, once Kyūzaemon's fish shop moved to Nihonbashi, each of the seven fishermen opened a fish stand. Their activity soon grew to the point where the wholesalers only had time to sell the catch and new fishermen were needed to go fishing.[18] This could explain the arrival of the aforementioned thirty-four individuals from Osaka to Edo in 1612, namely, twenty-seven fishermen from Tsukuda village, six from Owada village, and Yoshitsugu Hiraoka (?–1647), a Shintoist priest, who was the younger brother of the chief priest of the Tamino Shrine in Tsukuda village, where the gods of Sumiyoshi were worshipped.[19] They left their villages on the twenty-sixth day of the seventh month and reached Edo on the sixth day of the following month.[20]

In 1613, the military government confirmed the rights given to Magoemon's group to catch seafood "by using fishing nets in the sea and in rivers in and around the vicinity of Edo," with the exception of the Asakusa and Inage rivers.[21] It is worth mentioning that among the names

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[17] Okamoto and Kido, *Nihonbashi uoichiba no rekishi*, 49–50, 108–109. Other sources cast doubts on the hypothesis that Vivero's description refers to the fishshops of Magoemon's group. See, for example, Tōkyōto, ed., *Tsukudajima to shirauo gyogyō*, 22–23.

[18] Okamoto and Kido, *Nihonbashi uoichiba no rekishi*, 41–44; Tōkyōto, ed., *Tsukudajima to shirauo gyogyō*, 16–19. Sources do not agree on the date and the number of shops opened by the fishermen coming from Osaka. For example, according to *Tsukudajima nenpyō* (4, 24), in 1613 only three branch stores were opened in Hon-Odawarachō in Nihonbashi.

[19] Tamino was the ancient name of Tsukuda village, while Taminoshima was the original name of the shrine, which in 1741 was changed to Sumiyoshi, and in 1868 to Tamino. Yoshitsugu is mentioned as Gondayū Yoshitsugu Hiraoka (平岡権太夫好次), and his elder brother as Shodayū (正太夫). See Chūōku kyōiku iinkai, ed., *Sumiyoshi jinja shozō bunsho kirokurui chōsa hōkokusho* [Research report of documents and records of the Sumiyoshi Shrine] (Tōkyō, 1986), 2: 3; Isao Sawa et al., "Ōsakashi Nishi Yodogawaku, Tamino (869nen) no yutai to torii" [History of the Tamino Shrine and its Torii, Nishi-Yodogawa Ward, Osaka City], *Dōkutsu gankyō Net gakkai kiyō* 2 [The Bulletin of Cave Environmental Net Society] (2011): 69–70.

[20] See *Tsukudajima nenpyō*, 4, where it is said that men coming from Owada were seven in number; Tōkyōto, ed., *Tsukudajima to shirauo gyogyō*, 17–24, with the list of names of the thirty-three fishermen on page 19; Okamoto and Kido, *Nihonbashi uoichiba no rekishi*, 32–35.

[21] The content of this statement, dated August 10, 1613, is reproduced in Mikirō Sasaki, *Toshi no yūwaku: Tōkyō to Ōsaka* [Cities' enticements: Tokyo and Osaka] (Tōkyō: Tibīesu buritanika, 1993), 53. Inage is on the east side of the Tokyo inner

of the government officials who undersigned the document was that of Andō, who had been recently appointed senior councilor (*rōjū*), one of the highest-ranking posts in the Edo Shogunate and a position from which he could intercede with the government on behalf of Tsukuda's fishermen.[22] Indeed, these special rights allowed the latter not only to deal with conflict with native Edo fishermen (whose piscatorial skill and techniques were otherwise inferior to those developed in western Japan), but also to maintain their exclusive privilege until the end of the Tokugawa period, together with the prestige and pride of supplying seafood for the *shōgun*'s table. However, the reason behind both Tokugawa's favor and Andō's protection was not simply because these fishermen provided protein to the *shōgun*, his troops, and the population of his growing city, but also because they contributed to Ieyasu's rise to power and to the safety of Japan's new center of military government.

Selecting a site for Tsukuda's fishermen

The aforementioned chronicle of the history of the Nihonbashi fish market also narrates other episodes relating to the campaign for the reunification of Japan and the final victory of Ieyasu, which earned Magoemon and his fellow countrymen the gratitude of the military chief. This source mentions, for example, that after Ieyasu occupied Kyoto in 1599, Magoemon provided fishing boats to Ieyasu's troops to travel around the coast of the western region, as well as offering guidance and intelligence. It also states that Magoemon took part in the Battle of Sekigahara in 1600, and that during the siege of Osaka in 1614–15, he and his men used to sail to the neighboring sea by fishing boat in order to gather military information, which was daily reported back to Chausuyama hill, where Ieyasu had established his headquarters of command.[23] This suggests that

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bay, now in Chiba prefecture. For the use of this and other statements by the Tsukudajima community, in order to both legitimise and perpetuate their exclusive rights even after the fall of the Tokugawa Shogunate, see Sahara, *Tsukudajima no konjaku*, 37–38; Akira Shimizu, "Eating Edo, Sensing Japan: Food Branding and Market Culture in Late Tokugawa Japan, 1780–1868" (PhD dissertation, University of Illinois at Urbana-Champaign, 2011), 199–205.

[22] Okamoto and Kido, *Nihonbashi uoichiba no rekishi*, 24.

[23] Uokaijo, ed., *Nihonbashi uoichiba enkaku kiyō*, 12. For the intelligence and military activities of Magoemon and his fellowmen see also Okamoto and Kido, *Nihonbashi uoichiba no rekishi*, 24–27. However, Magoemon's actions in support of Ieyasu's military campaigns in western Japan seem to be hardly compatible with his fishing and commercial activities in Edo. Besides, at the Hongan Temple in

Magoemon and his men were more than merely skilled fishermen. Indeed, it is said that the broad fishing rights themselves were granted to Magoemon's men in order to facilitate their maritime intelligence activities.[24] This also helps to explain why, as a reward for their service, they were also given an area positioned in a strategic location in Edo Bay.

As mentioned above, the first seven fishermen from Tsukuda lodged with Andō, who also assisted the group of thirty-four people that moved to Edo in 1612, giving them hospitality in his residence. It was near Amihoshizaka (the "slope of dried nets") in Koishikawa, close to the Koishikawa river which, once the Ochanomizu waterway was built at the beginning of the Edo period as part of the larger Kanda waterworks, was connected to the Sumida river. The fishermen used to anchor their ships about a few hundred meters from here (where today is Kubomachi Higashi Park), and from here they could sail to the Sumida river and the bay.[25]

The fishermen were also housed by Hachizaemon Ishikawa,[26] a direct vassal of the *shogun* who, although titled Ōsumi *no kami* (governor of Ōsumi province), came from the same province as Ieyasu, and whose eldest son, Hachizaemon, was appointed the official in charge of maritime and naval affairs (*funategashira*) by the Shogunate in 1625. Ishikawa's residence was near Koamichō, the "little net district" in Nihonbashi, whose name is said to derive from the presence of these men catching

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Tsukiji there is a memorial tower for Magoemon Mori, which was erected by his descendants in 1861, on the 200th anniversary of his death. An adjacent plaque records his gesture, from his arrival to Edo and the opening of the fish shop in the city to the construction of an island named after his native village, which gave him the reputation as the founder of Tsukudajima. As has be noted, this would suggest that he lived for more than a century. It seems more plausible to suppose that Magoemon indicates the man who first went to Edo in 1590, as well as his eldest son, who received the family's property together with the same name as his father. For this hypothesis, see Okamoto and Kido, *Nihonbashi uoichiba no rekishi*, 23–27, 31–32, 36–38. See also Sahara, *Tsukudajima no konjaku*, 41–42.

[24] Shimura, *Tsukishima saihakkengaku*, 72.

[25] Tōkyōto, ed., *Tsukudajima to shirauo gyogyō*, 23; Shimura, *Tsukishima saihakkengaku*, 69–70.

[26] Different sources give different characters for the name of Ishikawa, who housed Tsukuda's fishermen, such as Hachizaemon (八左衛門), Shigetsugu (重次), and Masatsugu (政次). Shimura (*Tsukishima saihakkengaku*, 33–36) states that Shigetsugu was the man who initially hosted them, while his eldest son, Hachizaemon, alias Masatsugu, was appointed *funategashira* in 1625.

icefish with small seines.[27] At that time it was a naval strong point, as well as a favorable point from which the fishermen could easily reach the rivers and sea in and around Edo to catch icefish during the night, and most likely conduct military activities for the Edo government as well.[28] It is said that within Andō and Ishikawa's mansions was also located the divided tutelary deity that was transferred from the Tamino Shrine of Tsukuda village.[29] It seems that for some years the festival worshipping the Sumiyoshi gods of the sea and sailing was performed in Ishikawa's compound, attracting Edo's old and new fishermen.[30]

Andō and Ishikawa's compounds only temporarily hosted both the fishermen and their cult. Indeed, once Edo's townsmen and wandering masterless samurai were forbidden to dwell in warriors' residences in 1625, the fishermen needed to find a new place to live.[31] Thus, in 1630, they obtained from the Tokugawa government an uninhabited mudflat formed by sediment from the Sumida river, which was situated on the east side of Teppōzu tideland. Indicated as Mukōjima ("island over there," 向島) on a map from the Bunki era (1501–04),[32] and Mikokushima (みこくしま, probably with the meaning of "three countries' island," 三国島) on a map of the early Edo period,[33] it had easy access to both the sea and the city's major rivers.[34] This sandbank was adjacent to the southwest side

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[27] Tōkyōto, ed., *Tsukudajima to shirauo gyogyō*, 23, 26. Shimura (*Tsukishima saihakkengaku*, 71) mentions a map from 1632 showing that Andō's "middle mansion" (*naka-yashiki*) was in Koamichō.

[28] Tōkyōto, ed., *Tsukudajima to shirauo gyogyō*, 23, 26; Shimura, *Tsukishima saihakkengaku*, 69–71.

[29] According to Okamoto and Kido (*Nihonbashi uoichiba no rekishi*, 32), the tutelary deity was transferred to Edo in 1616, when it was located in Andō's compound. While in Tōkyōto, ed., *Tsukudajima to shirauo gyogyō*, 26, it is stated that it was transferred in 1630 and directly located in Ishikawa's compound.

[30] Tōkyōto, ed., *Tsukudajima to shirauo gyogyō*, 26–27.

[31] The prohibition was issued in 1619 and reaffirmed in 1623, while severe punishment was imposed on transgressors two years later. *Tōkyō shiyakusho* [Tokyo City Government], ed., *Tōkyō shishikō. Sangyō* [Historical records of Tokyo: Industry] (Kyōto: Rinsen shoten, 1993), 3: 111.

[32] *Shintei Edo meisho zue*, 1: 197.

[33] *Bushū Toshima-gun Edo shōzu* [Map of Bushū Toshima Area in Edo, 武州豊嶋郡江戸庄図], a copy of which, realized in 1632, is available in Tokyo Metropolitan Library; accessed: https://www.library.metro.tokyo.jp/Portals/0/edo/tokyo_library/english/modal/index.html?d=41

[34] Tōgo Yoshida, *DaiNihon chimei jisho* [Encyclopedia for place names of Great Japan] (Tōkyō: Fuzanbō, 1970; 1st ed. 1923), 306; Fukagawakushi hensankai, ed.,

of an island of about 55,000 square meters, labeled as Morishima ("woods island," 森嶋) or Yoroijima ("armor island," 鎧嶋) on old maps, and renamed Ishikawajima after the above-mentioned Hachizaemon Ishikawa, who had been granted the island by the Shogunate in 1626 to build his residence.[35]

The area occupied by both the island conceded to the fishing community and that granted to the official in charge of the government's ships and marine transportation was of great strategic importance as an outpost for naval and maritime affairs, from which to both monitor naval traffic and defend Edo's castle and city. This attests to the fact that the Tokugawa government considered Magoemon and his companions not only skilled fishermen, but also experienced and trustworthy watermen and navigators able to inform the military government of any activity that could menace the city from the sea.

It is said that thirty-one fishermen spent fourteen years reclaiming the land, working by themselves "tirelessly day and night" under the direction of Magoemon and his son Kyūzaemon, and that during this period they found accommodation in Hachizaemon's mansion on nearby Ishikawajima. However, it is conceivable that the construction of the island was not completely made at their own expense, and that both Hachizaemon and the Shogunate gave their support to the fishermen's work.[36]

The island was completed on the first day of the second month of 1644. The new settlers named it Tsukudajima after the fishermen's home village, and the island was included in Toshima County of the Musashi Province. In that same year, Magoemon left Edo for his native village; the husband of his granddaughter, Chūbei Tsukuda,[37] became the headman of

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Edo Fukagawa jōcho no kenkyū [Studies on Fukagawa's atmosphere] (Tōkyō: Arimine shoten, 1975), 145.

[35] See *Shintei Edo meisho zue*, 1: 204; Yoshida, *DaiNihon chimei jisho*, 306; Shimura, *Tsukishima saihakkengaku*, 36, 46. The concession of the island was the reward for Hachizaemon's role in uncovering a plot to assassinate the shogun in the so-called "Utsunomiya Castle Hanging Ceiling Incident" in 1622. Another source states instead that he was confined to this island for his misconduct during the same incident, but this hypothesis is inconsistent with historical evidence. See Shimura, *Tsukishima saihakkengaku*, 36–37.

[36] See Tōkyōto, ed., *Tsukudajima to shirauo gyogyō*, 26–27; Shimura, *Tsukishima saihakkengaku*, 76–78.

[37] Some sources indicate that Chūbei (忠兵衛) was one of the seven men who arrived in Edo in 1590. See, for example, Sahara, *Tsukudajima no konjaku*, 21, 37. Yet, his name is not listed in Uokaijo, ed., *Nihonbashi uoichiba enkaku kiyō*, 12.

Tsukudajima, and the name Chūbei was inherited by the following six village headmen.[38] On the twenty-ninth day of the sixth month of 1646, the tutelary deity was relocated to the Sumiyoshi Shrine, built on the island. Yoshitsugu Hiraoka, who had moved to Edo in 1612 along with thirty-three fishermen, became the first chief priest of the shrine, an office that would have been inherited by his descendants.[39] In 1645, a ferry crossing the "big river" to the opposite bank was opened (Fig. 3). For more than three centuries, it remained the only, although irregular, access to the island.

Townscape of the fishing village

Some maps of Tsukudajima which are included in a collection describing streets and land-use changes in the *shōgun*'s capital from the Enpō era (1673–81) to the late Edo period, give us an idea about the island's shape, which remained unaltered throughout this time.[40] However, several information of its original settlement pattern, as well as of its socio-economic structure, can be obtained by examining a map of 1710. In order

[38] *Tsukudajima nenpyō*, 6; Tōkyōshi Kyōbashiku, ed., *Kyōbashikushi* [History of Kyōbashi ward] (Tōkyō: Tōkyōshi Kyōbashiku, 1937), 1: 72; Tōkyōto, ed., *Tsukudajima to shirauo gyogyō*, 27. During the Edo period, ordinary people were forbidden to bear surnames, which was a right reserved for the members of the civil aristocracy and the warrior class, with some exceptions made for commoners of special merit. Even if Chūbei's surname was Tsukuda, his descendants continued to use his personal name. A list of Tsukudajima's landowners in 1710 seems to indicate that the same also happened to other fishermen coming from Osaka, including Mogaemon's family descendants. For the list see Etsuzō Furuta, "Kinsei Tsukudajima ni okeru shūraku keitai no ichikōsatsu" [Some consideration of the settlement pattern at Tsukudajima in Tokyo during the Edo era], *Tōkyō gakugei daigaku kiyō*, *Daisanbumon*, *Shakai kagaku*, (1981): 43. This hypothesis is also suggested by Sahara, *Tsukudajima no konjaku*, 34. After six generations, the name of the headman was changed to Kōemon (幸右衛門), who started using the surname Mori again. Rokurō Sahara, "Tsukudajima to shakai-bunkateki henka. Tōkyōto Chūōku Tsukudajima chōsa jōsetsu," [Socio-cultural changes of Tsukudajima: A unique small community in old Tokyo], *Keiō gijuku daigaku daigakuin shakaigaku kenkyūka kiyō. Shakaigaku shinrigaku kyōikugaku* 2 (1963): 5.

[39] Chūōku kyōiku iinkai, ed., *Sumiyoshi jinja shozō bunsho kirokurui chōsa hōkokusho*, 2: 3. See also Sahara, *Tsukudajima no konjaku*, 26–27.

[40] *Go-funai ōkan sono hoka enkaku zusho* [Records of the historical development of the *shōgun*'s capital streets and other], 7: 140–45, available at the National Diet Library Digital Collections; accessed: http://dl.ndl.go.jp/info:ndljp/pid/2571700

to both manage urban administration and control Edo, the military government twice ordered the compilation of a very detailed map of the city called *koken ezu* (picture map of bills of sale), in 1710–11 and in 1744. The compilation of this cadastral map—which contained information about the social and administrative life of towns and villages, including properties, administrations, land prices, sewers, roads, canals, etc.—was entrusted to the town or village headmen, who submitted it to the city's magistrate and also conserved a copy (*hikae*) of it for themselves.[41] Thanks to a copy of the *koken ezu* of Tsukudajima (Fig. 4), which is dated the eighth month of 1710 and is the oldest cadastral map of the island, it is possible to gain some insight into the townscape and socio-economic life of the island, constructed six decades earlier.[42]

An idea of the general layout of the island can be immediately gained thanks to the fact that, in the original map, streets, banks, and the bridge are colored in yellow, while the sea and waterways are colored with different tonalities of indigo blue.[43] The map shows Tsukudajima surrounded by the river Sumida on the west side, and by the inner bay's water on the southeast and south sides. The foliage along the north and northeast side of the map indicates the nearby island of Ishikawajima. In this map Tsukudajima and Ishikawajima appear to be contiguous, while in many other maps compiled during the Edo period the distance between the

[41] Kazushige Mashiyama, "Hōei 7nen 'Tsukudajima koken ezu hikae' o yomu" [Reading the *Tsukudajima koken ezu hikae* of 1710], *Chizu chūshin* 423 (December 2007): 28–29; Hiroshi Yamasaki, "Tsukudajima (gen Tsukuda 1chōme) no machinarami" [Townscape of Tsukudajima, now Tsukuda 1chōme], in *Chūōku Tsukudajima chiku bunkazai chōsa hōkoku* [Research report on cultural assets in Tsukudajima, Chūō ward] (Tōkyō: Tōkyōto kyōikuchō shakaikyōikubu bunkaka, 1984), 34, 44, fn. 14.

[42] In 2015, this ancient document—known as *Tsukudajima koken ezu hikae* (佃島沽券絵図控), measuring 129 x 118 cm, and owned by the Kaneko family—was designated a "Tangible Cultural Property of Chūō Ward." For other versions of the map see Sahara, *Tsukudajima no konjaku*, 33–34. Some studies have been conducted based on this map, among which are: Yamasaki, "Tsukudajima (gen Tsukuda 1chōme) no machinarami," 32–69; Mashiyama, "Hōei 7nen 'Tsukudajima koken ezu hikae' o yomu," 28–30; Furuta, "Kinsei Tsukudajima ni okeru shūraku keitai no ichikōsatsu," 33: 39–46; Shimura, *Tsukishima saihakkengaku*, 82–88.

[43] Sahara, *Tsukudajima no konjaku*, 34; Yamasaki, "Tsukudajima (gen Tsukuda 1chōme) no machinarami," 34; Mashiyama, "Hōei 7nen 'Tsukudajima koken ezu hikae' o yomu," 29.

two islands is marked, perhaps to emphasize the social distance between the fishermen's community and the warrior's residence.[44]

The island is composed of two parts, which are linked by a small crooked bridge, similar in form to a Venetian "ponte storto." The frontal part of the island is on the western side and runs parallel with the Sumida river. It is oriented towards Edo Castle, and this is an evident sign of respect of the Tsukudajima community for the Tokugawa rulers. The bridge stands above an inner canal about twenty-one meters wide, which is the back entrance of the village. The boats have access to the inner canal through the northern moat, about seventeen meters wide, that separates Tsukudajima from Ishikawajima, as well as the almost ten-meter wide canal on the south side, where a breakwater was built to protect the entrance and mooring areas. Moreover, all the waterfronts exposed to the tides are protected by embankments created to prevent flooding.[45] The ship moats, forming a shape that resembles that of the character *ko* (コ), are thus protected from the waves and wind coming from the bay's inner sea.[46] One rare picture that portrays boats and ships crossing the canal between the two islands may give some idea of both the embankments built on the northern edge of Tsukudajima, and the distance that separated it from Ishikawajima (Fig. 5).

As aforementioned, since 1645 a ferry crossing the river Sumida connected Tsukudajima to the opposite bank. The *koken ezu* of 1710 (Fig. 4) shows the ferry's pier located in the middle of the bank along the river, in Venice called a "fondamenta" or a street running alongside the water. The street connecting the pier to the bridge is the *tosenba dōri* (渡船場通り),[47] similar to a Venetian street leading to the ferry dock and thus called "calle del traghetto." It crosses the perpendicular streets that run from north to south, giving the layout of the western part of the village a regular shape resembling the character of a paddy field (*ta* 田).[48]

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[44] Indeed, the officially sanctioned social differentiation between the classes in feudal Japan was translated in the planning of Edo's districts, with the merchants and tradespeople living in the *shitamachi* (the "downtown" which expanded as marshy areas near the bay were reclaimed), the warrior class residing in the *yamanote* (the hilly residential districts), and *jishachi* (lands for temples and shrines) reserved for the religious institutions.

[45] Furuta, "Kinsei Tsukudajima ni okeru shūraku keitai no ichikōsatsu," 42; Shimura, *Tsukishima saihakkengaku*, 84.

[46] Yamasaki, "Tsukudajima (gen Tsukuda 1chōme) no machinarami," 33; Shimura, *Tsukishima saihakkengaku*, 84.

[47] Shimura, *Tsukishima saihakkengaku*, 85.

[48] Yamasaki, "Tsukudajima (gen Tsukuda 1chōme) no machinarami," 35.

The streets internal to the residential space are almost six meters wide, except the section of the *tosenba dōri* between the crossroads and the bridge, which is two-thirds the width of the others.[49] The banks on both sides of the inner canal are wider since they serve as a base for fishing activities. They are about thirteen meters wide, with a dry dock in the north area of the eastern side, about fifty meters wide. This area was conceived as the very center of the fishing village's life, and its appearance may have been quite different from that of the front part, along the riverside, looking towards the castle. The bridge connects the street coming from the ferry's pier directly to the dry dock, which might be the reason why it was deliberately built crooked. Three small warehouses (*dozō* 土蔵) are situated along the banks of the inner canal (Fig. 6), one at the corner of the dry dock near the bridge, and two on the opposite side, in front of lot no. 12. A carpentry shelter (*daiku kariya* 大工かりや) is located in the southern part of the eastern bank, in front of lot no. 31. A picture showing Tsukudajima from the backside (Fig. 7), contained in a work describing the banks of the Sumida river, gives an idea of the fishing village's landscape, as well as of the area designated for its main activity.[50]

The island's total surface, which is said to have been roughly "100 *ken* for each of the four sides" at the time of its realization,[51] in the *koken ezu* of 1710 is said to be "95 *ken* from east to west and 90 *ken* from south to north," thus covering a surface area of 8,550 *tsubo*,[52] which includes the two ship moats along the northern and southern edges.[53] Since the exact value of one *ken* (and, consequently, that of one *tsubo*) in Edo varied between about 1.82 to 1.97 meters, the island should have been between 173 and 187 meters in length, and between 164 and 177 meters in width. Consequently, the total area should have been between 28,000 and 33,000

[49] The different width of the street connecting the crossroads to the bridge is evident in the *koken ezu*, and is also specified in the map available in Furuta, "Kinsei Tsukudajima ni okeru shūraku keitai no ichikōsatsu," 42. In Yamasaki's map ("Tsukudajima (gen Tsukuda 1chōme) no machinarami," 53) the width of both sections is the same (3 *ken*). Also Shimura, *Tsukishima saihakkengaku*, 85, states that the entire street is 3 *ken* wide.

[50] Rosui Tsuruoka, *Tōto Sumidagawa ryōgan ichiran. Nishi* [Views of both banks of the Sumida river: The west], 1781, 31.

[51] *Shintei Edo meisho zue*, 1: 200.

[52] One *tsubo* is an area surface unit with one *ken* for each side.

[53] See Tōkyōshi Kyōbashiku, ed., *Kyōbashikushi*, 722; Okamoto and Kido, *Nihonbashi uoichiba no rekishi*, 122; Tōkyōto, ed., *Tsukudajima to shirauo gyogyō*, 27; Yamasaki, "Tsukudajima (gen Tsukuda 1chōme) no machinarami," 33, 53.

square meters. Indeed, at the time the island was made, the standard value of one *ken* in Edo still corresponded to about 1.97 meters; nevertheless, some sources state that its total area was about 28,000 square meters, thus assuming that one *ken* corresponded to about 1,82 meters.[54] As will be shown below, this is not the only uncertainty regarding measurements concerning the island. At any rate, less than half of the island's total area was occupied by residential lots (4,080 *tsubo*), while the dry dock covered an area of 810 *tsubo*.[55]

The *koken ezu* (Fig. 4) shows the residential lots arranged in three vertical rows, two along the western side of the inner canal and one along the eastern side. One faces the river, while the other two look towards the inner canal. The lots number thirty-five in total (Fig. 6): nine in the western row, fourteen in the central row, and twelve in the eastern row. This number does not include the Sumiyoshi Shrine, located to the north of lot no. 23. While the depth of all the lots is 20 *ken* (about 36 meters), their street frontage length varies considerably, from 12 *ken* (almost 22 meters) in four lots (lot nos. 1–3 and 35) to 4 *ken* (about 7 meters) in twenty-one lots (Fig. 8).[56]

Regarding the village roofing, it is said that when a wave hit the village in 1680, the fishermen "escaped death by climbing onto the thatched roofs of their houses," which form of roofing had been used for a long time,[57] as it also appears in some images from the Edo period (Fig. 9). It is also said that the frequent fires occurring in the *shōgun*'s city during this period, induced the residents of the island to cover their homes

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[54] See, for example, Tōkyō ni furusato o tsukurukai, ed., *Chūōku no rekishi* [History of Chūō ward] (Tōkyō: Meicho shuppan, 1979), 56; Shimura, *Tsukishima saihakkengaku*, 78.

[55] Furuta, "Kinsei Tsukudajima ni okeru shūraku keitai no ichikōsatsu," 42; see also Yamasaki, "Tsukudajima (gen Tsukuda 1chōme) no machinarami," 34.

[56] The list of the thirty-five lots in Fig. 8 contains information regarding respectively: the owner's name, his birthplace, the street frontage's length measured in *ken*, the lot's depth, its surface size, the land total price, the land price for each *ken* of the frontage's length, and the name of the house manager (*yamori* 家守). The list shows that almost all landowners have a *yamori*, namely, a manager who works for the homeowner, acts as his substitute, assists the owner in the management of the house and room rent, and lives by working on commission. Sahara, *Tsukudajima no konjaku*, 34; Yamasaki, "Tsukudajima (gen Tsukuda 1chōme) no machinarami", 35. The list in Fig. 8 is taken from Furuta, "Kinsei Tsukudajima ni okeru shūraku keitai no ichikōsatsu," 43, where the actual street frontage's length of lot no. 4 is 10 instead of 12 *ken.* For a similar list see also Yamasaki, "Tsukudajima (gen Tsukuda 1chōme) no machinarami," 51.

[57] *Tsukudajima nenpyō*, 19.

with shingles.[58] Indeed, after the first fire that hit the city in 1602, it was ordered to cover houses with boards instead of straw, and at this time tiles started to be used in the city as well.[59] Yet, the latter came to distinguish the houses of warriors and well-off people, while cheaper roofs of wooden boards prevailed in poorer areas, and the same may have also occurred on the fishermen's island.

From the *koken ezu* of 1710 it is possible to deduce that the organization of the residential space corresponded to the socio-economic differentiation inside this small community which, according to a census realized in 1649, five years after the completion of Tsukudajima, was of eighty families, and about one-hundred sixty individuals, who lived in thirty-five households.[60] Interesting details can also be discovered by comparing the list of the landowners of thirty-five lots, with those of the fishermen who moved from Osaka to Edo at the *shōgun*'s wish about one century earlier.[61]

The *koken ezu* shows that the western row of the village is mostly occupied by large houses, whose dimensions decrease from north to south. Fig. 8 shows that the price of land, here, is high (between 9 and 11 *ryō* for each *ken* of street frontage length), particularly that of lot nos. 3 and 4, since they are not only located along the Sumida river facing Edo Castle, but are also close to the ferry's pier.[62] The names of the owners of lot nos. 1, 2, and 3—all with a street frontage of 12 *ken*—are respectively Kyūzaemon, his younger brother, Magoemon, and Hachiemon, who was probably related by blood to Kyūzaemon.[63] They are apparently the descendants of Magoemon's family who, together with their names, inherited a privileged status. Besides, they are the only people listed as being native to Tsukuda village in Settsu, and it also seems to emphasize their predominant position in the island community.

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[58] Yamasaki, "Tsukudajima (gen Tsukuda 1chōme) no machinarami," 36.
[59] A. L. Sadler, *The Maker of Modern Japan: The Life of Tokugawa Ieyasu* (New York: AMS Press, 1977; 1st ed. 1937), 224.
[60] *Tsukudajima nenpyō*, 6–7.
[61] A list of Tsukudajima's landowners in 1710 is in Furuta, "Kinsei Tsukudajima ni okeru shūraku keitai no ichikōsatsu," 43, while, as indicated above, the lists of the first two groups who arrived in Edo in 1590 and in 1612 are respectively in Tōkyōto, ed., *Tsukudajima to shirauo gyogyō*, 19, and Uokaijo, ed., *Nihonbashi uoichiba enkaku kiyō*, 12.
[62] Sahara, *Tsukudajima no konjaku*, 34–35; Yamasaki, "Tsukudajima (gen Tsukuda 1chōme) no machinarami," 35; Mashiyama, "Hōei 7nen 'Tsukudajima koken ezu hikae' o yomu," 30.
[63] Furuta, "Kinsei Tsukudajima ni okeru shūraku keitai no ichikōsatsu," 42, 45, fn. 8.

The elite of the fishermen's village included the owner of lot no. 4, with a street frontage of 10 *ken* (Fig. 8). His name was Chūbei, the headman of Tsukudajima. The same name also appears in lot nos. 10, 12, 29, and 35. This last lot, no. 35, is not only one of four lots with the widest street frontage, but is also one with the highest land price—more than 22 *ryō* for each *ken*—more than twice the price of the lots on the Sumida riverside. Indeed, such a high land price, the reason for which is unclear,[64] appears even more puzzling in light of the fact that the price of land of all the other lots in the two rows looking towards the inner canal is the lowest (5 or 6 *ryō* for one *ken*). It was in and around the inner canal that Tsukudajima's main activity was concentrated, and it was here that ordinary fishermen lived. Etsuzō Furuta notes that the total surface area of lot no. 35 included a large storehouse,[65] and it might perhaps explain its high price.

The birthplace of the headman Chūbei was Tsukudajima, and it makes him one of the fourteen out of thirty-five landowners who were born on the island.[66] The hometowns of seventeen landowners were located in Edo's commercial districts, in or around Nihonbashi, and it might indicate that the growing number of families living in Tsukudajima—which doubled between 1649 and 1739[67]—was due not only to the prolificity of Magoemon's descendants, but also to a migration towards the islands by fishermen, other than those from the original group.

Regarding the settlement pattern of Tsukudajima, it has been noted that the fishermen realized a "grid-pattern" which can be seen in "Edo type" (Fig. 10-a), as well as in "Kyoto type" (Fig. 10-b), settlement. For example, the fact that both the front and back entrances of each residential site has access to the street is consistent with the "Kyoto type," while the residential sites' fixed length of 20 *ken* corresponds instead to the "Edo type."[68] This set length is perhaps due to the fact that, in realizing their

[64] Yamasaki, who took part in the Tokyo Metropolitan Cultural Assets Investigation in Tsukudajima and whose research report was published in 1984, emphasized the high land price of this lot; nevertheless, he states that the reason for it is obscure. Yamasaki, "Tsukudajima (gen Tsukuda 1chōme) no machinarami," 35.

[65] Furuta, "Kinsei Tsukudajima ni okeru shūraku keitai no ichikōsatsu," 43, fn. 2 to fig. 1.

[66] Moreover, the other landowners named Chūbei are natives of Tsukudajima, except the owner of no. 29, whose native place was Hon-Odawarachō, the area where the seven fishmongers had opened their fish stands more than a century earlier.

[67] The number of families grew from 80 in 1649 to 160 in 1739. *Tsukudajima nenpyō*, 6-7, 15.

[68] Furuta, "Kinsei Tsukudajima ni okeru shūraku keitai no ichikōsatsu," 44–45.

island, the fishermen followed the rule of Edo's districts, where the tax paid was based on the length, calculated in *ken*, of the property's street frontage.[69]

However, as previously hinted, the value of one *ken* (the "space" or "interval" between two pillars in traditional houses) changed over time and location. In Edo, until the great Meireki fire of 1657, one *ken* was about 1.97 meters and usually called a *kyōma* (京間). In order to increase taxes, soon after the great fire the military government reduced it to about 1.82 meters, and this new measurement was said to be *inakama* (田舎間). Hence, at the time the island was built, one *ken* still corresponded to almost 2 meters, and, indeed, in the map of 1710 the term "*kyōma*" is used to indicate the width of both the northern and southern ship moats (Figs. 4, 6). Nevertheless, on the basis of estimation and calculation made by comparing the *koken ezu* of 1710 with a map realized in 1744,[70] where *inakama* is used as the standard measurement for distance, it has been possible to hypothesize that the island was built by employing an "intermediate measure" corresponding to about 1.90 meters.[71] Despite the unclear reasons behind the choice of adopting such an intermediate solution, it might represent a peculiar local feature of Tsukudajima.

Hence, an analysis of the *koken ezu* of 1710 suggests that in conceiving the island's space, these fishermen adopted original solutions, combining the idealized view of their native place with the new ideal image that had emerged with Tokugawa's rise to power.[72] After all, being built *ex novo*, Tsukudajima could be molded by transposing some familiar features onto new ones originating in the *shōgun*'s city. This strategy is also witnessed in the location of the shrine where the local community could worship their deities.

Tsukudajima's sacred spaces

Built two years after the completion of the island, the Sumiyoshi Shrine was located along the northeast border of the front part of Tsukudajima. The shrine covered an area that differs from that of the residential lots,

[69] Yamasaki, "Tsukudajima (gen Tsukuda 1chōme) no machinarami," 35.
[70] *Enkyō gannen Tsukudajima baikenezu* [Picture map of sale of Tsukudajima of the first year of Enkyō era], 1744, 2–9, available at the National Diet Library Digital Collections; accessed: http://dl.ndl.go.jp/info:ndljp/pid/2542349
[71] This hypothesis is suggested by Hiroshi Yamasaki in his "Tsukudajima (gen Tsukuda 1chōme) no machinarami," 35.
[72] Furuta, "Kinsei Tsukudajima ni okeru shūraku keitai no ichikōsatsu," 44–45.

being 22 *ken* on the northern side and 23 *ken* on the southern side. The length of street frontage looking toward the river is 8 *ken*, while the rear side is 6.5 *ken*. It was in this space, covering a total area of about 160 *tsubo*, that the deities of Sumiyoshi were relocated. It was a *chinjusha* (鎮守社), namely, a Shinto shrine on Buddhist temple grounds dedicated to the tutelary deity of the area.[73]

Even though the Sumiyoshi Shrine was generally reached by boats that anchored in the inner channel, a *torii* (the traditional Japanese gate at the entrance to a Shintoist shrine) built at the northwest edge of the village clearly indicates that the main entrance to the shrine was facing the west, in coherence with the general planning of the island. This orientation might have been due not only to the need to orient the shrine in the direction of the rulers' castle, but also to the fact that the three deities of the Sumiyoshi Shrine were supposed to come from the west. Indeed, the shrine in Tsukudajima had the same orientation as the Tamino Shrine in Tsukuda village, where Ieyasu had been deified in 1631 and with which the descendants of Yoshitsugu Hiraoka, the above-mentioned first chief priest of Tsukudajima Sumiyoshi Shrine, maintained a strong relationship.[74] The location of the *torii*, the gate at the entrance to the shrine, which was visible .from the Sumida river and made the presence of the sacred spot recognizable (Figs. 11–12), might have been a way to remedy the backward facing position of the shrine (Fig. 13).

While Shintoist shrines are generally built in elevated and green places and have a central position, the Sumiyoshi Shrine is not located in the center of Tsukudajima, nor does it occupy an elevated area. The choice behind this peculiar location can be explained in the light of several factors. The central and upper area of the island, surrounding the inner canal, was about one meter higher than the western and eastern banks, and served as the main base for fishing activities.[75] Hence, the members of this community seem to have had no alternative but to locate the shrine in the only place where a green area could be found, namely, close to Ishikawa's compound. After all, good relations with the holder of Ishikawajima was a guarantee to protect the *shintai*, the sacred body of the gods coming from the Tamino Shrine, which included the tutelary god of shipping and

[73] See Sahara, *Tsukudajima no konjaku*, 34; Yamasaki, "Tsukudajima (gen Tsukuda 1chōme) no machinarami," 34, 51; Mashiyama, "Hōei 7nen 'Tsukudajima koken ezu hikae' o yomu," 30, where the length of the back side is said to have been 6.3 *ken*.

[74] Sawa et al., "Ōsakashi Nishi Yodogawaku," 70; Shimura, *Tsukishima saihakkengaku*, 86–87.

[75] Shimura, *Tsukishima saihakkengaku*, 89.

seafarers. This solution might have allowed the community's deity protectors to be guarded in a hidden, quiet area, far from tides and waves. It has also been suggested that the reason for locating the sacred place on the eastern edge of the western part of Tsukudajima might be explained by the fact that, in Shintoist belief, the right is a symbolic place.[76]

Despite its peripheral position, the Sumiyoshi Shrine held a central position in the communitarian life of the fishing village. Yoshitsugu and his successors continued to commemorate the foundation of the Sumiyoshi Shrine on every twenty-ninth day of the sixth month, with a festival celebrating the repose of Sumiyoshi's Four Pillars, as well as Ieyasu Tokugawa, which involved all the people of Tsukudajima and mobilized the resources of the entire community.[77] The Sumiyoshi Festival was held every three years and was worthy of being portrayed by the brush of several artists from the Edo period. For example, Hiroshige Utagawa (1797–1858) dedicated one of his *One Hundred Famous Views of Edo* to the Sumiyoshi Festival held on Tsukuda Island (Fig. 14). Behind a foreground banner cutting across the *ukiyoe*,[78] he depicted a crowd performing the practice of *mizu togyo* (水渡御), namely, carrying the shrine through the water. Here the sacred palanquin (*mikoshi*) of the Sumiyoshi Shrine is carried by a throng of chanting men through the shallow waters surrounding the island. The banner bears the inscription "Sumiyoshi Daimyōjin" (Great Bright God Sumiyoshi) and, below, a smaller inscription with the names of the people who enshrined the Tsukudajima tutelary god (*ujikojū* 氏子中). The traditional music performed during the Sumiyoshi Festival is said to be one of the three most popular pieces of festival music in the city, which became known as Tsukuda *bayashi* (佃囃子).[79]

Another important summer event was the Obon Festival, which celebrated the spirits of the dead who were believed to return to their home place, and it is said to have begun in Tsukudajima in 1680, one year after the completion of the rebuilding of the Buddhist temple Honganji in Tsukiji. Originally located near Asakusa and burned during the great Meireki fire in 1657, the Hongan Temple was reconstructed on a parcel of land to be reclaimed from the sea, that was thus named Tsukiji (literally "reclaimed land"). It is said that the residents of the nearby Tsukudajima,

[76] Shimura, *Tsukishima saihakkengaku*, 87.
[77] Chūōku kyōiku iinkai, ed., *Sumiyoshi jinja shozō bunsho kirokurui chōsa hōkokusho*, 2: 3.
[78] The banner still remains in the treasury of the Sumiyoshi Shrine.
[79] Sahara, *Tsukudajima no konjaku*, 188–90.

who were loyal to the temple and contributed to the reclamation work, performed a ritual of Buddhist dance and recitation (*odori*) in the ceremony of completion of the temple, and that it was the origin of the *Bon odori*.[80] While the Obon festival was celebrated everywhere in the country, the *Bon odori* performed in Tsukudajima became both unique to this place and famous in Edo (Fig. 15). In the night between the thirteen and the fifteenth days of the seventh month, everyone in Tsukudajima came out, gathered in groups of about ten people, lighted the lanterns, and went strolling from Kyōbashi to Nihonbashi to gather donations to be offered to the Honganji. In these dancing tours, they clanged gongs and sang "*yaatose*, *yaatose*" chanting the Buddhist devotional formula (*nenbutsu*) in tune.[81] After these dancing tours were forbidden in 1831, the fishermen community confined the performance of the *Bon odori* to Tsukudajima, dancing along the streets, in the beach and in the dock where they used to dry fishing nets.[82]

Being located at the entrance to Edo harbor, and guarding the deity of shipping and seafarers, the Sumiyoshi Shrine was worshipped not only by locals, but also by other people involved in the city's fishing activities, shipping trade, and wholesale dealer associations. For example, the Sumiyoshi Fraternity (*Sumiyoshi kō* 住吉講), a mutual assistance association created in 1824, held its yearly general meeting on the tenth day of the fourth months, and on that day it became a custom to pay homage to the Sumiyoshi Shrine at Tsukudajima.[83]

The Sumiyoshi Shrine was not the only sacred spot on the fisherman-made island. In 1738, a Jizō, the guardian deity for children and travelers, and one of the most revered and beloved deities both in and outside Edo, was enshrined in Tsukudajima. To protect the image of Tendai Kosodate Jizōson (天台子育地蔵尊), the Child-raising Jizō of the Buddhist Tendai Sect, a small area was chosen corresponding with lot no. 29 in Fig. 6. This might have been the safest place to safeguard the image

[80] Kazushige Mashiyama, *Tsukudajima no Bon odori. Rekishi denshō to odoriuta no kiroku. Tōkyōto shitei mukei minzoku bunkazai* [Tsukudajima *Bon odori*, a Tokyo Intangible Cultural Property. Its historical tradition and dance songs] (Tōkyō: Tsukudajima Bon odori hozonkai, 2012], 5.

[81] Kiichirō Kikuchi, *Edo funai ehon fūzoku ōrai* [An illustrated book of Edo manners] (Tōkyō: Rōyōdō, 1905), 1: 139, available at the National Diet Library Digital Collections; accessed: http://dl.ndl.go.jp/info:ndljp/pid/767856

[82] Mashiyama, *Tsukudajima no Bon odori*, 6.

[83] Yosoburo (Yosaburō) Takekoshi, *The Economic Aspects of the History of the Civilization of Japan* (London: Dawsons of Pall Mall, 1967; 1st ed. 1930), 1: 561–62; Tōkyōshi Kyōbashiku, ed., *Kyōbashikushi*, 217–18.

of the deity carved on a flat natural stone (Fig. 16), since this tiny spot located among ordinary houses seems to have been the highest place in the fishing village.[84] Close to the Jizō, a ginkgo tree was planted, which over the following centuries continued to grow above the narrow tunnel of houses, revealing the presence of the deity to non-residents.

Other places of worship were later built on the islands, particularly along the inner canal. In 1869, a ceremony was held to relocate the deity of rice from the district of Odenma in Nihonbashi to the Irifune Inari Jinja (入船稲荷神社), the shrine of the deity protecting the ships' arrival. This shrine was built inside the precincts of the Sumiyoshi Shrine, facing the northern side of the inner canal. Not far from the Irifune Inari Jinja was the Funadama Jinja (船魂神社), the shrine of the guardian deity of ships, which had been built in 1863. On the same side of the inner canal, at the edge of a residential lot in the southern block, the Mori Inari Shrine (森稲荷神社) was built, showing a clear connection with the family whose surname had been given by Ieyasu. On the opposite side of the canal, not far from the Jizō, two uninhabited shrines were built side by side in the same sacred precinct, their access being indicated by a *tori* (Fig. 17). Here, the deities of both the Osaki Inari Jinja (於咲稲荷神社) and the Namiyoke Inari Jinja (波除稲荷神社) were worshipped to protect the islands from waves, which were obviously considered to be among the worst calamities that could hit the community. Even if the origin of these shrines is unclear, they might have had a connection with the Namiyoke Inari Shrine that was built in 1659 on the water's edge of Tsukiji, the newly "reclaimed land" on the opposite side of the Sumida river.[85]

Sacred spaces within Tsukudajima reflect the coexistence of several elements and power relations. While the worship of Ieyasu continued to strengthen the link between Tsukudajima and the Tokugawa rulers, and the enshrinement of deities also worshipped in other areas of the city testified to the degree of continuity between local and urban lifestyles and activities, other cults and festivals came to characterize the fishing village and remained peculiar to Tsukudajima.

[84] Shimura, *Tsukishima saihakkengaku*, 89.
[85] Sahara, *Tsukudajima no konjaku*, 77; Jinja honchō chōsabu, ed., *Jinja meikan* [A shrines directory] (Tōkyō: Jinja honchō, 1962), 210.

From a fishing village to a famous place in Edo

As the *koken ezu* of 1710 clearly shows, the planning of Tsukudajima had been conceived in such a way as to provide an efficient layout to serve the needs of the fishing community, which continued to supply fresh seafood to Edo Castle, the military class, and the ordinary population of Edo. To meet their demands, the fishermen of Tsukudajima developed various methods and used different nets to catch diverse types of fish, both in the rivers and in the bay.

Icefish were caught in the shallow waters near or in the estuary of the Sumida river by employing large trap nets stretched across four poles (Fig. 18). *Shirauo* were attracted to the surface by the light of firewood burned in a metal container, and this technique became known as nighttime fishing typical of Tsukudajima. The boats' bright fires came to characterize the nocturne landscape of the bay and the rivers, becoming a sign of the winter season that several artists of the time portrayed in their works (Figs. 19–20). Nevertheless, because of the risk of fire, the Edo government issued an ordinance in 1707 to reduce the number of *shirauo* fishing boats along the course of the Sumida river.[86]

The consonance between icefish catching and Edo's winter season was also evoked in a kabuki play by the dramatist Mokuami Kawatake (1816–93), where the female protagonist, while standing by the Sumida river and gazing at the spring sky, pronounces the following words:

> Under the pale moon, torches for *shirauo* catching appear hazy in the spring sky; feeling cold in the breeze, drinks have made me feel tipsy but easy ... Is it really *setsubun* [season divider] tonight? I am full of good luck from the spring![87]

Tsukudajima fishermen continued to deliver fresh icefish to Edo Castle in elegant boxes (Fig. 21), consolidating their relationship with Ieyasu's heirs, as well as the *shirauo*'s good reputation. Indeed, *shirauo* became one of the delicacies of the *shōgun*'s city, and in *Oedo meibutsu ōrai* (*A guidebook of Edo's special products*, 1805) it appeared among the renowned seafood of Edomae, as the sea "in front of Edo Castle" was originally called and, later, more generally, the fish and shellfish that were

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[86] *Tsukudajima nenpyō*, 12.

[87] These words, uttered by Lady Kichisa, one of the three bandits of *Sannin Kichisa kuruwa no hatsukai* [Three Kichisas' first visit to the pleasure quarter], first performed in 1860, are quoted by Shimizu, *Eating Edo, Sensing Japan*, 189.

caught in Edo Bay.[88] Another local product was *tsukudani*, originally made by simmering small fish and shellfish in salt, rather than drying them, as the island was barely large enough to dry their nets and store equipment. No different from the Venetian "sarde al saor" (savored sardine) and other foods with maritime roots, which were originally invented to prevent fish rot and consumed by fishermen and sailors on board during times of shortage, but later became cherished dishes, *tsukudani* originated as a preserved food that could be saved and eaten over a certain period of time. Later "enriched" with soy sauce and sugar, which gave it a salty-sweet taste, *tsukudani* became a luxury that feudal lords traveling to and from Edo not only consumed during their voyage, but also brought home as a souvenir, making it known and cherished all over the country.[89]

Even if fishing remained the main activity of Tsudukajima's residents, it was not unusual for them to perform other tasks in what, at that time, was a water city, where ships unloaded their cargo at the main docks and goods were distributed throughout the city by an efficient waterway network, and where boats were also used to cross the waterways, as well as for pleasure outings. Being not far from other docks, such as Tsukuji, Shiba, and Minato, the shallow water around Tsukudajima was suitable for the anchorage of ships waiting to be unloaded, or which directly discharged their cargo onto small boats and barges, often steered by the island's fishermen. Several pictures from the Edo period show boats sailing near Tsukudajima or lying at anchor in the lee of the island, where rows of towering ship's masts can be seen (Figs. 22–25).

Tsukudajma's fishermen also used their watercraft as a means of transporting people across the water, an occupation which reminds one of the Venetian gondoliers. Indeed, many of the roofed and unroofed pleasure boats that often crowded Edo's bay and waterways reached Tsukudajima during the day as well as at sunset, sometimes waiting until the *hinode*, the "rise of the sun," which rose beyond Tsukudajima (Figs. 26–27). Thus, in the vicinity of Tsukudajima, fishing was often carried out alongside leisure activities (Figs. 28–30). After all, during the Edo period Tsukudajima became a *meisho*, a "famous place," worthy of being mentioned in several

[88] Kikuchi, *Tōkyōwanshi*, 136.

[89] Tetsu Okada, *Tabemono kigen jiten* [A Dictionary of the origins of food] (Tōkyō: Tōkyō dōshuppan, 2003), 297. Sugar, the trading of which increased during the seventeenth century, was mostly shipped from the Ryūkyū Kingdom and the Amami Islands to Japan via Satsuma, southern Japan's fief, which, in 1611, imposed control over the region and its trade.

guidebooks describing the *shōgun*'s city, and is even depicted in a woodblock print in the room of a beautiful woman of the time (Fig. 31).

Tsukudajima in a modernized Tokyo

Although strictly linked to the city's socio-economic structure and everyday life, Tsukudajima maintained an insular feature, which was even emphasized in several maps and images of the Edo period. Nevertheless, the insularity of Tsukudajima was jeopardized by the process of modernization that started once the Tokugawa military rule was replaced by the Meiji government in 1868, notably after the former *shōgun*'s city was finally chosen as the capital of the centralized and unified state, and renamed Tokyo – the new "eastern capital" – on the 3rd of September of that same year.[90] The modernization process affected the city, progressively erasing the signs of its past, while the reclamation of land from the sea and from the marsh and wasteland in the coastal areas dramatically changed the traits and the geography of the city.

In 1883, dredging works started in the area of the inner bay around the mouth of the Sumida River in order to create new landfill space, as a part of a wider plan aimed at modernizing the new capital and equipping it with a modern port. In the following year, new man-made land progressively appeared around and in the vicinity of Tsukudajima. In 1892, reclaimed mud flats to the south of Tsukudajima created the present Tsukishima Island, originally written with the character for the word "built" (築, as one of the characters used for Tsukiji) and later changed to that for "moon" (月), most likely to make the new area more attractive.[91] Reclamation projects continued with the completion of another neighboring district on the southeastern edge of Tsukishima in 1894, which was later named Kachidoki.[92] The total area reclaimed during 1892

[90] For the reasons behind the final decision to designate Edo as the capital of Japan, see H. D. Smith II, "The Edo-Tokyo Transition: In Search of Common Ground", in *Japan in Transition. From Tokugawa to Meiji,* ed. M. B. Jansen and G. Rozman (Princeton: Princeton University Press, 1986), 355–56.

[91] Sahara, *Tsukudajima no konjaku*, 94. Considered as the product of one of the earliest Japanede attempts to develop a modern urban planning, Tsukishima developed as both an industrial area and a residential zone.

[92] Kachidoki (originally written 勝鬨 and later simplified in 勝どき) was the name given to the ferry that started regular service in 1905, linking this district to Tsukiji area on the opposite edge of the Sumida river. The name (which means "cry of triumph") was chosen to commemorate Japan's seizure of Port Arthur in the war

and 1894 was more than 945.000 square meters, and in 1896 almost 198.000 square meters were reclaimed on the eastern side of Tsukudajima (Fig. 32). This area, which was built as an extension of the latter but followed the street plan of Tsukishima, was named Shin Tsukudajima (New Tsukudajima).[93] These interventions made the borders of Tsukudajima hardly recognizable in the maps of the city as well as in the eyes of Tokyo's old and new residents (Fig. 33).

With the growth of Tsukishima as an industrial hub, a new bridge named Aioibashi directly linking the northern edge of the new complex of made-man lands to Fukagawa, opened in 1903. However, even after the opening of Aioibashi bridge, the ferry that had been operating since 1645 continued to provide the main access to Tsukudajima, which was not only used by Tsukudajima's residents and the new settlers of the adjacent areas, but also became a well-known attraction for people living on the opposite edge of the Sumida river.[94] Indeed, despite the radical transformations of the city's urban space, and the rapid economic, political and cultural changes throughout the whole country, noticeably affecting the new capital, the old townscape of the rural fishing village survived in the modernized Tokyo, together with several attitudes and practices of its community. It is said, for example, that the fishermen continued to deliver icefish as a ceremonial gift to the descendants of the Tokugawa family, and that the 300th anniversary of the dead of Ieyasu, in 1916, was celebrated in Tsukudajima with a "respect higher than Mount Fuji and deeper than Shibaura Sea."[95]

In the following decades, two devastating events hit Tokyo, the 1923 earthquake and the 1945 air raid, which destroyed large part of the city, but only marginally affected Tsukudajima. The postwar period saw a

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against Russia in 1904-05. Makoto Takeuchi, *Tōkyō no chimei yurai jiten* [Dictionary of Tokyo place names] (Tōkyō: Tōkyōdō shuppan, 2006), 95–96.

[93] Sahara, *Tsukudajima no konjaku*, 94–95. The panorama offered by the east side of this 'new' Tsukudajima, with a wide view of the bay as well as of the rise of the sun, made it a location that many wealthy people choose for their second residence.

[94] Chūōku kyōiku iinkai jimukyoku shakai kyōikuka, ed., *Chūōku no mukashi o kataru* [Telling about old days in Chūō ward] (Tōkyō: Chūōku kyōiku iinkai jimukyoku shakai kyōikuka, 1989), 1:44. "By December 1928, the number of daily crossings had been increased to 166, with 262 carts, 2188 bicycles, and 10,199 passengers making the short journey each day." Paul Waley, "By Ferry to Factory: Crossing Tokyo's Great River into a New World", in *Japanese Capitals in Historical Perspective. Place, Power and Memory in Kyoto, Edo and Tokyo*, eds. Nicolas Fieve and Paul Waley (London: Curzon, 2003), 226.

[95] Shimura, *Tsukishima saihakkengaku*, 79.

new wave of land reclamations which, as mentioned above, made Tokyo one of the largest metropolitan areas with reclaimed land. As a result of the reiterated interventions, the distance between Tsukudajima and the right bank of the river has been reduced to less than 200 meters–a shorter distance than that separating the Giudecca island from the Fondamenta Zattere in Venice. If this diminished distance reflects the huge process of reclaiming land from water, the towering apartment buildings looming over Tsukudajima (now Tsukuda 1chōme, namely the first of Tsukuda city district), is an emblem of the rampant high-rise construction, to which, as will be shown below, the residents of this small neighborhood have managed to survive (Fig. 34).

Today, Tsukudajima preserves much of its original street plan, with traces of a rural fishing village, traditional wooden timbered dwellings standing side by side along narrow pathways scattered by some hand water pumps still in use, and a peaceful atmosphere which is unusual for Tokyo (Fig. 35). In this sense, Tsukudajima is still an island, where fishing remains a part of the local economy, and several traditional practices still characterize its communitarian life.

Indeed, fishing vessels and traditional wooden tour boats docked on rickety wooden poles can be still seen in the inner canal (Fig. 36), and typical high door thresholds protecting against flood waters can still be found in several houses. A small memorial stone near the river is a remainder of the ferry crossing, which was in use until 1964, when the Tsukuda Ōhashi (Tsukuda big bridge) was completed, connecting Tsukudajima to the heart of the city. Three shops, each run by their respective families for generations and who fiercely guard their recipes, sell *tsukudani*, which is still considered a delicacy (Fig. 37), while an old-fashioned bathhouse called "Hinode" preserves the memory of the place of the "rise of the sun" that, during the Edo period, might have been contemplated by many lovers. The Jizō can still be easily found not only because of a sign indicating the Tsukuda Tendai kosodate Jizōson, but also thanks to soaring crown of the ginkgo tree, which still stands there, with its trunk filling up half the sacred space (Figs. 38a, 38b). Near the Namiyoke Inari Shrine, three andesite stones called "*chikaraishi*" (力石, lifting stone) remain to testify an old local custom performed by the youth who worked in the fishing industry and who used to haul the large stones (about half a meter long) in physical power challenges (Fig. 17). The competitions continued until the Great Kantō Earthquake in 1923, and the

names of strong men were inscribed on one of the stones, which are now among the Folk Cultural Assets of the Chūō ward.[96]

The chief priest of the Sumiyoshi Shrine is still a descendant of the priest who moved to Edo in 1612, while the Sumiyoshi festival maintains its symbolic structure. It continues to be held once every three year, starting on the Friday around the 6th of August, when the ritual that involves placing divine spirits on the boat to cross the river (*funatogyo*) begins by taking the humped-head goldfish (*shishigashira*) and the heavy octagonal portable shrine (*hakkaku mikoshi*) out the shrine. The first is then carried around the parishioner area, and the latter is carried on to a ship (Fig. 39). The Obon festival has remained unchanged up until today and it continues to represent a peculiarity of Tsukudajima and, as the oldest and the only suriviving *odori* of the Edo period, it has been designed as a Metropolitan Intangible Folk Cultural of Tokyo. Through these traditions and events, the parish members renew their sense of cultural and group identity, which is also deeply linked to the physical space where the approximately 2600 residents live.[97]

Indeed, neither the building of the Tsukuda Big Bridge in 1964, nor the subway that has reached the nearby Tsukishima in 1988, seem to have changed the perception that the residents have of the space they live in. Their place identity is still palpable, insular yet not isolated, and inspires not only their emotive responses, but also their political actions. In fact, it has helped them protect their island from the high-rise developments in the neighboring areas, particularly in Ishikawajima, where a large-scale project called Ōkawabata River City 21 started in 1988. Under the guidance of Yōichirō Tōma, the head of the neighborhood and leader of the Sumiyoshi Association, the residents managed to resist the pressure of powerful construction companies, while Hidenobu Jinnai managed to present the issue at the International Waterfront Conference held in Venice in 1991. The commitment of the Tsukudajima community to safeguard their island was highly commended by the mayor of Venice, Ugo Bergamo, who gave a Murano glass artwork to Yōichirō Tōma. The gift is still proudly conserved by the descendants of Magoemon's group in their

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[96] *Chūō–ku Minbunkazai 26, Tsukuda Namiyoke Inari Jinja no chikaraishi* [Lifting stone at the Namiyoke Inari Shrine in Tsukudajima]; accessed: http://www.city.chuo.lg.jp/kusei/syokai/tyuobunkazai/tsukudanamiyokeinaritikaraishi.html

[97] In 2010, the residents were 2,623, the 70% of which between five and sixty-four years old. The data are available in Chūōku (Chūō ward); accessed: http://www.city.chuo.lg.jp/kusei/tokeiderta/kokusei/kokuseichosanituite/01_02_03_nenreikaisou.files/koku1.xls

fishermen-made island (Fig. 40), whose awareness and engagement proved to be of basic importance in building a resilient community.

Fig. 1) The area around Tsukudajima, now part of the city district of Tsukuda

(full map)

(detail of the map with Tsukudajima and Ishigawajima)

Fig. 2) *Kaitei Edo zu* [Revised map of Edo], Kōka era (1844-48) (Courtesy of the University of Texas Libraries, The University of Texas at Austin)

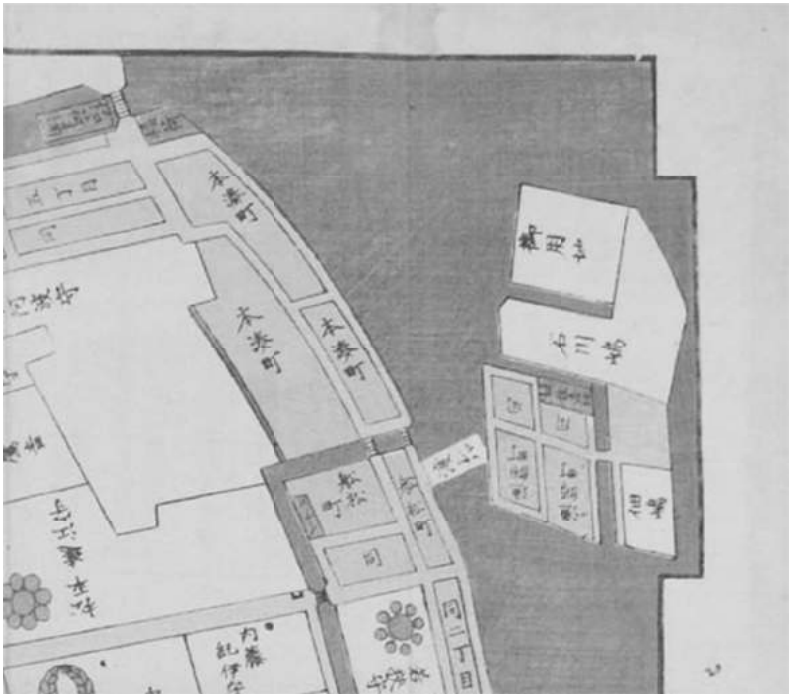

Fig. 3) A detail of *Kyōbashiminami Tsukiji Teppōzu ezu* [Map of Kyōbashiminami, Tsukiji and Teppōzu], from the series *Edo kiriezu* [Cutout Picture Map of Edo], 1861 showing Tsukudajima and the route of the ferry to the opposite bank (Waseda University Library)

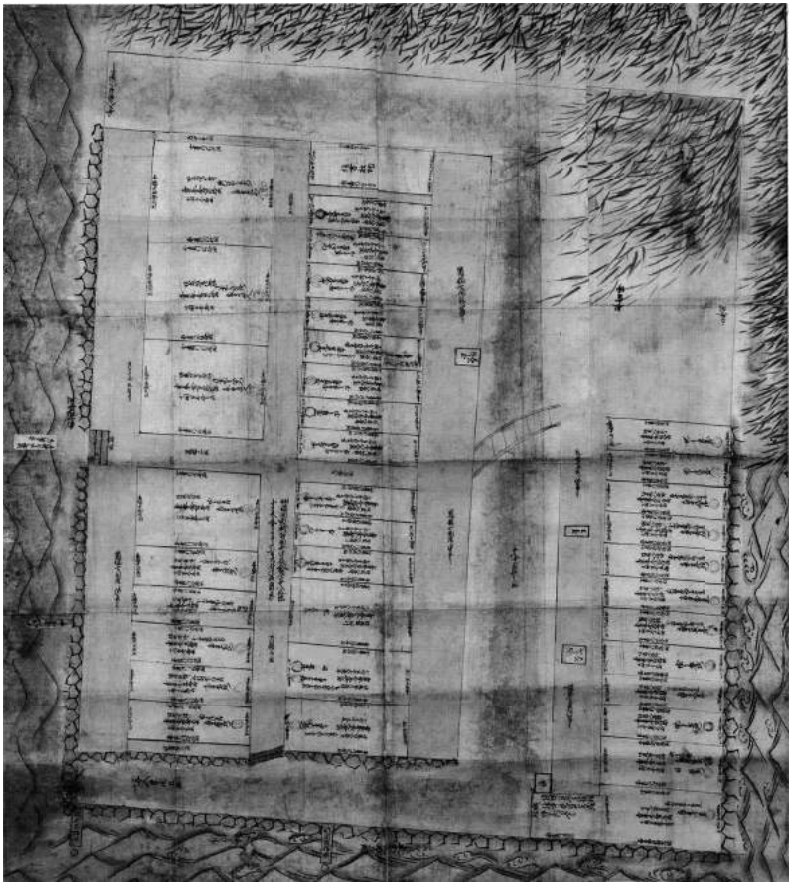

Fig. 4) *Tsukudajima koken ezu hikae* [Tsukudajima, copy of picture map of bills of sale], 1710 (from Kazushige Mashiyama, "Hōei 7nen 'Tsukudajima koken ezu hikae' o yomu", 28)

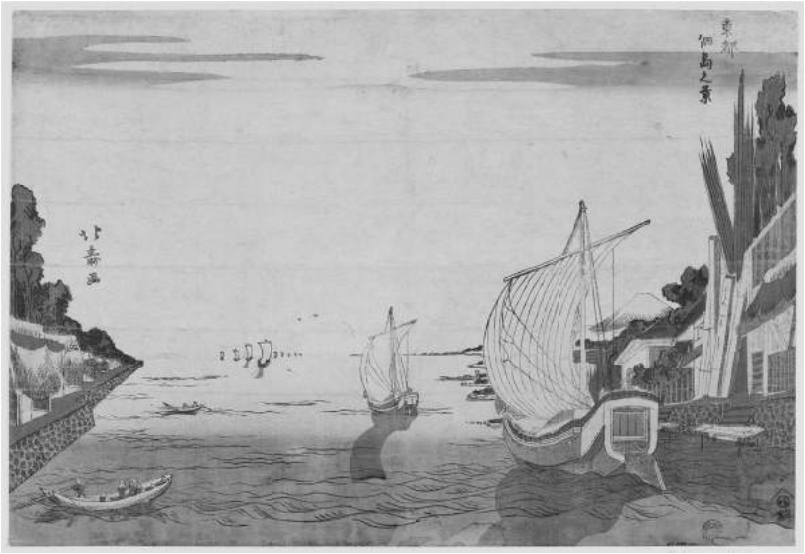

Fig. 5) The canal between Tsukudajima (on the left) and Ishigawajima (on the right). Hokuju Shōtei (1763-1824), "Tsukudajima no kei" [View of Tsukuda island], from the series *Tōto* [The eastern capital], Edo period (Museum of Fine Arts Boston)

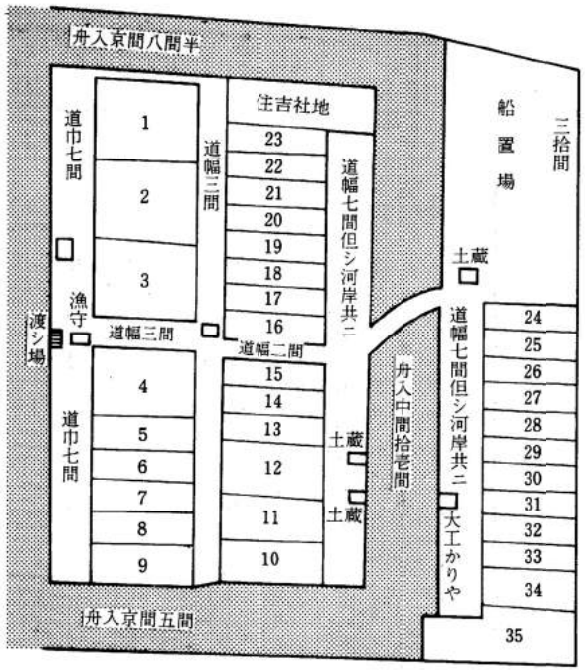

Fig. 6) Land allotment in Tsukudajima, 1710 (from E. Furuta, “Kinsei Tsukudajima ni okeru shūraku keitai no ichikōsatsu”, 42)

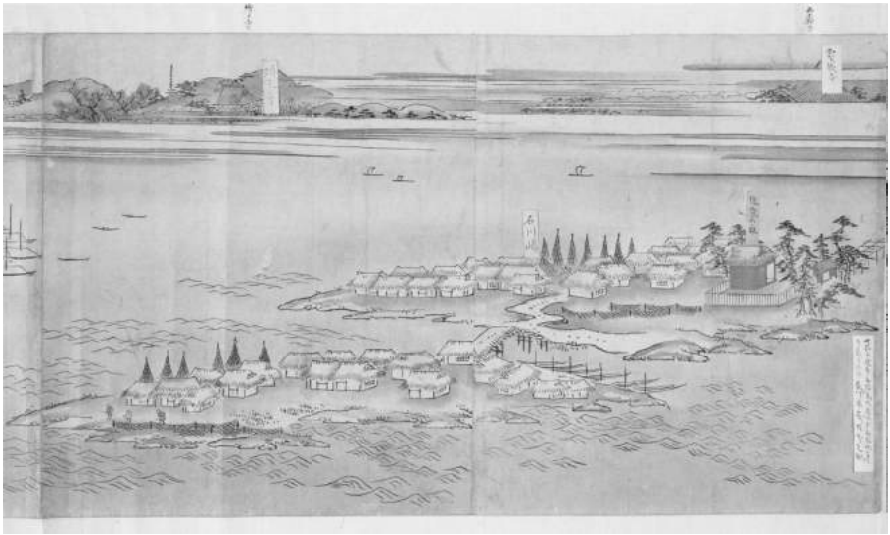

Fig. 7) View of Tsukudajima (labelled as Ishikawajima in the picture) with the Sumiyoshi Shrine on the right. Rosui Tsuruoka, *Tōto Sumidagawa ryōgan ichiran*, 1781 (National Diet Library Digital Collections)

地番	所有者	出身地	間口	奥行	面積	地価	小間※あたりの地価	家守
1	九左衛門	摂州佃村	12 間	20 間	240 坪	120両 分	10両 分	平左衛門
2	孫右衛門	同上	12	20	240	120	10	同上
3	八右衛門	同上	12	20	240	132	11	同上
4	忠兵衛	—	12	20	200	110	11	宇右衛門
5	孫 八	舟松町２丁目	5	20	100	50	10	弥次右衛門
6	作兵衛	本小田原町	5	20	100	50	10	清兵衛
7	忠次衛門	本小田原町	5	20	100	50	10	六左衛門
8	伝兵衛	町	5	20	100	50	10	甚左衛門
9	清兵衛	—	5	20	100	45	9	加右衛門
10	忠兵衛	舟松町２丁目	8	20	160	72	9	六左衛門
11	彦左衛門	南八丁堀５丁目	8	20	160	52	6 2	六兵衛、権岳衛
12	忠兵衛	—	9	20	180	58 2	6 2	—
13	善太郎	武州清沢村	4	20	80	25	6 1	善次郎
14	平右衛門	—	4	20	80	25	6 1	—
15	右衛門	本小田原町	4	20	80	25	6 1	四郎兵衛
16	理兵衛	—	4	20	80	25	6 1	茂兵衛
17	吉右衛門	—	4	20	80	25	6 1	—
18	善兵衛	—	4	20	80	25	6 1	五兵衛
19	善右衛門	本小田原町	4	20	80	25	6 1	長兵衛
20	覚兵衛	—	4	20	80	25	6 1	善兵衛
21	庄兵衛	—	4	20	80	25	6 1	庄五郎
22	宇右衛門	—	4	20	80	25	6 1	伝右衛門
23	十兵衛	南伝馬町	4	20	80	25	6 1	長五郎
24	庄兵衛	—	4	20	80	29	5	—
25	清兵衛	—	4	20	80	20	5	—
26	七兵衛	南茅場町	4	20	80	20	5	八兵衛
27	治兵衛	本小田原町	4	20	80	20	5	五左衛門
28	張郎兵衛	南茅場町	4	20	80	20	5	庄左衛門
29	忠兵衛	本小田原町	4	20	80	20	5	五郎兵衛
30	市郎兵衛	本小田原町	4	20	80	20	5	藤兵衛
31	長右衛門	—	4	20	80	20	5	—
32	張兵衛	本小田原町	4	20	80	20	5	久兵衛
33	甚右衛門	—	4	20	80	20	5	—
34	七兵衛	—	8	20	160	40	5	次右衛門、 右衛門
35	善兵衛	南小田原町	12	20	320	370※※	22 2	四郎兵衛

Fig. 8) Numbered list of the lots containing, respectively, the owner's name, its birthplace, the street frontage's length, the lot's depth, the surface size, the land total price, the land price for each *ken* of the frontage's length, and name of the house manager (from E. Furuta, "Kinsei Tsukudajima ni okeru shūraku keitai no ichikōsatsu," 43)

Fig. 9) Katsushika Hokusai, “Tsukudajima sekishō” [Sunset glow at Tsukudajima], from the series *Edo hakkei* [Eight views of Edo], about 1833 (Museum of Fine Arts Boston)

Fig. 10-a (“Edo type”)

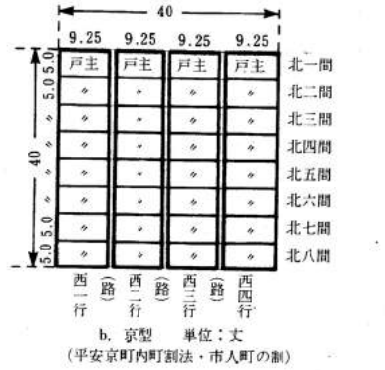

Fig. 10-b (“Kyoto type”)

Fig. 10) “Edo type” and “Kyoto type” settlement (from E. Furuta, “Kinsei Tsukudajima ni okeru shūraku keitai no ichikōsatsu,” 44)

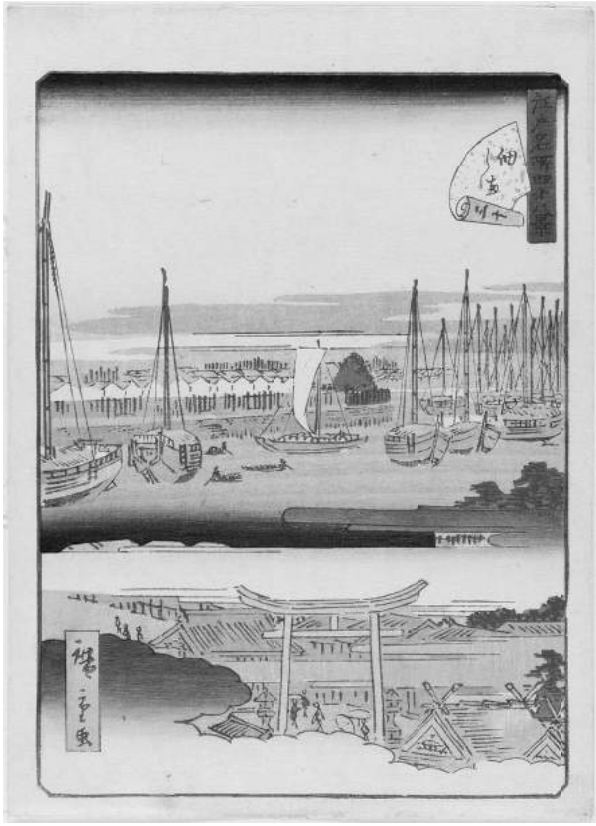

Fig. 11) Hiroshige II Utagawa, "Tsukudajima", from the series *Edo meisho yonjūhakkei* [Forty-eight famous places of Edo], about 1860–61 (Museum of Fine Arts Boston)

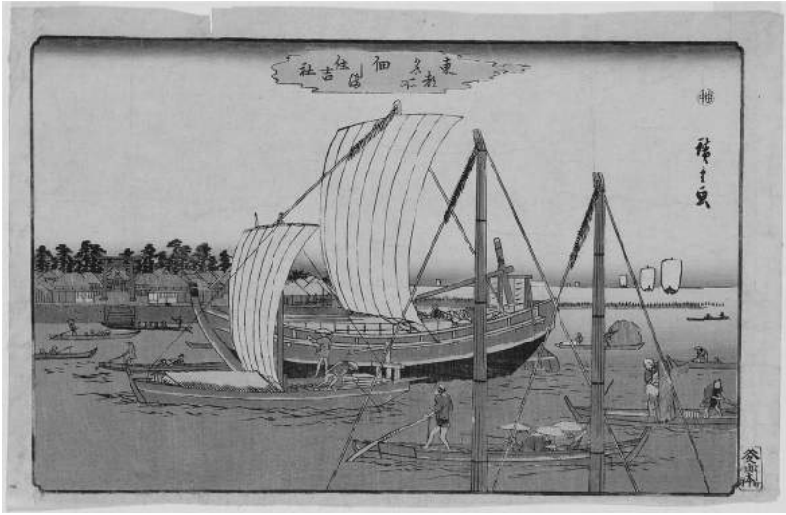

Fig. 12) Hiroshige Utagawa, “Tsukudajima Sumiyoshi yashiro” [Sumiyoshi Shrine at Tsukudajima], from the series *Tōto meisho* [Famous places in the eastern capital], 1843–47 (Museum of Fine Arts Boston)

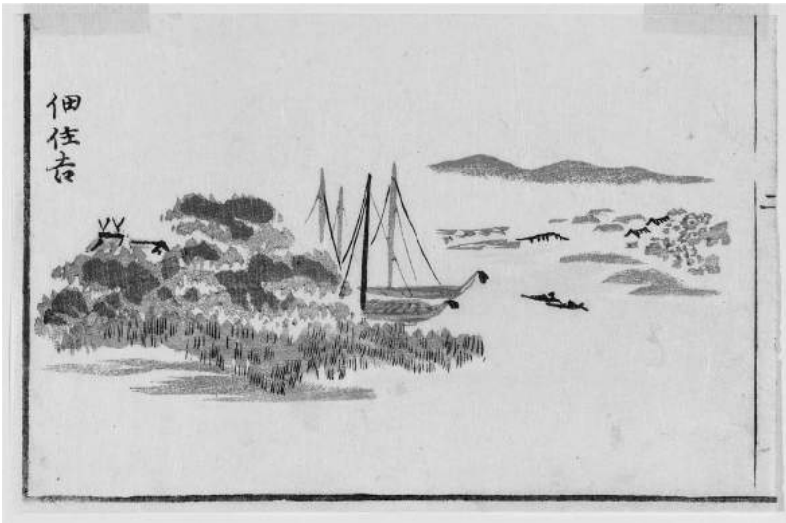

Fig. 13) Masayoshi Kitao, “Tsukuda Sumiyoshi” [Sumiyoshi Shrine on Tsukuda island], cut from a page of the book *Sansui ryakuga shiki* [Landscape sketches], 1800 (Museum of Fine Arts Boston)

Fig. 14) Hiroshige Utagawa, "Tsukudashima Sumiyoshi no matsuri" [Sumiyoshi Festival, Tsukudajima], from the series *Meisho Edo hyakkei* [One hundred famous views of Edo], 1857 (Brooklyn Museum)

Fig. 15) Tsukujima's fishermen dancing in the dock; the green area beyond the bridge is that of Sumiyoshi Shrine. Ikkei Shōsai, "Shichigatsu Tsukudajima Bon odori" [The seventh month, Tsukudajima Bon Dance], from the series *Tōkyō meisho jūnikagetsu* [Twelve months at famous places in Tokyo], 1872. (Time Dome Akashi-Chuo Historical Museum/Planetarium, Chuo City)

Fig. 16) The Child-raising Jizō

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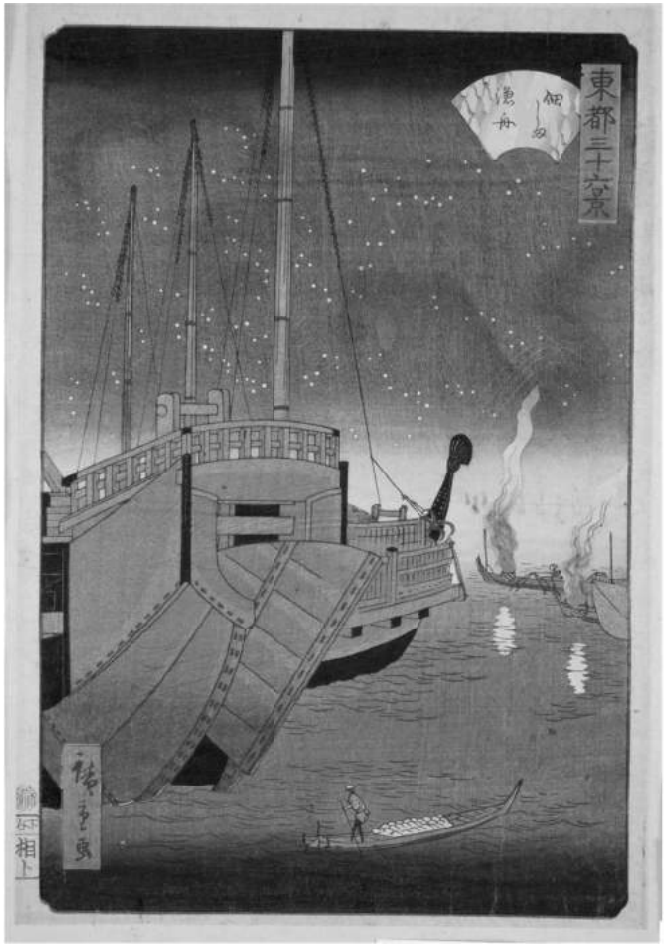

Fig. 19) Hiroshige II Utagawa, "Tsukudashima gyoshū" [Fishing boats at Tsukuda Island] from the series *Tōto sanjurokkei* [Thirty-six views of the eastern capital], 1862 (National Diet Library Digital Collections)

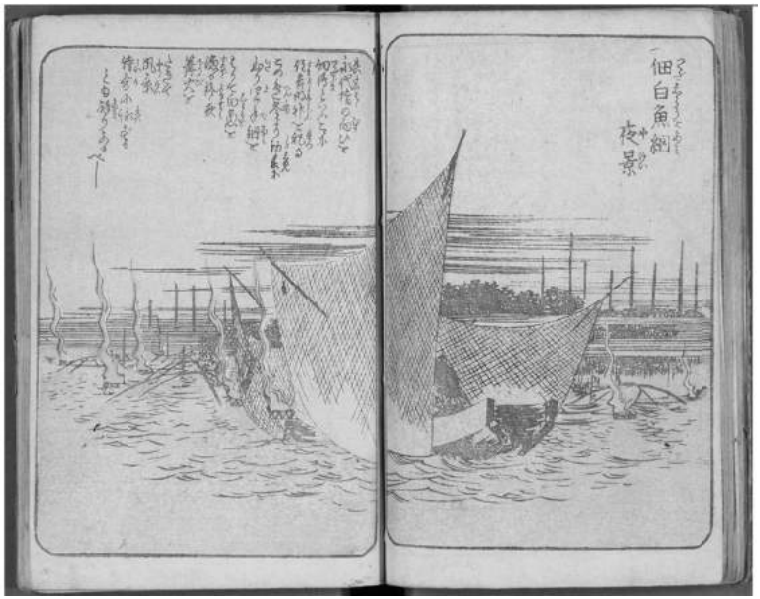

Fig. 20) Hiroshige Utagawa, "Tsukuda shirauo ami, yakei" [Netting icefish at Tsukudajima, night view], in *Ehon Edo miyage* [Picture Book of the Souvenirs of Edo], 10:13 (National Diet Library Digital Collection)

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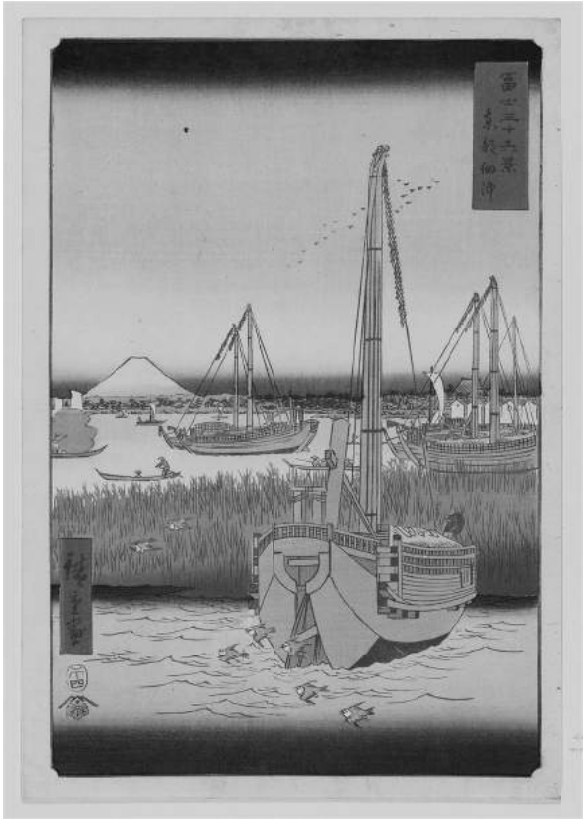


Fig. 23) Hiroshige Utagawa, “Tōto Tsukuda oki” [The sea at Tsukuda in Edo], from the series *Fuji sanjūrokkei* [Thirty-six views of Mount Fuji], 1858. (Museum of Fine Arts Boston)

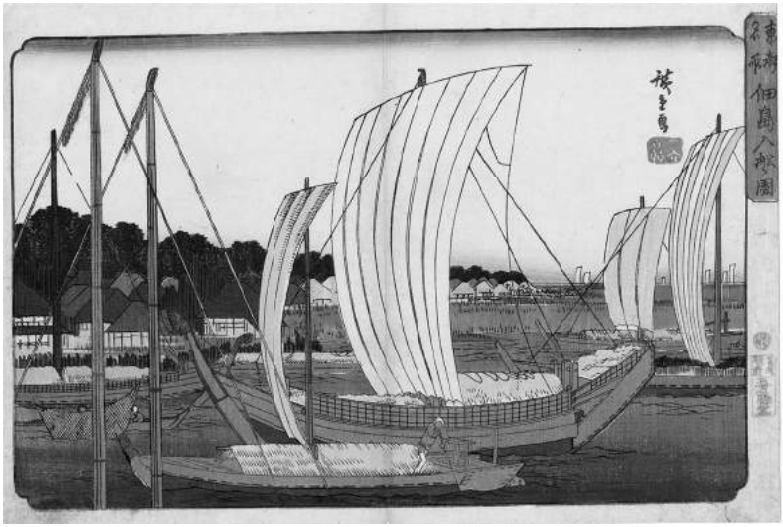
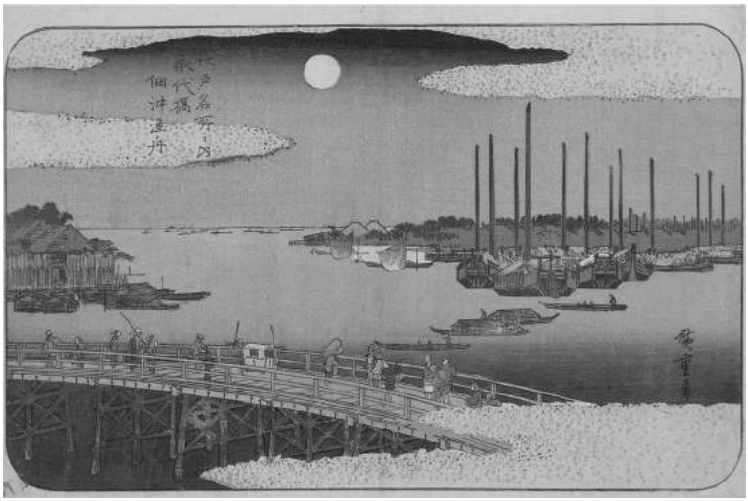


Fig. 24) Hiroshige Utagawa, "Tsukudajima irifune no zu" [Boats Entering the Harbor at Tsukudajima], from the series *Tōto meisho* [Famous places in the eastern capital], about 1832–38 (Museum of Fine Arts Boston)



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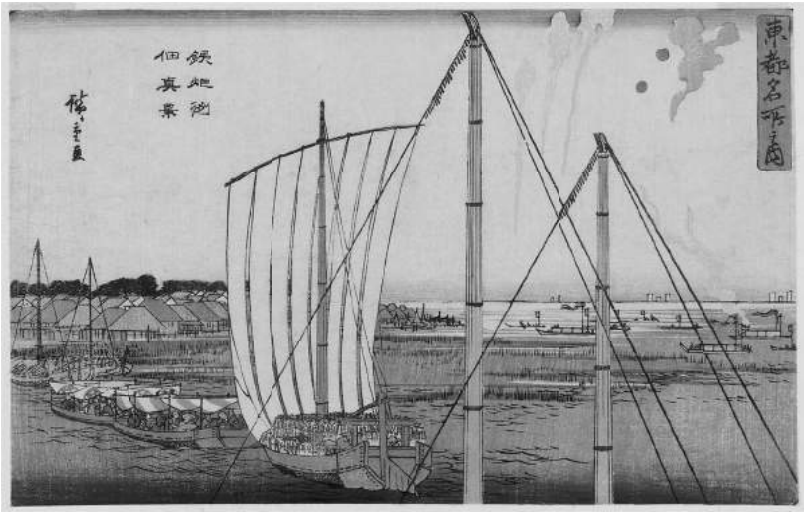

Fig. 26) Hiroshige Utagawa, "Teppōzu Tsukuda shinkei" [True view of Teppōzu and Tsukuda], from the series *Tōto meisho no uchi* [Famous Places in the Eastern Capital], about 1840–42 (Museum of Fine Arts Boston)

Fig. 27) Tsukuda Island from under Eitai Bridge. Kuniyoshi Utagawa, "Tsukudajima", from the series *Tōto meisho* [Famous places in the eastern capital], about 1830–35 (Museum of Fine Arts Boston)

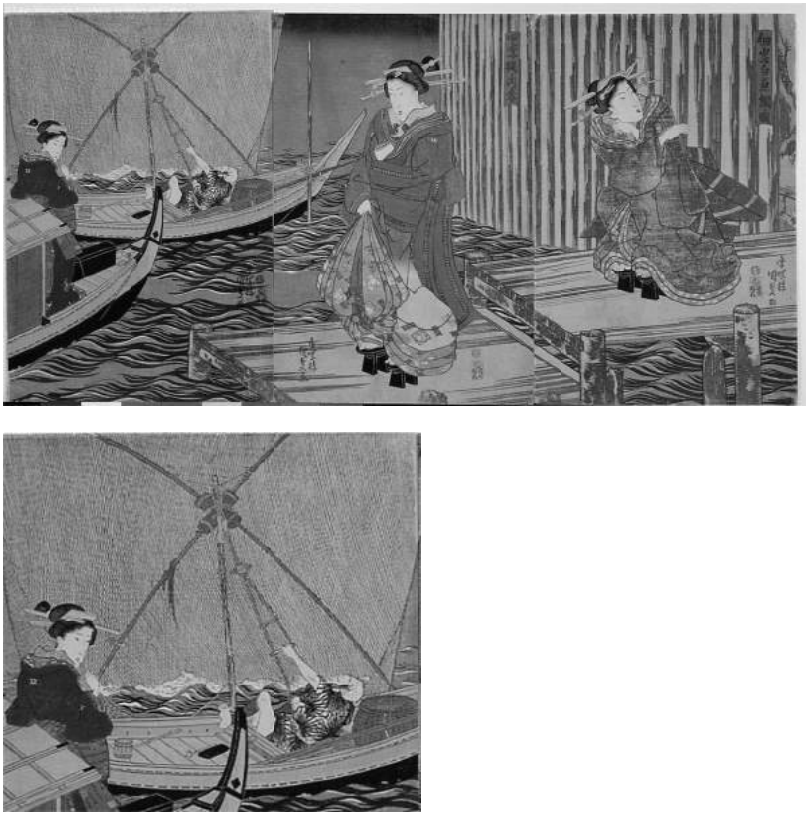

Fig. 28) Kunisada Utagawa, "Tsukudajima shirauo ami no zu" [A view of netting icefish at Tsukudajima], triptych from the series *Shiki asobi no uchi, haru* [Pleasures of the four seasons, spring], 1830s (from Ukiyo-e.org database)

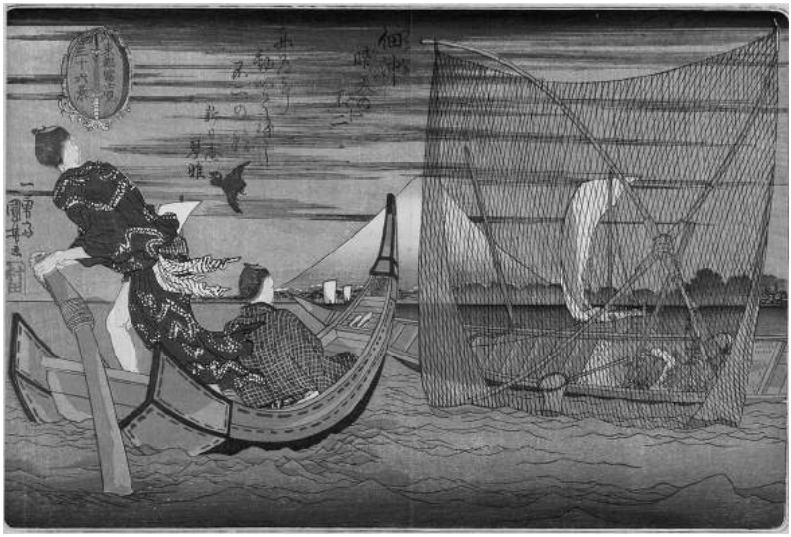

Fig. 29) Kuniyoshi Utagawa, "Tsukuda oki kaisei no Fuji" [Mount Fuji on a clear day from the sea off Tsukuda], from the series *Tōto Fujimi sanjūrokkei* [Thirty-six views of Mount Fuji seen from the eastern capital], about 1843 (Museum of Fine Arts Boston)

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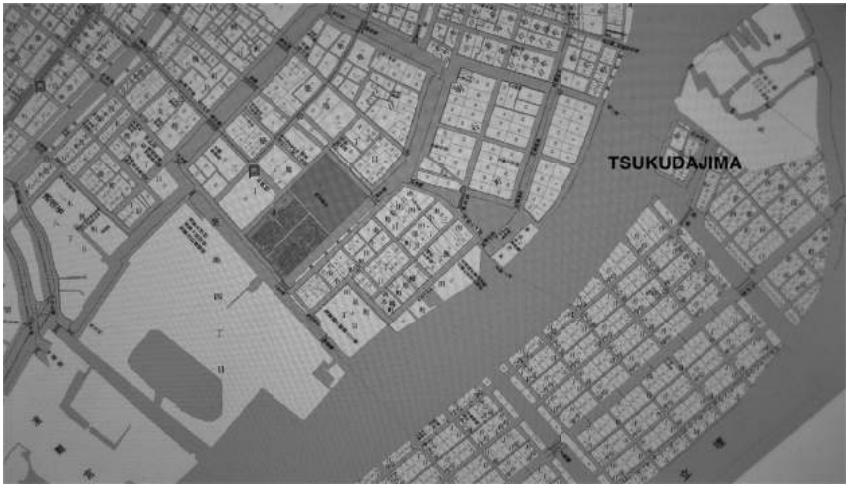

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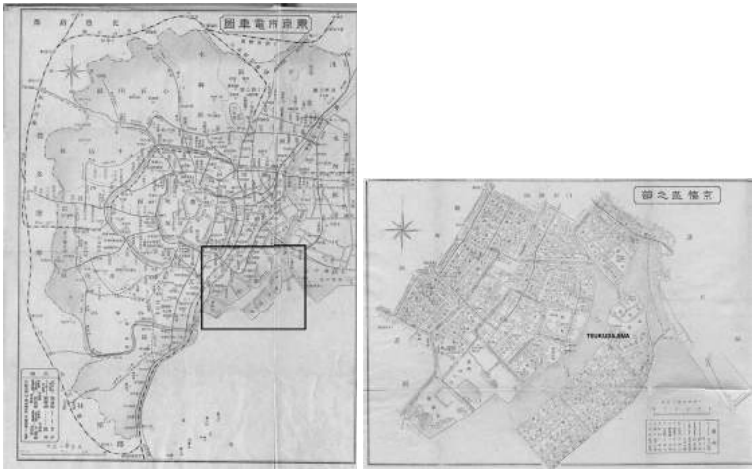

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CHAPTER NINE

THE DEVELOPMENT OF TOKYO BAY AND WATERBORNE TRAFFIC

IWAO TAKAMATSU

Introduction

When discussing the issue of Tokyo and water transportation, it is necessary to consider the city's origins and how the Port of Tokyo came into existence (Fig. 1).

After the Edo period (1603–1867), Tokyo became the capital of Japan, and meandered its way into becoming a large and impressive city. It cannot be disputed that the stable economic activities supporting the politics, economy, history, and culture of Tokyo have played a key role in this transformation. It is also a fact that these economic activities have been largely dependent on Tokyo's port, and water and boat transportation. Such a system of transport has been the backbone of Tokyo's economic activities.[1]

The unique topographical shape of the bay area of the Tokyo region is the result of the merging of many rivers. The relatively large rivers on the east side of the city, such as the river Edo, a tributary of the river Tone, have mild curves. The smaller rivers, such as the river Tama, on the west side, on the other hand, are characterized by many sharp turns. These rivers have poured large amounts of nutrients into Tokyo Bay, turning it into a rich fishing area. Copious amounts of sand and soil have also flowed into the bay, forming a topography that is characterized by many shallows and sandbars.

Before Edo could transform itself from a small fishing village into the nation's capital, it needed to build a port. A large steady supply of

[1] See Hidenobu Jinnai, ed., *Mizu no toshi Edo-Tōkyō* [Water city Edo-Tokyo] (Tōkyō: Kōdansha, 2013).

everyday commodities had to be procured in order to maintain the city (nation), thus allowing the urban area of Edo to function as the capital.

To support such a supply of commodities for its people, the existing river needed to be transformed into a navigation channel. To dredge the waters near the mouth of the rivers and, thus, reinforce the navigational function of Tokyo Port, the water from the sea was removed, shallows were filled, and a wharf was built for boat moorage. However, before all this could happen, to ensure the supply of salt, an important staple food, a canal was dug across the river Konaki, connecting the city of Edo with Gyōtoku, at the eastern end of Edo Bay, which was the only town in the area capable of producing salt.[2] The early stages of Edo-Tokyo's development began in such a way.

Development and decline of water transportation

"Catch up with and overtake the West" was the slogan during the Meiji period (1868–1912). Improvement works were carried out, which involved dredging the Sumida, thus allowing large boats to navigate the river. The dredged soil was then used to reclaim the islands of Tsukishima, Kachidoki, and Harumi along the mouth of the river Sumida. The next step was to persuade factories, such as steelworks, needed for the westernization of industry, to locate to the area. During this period, boats were the main method of transport as they were able to navigate the rivers and canals which had been built laterally and longitudinally (Fig. 2).

It was the Sino–Japanese (1894–95) and Russo–Japanese (1904–05) wars which brought change. Industrial development in Japan shifted from light industry to heavy industry, and many wharfs were built, mainly along the Keihin zone, a large industrial belt along the north-western shore of Tokyo Bay. In actual fact, it was rail construction that progressed during this period. Transporting people and coal, and other commodities, from the provinces to the port triggered the development of rail transportation, leading to the decline of water transport.

The Great Kantō Earthquake in 1923 brought further changes to the logistics of transport. Under the "Restore the capital" banner, urban reform was initiated in Tokyo. It was the first major urban plan to be undertaken since the Meiji period. A zealous long-term enterprise, it

[2] See Yasukata Sennohara, *Gyōtoku shiohama no hensen. Shimōsa Gyōtoku shio no rekishi to unmei* [Vicissitudes of Gyōtoku Shiohama: The history and fate of the Shimōsa Gyōtoku salt] (Nagareyama: Ronshobō, 1978).

included the land readjustment plan, the large open space plan, the elementary school restoration plan, and others.

In particular, with an understanding that international trade would be indispensable for development, an emphasis was placed on building the port infrastructure. Hinode Wharf, the first fully fledged wharf in Japan, was constructed in 1925. This was followed by the construction of Shibaura Wharf (1932) and Takeshiba Wharf (1934). Although mammoth wharfs, such as those at Shinagawa and Ōi, had been included in the original development plan for Tokyo, these were not built until after the Asia Pacific War (1937-45). The Tokyo region had been selected as the location to build wharfs for several reasons. First, it was considered to be an easy matter to build a wharf using the dredging method. Second, nearby was the Keihin industrial zone which was home to many small and medium-sized factories. These were perceived as a great potential for industrial zone development. A third reason was the close proximity to the city center. In retrospect, the offshore waters of Shinagawa have a history of water transportation that dates back to the Edo period. Boat moorage and fishing villages used to exist in this area.

The main function of the wharfs and piers at Tokyo Port was the distribution of goods, and both facilities had unloading yards. Today, large gantry cranes and containers dominate the wharf scenery.

Construction of Tokyo Port and the decline of waterborne transport

As one of the first post-World War II economic restoration initiatives, Tokyo Bay was dredged, making way for the construction of Tokyo Port. Toyosu, Shinagawa, and Harumi wharfs were built, playing a role in economic restoration. The high rate of economic growth which followed saw the construction of large container wharfs in the bay area.

As a direct result of post-war economic growth, water transportation became mainly obsolete in Tokyo. Some forms of transit still relied on boats, but most shifted to rail and ground transportation. There was a rapid distancing of people from the rivers, which had become polluted. Furthermore, with urban development, the land around the river basin became covered in concrete. Urban flooding was a recurring problem in the region and to protect the cities embankments were raised. As a result, the waterside became even more inaccessible.

Rapid population growth, scrap-and-build policy, and an economy which prioritized disposables bred mass household waste, industrial waste, and construction residual soil. Tokyo Port inevitably turned into a

waste-dumping area from which, later on, a large stretch of land was reclaimed.[3]

Reclamation of the Rinkai Fukutoshin Area (Tokyo waterfront) and the role of reclaimed land

Many islands in Tokyo Bay came into existence due to reclamation projects. Initially, various urban facilities, those that could not easily be built in the center of the city, were established on these islands. Such facilities included fire generators, incineration plants, sewage treatment plants, ready-mix concrete plants, and hazardous material storage tanks. Yet, despite such measures, pollution became a serious issue. Minamata disease, which was first discovered in south-western Japan in 1956, reached the central region of Japan's main island in 1965. Yokkaichi asthma, prevalent between 1960 and 1972, also began to garner public attention leading to the implementation of such legislation as the Water Pollution Control Law of 1970 and the Industrial Relocation Promotion Law of 1972. Slowly, the quality of water in rivers and Tokyo Bay improved as a result of these measures (Fig. 3).

In spite of the 1973 oil crisis, the demand for logistic facilities in Tokyo continued to increase steadily. To meet this demand, in 1975 a container wharf was built in Ōi and, in 1985, a larger one was built in Aomi.

During the eighties, water quality improved and larger stretches of land were reclaimed from Tokyo Bay. This drew attention to the productive nature of the bay area. The supply of high-grade housing became a prevalent topic with the result that large apartment blocks were built on the old sites of factories.

A new urban area

In 1985, under the Tokyo Teleport project, a plan was formulated to build a new urban area on reclaimed land; these became a series of small islands, constructed from mass waste and residual soil.[4]

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[3] Edo Tōkyōwan kenkyūkai, ed., *Edo Tōkyō wan jiten* [Dictionary of Edo-Tokyo Bay] (Tōkyō: Shin jinbutsu ōraisha, 1991).

[4] Tōkyōto Kikaku shingi shitsu [Tokyo Metropolitan Government, Office of Policy Planning] et al., eds., *Rinkai Fukutoshin kaihatsu jigyōka keikaku* [The master plan of Tokyo Waterfront sub-center] (Tōkyō: Tōkyōto jōhō renraku shitsu jōhō kōkaibutomin jōhōka, 1989).

During this period, companies began to seek new urban areas equipped with the latest information technology in order to set up new facilities. Many private companies successively established themselves on the reclaimed land. The "bubble" economy heightened an interest in the bay area, where real estate was abundant and large development projects possible. More and more major companies moved into the area.

This, in turn, drew attention to the waterfront. Abandoned warehouses with large internal spaces were available at low prices. Perceived as a new, attractive, and fun area, the value of the newly reclaimed land increased.

A great Tokyo Exposition was planned to be held in March, 1996. To facilitate such an exhibition, several inherent weaknesses in the existing urban infrastructure needed to be addressed, namely:

1. Construction of durable disaster-resistant buildings, specifically with a liquefied soil foundation;
2. Building of high quality roads to counter traffic congestion;
3. Optimizing the waterfront, creating panoramic views;
4. Proximity to the city center;
5. Modernizing the existing urban infrastructure, including the provision of electricity, gas, a sewage system, garbage processing, communications, local heating, and air conditioning;
6. Construction of spacious offices.

However, the plans and programs which aimed to address the above issues were to contribute to the weaknesses of the Rinkai Fukutoshin Area (Tokyo Waterfront). The large plots of land exceeded the human scale, and it became an artificial urban area devoid of any playful elements (Fig. 4). In 1991, the bubble economy burst and the demand for office space declined. As a result, the Tokyo Expo was cancelled and development plans were halted.[5]

In spite of all this, development, although gradual, has been continuing in the Rinkai Fukutoshin Area since 2000. It has successfully lured the head offices of major companies and commercial facilities have been built; today the area brims with liveliness.

However, in recent years, with major redevelopment occurring in urban areas such as Marunouchi, Roppongi and Kyōbashi, the Rinkai Fukutoshin Area must keep apace. It still has much unused land and the

[5] Tōkyō furontia kyōkai, ed., *Sekai toshi hakurankai. Tōkyō furontia* [Urban Frontier. The World City Exhibition Tokyo] (Tōkyō: Tōkyō furontia kyōkai, 1996).

main topic of discussion is how this land can be productively utilized for future major events, such as the 2020 Tokyo Olympics and thereafter.

Tokyo's role as a trading port continues to grow steadily. Today it is the number one port in Japan, handling 34.25 million tonnes of imports and 13.14 of exports.

In the past, the Tokyo Bay area acted as the receptacle for facilities which were perceived as being a nuisance and, thus, were rejected by the existing metropolitan region. Alternatively, it was used to optimize the existing urban area. In short, it had a subservient presence in the metropolitan region. With the development of a new urban center called the Rinkai Fukutoshin Area, the bay area was finally able to emerge from its subservient role. This has proved to be the ultimate opportunity for the area to optimize its singular asset, the waterfront, in existence since the days of the Edo period.[6]

Towards the convening of the Olympics

The main venue for the 2020 Tokyo Olympics and Paralympics will be located in the Rinkai Fukutoshin Area.

The main transportation infrastructure will be the existing New Transit Yurikamome, the Rinkai Line, and the BRT (bus rapid transit). Venues are currently being restudied; at one given time, the area must provisionally be able to accommodate more than 300,000 visitors. Various infrastructural elements must be put in place in order to address unexpected circumstances. Water transportation is one such infrastructural solution that is currently being deliberated over with regards to managing traffic flow in the Bay Area.

Furthermore, we need to use this occasion as an opportunity to disseminate the allure (convenience) of water transportation to the mass public and connect it to the rediscovery of the waterfront.

Water transportation: Past and present

Thus far, I have discussed the development of Tokyo from the perspective of geographical conditions, by focusing on the city's economic activities. I would now like to discuss the future development of the bay area within the context of water transportation.

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[6] See Tōkyōto Kōwankyoku [Tokyo Metropolitan Government, Bureau of Port and Harbor], ed., *Tokyoko handobukku* [Port of Tokyo Bay handbook] (Tōkyō: Tōkyōto kōwan shinkō kyōkai, 2015).

Using water as a means of transportation has evolved from one supporting the economy of Edo-Tokyo, to one focusing strictly on port function. At the same time, using water transportation within the tourist industry has continued unabated since the Meiji period. The tourist boat industry has slowly been expanding its horizons and, today, these boats carry more than two million tourists annually. The number of companies has gradually increased, each with its own water tourism plan. There are two boat transportation companies providing regular services, while more than ten companies provide irregular services.

During the Edo and the Meiji periods, when ground transportation was still underdeveloped, water transportation was the most convenient and efficient method available, supporting the national and regional economy. The waterside was closely linked to the lives of people. Yet, it has become distanced from the people during recent years, prompted by the development of ground transportation, pollution from the high growth period, and the recurrence of natural calamities.

As the waterside began to attract attention once again, due to the improved water quality of rivers and the construction of architectural structures close to the waterside, such as Tokyo Skytree,[7] the way in which water transportation was viewed slowly began to change.

This is because water transportation provides the kinds of experiences that ground transportation is incapable of giving. These include the thrill of being ushered into an unknown world away from everyday routine, a relaxing calmness, and feelings of liberation. Depending on the route, boat transportation can also be faster than ground transportation and, as a result, more inexpensive. Surprisingly, it is also very convenient.

The reclamation of the Rinkai Fukutoshin Area reignited the sense of being reconnected with water, a feeling which has lain dormant inside all of us since the Edo period. This new location has a waterfront, an asset that existing urban areas lack. The potential significance of this new urban area lies in its ability to evolve into a richly humane urban area, one that can benefit from the surrounding beautiful scenery. This new urban area will not be confined to the existing urban area structure. This is the reason why we can safely say that the area's transportation infrastructure, the symbol of the next generation and the manifestation of an affluent lifestyle, should rely on "water transportation."

[7] With a height of 634 meters, Tokyo Skytree is the tallest tower in the world. It was completed in February 2012, and was opened to the public the following month.

The state of a new city

Over the last few years, Japan has seen a steep decline in population with a markedly low birth rate and an aging society. By 2020, the depopulation of Tokyo will begin. Even today, the low birth rate and aging society continues to progress rapidly. In this situation, "tourism" is an important urban industry by bringing in a transient population and increasing the number of consumers. In 2020, Japan plans to host twenty million tourists (Tokyo plans to host thirteen million tourists in 2024). However, Tokyo lags prominently behind in the tourist industry compared to other global cities.

The promotion of this industry is an urgent task. A comparison with many global cities shows that the waterfront and water transportation, the backbone of Tokyo's tourism, are particularly weak.

With the arrival of the Tokyo Olympics and Paralympics in 2020, many tourists will have the chance to immerse themselves in the wonders of Japan and Tokyo. Unlike tourist spots in western countries, there are very few areas in Tokyo where old architecture is being preserved as part of the cultural heritage. Tokyo's resources lie in the sharing of customs that have been passed down through history, such as "festivals," or aspects of the city's vibrant everyday lifestyle, traditional industrial craft workshops, small and medium-sized factories that boast cutting-edge technology, and suchlike. Culinary culture is one such tourist resource that we can boast about to the world. All these resources used to be concentrated along the waterfront. The waterside clearly reveals an urban structure that has existed since the Edo period. Tokyo's charm lies in the essence of a city which has evolved over time, and the many intermingling attributes that have been passed down from generation to generation. This is the very reason why it is so important to give prominence to the waterside perspective, using it as a key stance from which to study urban area construction.

Water transportation provides us with a first-hand experience of the above. For this reason, we can say that the reinvigoration of water transportation is the most important issue. Furthermore, unlike subways, water transportation does not require construction costs. It is thus a reasonable and flexible transportation system (Fig. 5).

The following two general points need to be raised when discussing the water transportation system of Tokyo.

1. Improved convenience so that it can be used for everyday transportation purposes. For that, it is necessary to:
   i. build a system of boat moorage at the ground transportation transit points;
   ii. provide water taxi (boat) services, connecting both banks with the bay area islands;
   iii. construct a system of boat stations that is not prone to tidal level changes, thus streamlining the regular service schedule.

2. Serving as the pillar of urban tourism, enabling the latitudinal and longitudinal navigation of transportation boats. For that, we will need:
   i. to secure and explore scenic points;
   ii. to construct diverse routes;
   iii. to establish a system of multi-language guidance.

In particular, a boat route from Haneda International Airport to the city center needs to be constructed, which will allow passengers to enjoy the panoramic view of aircrafts taking off and landing. The gateway on the city-side is Tsukiji. On the Rinkai Fukutoshin Area side, the gateways are the new wharfs at Aomi and Odaiba.

On the Rinkai Fukutoshin Area side, water and ground transportation will be combined to enable unrestricted access to and from the sea and the urban area. Furthermore, passengers will be able to tour the waterside of the richly historic urban area, tracing the history of Tokyo from Tsukiji, Nihonbashi, and Ryōgoku to Asakusa. There are many historical assets to the east of the river Sumida and it is important to make optimal use of all of them.

Another key element is to ensure the construction of a system that can provide consistently comfortable transport. To facilitate this, we need to broaden the usability of the waterside. This can be achieved by redesigning the bridges that currently cannot be crossed when the tidal level reaches two meters high. Inconvenient disembarkation points will also need to be redesigned, as well as calming the water flow by building lock gates for the canals that have been in existence since the Edo and Meiji periods.

In preparation for 2020, various projects have been launched in Tokyo.[8] The existing metropolitan area is teeming with large redevelopment

[8] See, for example, Tōkyōto [Tokyo Metropolitan Government], *Tōkyō sangyō kankō puromōshon keikaku* [The Plan of Tokyo Sightseeing Industrial Promotion] 2013; Tokyo Organizing Committee of the Olympic and Paralympic Games, *Tokyo*

schemes. Most of them involve the construction of high-rise buildings based on the Overall Design System. Plans are also underway for a new railway line and a new train station providing access to and from Haneda Airport. By 2040, it will be necessary to rebuild or service these facilities. Will the inhabitants of the 2040s have the economic means to support this infrastructure? This is a cause for concern.

If a low birth rate and an aging society are unavoidable, it is necessary to rethink how we can build an urban area that places a minimal economic burden on the city, that is compact, and that satisfactorily enhances the city's existing worth. In my opinion, water transportation is able to provide an infrastructure that is flexible and that minimizes the economic burden. I am confident that if we hone our existing tourist resources and shower our many foreign visitors with the kindness and hospitality inherent in the Japanese people, the waterfront will be at liberty to play a new dynamic role in the shaping of Tokyo's future.

Fig. 1) Tokyo Bay Area
(Photo provided by the Bureau of Port and Harbor, Tokyo Metropolitan Government)

2020 Games Foundation Plan, February 2015, https://tokyo2020.jp/en/games/plan/data/GFP-EN.pdf.

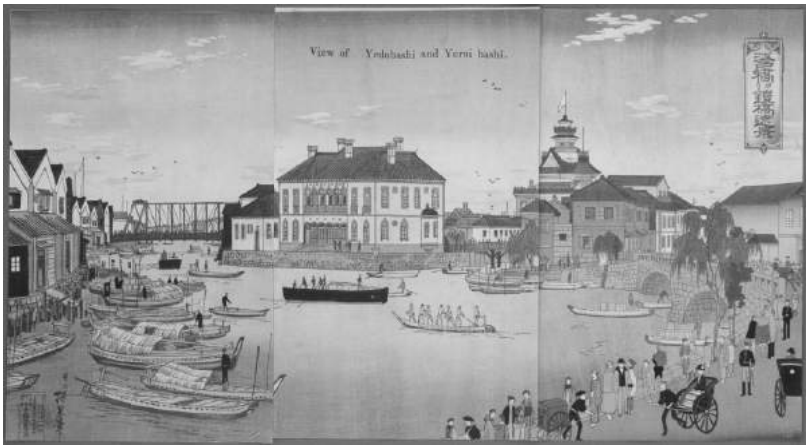

Fig. 2) View of Yoroibashi from Edobashi
(Time Dome Akashi-Chuo Historical Museum/Planetarium, Chuo City)

Fig. 3) Sumida River Side walk (Photo by I. Takamatsu)

Fig. 4) Daiba area from boat (Photo by Taxt of GNU Free Document License)

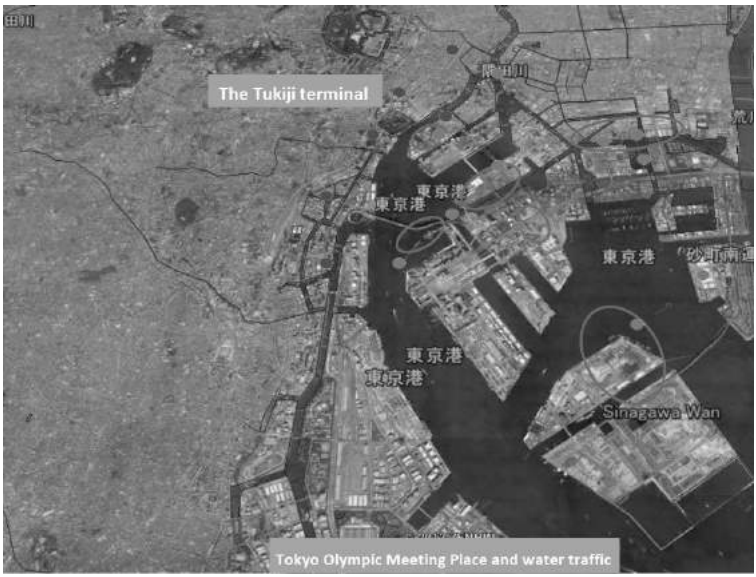

Fig. 5) From Haneda and Aomi wharf to Tsukiji

CHAPTER TEN

VENICE: LIVING WITH WATER, LEARNING WITH NATURE – A REGENERATING ARENA FOR GLOBAL CITIES

GIOVANNI CECCONI

Introduction

In the global arena of encroached delta cities, impacted by unprecedented climatic and social transformations, the Venetian practice of *learning with nature* can play a leading role in generating resilience and positive worldwide change.

Venice, as the icon of cities on water, can empower global coastal cities in developing an inclusive solution to such challenges based on ecosystem services, a good quality and quantity of water, and soil and carbon reuse and sequestration.

We, the passionate professionals of the Venice Resilience Laboratory, wish to convey to the coastal communities a novel method of adaptive co-management in the form of a friendly exploration of territories, with the active participation of artisans and artists, a special sub-set of society which is usually deeply concerned about the custody and cultivation of nature.

Based on the wide recognition that *trust* between individuals and organizations is the dominant factor required for sustainable cooperation, we intend to start by exploring together new ways of helping each other, by borrowing goods and services, redefining them, and then serving them to society.

This traditional attitude was widespread throughout Italian agricultural society of the last century and is still present in many isolated Mediterranean villages today, which continue to provide hospitality and

developmental integration between local people and migrants escaping from war zones.

Trust can be gained by peer exploration of local socio-ecological landscapes, and by the deployment of demonstration projects made from joint ventures between different "green and blue" infrastructures, for the beneficial reuse of every by-product, in line with the principles of the circular economy.

The production and demonstration of joyful spiraling chains of eco-innovative solutions will become the foundation for inclusive development and adaptation to social and climatic changes, including job opportunities for the increasing flow of refugees. The friendly actions of *glocal* explorers (artisans with a global vision and local knowledge) will become the starting point for the internal regeneration of the tourism-spoiled and aging city of Venice.

The unique local culture of Venice can only be preserved if we are able to gain global visibility, for instance, by installing harmonic *living with water* conditions in other encroached delta cities, such as Valona (Albania), Alessandria (Egypt), Hue (Vietnam), Caofedian (China), Kochi (also known as Cochin) in Kerala (India), Chilika Lake/Bhubaneswar in Orissa and Calcutta in Est Bengal (India), Jakarta and Semarang (Indonesia), Cartagena (Columbia), Jamaica Bay in New York and New Orleans (USA), and many other cities that wish to enter into a twinning partnership in order to maintain a community of practice, and provide hospitality to the many war refugees.

Inside projects, shared and prepared using the Venice Resilience Lab and related Platform for eco-innovation, based on historical knowledge of *living with water*, local culture and ecosystem services will be explored.

The hybrid knowledge provided by Venice consists of proved methods of technology for the purpose of engineering nature in different ways: enhancing ecosystem services; installing bio-stabilizing and sequestration habitats; improving the production of food, water, and soil; inspiring and maintaining inclusive production processes for migrants; and deploying eco-villages and new urban landscapes in harmony with nature (using the energies of the sun, the wind, the waves, and the tides) for the peaceful co-evolution of people inside a multitude of "top-down" and "bottom-up" societal interests.

It is the purpose of the Venice Resilience Lab Platform to guest individuals, local private or public organizations, companies, or networks, who wish to cooperate, borrowing our knowledge or simply presenting

their own new ideas—diverse cultures will globally resonate together in the new light shed by Venetian regeneration.

Based on a good connection between partners and nature, we also expect the resilience generation process to grow very rapidly, forming a developmental organism able to regenerate Venice, as well as other cities, by creating a permanent network of inclusive eco-innovation villages.

The first prototype of the floating village expo of eco-innovative solutions will be staged in Venice, with the participation of the remaining Venetian artisans and fishermen, who will manage the project from the design phase to the use and maintenance phase.

In order to disconnect the project from the demand for global tourism, we plan to locate the floating village offshore Venice, in the Upper Adriatic, on a new atoll island constructed at sea and protected by pre-cast caissons or armored sand dikes at a depth of approximately 25 to 30 meters. The final position of the atoll will very much depend on legal constraints and opportunities, ranging from a catamaran (a multi-hulled watercraft) travel time of between thirty minutes and one hour from the Lido, covering a distance of 12–20 miles.

Local and global eco-innovations, with a *no waste* criteria in the production of energy, water, soil, biodiversity of habitats and species, food, and renewable energy, will be borrowed, integrated, and operated as an experimental circular economy system.

Floating villages in Venice and abroad will constitute a community practice of new *sensible* and diverse people who are able to enjoy the wonders of nature.

The challenge

There is a growing recognition that the resilience of social-ecological systems is being undermined by human activities, and there are many indications that new approaches to both understanding and managing change are needed.[1] Greenhouse gas emissions resulting from human activities and carbon-based energy systems are contributing to potentially

[1] Carl Folke, Stephen Carpenter, Thomas Elmqvist, Lance Gunderson, Crawford S. Holling and Brian Walker, "Resilience and Sustainable Development: Building Adaptive Capacity in a World of Transformations," *Ambio* 31, 5 (2002): 437–40; Karen O'Brien, Bronwyn Hayward and Fikret Berkes, "Rethinking social contracts: building resilience in a changing climate," *Ecology and Society* 14, 2 (2009): 12 [online] URL: http://www.ecologyandsociety.org/vol14/iss2/art12/.

unprecedented environmental changes.[2] These changes create challenges in terms of the protection that citizens might expect to receive from the state.

For instance, rising sea levels and, even more so, subsidence put urban areas and human welfare under unprecedented risk.[3] An acceleration of rising sea levels and uncontrolled subsidence are bound to increase these risks for a large number of cities worldwide.[4]

Due to climate and social changes, encroached delta and coastal cities are increasingly exposed to shortages of water in terms of quantity and quality, and a lack of valuable soil for agriculture and carbon storage, as well as protection from flooding.

New migrations are increasing the gap between the rich and the poor, and a lack of integration is undermining opportunities for the existence of more inclusive peaceful communities.

Central governments, city planners, and investors can provide top-down urban plans and projects in an attempt to solve these problems; however, they sometimes ignore problems that are better known to the local groups. This is why top-down plans are rarely effective and often subject to delay, due to political opposition and vetoes from local representatives who do not see any advantage in such plans. They also often feel offended by the limited consideration they have received, independent from the fact that they have raised, or not raised, the issue of the conservation of local culture.

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[2] Rajendra Pachauri and Ernest Reisinger, eds., *Climate Change: IPCC Fourth Assessment Report (AR4)* (Geneva, Switzerland: IPCC, 2007).

[3] Noha Adly, Erik Bonsdorff, Carlo Carraro, Giovanni Cecconi, Michael Depledge, Michael Dettinger, Jim Falk, Charles Kennel, Paul Linden, Kim McIntyre, Cristina Nasci, Emiliano Ramieri, David Woodruff and Gabriele Zanetto, "Improving the capacity to assess and to adapt to climate change in urban coastal regions," in *Technical Report: The Venice Conference* (Venice, 2011), 1–20; Swiss Re, *The Hidden Risks of Climate Change: An Increase in Property Damage from Soil Subsidence in Europe* (2011), http://www.preventionweb.net/go/20623; Nicholas Stern, "The Economics of Climate Change," *American Economic Review* 98, 2 (2008): 1–37.

[4] Christopher Field, Vicente Barros, Michael Mastrandrea, Katharine Mach, Mohamed Abdrabo, Neil Adger, Ya Anokhin et al., "Summary for policymakers," in *Climate Change 2014: Impacts, adaptation, and vulnerability. Part A: Global and sectoral aspects. Contribution of working group II to the fifth assessment report of the intergovernmental panel on climate change* (Geneva, Switzerland: IPCC, 2014), 1–32.

In Venice, for instance, fifty years after the terrible flooding of November 4, 1966, and a thirteen billion euro State investment in erosion control, flood protection, and environmental and urban restoration, it is finally likely that from 2018 the population will be protected from flooding (including a projected sea-level rise of 60 cm over the next century). However, the *two-thousand-year-old living with water* culture is still at risk of disappearing due to a poorly managed touristic economy, which today has become more disruptive even than flooding.

As a consequence of the increased cost of living and inland migration, the resident Venetians are now very small in number, and aging and alone because most of their well-educated children prefer to live a more challenging life abroad, postponing for the moment the decision if and when to return to the parental business of tourism.

Aging parents are, in general, parted from their children, and have less money to spend due to the present welfare crises.[5]

Continuing adaptation works using only large-scale infrastructural projects is not effective because of the present scarcity of investment, long delays, and risk of corruption. A number of front-runner cities already experiencing such problems have started other adaptation measures, serving as showcases for other cities. Ultimately, we suggest that social-ecological resilience can better be achieved by developing a sense of responsibility and a vision of the affected population, alongside their involvement with infrastructural adaptation projects.

The solution proposed by the Venice Resilience Lab

Resilience thinking offers a new way of understanding complex adaptive systems. It can provide key insights into how implicitly and explicitly governance can respond to climate change, which can also benefit from the completion of major top-down international investments (for instance, the Netherlands, Japan, and Korea have started to invest in the *Great Garuda* in Jakarta, a delayed forty billion dollar project, with little success in terms of participation).

Rather than simply exploring the consequences of climate change on the population, political arrangements and, in turn, how the evolution of these political arrangements exacerbates or reduces vulnerability to climate risk, the Venice Resilience Lab, acting together with local people,

[5] Unioncamere Veneto, *Le famiglie e i giovani. Rapporto Unioncamere* (Venice: Unioncamere, 2016), http://rapportoannuale.unioncamereveneto.it/le_famiglie/

artisans, and organizations, intends to explore, design, and implement resilience using joint decisions about how it should be managed.

The co-production of communities to deliver their own basic goods and services in cooperation with public administration is one of the fundamental notions used in order to achieve increased responsibility among local populations.[6]

Due to the population encroachment of large cities of developing and developed countries there is an increasing need to train people in the cultivation and custody of ecological services for improving living conditions, and this can be more easily achieved relying on the passionate, inclusive, and, most of the time, joyful nature of artisans, artists, and responsible citizens.[7]

Individual entities co-producing goods and services share knowledge about the state of the environment and mutually learn and develop adaptive capacities.

Trust is the foundation needed to yield the benefits which co-productive projects generate. Building trust is enabled by open communication and participation of communities in planning for adaptation. Trust is the basis for establishing reciprocal relations between social entities.[8]

These processes have mutually reinforcing effects on each other—trust enhances reciprocity, cooperation, and altruism,[9] which are the foundation and the amplifier of co-production, which is used to enhance social-ecological resilience.

The disappearing historical culture of learning and living with water can still be saved if we are able to produce trust and eco-innovation opportunities, starting with a friendly exploration of nature.

In this chapter I will explain the Venice Resilience Lab's strategy for building resilience by learning and building with nature, which presents threats, opportunities, and triggers, and in particular, the positive

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[6] Elinor Ostrom, "Crossing the great divide: Coproduction, synergy, and development," *World Development* 24, 6 (1996): 1073–87; Elinor Ostrom, "Polycentric systems for coping with collective action and global environmental change," *Global Environmental Change* 20, 4 (2010): 550–57.

[7] Francesco the Pope, *Lettera Enciclica Laudato si'* (Rome: Edizioni San Paolo, 2015).

[8] Ernst Fehr and Simon Gächter, "Fairness and Retaliation: The Economics of Reciprocity," *Journal of Economic Perspectives* 14, 3 (2000): 159–81.

[9] Ernst Fehr and Urs Fischbacher, "The nature of human altruism," *Nature* 425, 6960 (2003): 785–91.

interactions that can be generated by *glocal* projects within cities that are twinned with Venice. On the one hand, other cities can benefit from the Venetian experience; on the other, Venetian artisans, fishermen, and professionals concerned with the custody and cultivation of Venice and the lagoon can challenge themselves and gain confidence helping Asian coastal cities to solve their problems. This is particularly true and can be rapidly implemented if we start this *chain of spiraling multi-empowerment* by bilateral or multilateral cooperation with interested partners.

Learning-by-doing: A peculiar Venetian attitude to building resilience

The Venice Resilience Lab has benefitted from the author's hybrid knowledge on complex environmental processes, for example, on climate, geology, hydrology, morphology, biology, remote sensing, water quality, engineering, landscape and urban planning, socio-ecology, and adaptation techniques to rising sea levels.[10] This knowledge has been recently cross-fertilized by cooperation with Laura Elsler, a socio-ecological PhD student at the Stockholm Resilience Institute, in her MA thesis on Venice.[11] Together, we produced a project proposal in December 2015 outlining trilateral activities based in Jakarta, New York, and Venice, and with the participation of the Jamaica Bay Resilience Center in New York, the Rockefeller Foundation, and the Jakarta Municipality. The project consists of a genuine bottom-up application of Elinor Ostrom Nobel Prize concepts of activating resilient solutions through exploration, empowerment, co-

[10] John W. Day, John Rybczyk, Francesco Scarton, Andrea Rismondo, Daniele Are and Giovanni Cecconi, "Soil Accretionary Dynamics, Sea-level Rise and the Survival of Wetlands in Venice Lagoon: A Field and Modelling Approach," *Estuarine Coastal and Shelf Science* 49 (1999): 607–28; Giovanni Cecconi, "Morphological restoration techniques," in *Flooding and Environmental Challenges for Venice and its Lagoon: State of Knowledge*, eds. Caroline Fletcher and Tom Spencer (Cambridge, UK: Cambridge University Press, 2005), 461–72; Giovanni Cecconi, "Il risanamento idro-morfologico della laguna di Venezia," in *Atti della XXVI Giornata dell'Ambiente* (Roma, Accademia dei Lincei, 14 November 2008); Giovanni Cecconi, Claudia Cerasuolo, Nadia Marchettini and Enzo Tiezzi, "Salt-marshes as emergent novelties in the Venice Lagoon," *Ecological Modelling* 220, 16 (2009): 1870–73; Giovanni Cecconi, "La gestione del MoSE. Resilienza delle città d'arte alle catastrofi idrogeologiche: Successi e insuccessi dell'esperienza italiana," (Rome: Accademia Nazionale dei Lincei, 4-5 November 2014).

[11] Laura Elsler, *Venice Ventures: Modeling social-ecological co-evolution for resilience* (Stockholm: Stockholm Resilience Center, MA Thesis, 2015).

production, and co-management.[12] The goal of the project is to develop trust, reciprocity, cooperation, and altruism in and among the three cities.[13]

A second project is under development in Kerala, India. It was inspired by the author's visit to Kerala in 2014, as well as by the article by Kegan et al. in the *Harvard Business Review* on deliberatively developmental organizations.[14] The project was also inspired by the 2012 Nassim Nicholas Taleb appraisal of facing uncertainty with the persistent adaptive strategy of asking what is needed (*anti-fragility behavior*).[15] Friendly compassionate co-production is also the everyday practice of the Wigwam Local Community, the Italian NGO which shares and supervises the activities of the Venice Resilience Lab.[16]

How nature works

Natural systems are, by definition, evolving through complex patterns that cannot be predicted, but some positive outcomes or factors can be constantly observed, monitored, analyzed, and selected. Natural systems inherently seek order out of chaos inside their domain in the form of *emergent ontic properties*, in an evolutionary manner resulting from *trial and error* control, using the inflow of matter, energy, and information at their boundaries.[17]

Similar behavior was observed by Charles Darwin and reported in the famous explanation of the formation of organic rocks from coral reefs, a conceptual map of the benefits of sinking, still valid for explaining the survival of salt marshes under rising sea levels: if the elevation is too low more frequent flooding will occur enhancing accretion, and if it is too high the volume will shrink reducing top-soil elevation. The result of this is the burial of organic and inorganic sediment together with an excess of

[12] The 2015 proposal is enclosed in the appendix to this paper.
[13] Fehr and Fischbacher, "The nature of human altruism," 785–91.
[14] Robert Kegan, Lisa Lahey, Andy Fleming and Matthew Miller, "Making Business Personal," *Harvard Business Review* (April, 2014): 44–52.
[15] Nassim Nicholas Taleb, *Antifragile: How to Live in a World We Don't Understand* (London: Allen Lane, 2012).
[16] Wigwam is a non-profit organization, founded forty-six years ago by Efrem Tassinato, which today connects more than a hundred joyful communities all over the world, inspired by the Mediterranean culture of *Borrow, Blend and Serve Now, with what you have!*
[17] Enzo Tiezzi, Giovanni Cecconi and Nadia Marchettini, "Confined Ontic Open Systems," *International Journal of Design & Nature and Ecodynamics* 5, 1 (2010): 3–9.

nutrients, pollutants, and carbon, in the effort for maintaining an optimal elevation for the seven Venetian halophytic species able to survive in these extreme environmental conditions.

In general, natural systems react to a persistent disturbance developing a sensible adaptation capacity to survive and expand at the expense of other species. Because of rising sea levels, water depth and wind-wave energy is increasing in an exponential fashion, compromising the survival of intertidal species, such as the microbial mats and plants. This is due to continuous re-suspension of organic and inorganic matter, the absence of sunlight due to turbidity, the erosion of habitats, and, in particular, the removal of nutrients from the surface.

From nature to society: The reason for eco-alphabetization

The above explanation is just one of the many adaptive models we can observe in nature; we can use it as a conceptual model for interpreting complex socio-ecological interactions.[18]

For instance, in describing cooperation and competition between the social and natural systems, we can give the example of the installation of an inlet breakwater in a pristine lagoon in order to keep the entrance navigable by mean of the produced concentrated tidal flushing of sediment. In this example it is possible to interfere with the lagoon tidal mixing, the sediment budget, and the littoral drift, but, if we install the transformations gradually, as was done during the last century in Venice, we have a win-win situation—the navigational goal can be reached while, at the same time, the natural environment gains in complexity and biodiversity: beach and dune formation, dispersal of polluted sediments at sea, better mixing, and, above all, increased primary production.

Venice's natural environment has been a cultural resource since Roman times, as well as being a source for inspiring a *living with water* cultural heritage. From this, fifty years after the serious flooding of November 4, 1966, a protection and adaptation plan to the risks of sea level rise has been implemented, relocating more than sixteen million cubic meters of sediment from inside the lagoon to recreate tidal flats and salt marshes.

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[18] Fritjof Capra, "La sopravvivenza dell'umanità dipende dall'alfabetizzazione ecologica," in *System Failure*, July 6, 2015. http://systemfailureb. altervista.org/fritjof-capra-la-sopravvivenza-dellumanita-dipende-dallalfabetizzazione-ecologica/.

Now a further step is required to complement the top-down holistic Venetian approach, by using bottom-up opportunities to regenerate Venetian society and local identities. Because of global interest in safeguarding Venice, we propose that twinning the Venetian skill of adaptation to climate change with other cities at risk of disaster will trigger the creation of *glocal* resilience networks of endangered coastal cities for the mutual benefit of Venice and the other cities.

Concluding suggestions for regenerating coastal cities with glocal resilience

Based on the Venetian "living and learning with water" experience, the following are the concluding suggestions for enabling resilient transformation in Venice and abroad:

Holistic approach and early integration. Avoid initial over-simplifications (for instance, by including in your project scenario the installation of mobile flood barriers to control the flow, simply to conceptually explore the opportunities afforded in this case by using the barriers to also flush out the lagoon) and consider the many different processes and interests.

Anti-fragile team. Never stop asking what is needed; for instance, regarding particular technical services or mathematical modeling. Surprisingly, someone will help you and you will help them, and both parties will increase each other's knowledge and opportunities.

Organic partnership with a positive attitude. For instance, to design and implement international twinning and developmental partnership with the aim of empowering the few remaining, aging Venetian artisans, together with artisans from other global communities.

Labor intensive and sensible villages. A lack of new artisans is the main problem of aging cities and the solution requires the transformation of the aging artisan into a shop master who is able to teach his practical skills to many others, in such a way as to enable a transfer of resident historical culture to a new incoming Venetian village population.

Developmental co-design team. Socio-ecological systems need to be explored starting from a declaration of incompleteness (how we are, what we want to achieve, and what we expect from others) which can lead to increased trust.

Borrow, blend, and serve resources, including the collection of funds: opportunities arise from acting immediately with what is available, or we can borrow from our neighbors, without waiting, so that we can quickly serve and gain trust.

Floating organic platforms. Venetians and guests will integrate, use, and demonstrate regional and international eco-innovations for renewable energy and sustainable development in a permanent expo village (the floating platform serves as a metaphor for natural adaptation to a rise in sea level, for experimenting with zero waste solutions, and for the dream motivation of a circular economy island). Many small scale examples are available from the Netherlands and Japan: green houses, parking lots, residential houses, milk factories, floating solar farms, etc. The most remarkable endeavor is the one of the Seastead Institute, San Francisco, CA, who has announced the construction of the first floating village in French Polynesia by 2020.[19]

In the current economic climate, there has been a renewed awareness of the role of cooperatives as a means to generate opportunities for transitioning out of poverty. Cooperatives help to bring people together, and to foster their participation in economic and political life. They can generate economic, human, and social capital, and promote a more just form of development.

Anyone can contribute to the regeneration of Venice simply by asking for cooperation, or by monitoring support or expertise on nature-based solutions. You can also help your village and Venice by contributing to the dream of building the island of floating villages, to be located offshore Venice, where the permanent living expo of eco-innovations will be showcased.

[19] James Carly, "Oceantop Living in a Seastead - Realistic, Sustainable, and Coming Soon," in *The Huffington Post*, December 3, 2016, http://www.huffingtonpost.com/entry/oceantop-living-in-a-seastead-realistic-sustainable_us_584c595ae4b0016e50430490

Appendix: Science and Resilience for Sinking Cities. A *Learning with Nature* project in Jakarta, Venice, and New York[20]

Summary

This is a project for *building social-ecological resilience* in three major cities of the world showcasing the ability to withstand global environmental change. In a unifying *living with water* approach the targets are to build social-ecological resilience tools in Jakarta, a city that is sinking one meter every ten years, promoting a *living with water* identity among the increasing population of Jamaica Bay, New York City, and revitalizing Venetian society**.**

These three goals will be achieved by joining problems and places and empowering extraordinary inhabitants in Jakarta, New York, and Venice, by means of connecting visits, open platforms, and on the job training. The exchange of experiences on bio-structuring habitats, soil improvement, and how to prevent subsidence all serve to help in adapting to rising sea levels.

Most of the activities and meetings will be organized on the water in order to celebrate the *living with water inhabitants* of the future.

The immediate and most relevant expected result is the harmonization of the needs of Jakarta's impoverished communities with the currently delayed $40 billion Dutch *Great Garuda* plan, by means of adaptation and extension of the plan first phase, including the restoration of soil, water, and ecosystems. Enhancing the availability of ecosystem services complementing the *Great Garuda* project serves, firstly, to secure impoverished livelihoods, and, secondly, to establish a resilient *living with water* culture.

The challenge

Rising sea levels and, even more so, subsidence, put urban areas and human welfare under unprecedented risk.[21] Continuing adaptation work in large-scale, infrastructural projects has been proven to cause long delays in adaptation, increase the risk towards urban populations, and augment

[20] This draft proposal was submitted to the *International Grant Application Rockefeller Foundation* by Giovanni Cecconi and Laura Elsler (Venice Resilience Lab) in December 2015.

[21] Stern, "The Economics of Climate Change," 1–37.

opportunities for corruption. With the acceleration of rising sea levels and uncontrolled subsidence these risks are bound to increase for a large number of cities worldwide.[22]

A number of cities in the world are already experiencing these risks and have started to adapt, serving as showcase*s* for other projects. Ultimately, social-ecological resilience can only be achieved by developing a sense of responsibility and a vision of the affected population, alongside infrastructural adaptation projects.

Jakarta (Fig. 1)**,** home of an ever-growing population of twelve million, is sinking more than any other mega-city at a subsidence rate of over one meter every ten years.[23] The main cause is groundwater extraction by local communities striving to exist on the edge of scarce and polluted surface waters.

The impoverished community, 16% of the total population according to a 2011 World Bank survey, is disconnected from the natural ecosystem and related ecological services (brackish-water horticulture and agriculture, fisheries, eco-tourism, water recreation) due to the degradation of soil and water in quantity and quality, encroachment, and air pollution—the expanding mega-city is in need of vital infrastructures.

The population is severely exposed to: 1) an increasing risk of storm surge flooding due to dike overtopping and disastrous breaching of levees, and 2) reduced access to drinking water and food due to the lack of suitable soil and estuarine waters (Fig. 2).

The Dutch US$40 billion *Great Garuda* project (NCICD),[24] a top-down plan aimed at strengthening ninety-four kilometers of existing sea walls and river embankments, and constructing seventeen new islands, taking an estimated thirty years to complete, has been submitted to the Jakarta Government.[25] In 2014 the Jakarta administration created a special office for accelerating Phase A of the NCICD project, which had shown little progress up to this point. The government has hesitated to start implementation because of the need to relocate some 100,000 people from

[22] Field, Barros, Mastrandrea, Mach, Abdrabo, Adger, Anokhin et al., "Summary for policymakers," 1–32.
[23] Hasanuddin Abidin, Rochman Djaja, Dudy Darmawan et al., "Land Subsidence of Jakarta (Indonesia) and its Geodetic Monitoring System," *Natural Hazards* 23, 2 (2001): 365–87.
[24] The National Coastal Integrated Capital Development project, NCICD.
[25] See: http://inhabitat.com/can-the-40-billion-great-garuda-project-stop-jakarta-from-sinking-into-the-sea/

poor neighborhoods as a consequence of initial reclamation works.[26] The lack of interaction between government and population, therefore, increases the risk of the local population.

Every month the situation becomes more critical with an exponential growth of flood risk and loss of ecosystem services due to anthropogenic induced subsidence, which is independent of global rising sea levels. Urgent action is needed to solve the problems of the encroached Sinking City of Jakarta, an icon and prototype site for many other sinking cities.

With this current project we wish to facilitate the participation of the local community in the Great Garuda project, creating a bottom-up monitoring system of soil and water quality and quantity as the trigger of a broader developmental, social-ecological project for promoting science and resilience in Jakarta, Venice, and New York. This *Learning with Nature* project will generate a system called CIRGS—Compassionate Inclusive Resilience Generation System—a method that can be transferred to other places which need to adapt to environmental large-scale problems, including subsidence and rising sea levels.

The empowering process

Venice is a city with good records in environmental restoration and with recently well restored wetlands, protected by an advanced system of mobile storm surge barriers which has been entirely financed by the State. However, it is now facing an increasing number of daily tourists who are eroding the local culture of *living with water*, in favor of well-paid shifting touristic services (Figs. 3, 5). Moreover, the cultural value of Venice is also continuously being reduced by a shrinking and aging population. As a consequence, the remaining inhabitants are unable to develop a vision and related adaptive capacity to preserve the identity of their historical city. Ultimately, this leads to a loss of *living with water* culture and social-ecological resilience of the metropolis and the surrounding lagoon.

The solution to Venice's population problem relies on empowering the few remaining local artisans, artists, scientists, and engineers, those citizens who can effectively contribute to the social-ecological revitalization of Venice with labor intensive initiatives connected to nature.

The empowerment of the Venetian artisans will come about by sharing and hosting diverse experiences between the inhabitants of cities

[26] Corry Elyda, "A year after breaking ground, NCICD Phase A yet to begin," in *The Jakarta Post*, October 23, 2015.

exposed to similar ecosystems and ecological services. The hosting activities will be put in place in Venice and New York in order to help solve the urgent problems of Jakarta.

At the turn of the twentieth century plans for a massive new seaport were drawn up for Jamaica Bay, New York. A number of deeper channels were dredged and the creeks along the northern shore were straightened to provide new docking basins (Fig. 4). Although the seaport was never finished, much of the shoreline was filled in using a mixture of ash and street sweepings. During the first years of the Great Depression, the city decided that Jamaica Bay should become parkland.

By 1938 a Belt Parkway had already begun to encircle Brooklyn and Queens. The Belt Parkway created parkland and open space along the shoreline, at the expense of extensive wetland filling, and also cut off the bay from many of the surrounding neighborhoods and yacht clubs. Recreational anglers and other users no longer had access to the water and related ecosystem services. Three modern landfills remained in operation until 1991, when Jamaica Bay became a National Wildlife Refuge. Currently, an undesirable state of reduced ecosystem services prevails in Jamaica Bay. The lack of identification between the communities of Jamaica Bay and New York has led to a lock-in situation. Therefore, a citizen-based approach to support the building of a new identity to increase the social-ecological resilience of the system has been undertaken by the Science and Resilience Institute.

Today there is growing international interest in transforming the landscape of many encroached cities. A very effective showcase for adaptation is Jakarta, providing a good example for reconnecting people with water.

None of the above described three cities has yet reached a resilient social-ecological system, but show tremendous interfaces for exchange and mutual learning. The similarities of the ecological and urban systems and environmental pressures allows learning from the individual positive developments, expertise, and historical mistakes:

New York will provide technical expertise, funding, and international attention needed for triggering the safety of Jakarta, and the social-ecological transformations for revitalizing Venice. The establishment of compassionate and open social-ecological relationships between New York, Venice, and Jakarta will give to New York, in general, and to the Science and Resilience Institute, in particular, an opportunity to contribute their knowledge. On the other hand, New York will gain new techniques for reviving its own social-ecological relationship with Jamaica Bay, learning, from helping to save both the sinking city of Jakarta, together

with Venice's heritage, two important challenges for strengthening the resilient *living with water* community of Jamaica Bay.

The solution

In order to develop resilient communities in the three coastal cities—Jakarta, affected by lack of soil and water; Jamaica Bay, with its lack of a resilient identity; and Venice, with its aging population—the aim is to activate a Compassionate Inclusive Resilience Generation System (CIRGS): a platform for mutual empowerment and cooperation connecting artisans and citizens with a *living with water* culture.

1. Because of the urgent situation in Jakarta, the process will commence by installing the Soil Watch Initiative, a monitoring program of soil and water quality and quantity developed by the Venice Resilience Laboratory, with the participation of the local communities of the impacted areas of Jakarta (i.e., Puit), and the support of the Science and Resilience Institute in New York City.
2. With the transfer of technology, the local communities will be supported in developing a report outlining their own problem appraisal and vision for the transformation of Jakarta. This activity will be conducted in Focus Group Discussions in the impacted areas.[27]
3. A plan for a set of urgent Jakarta *living with wate*r projects will be organized based on problem appraisal by the Venice Lab and the Science and Resilience Institute, with the contribution of local communities.[28]
4. During the implementation of the development and monitoring of the plan, citizens, scientists, and engineers will be connected by team projects involving them in a series of international learning-by-comparison activities.
5. The progress of these activities will be guided by social-ecological modeling of interaction and transformation potential. Opportunities will be systematically analyzed with holistic simulations for

[27] Contact with the communities will be sought through the local government and the heads of local districts, relying on previous exchange and hospitality between Venice and Jakarta.

[28] The plan will be integrated and adapted considering the priorities of the Jakarta government in the activation of the *Great Garuda* project, and also the experience from similar projects, completed or under development, in Venice and New York.

addressing subsidence, and water and soil management, in a *learning with nature* lab.[29]

6. The local communities of Jakarta will be trained in Jakarta, Venice, and Jamaica Bay on monitoring and working with nature design. The monitoring system will then be installed and operated by the local community of Jakarta under the supervision and quality control of the Venice Lab.[30]
7. The Venice Lab and the Science and Resilience Institute will establish a platform with workshops and public events on the water. Jamaica Bay and Venice will host representatives of the local communities of Jakarta.[31] The training activities will be conducted mainly along the waterfront with on-board intensive interaction between local people, fishermen, artisans, and concerned citizens for, firstly, transferring knowledge to the representatives of New York and Jakarta, and, secondly, promoting international attention to the shared challenges of, and solutions for, the three cities (Fig. 6).

Implementation

Venice Lab is immediately available to start the Soil Watch Initiative project as described above in *Science and Resilience for Sinking Cities*.

After a general letter of interest we can set out a more detailed program of reference for the project, outlining specifications about the partners involved, the recipients of the activities, and the results, in order to apply for financial contribution.

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[29] The basic modeling framework for this activity has already been developed and specified for the case of Venice; it will be further parameterized for the Jakarta case study. Elsler, *Venice Ventures: Modeling social-ecological co-evolution for resilience*.

[30] International cooperation between Venice and New York in solving the Jakarta problem defines a starting point to open up opportunities for the regeneration of Venetian society, and for landscape transformation in Jamaica Bay by building a local identity.

[31] The Venice Resilience Laboratory and the Science and Resilience Institute will offer "on the job" training, and workshops with fishermen and eco-tourism organizations, as well as visits to on-going projects of USACE-NAD for wetland restoration and beneficial use of dredged sediments. Selected representatives from New York and Jakarta communities will visit Venice for training activities on monitoring and building with nature techniques, to be organized by the Venice Resilience Lab.

We are open to working together with the Science and Resilience Institute and the Coastal Storm Risk Management Planning Center of the US Army Corps of Engineers, or any other partner suggested by the grant provider.

As haste is of great importance, we propose to activate the *Jakarta Soil Watch Initiative* with the installation of inSAR corner reflectors for monitoring subsidence, together with "on the job" training of local communities.

During the training and installation of the monitoring network, the project team will benefit from direct contact with opinion leaders, the private and governmental institutions of Jakarta. This local knowledge will be analyzed and shared with the other project partners in the form of an internal Field Assessment Report with answers and suggestions about:

1. What are the actual and perceived causes of subsidence in Jakarta?
2. How are the poorest levels of society, living beside Jakarta's coastal waters, affected?
3. What is their reaction to the problem?
4. Which changes, if any, are they considering/proposing?
5. Which opportunities/risks do they see in the implementation of the Great Garuda project?
6. What kind of cooperation are they suggesting?
7. Concluding remarks on which other local projects to include in the Great Garuda project for promoting inclusive infrastructure in Jakarta.

The Soil Watch Initiative

Fieldwork will be led by the project leader, Giovanni Cecconi, an expert on monitoring subsidence and on social-ecological planning. The main activities will include the finalization of previous Venice Lab partnerships in Jakarta,[32] the collection of information, agreements, and authorizations, and the integration of local universities' programs.[33]

[32] Based on Giovanni Cecconi previous contacts with the Jakarta Government Officers who visited Venice and expressed their interest in this kind of *bottom-up* international cooperation.

[33] They are expecting to benefit from Venice experience in the holistic socio-ecological approach, and from works developed inside the Venice Laboratory for balancing the Dutch cultural presence in Jakarta since the age of the Batavia colony (Fig. 7).

1. Design and construction of a significant number of InSAR corner reflectors in Italy and/or Jakarta, and preparation of the installation and maintenance manual. Fieldwork for the installation of corner reflectors in order to sense soil motion in relevant places around Jakarta.
2. Agreement with the research center that, every two weeks, it will analyze the signals producing the soil motion results at the selected InSAR reflectors and at the natural reflector sites in Jakarta province.
3. Quality control and distribution of results within the local communities, facilitating discussion, and supporting the preparation of reports from the field to the government.
4. Assistance to the government and communities in communicating the subsidence problem using traditional forms of media, as well as calling for new *sensing city* techniques;[34] for instance, light flashing and color coding in the main buildings, or intermittent night sounds.
5. Local focus group discussions with local communities, which are invited to contribute to an overall vision and to express their needs for change.
6. Field Assessment Reports on subsidence and transformability centered on the expectations of the local communities.
7. Assistance to the Jakarta government in the planning and designing of new adaptive infrastructures, based on the teamwork of the Venice Lab and its USA partners, interacting with the local communities and Dutch companies involved in Phase A of the Great Garuda project. This work will be supported by the government office in Jakarta, which is responsible for the implementation of public works, including the Great Garuda project.
8. Traveling and living costs for:
    - Team projects in Jakarta and New York,
    - Six to ten representatives of the communities of Jakarta visiting Venice and Jamaica Bay for training on the monitoring and design of bio-structuring habitats associated with mutual empowerment through friendly field interactions between the *living with water* communities.

[34] Sensing city techniques focus on augmenting connectivity between the urban and natural landscapes and the citizens, facilitating a social-ecological co-evolution.

Outcomes

In New York the Science and Resilience Institute, together with the Venice Lab, will facilitate the formation of a *living with water community* in Jamaica Bay. The technical and scientific community of New York will outline the impending problems of the sinking city of Jakarta.

A wider and diverse global community will become aware of the consequences of rising sea levels and subsidence in Jakarta and also on the availability of resilient solutions, such as the ones implemented in Venice. The immediate and most relevant expected result is the harmonization of the needs of Jakarta's poor communities with the presently delayed US$40 billion Dutch Great Garuda plan for the restoration of soil, water, and ecosystem services.

The citizens of Jakarta (Fig. 8), New York, and Venice will have the opportunity to commence sustainable adaptive changes for: i) renewed soil and infrastructure in Jakarta, ii) a resilient community in Jamaica Bay, and iii) supporting inhabitants in Venice and making them more responsible and active.

Evidence[35]

Sinking Cities: Subsidence is an underrated problem worldwide

How much and how quickly it can proceed is apparent in North Jakarta, where the city has sunk four meters in the last thirty-five years, a fall of 10–20 cm per year. The consequences are an increase in flooding, leading to more economic damage and loss of life. Ground movement can also cause significant economic loss in the form of structural damage and high maintenance costs for roads, railways, dikes, water pipes, pumping stations, and buildings.

Groundwater extraction is the primary cause of subsidence

Groundwater extraction due to urbanization and population growth is the primary cause of serious subsidence in the mega-cities; however, this is also where the solution lies. Besides this, coastal cities are confronted with greater natural subsidence, as they are usually built on weak soils. However, subsidence only occurs where groundwater is being extracted.

[35] Modified from the Deltares Report, September 2015, issued after the Jakarta International Roundtable on Subsidence, May 25–26, 2015. Organized by the Jakarta government, local universities, Deltares, and with the assistance of the Venice Learning with Nature Laboratory. See:
https://www.deltares.nl/app/uploads/2015/09/Sinking-cities.pdf

This is in contrast to climate-driven, sea-level rises which are a problem for all coastal cities. The solution to subsidence must be found within the city itself.

Governments unaware of subsidence problem

Government bodies and inhabitants are often not aware that subsidence is an urgent problem. A different way of thinking and an integral approach are needed to stop subsidence. The current reaction to a flood is most often to build a barrier. But if the flood was caused by subsidence, during the course of time the barriers will no longer suffice, because the actual cause of the problem—the extraction of groundwater—has not been addressed. Subsidence must be included, along with water and soil safety, in medium and long-term planning processes. In future scenarios, many governments have only targeted the consequences of rising sea levels, but subsidence is an equally urgent issue. The sea is rising by 3–10 mm a year; the ground may sink up to 100 mm a year (Fig. 9).

Integrated approach based on European Method DPSIR[36]

Raise awareness

Involve stakeholders to determine ownership and responsibilities

Organize monitoring

Ensure reliable and easily accessible data

Develop knowledge

Models and tools to assess subsidence and evaluate the effects of mitigation measures

Assess vulnerabilities, risks, and impacts

Flooding, buildings, infrastructure, roads in the short and long term, including costs

Develop responses and solutions

Adaptive social-ecological approaches for resilience

Address governance

Sustain stakeholder participation, multi-sectoral policy adjustments, and innovative financing

[36] Driving forces, Pressures, State, Impacts and Responses.

Support decision makers

Models and tools for selecting cost-benefit adaptive measures

Exchange of knowledge and experience on complex systems

Social-ecological and cultural toolbox to promote connections and transformations

Fig. 1) Jakarta is sinking more than any other city, 50 times faster than sea level rise, with extensive flooding

Fig. 2) Jakarta flooding in 2007

Fig. 3) Tourist flooding in San Marco versus a *Living With Water Meal Venice lagoon*, C. Martens 1926 (oil paint)

Fig. 4) Ramblersville in 1900: a *Little Venice* in Jamaica Bay, and now

Fig. 5) Venice 1641. M. Merian

Fig. 6) New York 1902 A.R. Ohman, and 1923 Jamaica Bay

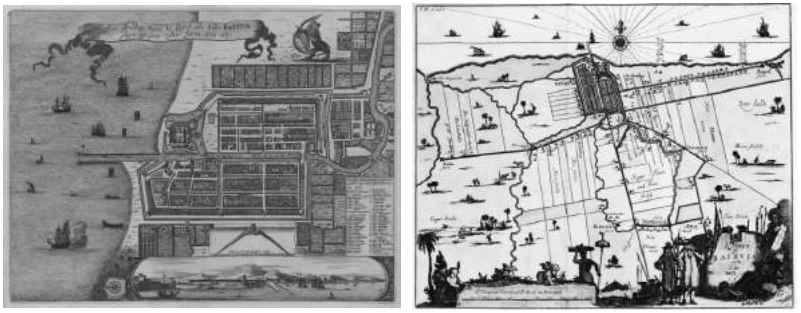

Fig. 7) Batavia (Jakarta) 1669 and 1682

Fig. 8) Pluit, one of the most vulnerable locations of Jakarta

Figure 2. Global sea level rise (SLR) and average land subsidence for several coastal cities (please note can differ considerably within a city area, depending on groundwater level and subsurface characteris

Subsidence in Sinking Cities

	Mean cumulative subsidence in period 1900 - 2013 (mm)	Mean current subsidence rate (mm/yr)	Maximum subsidence rate (mm/yr)	Estimated additional mean cumulative subsidence until 2025 (mm)
Bangkok	1250	20-30	120	190
Ho Chi Minh City	300	Up to 80	80	200
Jakarta	2000	75-100	179	1800
Manila	1500	Up to 45	45	400
New Orleans	1130	6	26	> 200
Tokyo	4250	Around 0	239	0
West Netherlands	275	2-10	> 17	70

Sea level rise (SLR)

	Cumulative mean SLR in period 1900 - 2013 (mm)	Current rate (mm/yr)	Maximum rate (mm/yr)	Possible additional future SLR until 2025 (mm)
Worldwide mean	195	3	-	86

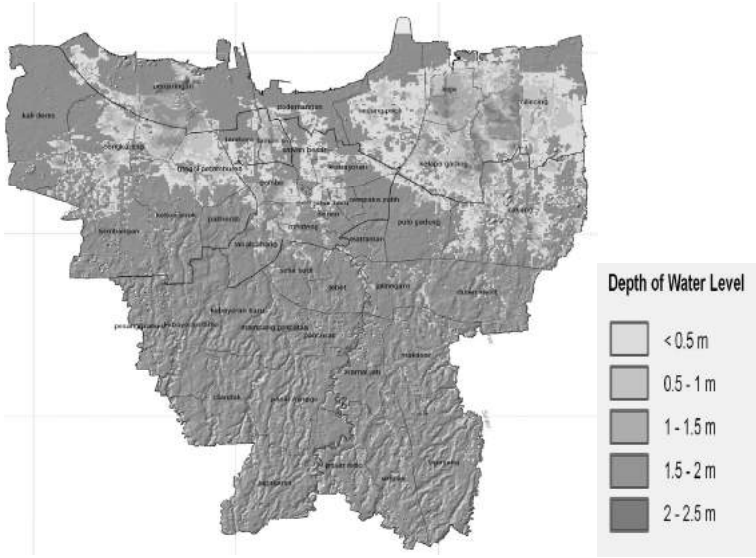

Fig. 9) Jakarta 2007 flood extent

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Giovanni Cecconi is the Director of the Venice Resilience Lab, a discovery-based partner for the management of ecosystem services based on improving soil and water availability. Benefitting from a vast experience inside the Venice storm-surge barrier project, he is promoting sustainable solutions for coastal cities in times of social and climate change. He is also an expert of soft sediments and socio-ecological *nature-based* solutions for navigation, fishing, aquaculture, and ecotourism.

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