PRESERVING THE WORLD'S GREAT CITIES

THE DESTRUCTION AND RENEWAL OF THE HISTORIC METROPOLIS

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THREE RIVERS PRESS
NEW YORK

Front cover painting (detail) by Canaletto, courtesy of Staatliche Museen Zu Berlin, Preussischer Kulturbesitz Gemäldegalerie; spine photograph of Xizhimen Gate (Beijing) by Donald Mennie, 1920

Published by Three Rivers Press, New York, New York.
Member of the Crown Publishing Group, a division of Random House, Inc.
www.randomhouse.com

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Originally published in hardcover by Clarkson Potter/Publishers in 2001.

Printed in the United States of America

Design by Caitlin Daniels Israel

Library of Congress Cataloging-in-Publication Data
Tung, Anthony M.
Preserving the world's great cities: the destruction and renewal of the historic metropolis/ Anthony M. Tung.
Includes bibliographical references and index.
1. Architecture—conservation and restoration. 2. Historic districts—conservation and restoration. 3. City planning. I. Title.
NA9053.C6 T86 2001
711'.4—dc21 2001021276

ISBN 0-609-80815-X

10 9 8 7 6 5 4 3

First Paperback Edition

CHAPTER ELEVEN
TOURISM VERSUS THE HABITABLE CITY

VENICE

> So we advanced into this ghostly city, continuing to hold our course through the narrow streets and lanes, all filled and flowing with water. On we went, floating towards the heart of this strange place—with water all about us where water never was elsewhere—clusters of houses, churches, heaps of stately buildings growing out of it—and everywhere the same extraordinary silence.
>
> —CHARLES DICKENS, *Pictures from Italy*

The visitor approaching by train cannot see Venice from the causeway that reaches out into the lagoon surrounding the historic metropolis. The only things visible are blue-green water, sea grass, and finally train yards. Inside the Stazione Ferrovie dello Stato Santa Lucia is a rush of activity. But take just one step beyond the doors of the terminal and you are engulfed by Venice, transported back in time. A pastel-colored medieval townscape capped with orange tile roofs extends in all directions. Vaporettos, gondolas, and motorboats weave through turquoise channels. Mysterious alleys, bridges, and byways lead to undiscovered treasures. Waves splash upon sidewalks at high tide. Gulls perch on candy-striped gondola poles. Stately classical buildings of white marble celebrate the flowering of the Renaissance. Beautiful palazzi with trefoil Byzantine Gothic windows speak in an architectural language unique to this special place.

From here, across many centuries, the trade goods of Asia were dispersed throughout Europe, and an often enlightened government ruled with restraint and tolerance, constructing a jewel among cities. Yet tomorrow, where will the

children of the metropolis find playmates? As the higher economic rewards from tourism drive real estate values upward, and drugstores, hardware shops, butchers, and cobblers are replaced by hotels, gift shops, and restaurants, how will ordinary Venetians—teachers, shopkeepers, nurses, gondoliers, the elderly, and young married couples—afford to live here? As school classes grow smaller, will youngsters have to traverse the whole city to find companions? If Venetians do not live in Venice, who will keep up the ancient buildings, fix the leaks when they first begin to drip, and patch the plaster before it corrodes across whole facades? Can Venice survive the success of its tourist economy? Is a city still a city when it no longer is a home to its people?

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Saving Venice is one of the most complex urban conservation problems in the world. As in other great cities, historic architectural preservation in Venice is not separable from the larger and intertwined issues of the whole metropolis—economic, social, political, and environmental. Nor are the quandaries of any city divorced from the broader developmental dilemmas of its nation and region. Yet Venice is more complicated. Its singularity as a historic built environment and the way these special characteristics clash with the forces that determine the vitality of modern cities is the reason. Its problems are extraordinary because there really is no other place—and has never been any other place—quite like it.

Venice is unique among the great historic cities in several ways. First and most obviously, it is a city built in water, in the Venetian lagoon. And, like Amsterdam and Aztec Tenochtitlán—two other cities built in watery environs which were also the capitals of great empires—its creation required the development of special local technologies in order to construct buildings and to reconcile the human-made settlement with the forces of the surrounding natural environment.

Second, Venice is unique among great historic capitals in that so much of the city's fabric survives from such an early date in its evolution. It is one of the largest, most complete, and architecturally most significant medieval urban constructions in the world, whose history stretches back more than a millennium. It is more intact than Kyoto or Beijing. It is older than Prague or Cairo.

Third, Venice is unique in that it survives in its geographic context. Unlike historic cities situated on land, the Venetian conurbation in the nineteenth and twentieth centuries did not spread over the immediate natural terrain—a wide, shallow sound that might have been more aggressively filled to accommodate modern expansion. Instead, contemporary Venice encroached on mainland areas bordering the lagoon. (Tenochtitlán and its macro-environment of

managed wetlands were destroyed by the Spanish during the construction of colonial Mexico City, and the development of Amsterdam in the nineteenth and twentieth centuries obliterated the marshes and agricultural fields that once surrounded it.) So Venice is one of the few medieval urban environments that can still be seen as it once existed in nature. And because it continues to exist in the same setting, Venetians must maintain the lagoon that encircles the city, as did their forefathers in centuries past. Here is a paradigm of how the cities of our quickly expanding urban world may yet be required to find a rapprochement with the natural environment—a reconciliation that has been widely ignored. It is a delicate relationship that, until recently, Venice was gradually losing, thereby imperiling its existence.

THE CITY IN ENVIRONMENTAL BALANCE

Venice's rise to world power, its social and cultural achievements, its beauty and architectural singularity sprang from its relationship to the body of water in which it was constructed. It was a city built in a setting where large cities usually had not existed.

Although it would eventually become a great maritime power, Venice was at first a refuge from the political instability that plagued Italy after the fall of the Roman Empire around A.D. 570. It was a rare enclave of civility in a prolonged era of turbulence when Italy was frequently invaded by Germanic (Gothic) tribes vying with the Byzantines for hegemony in Europe. The lagoon itself was the city's defense. As Venice evolved, it gradually learned that although the construction of a permanent cityscape in a wetland environment would require laborious construction methods, such a setting had several advantages.

The lagoon that surrounds Venice is wide and shallow, and more than fifty times larger than the area that would eventually be occupied by the city itself. A lagoon is a form of estuary: a partly enclosed coastal body of water in which saltwater and freshwater are mixed by the sea's tides. The Venetian lagoon has a specific mix of characteristics that allowed it to serve as a defensive barrier to both land and sea attack, as a deepwater port, as a center of commercial fishing, as a site for salt- and glass-making, and as a natural mechanism for eliminating the human waste produced by a large urban settlement.

As a defensive barrier from assault by land, the tidal marshlands and bogs that border the Venetian lagoon are a treacherous maze impassable to soldiers on foot. Inside the bay, an irregular network of navigable channels weave between numerous shallow areas and sandbars. The eccentricity of this shifting natural pattern put hostile naval forces at a severe disadvantage when maneuvering against native Venetian seamen during a sea battle. In the heat of fighting, enemy forces might easily run aground.

Although most of the lagoon is shallow, a curving deepwater channel runs through its center and penetrates the long chain of barrier islands that isolate the estuary from the Adriatic Sea. Venice was built in the heart of the bay on the islands that constitute the Rivo Alto (high bank) that embraces the deepwater passageway where it forms a sweeping and sinuous curve, later called the Grand Canal. This positioned the city where seagoing ships could find safe harbor and anchorage.

When first occupied, the lagoon was also fed by freshwater from several rivers and streams. This produced wetlands rich with aquatic plants and the microorganisms—fish, mammals, birds, and insects—associated with such natural systems. Here was another advantage to building a city in what seemed an unnatural location.

Until the nineteenth century and the identification of the role of bacteria in the transmission of infectious diseases, the sanitation of urban areas was achieved by a process of trial and observation. Unknown to the Venetians, who believed that the tides flushed away the city's waste, a far more complex chemical and biological process was at work—a process that today is recognized as a highly effective method of wastewater treatment. When human waste enters the estuary, it is broken down, and its components become part of the food chain. The action of the tides within the lagoon reduces solid waste into small particles, which become food for microscopic animals and insects. Plants absorb nitrogen, phosphorus, and other compounds from the water. The oxygen released by submerged plant roots supports the activity of bacteria and fungi, which further break down organic waste particles. (Artificial wetlands with an ecological dynamic similar to that of the lagoon of Venice have become a means of sanitation in many smaller contemporary urban communities.)

Moreover, the barrier islands that protect the Venetian lagoon restrict the waves that wash through the estuary with the changing of the tides. A specific balance is achieved. The tides are sufficient to flush the waste out of the city and disperse it into the broad lagoon, but not so active that polluted water moves too quickly for the natural cleansing processes to take effect. Given sufficient time, nature will eventually sanitize human waste, but dense urban settlements overburden most natural systems. The ratio of Venice's size to the extent of its lagoon and the unusual effectiveness of the estuary as processor of organic waste made the location of the city very propitious in this regard.

The microscopic animals and insects that thrive in this environment become food for larger creatures, eventually supporting an abundance of edible fish, fowl, and mollusks. Shallower areas of the estuary also produce heavily salinated water due to an increased rate of evaporation, yielding large amounts of table salt—a vital product in the Middle Ages for preserving meat, and the main commercial export of the city for several hundred years. Salt from the

lagoon is also absorbed by seaweed, which when reduced to ashes forms sodium carbonate—a primary component (along with the fine sand to be found in nearby riverbeds) in the making of glass. And Venice for many centuries was one of Europe's major suppliers of glass.

Much as the physical characteristics of the lagoon were particularly felicitous for Venice, the ascent of Venice as an independent city-state and a great maritime power was affected by its geographic location between Constantinople and Europe.

In A.D. 330, when the Roman Empire was divided into Eastern (eventually Greek Orthodox) and Western (eventually Latin Roman Catholic) spheres, Venice was located between two strong geopolitical poles. During the early Middle Ages, as various Gothic tribes conquered different parts of Europe, the original community of fishermen and salt makers gradually became a colony of traders; their skills at shipbuilding and navigation grew, and Venice became a self-sufficient outpost at the far reaches of the Byzantine Empire. By the time Charlemagne consolidated Gothic Europe and was crowned emperor of the Holy Roman Empire, Venice was a trading and diplomatic intermediary between different civilizations. The Venetians' position was further strengthened as the Muslim Empire expanded in the Middle East (occupying Jerusalem in 637), the southern Mediterranean (taking Alexandria in 642), and parts of Continental Europe through Spain (claiming Cordova in 711), for Christian Europe became landlocked from Asia. Italian maritime cities—Venice in particular—became the major commercial link between East and West.

The life of the city as a global trader and intermediary exposed Venetians to the cultures of different places and inculcated in them a cosmopolitan consciousness. Venice became a Gothic metropolis assimilating cultural strains from Byzantium, the Muslim Empire, and the Italian mainland. Simultaneously, the practical limitations and unusual freedoms of building in the center of a lagoon would combine with the multicultural orientation of the city to produce architecture unlike that found anyplace else.

The construction of buildings on the low-lying islands of Venice required the sinking of wooden piles into a compact substratum of sand and clay, the *caranto,* upon which was built a wooden raft that served as a platform for stone foundations. This allowed Venetian buildings to "float" in shifting geological strata. Since the piles were driven to a depth below sea level, the wood was constantly submerged and gradually mineralized in the saltwater. Posts could thus last almost indefinitely. The current piles of the Ducal Palace, or Doges' Palace, were last examined in 1874, at which time they were 530 years old and entirely sound. In other cases, however, mineralized piles would splinter when subjected to lateral pressure.

Because the sinking of piles was an expensive, labor-intensive process and the *caranto* substratum could shift over time, it was necessary to make the buildings of the permanent city as flexible and light as possible. The exterior walls were accordingly made of a light brick and soft mortar, and were highly plastic. Inside, wooden construction was carefully integrated with the masonry to distribute the weight of the building evenly should the foundations move. In larger structures the supporting walls were thinner in the upper stories. But while the lightness of Venetian buildings was necessary, what made it possible was the security of the city from outside attack. In Gothic cities on the mainland, urban structures were designed as fortresses in case of invasion. The impenetrability of Venice's natural defenses allowed its buildings to be constructed of less heavy materials, with numerous openings for light and air, which further reduced the amount of solid masonry in exterior walls.

In an era when the use of glass in windows was considered a luxury, the numerous glass furnaces situated on the nearby island of Murano made it feasible for Venice to become a city sparkling with glazed fenestration. At first, the shape of window openings in the residences of the city was based on Byzantine architectural models with shallow arches. With time, a Muslim-influenced residential building type evolved (called a *fondaco* in Venetian, from the original Arabic *funduk*). These buildings combined trading offices and warehouse facilities on the lowest floor with residences in the upper stories. Thus, Arabic horseshoe-shaped and inflected arched windows became part of the city's formal vocabulary. Eventually, a distinctly Venetian-style window evolved, with ornate tracery carved in stone and synthesizing Byzantine and Arabic forms with those of Gothic Europe. The architecture of the city assumed an effervescent quality punctuated by the reflected light of its many glazed windows.

As the population grew, the central islands became densely settled. Each island was a separate parish, with a community church situated next to an open square known in Venice as a *campo*. In order to supply fresh drinking water, the *campo* was designed to work as a rainwater cistern and well. Beneath the paved walking area of each plaza the Venetians constructed a large cavity sealed by an impermeable shell that prohibited the penetration of saltwater. This underground tank was filled with sand, which acted as a filter, and a well reached from the bottom of the cistern up to the plaza, where a decorative wellhead was placed. Neighboring buildings had steeply pitched roofs with gutters and spouts that collected and delivered rainwater to the *campo* cistern, where the liquid seeped downward through the sand to the well bottom. Each parish island (sixty-eight would eventually be developed), with its church, *campo,* and cistern, was a self-sufficient unit of the larger city.

As more and more of the central higher areas of the lagoon bed were recovered and the number of islands increased, the Venetians were careful to

maintain the flow of major navigable channels. While most medieval cities have an eccentric circulation pattern that is often described as organic, the irregular configuration of the islands of Venice and its network of canals grew in direct response to the natural flow of water within the estuary. Gradually a second independent movement system was developed on the land. For commercial purposes, warehouse-residences had doors that opened to a canal for the loading and unloading of trade goods, and another doorway that led to the winding network of medieval pedestrian pathways *(calle)* of the city's neighborhoods. Eventually 350 to 400 bridges *(ponti)* crossed more than 200 original channels, linking 118 separate islands in a vast patchwork.

Until the fall of the Venetian Republic in 1797, a special branch of government—called the Piovego in the medieval period and, later, as it became more specialized, the Savii alle Acque—strictly monitored development to ensure that the natural flushing action of the lagoon continued to clean the city. Over the centuries, the Venetians had learned that silt gradually accumulated and the canals grew shallower, reducing the flow of the tides. Therefore, they devised a laborious system of constant canal maintenance, which has been documented back to the fifteenth century. Areas of the city were isolated and drained through the use of temporary dams. The canals were then dredged, foundations and embankments were repaired, and the temporary dams were removed and installed in another area. The process of rehabilitating all the city's canals took about twenty years, by which time it was necessary to begin the cycle once more.

As the city assumed its ultimate form (the population reached about 130,000 by 1500, when Venice was one of the largest and wealthiest cities in Europe), the Venetians gradually gained a deeper understanding of the living lagoon upon which their lives depended. Lagoons are an unstable evolutionary state of estuaries. They are either in the process of filling up with the sediments deposited by rivers, or emptying out to become deep bays through the tidal action of the sea. Both of these extreme conditions were undesirable for Venice—the silting of the lagoon would expose the city to attack by land, while the deepening of the estuary would make the harbor navigable by hostile forces from the sea—so the city decided to interrupt the natural process. Although their scientific knowledge was rudimentary compared to our understanding today, studies at the University of Padua and within the Venetian bureaucracy had uncovered a fundamental environmental concept, which by 1718 was expressed concisely as "Element opposes element."

If the Venetian lagoon was to remain to be shallow and wide with periodic navigable channels, its evolution toward either a bay or a wetland would have to be permanently arrested. Neither the sea nor the rivers could be allowed to dominate. An artificial state of environmental equilibrium, or stasis, had to be created in which the movements of the sea and the rivers were controlled so

that they perpetually counterbalanced each other. Given the variables of weather and the changing conditions of the land and sea, this was a problem of enormous complexity that Venice would gradually solve over a period of several centuries through a sophisticated program of regulation, monitoring, maintenance, and the construction of public works.

The Venetian lagoon is approximately 40 kilometers long, varying in breadth from 5 to 10 kilometers. It is protected from the sea by several narrow barrier islands and peninsulas, with three major openings through which the tides flow in and out of the estuary. Historically, a dozen rivers and streams debouched into the lagoon, including three major rivers: the Sile, the Piave, and the Brenta, which flow out of the mainland a distance of approximately 50 to 75 kilometers. None of these water sources could be simply blocked; each had to be allowed to continue to flow in order for the Venetians to achieve a balance of opposites responding to varying climatic conditions.

Between 1300 and 1800, more than 160 kilometers of canals and several large dikes would be dug on the landward side of the lagoon, creating a complicated system of diversions that would allow the city either to redirect floodwaters around the lagoon and out into the Adriatic or, at other times, let a

Historic environmental interventions in the Venetian lagoon · Maintaining environmental stasis in its lagoon was crucial to Venice (the inhabited core of central islands are shown in black). These large civil engineering projects required a commitment founded in knowledge. Over centuries, the Venetian Republic gradually came to know that constructing massive seawalls (solid black lines), lengthy dikes (dotted line to the east of the lagoon), and more than a hundred miles of river diversions (dot-dash lines) would preserve a delicate balance of opposing environmental elements in the surrounding natural terrain.

controlled amount of freshwater enter the lagoon at specific locations. Correspondingly, numerous sea barriers, eventually protecting a length of around 20 kilometers, would be constructed along the edge of the Adriatic to protect the narrow strip of barrier islands from being either swept away by violent storms or slowly devoured by the tides.

Commercial activities—such as the construction of salt pans and fish farming, which involved the artificial isolation of parts of the lagoon—were closely regulated. Continuous dredging was required, both in the city's canals and in the lagoon itself. And between 1610 and 1792, an official area encompassing the whole lagoon environment was mapped out and monitored at 102 datum points.

All this activity stabilized the natural conditions that had so decisively determined the shape of the city and its architecture. The action of the Venetians in preserving the character of the lagoon also perpetuated the character of the urban agglomeration. Radical alterations in the defensive characteristics of the lagoon would have precipitated radical changes in the configuration of the cityscape. A fundamental principle had been revealed: the conservation of the built environment of Venice would always involve the conservation of its natural environment as well.

The ability of Venice to sustain an effective environmental program within the lagoon over many centuries was made possible by the continuity of the city's government. Venice had not been conquered or ruled by a foreign power since recognition of its independence by Constantinople in 814. Nor was it torn by the frequent internal political upheavals that had afflicted Italian cities on the mainland. From 1140 to 1160, it was run by a continuous form of republican government in which administrative and legislative powers were vested in assemblies constituted of members of the patrician class. The highest official of the republic was the doge, who was elected for life but could be removed for high crimes against the state. This oligarchic government was, in effect, a commune devoted to the continued mercantile success of the city. It consciously fostered the political stability that, at the dawn of the Renaissance, made Venice one of the world's great commercial and political powers, with diplomatic ambassadors at every major court in Europe.

THE CITY AS AN ARTISTIC CONSTRUCTION

At its height, the maritime empire of Venice included a substantial portion of adjacent mainland Italy, as well as a string of cities, islands, and territories on both sides of the Adriatic, around Greece and east to Istanbul and beyond. This extensive network offered safe harbor for the Venetian republic's ships, controlled piracy in the sea-lanes to the Middle East, provided food and basic

necessities that the city did not produce, and offered new commodities and markets for trade. Over the centuries, the flow of wealth through the metropolis generated a cityscape filled with extraordinary buildings.

The Grand Canal had become one of the most remarkable urban thoroughfares in the world, a broad curving passageway lined by imposing warehouse-residences and ornate palazzi. The many parishes and monasteries of the city had built numerous large and splendid churches that were often a distinct blend of Byzantine and Italian medieval architecture. At the heart of the city, where the Grand Canal merged with the deepwater harbor that connected to the sea beyond, the major public plaza of the city was bordered by its most important symbolic buildings.

Like Saint Basil's in Moscow or the Duomo in Florence, the singular form of the Basilica of Saint Mark—inspired by the Christian Roman architecture of Constantinople—is an architectural expression unique to the city and its culture. The basic plan was a Greek cross composed of five squares, over which were constructed five domes perched on spherical pendentives, a structural advance of the Byzantines. And like the great church of Saint Sophia, the interior surfaces of the domes, barrel vaults, and pendentives of Saint Mark were richly adorned with exquisite gold mosaics. Although the original structure took only thirty years to complete, its embellishment required centuries of refinement and additions. The completed building was a dense, sumptuous treasure box embroidered by the site-specific artworks of generations of Venetian artists and the most precious plunder from hundreds of years of foreign conquest.

Immediately adjacent is the Doges' Palace, whose unusual eclectic design integrates Gothic, Arabic, Byzantine, and Renaissance architectural elements. Here, in the ducal residence, the Palace of Justice, and the great hall of the city's legislature, were housed the principal administrative functions of the empire. The first two floors of the structure are wrapped by a Byzantine portico and Gothic loggia of elaborately carved white Istrian stone. The floors above are enclosed by a screen wall with an inlaid geometric pattern of pink and white stone. Arabic crenellations marched along the crest of the facade. Like that of Saint Mark's, the aesthetic elaboration of the Doges' Palace eventually came to reflect centuries of accumulated endeavor by Venice's artists and architects, who filled the interior with masterworks of furniture, painting, and sculpture.

In parallel with the other city-states of Italy, a heightened civic self-consciousness had evolved in the metropolis. The majority of the city's adult males participated in public and civic life. All male nobles—who numbered from 1,000 to 2,500 in different eras—were eligible to vote in the Great Council, the Maggior Consiglio. Many non-nobles belonged to guilds or *scuole,* religious fraternities devoted to mutual assistance and public philanthropy. The largest of

these, the Scuole Grandi, of which there were eventually seven, was composed of 500 to 600 prominent upper-class Venetians. Participants in the minor guilds varied from about fifty to seventy-five members, and there were Scuole Piccole for goldsmiths, cabinetmakers, carpenters, builders, stonemasons, clothmakers, spice dealers, rope makers, boatbuilders, vintners, and bakers.

By the eighteenth century, over 400 *scuole* provided aid for widows and orphans, the aged, the destitute, lepers, and former prostitutes; they also supported public health care, promoted education, and sometimes built subsidized housing for the poor. In the eighteenth century, four orphanages dedicated to music—the choirmaster of one of these was Antonio Vivaldi—became famous throughout the Continent, making significant contributions to the development of classical symphonic music. Although the Venetians could be tyrannical in the pursuit of commercial interests abroad, and power and its privileges were enjoyed by an elite minority within the city, civil unrest among the lower classes erupted infrequently. The culture of Venice had evolved to the point where most families had a male member directly involved in the workings of Venetian society.

As the Renaissance widened interest in learning, Venice housed over 125 publishing houses and became the most prominent printing center in Europe. The city's churches, government, *scuole,* and nobility became important patrons of the arts. Throughout Venice extraordinary artistic creations—often integrated into the decorative fabric of interior walls and ceilings—by the Bellinis, Carpaccio, Giorgione, Titian, Bassano, Tintoretto, Veronese, and eventually Tiepolo, Longhi, and Canaletto, adorned palaces, churches, and public buildings. The living city constituted one of the major art collections of the world and, from across Italy, leading intellectuals, architects, artists, and craftsmen were drawn to the islands in the lagoon. The city's inhabitants' pride in the prosperity and social advances of the metropolis fostered the realization that Venice was unique. The splendid physical agglomeration of the city also reflected the power of the republic, the contributions of its citizenry, and the cultural milieu that blossomed in this urban setting. Thus, as the development of perspective drawing and city planning during the Renaissance engendered consideration of the metropolis as an object subject to design, Venice looked at itself and, with its extensive wealth, began to add a number of carefully orchestrated architectural effects that would transform its built environment into an artistic construction.

Due in part to the laborious efforts required to build in the estuary, the medieval city was highly compressed, with structures crowded close together. Because most buildings were low, the cityscape took the form of a homogeneous horizontal aggregation of cellular clusters. From within the maze of its pedestrian pathways, facades were seen partially or at extreme angles. Only

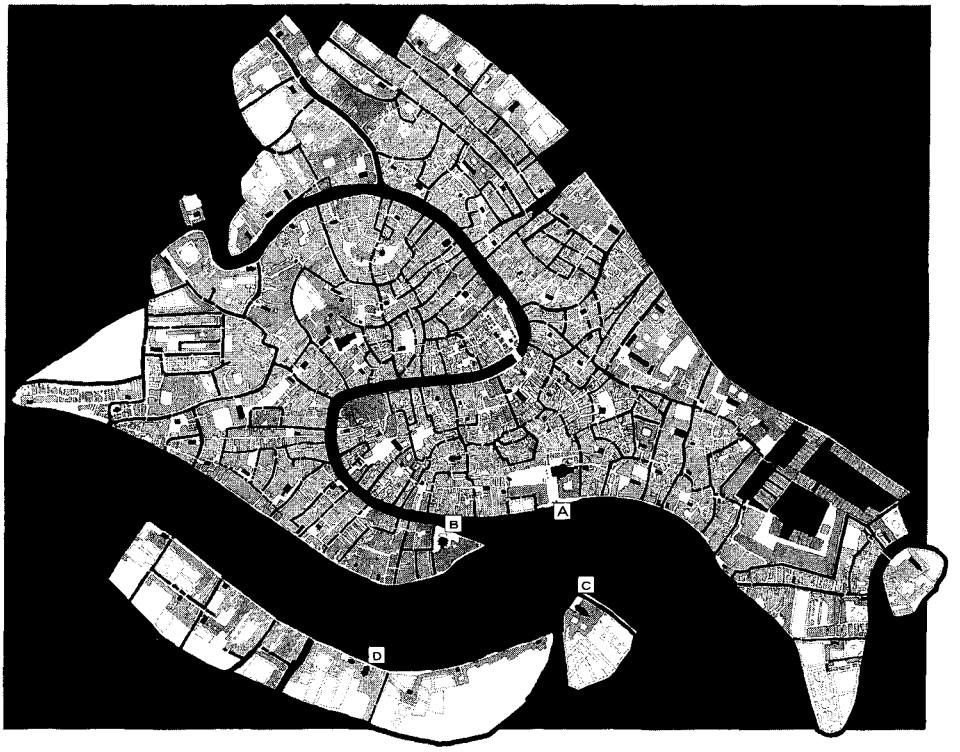
across the periodic open spaces of its campos or along its broader waterways could architecture be seen from afar and whole designs be appreciated.

In contrast, the major buildings of the Renaissance were designed as the culmination of dramatic vistas or as the sculptural climax of the city's urban massing. The fact that the new architecture constituted a radical aesthetic departure from the medieval fabric of the existing city heightened the effect of creating a visual counterpoint. The colors of the Gothic city were predominantly earthen hues of orange, brown, and ochre. The same clay from which bricks were made was often used for roof tiles, and the stucco that covered many facades was routinely mixed with dust from the bricks to color it. The tints of the medieval city, literally, came from the same earth. Against this palette, the classical white stone facades of Renaissance buildings were a blaze of light, and the organic rhythms of the Venetian city were punctuated with the distinctive bright notes of the new architectural aesthetic.

As classically designed churches and *scuole* (most *scuole* had their own building, symbols of their piety and good works, sometimes of grandiose design) rose in prominent places in numerous campos, the city became a place of visual surprise. During the Renaissance, architects came to be valued as artist-intellectuals. As a result, the new buildings, responding to the eccentric angles and massing of the city, embodied a heightened degree of compositional invention. Around a blind corner the mass of the city would unexpectedly open up and white Renaissance structures would come into view, conspicuous and in sharp contrast to the vernacular medieval context.

The decisive transformation would occur at the center of the city, in the piazza and piazzetta of San Marco and the Doges' Palace. The basin of San Marco was the geographic location in the configuration of Venice where several islands were separated by wide expanses of water. (The distances between islands ranged from a quarter-mile to a mile.) Looking out across the basin from the center, one saw an urban panorama of water, ships, and islands. Looking back toward Saint Mark's, one saw the formal entrance to the heart of Venice.

Over a period of about two hundred years, from the late fifteenth century to the late seventeenth century, some of Italy's greatest architects designed masterworks that captured both ends of these vistas. On the outward islands opposite Saint Mark's, three major buildings—beacons of elevated architectural conception—punctuated the horizon: the churches of San Giorgio Maggiore and the Redentore (the Redeemer), both by Palladio, and the church of Santa Maria della Salute by Baldassare Longhena. Large and arresting, the great churches spoke of the wealth, reverence, and enlightened patronage of the city-state. The eye was riveted by the sophistication and majesty of their proportions. Next to Santa Maria della Salute, the government erected a Customs House whose design united with the sculptural shapes of the church



The canals, islands, and churches of Venice • When canals and other water bodies are drawn in black, the urban structure of the settlement becomes evident. Initially each island was a parish unto itself, with a church facing a central campo with a cistern and well (religious buildings—churches, monasteries, and *scuole*—are shown as small black shapes). As Venice prospered and grew, its cityscape became more densely compacted and varied in its organization. During the Renaissance, the settlement's organic medieval order was embellished by long orchestrated architectural vistas—not cut through the urban fabric as in Paris, but seen across bodies of water. (For greater detail see illustration, page 219.) A: The Piazza, Piazzetta, and Church of Saint Mark's. B: Church of Maria della Salute. C: Church of San Giorgio Maggiore. D: Church of the Redentore.

to dramatically terminate the architectural massing of the island of Zattere. The combined effect of these important monumental constructions transformed the city into a stage set for its own pageantry.

At the heart of Venice was created one of the most subtle and compelling public spaces in urban history. For several centuries an eccentrically configured L-shaped plaza had existed in front of Saint Mark's (the Piazza San Marco) and along the side of the Doges' Palace (the Piazzetta San Marco) facing out to the Grand Canal and the harbor. A large and beautiful campanile had been built where these two plazas merged. This was by far the tallest structure in the city, marking the central significance of the plazas to the ceremonial and

public life of the metropolis. (Its striking design would influence the shape of urban towers throughout history.) The lines of the piazza and piazzetta were not precisely parallel or perpendicular; nor were the major structures geometrically centered. The arrangement was organic, having developed in response to both the geomorphic lines of the city's canals and a medieval architectural conception of space.

But during the Renaissance, the piazza and piazzetta were rationalized through the construction of classically inspired structures along the perimeter of the plaza—except to the east, where the church and palace were situated. Although the new structures were actually separate buildings, they all adopted a similar architectural approach: the new walls of the plaza were knit into a continuous horizontal perimeter of repetitive bays in white Istrian stone, with arched openings, rows of equidistant columns, and an open arcade along the ground floor. A simple shift in plan was also accomplished. The piazza and piazzetta were both widened so that the campanile stood apart as an independent structure and the facade of San Marco was situated more on center to the piazza. A mysterious but powerful contrast had been achieved. For centuries afterward, visitors from around the world would be seduced by the unquantifiable magic of the space. The irregular angles of the organic city had been reconciled with the rationalized Renaissance stage set, and the intersection of the several different architectural traditions of the cosmopolitan city, accrued over the centuries of the city's life, were brought together in a potent artistic totality. Standing at the juncture of the piazza and piazzetta, in the shadow of the golden facade of San Marco, with the distant image of San Giorgio Maggiore suspended above the lagoon, one could see the evidence of an uncommon moment of cultural achievement in the history of cities and civilizations.

THE CITY IMPERILED BY WATER

By the end of the sixteenth century, Vasco da Gama had encircled Africa, Magellan had sailed around the tip of South America, and Sir Francis Drake had circumnavigated the globe—establishing new routes to the trade of Asia. Maritime dominance began to shift to such Atlantic seafaring nations as Portugal, Spain, Holland, and Great Britain. The seeds of Venice's decline had been sown, but it would take centuries to deplete the city's extensive wealth and wide holdings.

In 1797, after a thousand years of continuous self-government and many decades of economic stagnation, Napoleon terminated the republic. Under the French, the Austrians, the kingdom of Italy (through World War I and a worldwide depression), and the Fascists (before and during World War II), and then as

subject to the complex and overly bureaucratic administrative apparatus of the modern nation of Italy (which between 1949 and 1974 had thirty-six parliamentary governments), the ability of the city to determine its own destiny and rationally plan its modernization was compromised. The continuous program of dredging the canals and monitoring the lagoon faltered and broke down.

Napoleon closed many of the republic's institutions, as well as numerous churches and monasteries, often abandoning such buildings to decades of neglect. The emperor also had the west side of the Piazza San Marco rebuilt as a more integrated part of the enclosure around the public space, which he is reputed to have called "the finest drawing room in Europe." The French, Austrians, and Italians all endeavored to widen the medieval pedestrian-circulation network by filling in numerous canals. Meanwhile, the economic marginality of both Italy and Venice made it impossible to maintain the city's extensive public and private architectural and artistic holdings. For more than a century, the city was exposed to unchecked deterioration.

In 1850 a causeway was constructed across the lagoon, and the metropolis was linked by train to the rest of industrialized Europe. Venice had long been an important stop on the grand continental tour and the direct railway connection further increased the number of visitors. More hotels were constructed, and tourism gradually became the most vital growth sector of the struggling urban economy. In 1932 an automotive causeway was built adjacent to the train line, but the enormously complex task of creating a circulation system for cars within the historic city was not attempted.

The Gothic city resisted modernization. The expense of building in the lagoon was one reason. Architecturally, the much larger scale of contemporary industrialized development and its corresponding need for modernized urban infrastructure were extremely difficult to reconcile with the delicate and intertwined fabric of the small-scale historic city. As income from tourism increased, the economic motive for conservation became evident, and the city was faced with a vicious circle: Without a revitalized economy, Venice could not afford to maintain its precious body. Tourism in itself would not rejuvenate the city. Yet the introduction of industrialized architecture would mar the beautiful object that visitors traveled from afar to admire.

After World War II, the rapid transformation of modern Italy into a major industrial power expanded the Venetian agglomeration in its mainland boroughs of Mestre and Maghera. The port of Venice was renovated, and deep cuts were made in the bed of the lagoon to accommodate contemporary transoceanic shipping. The expansion of heavy industry also brought higher pollution levels, a rising regional population, and a suburban residential ring. In 1966 the floods came.

Disastrous high tides resulting from torrential storms that inundated northern Italy focused the world's attention on the peril of both Florence and Venice. The national government called for the help of UNESCO. An emergency team of international experts found much more than the damage caused by a fleeting natural disaster: a treasure of civilization was on the verge of extinction. The makeshift modernization and poverty of Venice had brought about a complex and interwoven set of social, economic, environmental, political, and ecological problems. These were being propelled to a crisis by an alarming physical fact: Venice was sinking.

The city whose unique significance had developed from its favorable relationship to an aquatic environment was now being destroyed by the water that surrounded it. Since its creation, the historic city had been slowly descending into the lagoon, due to the pressure its urban constructions exerted on the layer of clay beneath its foundations. Careful examination after the floods revealed that the rate of sinking had drastically escalated in the modern era. UNESCO scientists located the cause.

Deep below the *caranto,* in the geological formation beneath the city, was a pressurized water aquifer. Modern manufacturing in Mestre had been withdrawing large amounts of water from artesian wells, which decreased the internal pressure within the formation. As this geological structure compressed, Venice was being pulled downward. Residential artesian wells among the expanded mainland population added to the problem. Since the edges of the city's islands had been built close to water level in order to facilitate the transfer of goods between ships and warehouses, slight variations in the elevation of the islands had dire consequences, allowing high tides to sweep inland across piazzas and into buildings. Scientists also feared that global warming would intensify the problem.

As the lower portions of buildings became more regularly exposed to the waters of the lagoon, moisture rose upward within masonry walls via capillary action. At the same time, factories were emitting airborne pollutants that coated the exteriors of buildings and turned to acid when wet. Bricks and stonework throughout the city were corroding. Inside buildings, rising moisture was damaging priceless artworks integrated into interior surfaces. Prevalent saltwater had always been a threat to the preservation of the city. Now modern atmospheric pollution and centuries of lack of maintenance quickened the damage (modern pollution, deferred maintenance, and environmental imbalance in a desert similarly constitute an omnipresent attack on the historic buildings of Islamic Cairo). UNESCO's initial study identified over a thousand artworks and hundreds of major and minor historic structures in immediate jeopardy.

Intensified wave action caused by motorboats in the lagoon was accelerating the physical deterioration of stone foundations bordering the canals. Exhaust from residential heating was worsening the air pollution. Droppings from Venice's vast flocks of pigeons contributed to the erosion of stone architectural features. Agricultural pollution was draining into the rivers that emptied into the lagoon. Industrial waste added more contamination to the estuary, as did oil spills from tankers. Many canals had silted up, causing septic systems to malfunction and substantial levels of raw human waste to leak into the lagoon.

During the summer months algae and scum proliferated in the city's narrower canals, due to the increased density of nutrients in the water. This process, known as eutrophication, depleted the canals of the oxygen that supports aquatic life and caused them to fill with decomposing matter. The streets filled with noxious gases during the height of tourist season. Eventually the fumes became so intense that, in extreme conditions, many residents and visitors had to be hospitalized.

Out in the harbor, deepened channels for modern sea traffic had heightened tidal action. This had speeded erosion, and shallow areas in the middle of the lagoon were being swept away. The roots of sea grass growing in these shoals had helped retain the soil; the removal of sea grass though the washing away of shoals further hastened underwater erosion. Meanwhile, large areas of saltwater marshland on the edges of the lagoon had been filled in for industrial purposes. Now toxic industrial and agricultural waste was further attacking the animal and plant life of the natural marshland cycle that cleaned the water. Fish farming was inhibiting the tidal flow that was part of the purification process. As the volume of waste increased, the estuary was becoming less and less effective at processing it. The lagoon was becoming both too deep and too shallow. While the city's canals were choking, the center of the lagoon was evolving into a bay in which waves increased in strength, further jeopardizing the city. Centuries earlier, the features of the natural environment had favored Venice. In the modern era, the human settlement was attacking nature, and nature was attacking back. A negative downward spiral had been activated, and the ecological balance of the city had been lost.

Because these problems were interrelated, they all had to be dealt with. Every one of them either required very expensive solution, such as overhauling the heating systems of the city, or would levy a substantial toll on emerging industries—forcing manufacturers to find new water sources, for example. And extensive action had to be taken without delay or an extraordinary heritage would be lost. But Venice could not generate the astronomical amounts of money that were needed. Nor could the city or the Italian government command the army of scientists and technicians that were required.

As has often happened, the help of UNESCO was indispensable. The marshaling of international aid to save the heritage of humankind may seem a commonplace occurrence in the world we now inhabit, but this is a recent phenomenon. To name but the major operations, between 1960 and 1990, the UNESCO Cultural Heritage Division mounted international campaigns to save the following:

- the monuments of Nubia (Egypt)
- the city of Venice
- the archaeological site of Carthage (Tunisia)
- the temple of Borobodur (Indonesia)
- the archaeological site of Moenjodaro (Pakistan)
- the Acropolis of Athens
- the cultural heritage of Katmandu (Nepal)
- the cultural heritage of Montenegro (Yugoslavia)
- the city of Fez (Morocco)
- the historic buildings of Malta
- the cultural heritage of Sri Lanka
- the historic sites of the island of Goree (Senegal)
- the historic city of Sukhothai (Thailand)
- the city of Hue (Vietnam)
- the ancient cities of Mauritania
- the historic monuments of Istanbul
- the site of Goreme (Turkey)
- the old city of Havana
- the historic cities of Sana'a and Shibam (Yemen)
- the monuments of Paharpur Vihara (Bangladesh)
- the historic sites of Guatemala
- the historic city of San Francisco de Lima (Peru)
- the Jesuit missions of Argentina, Brazil, and Paraguay
- the artistic heritage of Ethiopia
- the historic sites of Haiti

The existence of an institution that constantly amasses the most current technical expertise to alleviate threats to the world's heritage, and that has the political credibility to call for public assistance from many countries, is an invention of the twentieth century. That the people of wealthier nations

contribute to the preservation of cultures foreign to their own marks a major step in the evolution of civilization. The saving of Venice was one of the earliest and has been among the greatest of these campaigns, perhaps because the glory of the city and the tragedy of its loss were so indisputably apparent.

Once UNESCO declared a state of emergency, spontaneous offers of help quickly came from around the world. Thirty-five separate organizations participated in the campaign: they came from Australia, Belgium, Canada, Denmark, France, Germany, Iran, Luxembourg, the Netherlands, Sweden, Switzerland, the United Kingdom, and the United States. Twenty private groups within Italy also collected and channeled contributions to the work.

Galvanizing worldwide public support was crucial to overcoming the single greatest obstacle to the preservation of the city: the administrative perversity of the Italian bureaucracy. The giant governmental machine of the modern Italian nation was legendary for its labyrinthine complexity and for the culture of illegality bred by this lack of transparency. A web of bureaucratic rules concealed the actions of politicians and administrators whose kickbacks and siphoning of public funds have been estimated at $6 billion to $12 billion a year. The public was defrauded and victimized, as were the many dedicated Italian civil servants who were frustrated in their endeavors to make their government productive. Saving Venice would require long-range planning at national and regional levels as well as the enactment of special laws and appropriations, and the coordinated action of numerous branches of government. As a result, the untangling of Italy's bureaucracy was a fundamental and requisite first step.

UNESCO's mobilization of worldwide public opinion demonstrated that the Italian government would be widely condemned if it did not act quickly. Thus, early in the campaign to save the city, an official International Advisory Committee ensured public accountability in Venice, in Italy, and around the world. Eventually UNESCO would also be given the statutory right to participate in pertinent planning bodies. Responsible Italians collaborated with UNESCO in using moral force as a lever to effect prompt action. The process was not perfect, however. Foreign participants often marveled at the degree of interdepartmental wrangling and the intractability of different administrative organs.

A cumbersome process was activated to attempt a heroic task: the complete reconception of the city's environmental structure. A bureaucracy infamous for making simple problems complicated would now be compelled to find sophisticated solutions to a dilemma of infinite complexity. Once the analysis of the puzzle was finished and the needed actions were identified, between 1984 and 1988 more than 2.7 trillion lire (2.2 billion $U.S.) was appropriated at national, regional, provincial, and metropolitan levels. By the campaign's end, miraculous results had been achieved.

As a prominent official in the Italian government put it: "UNESCO has been both our good and our bad conscience. Our good conscience when both the highest institutions and ordinary citizens have engaged in battles that have brought significant victories. Our bad conscience, on the other hand, if we call to mind the delays, the neglect, the broken promises, the violations in the name of consumerism. Our conscience, but not ours alone: any problem or proposal that affects Venice mobilizes public opinion the world over; alliances are formed and decision-making processes become of necessity more transparent, with the involvement of experts, public figures, and the world's press."

As a result of in-depth studies by teams of international and Italian experts, regional planning was instituted to reduce industrial and agricultural air and water pollution at their sources. A prohibition was enacted that stopped industry from drawing water from the artesian system. Aqueducts were constructed to provide new sources of water. Domestic heating plants throughout the city were converted from oil to gas fuel. The citywide infrastructure of septic tanks and sewers was expanded and rehabilitated. Higher standards for the maintenance of historic buildings were mandated. Movable works of art were placed in the controlled climatic environments of museums.

The continuous program of cleaning the canals was reinstituted, and a sophisticated monitoring effort was launched to deal with the complex environmental determinants affecting the modern lagoon. Fish farming and other commercial operations in the estuary were once again controlled by the city. In areas where the lagoon had been filled to create dry ground for industrial uses, channels were cut through the landmasses to reinstate a more natural pattern of tidal flow. More effective saltwater barriers were constructed along the Adriatic coastline. The flow of water from the mainland via rivers was carefully managed. Deepwater shipping was restricted. The shorelines of Venice's islands were refurbished to limit the penetration of normal high tides (*aqua alta*) onto pavements and into the ground floors of buildings.

New environmental programs were activated. The interdependent qualities of the natural ecosystem had been recognized. Marshlands and shallow areas of sea grass were reestablished in the lagoon. Large parts of the estuary were designated as wildlife sanctuaries in order to protect the variety of creatures linked by the natural food chain. As had been first recognized by the city's early inhabitants, "element" was made to oppose "element" and environmental equilibrium was achieved once more. When internal pressure was regained in the aquifer, Venice actually rose.

With this wide expanse of problems attended to, international congresses of conservation specialists were held to determine how best to restore the city's artifacts. Since the environmental conditions of Venice were unique, special techniques had to be developed. Each painting, mural, fresco, sculpture,

mosaic, and architectural detail had to be treated with meticulous care: these artifacts were priceless, irreplaceable, and often frail. Specialized workshops, schools, and laboratories with the most sophisticated equipment were set up. The artistic wealth of the city represented the accumulated endeavors, across many centuries, of numerous artists, architects, and craftsmen. In the same way, the threatened physical material of the modern city would be saved by the accumulated endeavors, across millions of hours, of a legion of dedicated conservators.

By 1992 foreign cash donations for the restoration of art and architecture totaled around $16 million. About $64 million was directly spent on the conservation of art and architecture by the Italian government. Over 80 monuments and more than 800 works of art were saved by the international committees, yet the greater significance of international participation was much more than monetary. The science, techniques, and standards established as groups from around the world adopted Venetian monuments and lovingly restored them, were a model for how to proceed. They were also a manifestation of the belief that the culture of Venice was the culture of all humankind.

THE THREAT OF TOURISM

From the beginning of the international campaign, a long-range problem occupied the mind of everyone involved. The most egregious conditions of deterioration could be stabilized; negative environmental conditions could be reversed. But a careful program of ongoing maintenance was necessary if the historic cityscape was to be preserved for generations to come. Venice had to be able to maintain itself. And here was the dilemma. The most viable economy of the modern metropolis, the economy of tourism, was making Venice unlivable for residents. Who would maintain the city if no one lived in it?

An astonishingly complex maintenance effort was needed, requiring close coordination between the municipal government and building owners. Deferred maintenance was endangering virtually every building in the city, and would continue to do so for as long as Venice was subject to salt, water, and waves. Since rising dampness and the decay in foundations and lower stories was the principal problem, the upkeep of buildings was tied to the continuous cycle of maintaining the canals. As parts of the city were isolated by temporary dams and canals were drained for dredging, it was possible to rehabilitate foundations. At that moment, several important operations could be performed: Damaged piles could be restored. New stone or masonry could be inserted in areas of extreme decay that were normally below water level. Shifting foundations and sections of uneven settlement could be corrected. And once a building's substructure was stabilized, damage due to uneven

sinking could be rectified in upper stories. As a preventive measure, an impermeable sill of silicone could be implanted into and all the way around a building's base, to block the rising of dampness in walls. This was difficult and costly but highly effective. Afterward, plaster could be removed from masonry walls for the first three feet above the protective sill (the zone of highest exposure to saltwater infiltration), allowing the structure to breathe and dry out. And while the canals were drained, corrections to septic tanks and sewage systems could be introduced.

Since most of the buildings in the historic city had at least one elevation facing a canal, and because it was otherwise costly to isolate a single building for repairs to its foundation, timing a building's rehabilitation to coincide with the draining of canals was an important cost-saving economy. Under the republic, a single cycle of dredging the lagoons had taken twenty years. It was the hope of the modern municipality that the contemporary cycle could be achieved in eight to nine years. The city would pay for canal maintenance, but the owners of buildings were responsible for the costs of building conservation and upkeep. Yet even when this complex program of repairs was achieved, across Venice further severe injury to buildings was nonetheless accumulating because of a lack of normal residential building maintenance.

For many years, numerous buildings had been neglected. Because the structures of the historic city had been engineered to be highly flexible and light in weight, and to resist uneven settlement, Venetian buildings could sustain substantial damage without failing. Rarely had these buildings collapsed, even from the tremors of earthquakes, and Venetians well understood that their buildings could tolerate much abuse. After the campaign to rectify the major environmental problems, however, numerous small injuries to structures had been left unfixed throughout the city, and major damage either had already occurred or was in progress. Substantial parts of the city were on their way to falling apart. The magnitude of deferred maintenance was astronomical and rising.

Why was Venice not being maintained? The answer was not simply a matter of money.

Cities cannot be sustained if they do not have a constituency to support the quality of life. The environment of the city is complex and dependent on many circumstances that are constantly changing and acting simultaneously. Ultimately, life in a city is too complicated to be objectively defined or engineered: it has to be experienced holistically. When people live in a city and experience its quality of life day and night, across seasons, years, and decades, the populace makes the urban environment a fit place in which to exist. When a city is inhabited, its residents have a stake in the character of the urban continuum.

In Venice, tourism was attacking many of the qualities that make a city habitable, and residents were being pushed out. So many people fled that soon there would not be enough inhabitants to protect many of the pleasant details of life in the city. The widespread failure to maintain buildings was a reflection of this social phenomenon. The historic city was not being repaired because too few Venetians actually lived in Venice and were subject to its conditions.

For decades the city's residential population had been decreasing—from 178,000 in 1945, to 145,000 in 1960, to 92,000 in 1981. Because there was little space in which to erect new buildings in the historic center, most contemporary public housing was constructed on the nearby islands of Guidecca and Murano and in mainland areas such as Mestre. By 1995, about 70,000 people lived on the islands of historic Venice, as compared to 300,000 people living in other areas of the municipality. Venetians living in Venice no longer constituted a voting majority in their city government.

Like the interconnected problems of the lagoon's ecology, the reasons for the decline in residential population were many and interrelated. Because of Venice's long economic stagnation, the quality of housing in much of the historic city was poor. In 1975, of the 39,400 residential buildings in the city, some 12,400, or 31 percent, urgently required repairs. Especially on ground-level floors, the increasingly high tides escalated the amount of rising damp and heightened the degree of discomfort within dwellings until 15.5 percent of dwellings suffered from extreme dampness. As residents began to compare their lot to that of residents in more modern housing, the lack of daylight resulting from the city's closely packed buildings came to be considered a liability (13.5 percent of the city's apartments needed electric lighting in nearly every room for many hours of the day).

The success and volume of tourism in proportion to the size of the city raised the value of real estate so that only the wealthy and the subsidized poor could afford to live in historic Venice. By 1995 some 7 million tourists a year, or about 20,000 visitors a day, came to the city. The nonsubsidized middle class was being squeezed out by the higher property prices and rents paid by hotels, restaurants, gift shops, and other stores that catered to visitors. In addition, as a greater percentage of career opportunities were located outside the historic center through the construction of industrial complexes in mainland areas, hard-pressed middle-class families moved to cheaper but more modern housing situated closer to their workplaces.

With fewer and fewer families living in the city center, the demand lessened for shops providing groceries, hardware, housewares, dry cleaning, and toiletries, and the income of such businesses declined, making it difficult for them to compete with the rising real estate prices produced by tourism. A vicious circle was created. As the businesses that catered to residential needs

decreased, the quality of life for residents grew worse. More residents left. More shops serving residents closed. Soon, in many neighborhoods, schools closed, and children had to travel farther across the city to go to class and to find friends to play with. More people moved, and residential amenities declined further.

Many of those who still lived in the city were elderly with fixed incomes. As real estate prices rose, they couldn't afford to stay in their apartments. The municipal authorities banned evictions, endeavoring to protect the poor and elderly living in private rental dwellings. As a result, the owners of such buildings were unable to benefit from rising property values by either leasing at higher prices or selling. The economic incentive to rehabilitate such restricted properties was lost. A black market in housing developed. Students from the two universities in Venice were willing to rent without a lease, and about 10,000 apartments were occupied illegally. In other cases, landlords sought tenants who were not residents of Venice and therefore not protected by the city's ban on evictions. Currently, authorities estimate that 70 percent of the available private rental housing of the city is occupied by nonresidents. Many of the city's wealthier real estate owners used their lodgings part-time, or simply bought properties as investments and purposely kept them vacant. By 1995 about 14 percent of the dwellings in the central city were unoccupied, and 75 percent of these were being warehoused until real estate prices rose higher.

At the height of the tourist season, visitors to Venice sometimes outnumbered the inhabitants (as many as 100,000 tourists, as compared to 70,000 permanent residents). Tourists jammed the city's vaporettos, clogged its alleyways, and filled its restaurants. Many Venetians working in the city were inconvenienced. A substantial percentage of inhabitants could not afford the entertainment that foreigners enjoyed.

Meanwhile, with the end of the campaign and the resolution of the immediate threats to Venice, the habitual byzantine machinations of the bureaucracy commenced once again. Major amounts of the funds allocated for the conservation of historic properties and their conversion to modern subsidized housing are not being released. A system of much-needed dikes to protect the lagoon from the higher tides due to global warming and the greenhouse effect is not being constructed, after years of careful research and successful testing.

That governments left to their own devices can become counterproductive is not unusual. But how can a municipal government be pushed to act responsibly, when there are no constituents to pressure it? The current administration continues to be subject to undue influence from the tourist lobby and from those who benefit from the existing conditions. Today the UNESCO Liaison Office for the Safeguarding of Venice continues to coordinate the twenty-four member bodies that are still striving to conserve the city's cultural

treasures. Yet the volume of necessary work far exceeds the goodwill of people from abroad.

The inhabitants of the great city at the center of a vast empire were once proud to identify themselves as Venetians. They were Venice, and Venice was they. Until the modern governments of Italy and Venice direct their wholehearted energies to increasing the number of Venetians who live in the historic city, it will not be truly saved. But when Venetians once again have an immediate stake in the character of the historic urban environment, at all times of night and day, during every season, over decades, then the innumerable positive acts that inhabitants devise to make a city livable will be unleashed. Only the same degree of creativity that produced Venice can save it, and no city can be saved unless it is loved. It can be cherished from afar and helped from afar, but it can be preserved only by people who love it from inside.