

SAN FRANCISCO'S TREASURE ISLAND

URBAN AND TANU SANKALIA REINVENTIONS

LYNNE HORIUCHI And Tanu Sankalia

EDITED BY

This publication is made possible in part by the University of San Francisco, College of Arts and Sciences, Faculty Development Fund.

© 2017 University of Hawai'i Press All rights reserved

Printed in the United States of America

22 21 20 19 18 17 6 5 4 3 2 1

Library of Congress Cataloging-in-Publication Data

Names: Horiuchi, Lynne, editor. | Sankalia, Tanu, editor. Title: Urban reinventions : San Francisco's Treasure Island / edited by

Lynne Horiuchi and Tanu Sankalia. Description: Honolulu : University of Hawai'i Press, [2017] | Includes index. Identifiers: LCCN 2016058320 | ISBN 9780824866020 (cloth ; alk. paper) Subjects: LCSH: Treasure Island (San Francisco, Calif.)—History. Classification: LCC F869.S36 U73 2017 | DDC 979.4/61—dc23 LC record available at https://lccn.loc.gov/2016058320

University of Hawai'i Press books are printed on acid-free paper and meet the guidelines for permanence and durability of the Council on Library Resources.

Designed by Nord Compo

Jacket photo: View of San Francisco Bay, Treasure Island, and San Francisco from the Berkeley Hills. Courtesy of Sudhish Mohindroo.

3. How to Celebrate a Bridge

ANDREW M. SHANKEN

Treasure Island, that artificial island built on the shoals of Yerba Buena Island. is now a minor curiosity of windswept fields, aging housing, and an odd hodgepodge of postmilitary institutions. But in its day it ranked among the visionary projects that aimed to transform San Francisco into a metropolitan area that could compete with Los Angeles. The largest human-made island in the world when it was completed, it took its place among the most ambitious public works projects in the nation. In the mid-1930s, the San Francisco-Oakland Bay Bridge (1933-1936), or SFOBB, and the Golden Gate Bridge (1933-1937) tied Marin and the East Bay to San Francisco by car. These spans created a coherent region out of a disjointed geography just as regionalism became a cause célèbre among planners and New Deal writers and artists. The Golden Gate Bridge was the longest suspension bridge of its time, the SFOBB the longest span of any kind. They joined the San Francisco Bay Toll Bridge (now the San Mateo Bridge), which had been the world's longest span when it was completed in 1929. The tens of thousands of boats that crossed the bay each day were gradually replaced by hundreds of thousands of cars, and trains that ran on the lower deck of the SFOBB. The Caldecott Tunnel (1937) extended the reach of commerce and commuters, allowing traffic to bypass the inner East Bay for the towns and more spacious suburbs east of the hills.

Treasure Island was of a piece with these extraordinary Depression-era public works projects—and part of what Roger Lotchin has called the "Tournament of Cities," an intermetropolitan competition for control of resources and trade on the West Coast (1997, 365). Such visionary projects were often born of insecurity in an era when cities proposed momentous, sometimes radical, and even economically destabilizing interventions as a way of spurring growth and upstaging rival cities. San Francisco overcompensated for its waning economic status with outsized visionary projects. In other words, the city's attitudes about the nature of urban land and its transformation were part of a larger regional dynamic of business, governance, and infrastructure that varied throughout the West. In this context, an island exposition-cum-airport was both extraordinary and normative. San Francisco repeatedly "doubled down" on grand infrastructural projects. It is a legacy still visible today, both in the built environment and in the city's willingness to stake its future on large gambits.

A Golden Gate Air Terminal

The origins of the island reach back to 1929, when the idea of filling in the shoals for an airport first took hold. Even then it had become obvious that San Francisco lacked the sort of airport that would help the city realize its ambition to be the center of trade on the West Coast. Although blessed with a large deepwater port and soon to be laced with bridges and tunnels that would give it room to grow, the city had few suitable sites for airports. Mills Field, on the site of the present airport south of the city, had opened in 1927 as a temporary site until a permanent one was located. Relatively far from downtown by the standards of the day, it had little room for growth without encroaching on privately held land or expensive reclamation projects.

The quandary over the airport was especially poignant in San Francisco, whose business community was obsessed with aeronautics as a way of extending its far-flung economic ties. Convinced that air traffic would supplant shipping, business leaders angled for a state-of-the-art airport in order to control Pacific trade. Beginning in 1927, articles and images of airplanes filled the pages of *Pacific Commerce* and *San Francisco Business*, the magazine of the Chamber of Commerce (Figure 3.1). Images like this were overtly anticipatory: the two great bridge projects, still years from completion, are both drawn in. Yet where would the planes land in this future metropolis? Oakland, Alameda, or the Army's Crissy Field? Tellingly, the plane's right wing blocks out the site of Mills Field.

The image was a forecast and an indictment. From the outset, Mills Field was beset with troubles. The Airport Committee of the San Francisco Board of Supervisors, who supported the site, admitted that it was "held up to ridicule and contempt" (Airport Committee 1931, 25). In 1928 it lost Western Air Express and Maddux Air Lines to Oakland, two of the major regional carriers, a significant blow in an era of intra-bay competition. The same year a \$1 million bond issue failed in a public referendum, leaving the city short of the funding it needed to bring the field up to date. (Voters rejected the airport even as they supported the bridges and tunnels.) Making matters worse, in 1929 Charles Lindbergh crashed on take-off because his plane, the largest one in the world, sank into a soft spot on the runway (Airport Committee 1931, 25). The newspapers pilloried the city (San Francisco Chronicle 1929b, 22). When Lindbergh's wheels got stuck, the San Francisco Chronicle editorialized: "What did he do? He sent his passengers over to Oakland in a smaller plane." A tractor pulled his plane out of the mud, then he flew to Oakland, picked up his passengers, and flew from there (1929a).

In a moment of explosive growth in air travel, while dozens of airports were being built across California, San Francisco muddled about. Oakland had just finished a modern airport, located just minutes from its downtown, with speedboat service to San Francisco. In March 1929, nearby Alameda inaugurated a small municipal airport and in August of the same year the San Francisco Bay Airdrome, a privately



;

FIGURE 3.1 Cover of San Francisco Business 14 (March 9, 1927), 9.

run company that competed with Oakland's municipal airport, also opened in Alameda—it cleverly appropriated the name San Francisco even though it was on the other side of the bay. These three airports had absorbed "practically all of the air traffic that [was] aiming for San Francisco" (Baldwin 1932, 20). By 1932, all commercial carriers in the Bay Area used East Bay airports. The *Chronicle* tried to embarrass the city into action: "The Boeing airmail transport tried to use Mills Field in the beginning. So did other big air companies. One by one they have given up and moved on. . . . Traffic is forced away . . . because the field is well, ask Lindbergh. He knows" (1929b).

The Lindbergh debacle reinforced what was long in coming. In 1925, the US government had begun contracting with private carriers to deliver airmail, greatly expanding the demand for landing fields. The Air Commerce Act of 1926 led to a flurry of reports, scholarly and architectural studies, and municipal attempts to figure out exactly where airport planning fit amid park systems, infrastructure and transportation, and city planning (Goodrich 1928; Nolan 1928; Bednarek 2005). Lindbergh's flight across the Atlantic in 1927 awakened interest in aviation and inspired "cities across the country to plunge into the business of building airports" (Bednarek 2005, 351). Many of the most successful commercial airlines were founded in the wake of his flight, including Pan-Am and TWA in 1928, Delta in 1929, and American Airlines in 1930, as well as scores of now obscure regional carriers.

By the end of the decade, airports were far more than business propositions or technical achievements. They had become a cultural phenomenon and a symbol of the age. Architects, planners, landscape architects, and engineers took up airport design. The Beaux-Arts Institute's annual competition in 1927 for the design of "an Air Transport Terminal" was part of an attempt to advance the cause of the Beaux-Arts into modern life. In 1929, both *Architectural Forum* (December) and the California-based *Architect and Engineer* (November) devoted entire issues to airport design, and in 1930 the Lehigh Portland Cement Company sponsored a national competition for the design of airports (*Bulletin of the Beaux-Arts Institute* 1928, 5–13). The plane held out hope for an economic recovery and thus became a symbol of relief from the Depression.

In San Francisco, the Junior Chamber of Commerce took up the issue. Formed only in 1927, by late 1931 its Aeronautics Committee began to press the idea for an airport on the "wastelands" north of Yerba Buena Island. They invited military, civic, state, and bridge officials, aeronautics experts, Mayor Angelo Rossi, congressional representatives, and more than fifty city, state, and commercial leaders to discuss the idea with a formidable group of experts who they had assembled (*San Francisco Chronicle* 1931, 16). Architect Mario F. Corbett, who would later become well known for his modernist houses, prepared maps; engineer Lochiel M. King provided estimates on filling the shoals; and engineer B. G. Hindes proposed a layout for the airport that roughly corresponded to the shape the island would eventually take. By May 1932, they had settled



FIGURE 3.2 Map of proposed airport near China Basin. Charles Hobart Baldwin, "Proposed Airport of San Francisco," *Architect and Engineer* 103, no. 2 (November 1930); 52.

on the site and strategically lined up the most important local authorities to appeal to Mayor Rossi, including B. M. Doolin, the superintendent of Mills Field, and E. G. Cahill, the manager of San Francisco Public Utilities Commission (*San Francisco Chronicle* 1932, 17). The Junior Chamber of Commerce endorsed the project as a way of "solidifying San Francisco's paramount position as the focal point for every air line operating in the Pacific Empire" (San Francisco Airport Museum 1932).

Charles Hobart Baldwin, a member of the Junior Chamber of Commerce, laid out the stakes. San Francisco's "mercantile preeminence," he wrote, "is in danger of being transferred to rival cities across the Bay" (1932, 4). Baldwin, who was both an aviator and had architectural training, reviewed the exhaustive search for suitable sites, including McLaren Park, Marina Park, Twin Peaks Mesa, the Marina, China Basin, State Islais, Bernal Heights, Hunters Point, the shoals of Goat Island (later renamed Yerba Buena Island), as well as sites in San Mateo, Millbrae, and Bay Farm Island. These competed with proposals to build great platforms over piers and train sheds (Dohrmann 1927, 22–23). Most of these sites were dismissed because they lacked sufficient land, were too crowded, or presented insurmountable technical challenges. Baldwin urged the abandonment of Mills Field, which by 1932 hosted no commercial flights.

Baldwin had been agitating about the airport for several years. Two years before, in an article for the *Architect and Engineer*, he presented a map that made clear just how remote the South San Francisco site was to the city (1930, 52–60) (Figure 3.2). At the time, he favored a site near China Basin, but by 1932 his vision had evolved. In place of Mills Field, he proposed a "system of airports" unlike existed anywhere in the country, which would turn San Francisco into "the aviation center of the entire Pacific Coast" (1932, 19). The various airports would serve different functions and parts of the city and region. To the north, a small airport on the Marina would cater to private flyers, and the top of Hunters Point would be leveled to serve the south parts of San Francisco. It was a solution born of the logic of zoning.

Meanwhile, Baldwin and the Junior Chamber of Commerce took up Major Harvey S. Burwell's idea to fill in the Yerba Buena shoals for "a unified terminal for commercial air lines serving the Bay district" (Baldwin 1930, 59). In fact, Burwell's idea was simultaneously narrower and more ambitious. He called for a naval air base on the shoals site as part of a regional approach to air transit that would cut through competition between Bay Area cities. He imagined a "central base terminal" within minutes of the "center of business," with "suburban ports" arrayed throughout the bay (San Francisco Chronicle 1929c, 11). Burwell, an aviator who served as the commanding officer of the air corps unit of the ROTC of the University of California, Berkeley, was among the earliest proponents of a system of airports. Henry V. Hubbard, a national figure in city planning based at Harvard University, argued for a "regional system of airports" in 1930 (Hubbard, McClintock, and Williams 1930, 20–36). The same year, the US Department of Commerce came out in support of the same idea, categorizing airports into three distinct types: smaller airports for private aviators; service airports for shipping, mail, and similar business activities; and terminal airports that took most of the commercial air traffic of a city (1930, 2). The Commerce report matches Baldwin's vision: he was applying national ideas to the local situation in San Francisco.

An airport on the shoals could only work, of course, after the city had chosen the Bay Bridge route over Goat Island (now Yerba Buena Island). Congress approved the bridge site in February 1931, and within a year the San Francisco Board of

FIGURE 3.3 Proposed airport site, December 1932. San Francisco Public Utilities Commission. Donald D. Larson Collection on International Expositions, Special Collections, Fresno State University.

Supervisors voted unanimously to support the proposal for a mid-bay "Golden Gate Air Terminal." City officials hoped that the future airport could be incorporated into the construction of the bridge. By May 1932, officials had begun to sketch out a vision for the island. That December, the San Francisco Public Utilities Commission roughed out its plan for a rectangular shaped island, which shows that the key municipal players were committed to the site long before it had been officially sanctioned (Figure 3.3). Separated from Yerba Buena Island by a channel, and lacking the causeway and bridge that would connect it to both sides of the bay, the new island was little more than a sounding, as the depth marks suggest, yet in outline it anticipated the basic shape and dimensions. As the bridge moved forward, the supervisors commissioned engineering studies from Charles H. Purcell, chief engineer for the SFOBB, for traffic connections to the proposed airport (Board of Supervisors, 1933, 215). A host of civic groups threw their weight behind the idea, and Rossi soon appealed to the state to cede the land to the city and county of San Francisco. The most important were the Columbus Civic Club, Haight-Ashbury Improvement Association, Property Owners' Association of North Beach, Eureka Valley Promotion Association, and the California Court (San Francisco Chronicle 1932c, 17). The support compelled Governor James Rolph, San Francisco's previous mayor, to grant 720 acres of submerged land to the city in June 1933.

From Airport to Fair

Within a month, the idea for hosting an exposition as a bridge celebration on the shoals site had been proposed and published in the newspapers (*San Francisco Chronicle* 1933, 5). The airport and fair converged. Local interests battled for two years before the site was officially chosen, but the airport and exposition had been linked in the popular imagination in a way that made it seem like a foregone conclusion. Yet the San Francisco Board of Supervisors was divided (*San Francisco News* 1934). The Advisory Planning Committee for the Bridge Celebration, as the exposition was first known, was formed at the beginning of 1934. In February, the committee came out in favor of the shoals, in part because it minimized the "risk of sectional antagonism . . . [and] community jealousies" in the Bay Area (Advisory Planning Committee 1934, 4). The site, moreover, had the advantage of being directly connected with the bridges—the object of the celebration and the means by which many people would get to the fair (4).

One month later, Mayor Rossi authorized architects W. P. Day and George Kelham to study potential sites for the fair. Day was an experienced establishment architect and engineer. As superintendent of building permits in San Francisco, he had designed several landmark buildings, including the Mark Hopkins and Sir Francis Drake Hotels, the Chronicle Building, and the cathedral, and in Sacramento the state library and courts building. Day had the technical skill to test the site himself and the design background to project how the fair might look. Kelham was a versatile traditionalist who could move freely between the Beaux-Arts classicism of his training and Art Deco. He had been supervising architect for the 1915 exposition, as well as for the UC Berkeley campus, and designed the San Francisco Public Library and the Federal Reserve Bank. They were among the elite and enterprising architects who had rebuilt San Francisco after the earthquake and fire of 1906. Day would go on to be the director of the Department of Works for the Golden Gate International Exposition (GGIE), and its vice president. Kelham would head the Architectural Commission until his death in 1936. Along with their colleague Arthur Brown Jr., most of the architectural cadre that would design the fair was in place from its inception.

Time was short and events moved quickly in 1934 and 1935. In May 1934, Day and Kelham published a proposal for the fair in the *San Francisco Chronicle*. It showed the characteristic rectangular island with its corners chamfered off and filled with a thick poché of Beaux-Arts palaces and courts sheltering the fair against westerly winds—the fair in embryo (*San Francisco Chronicle* 1934, 11). In July, they released their official report, which argued compellingly for the artificial island and dismissed all other sites (Day and Kelham 1934). Urban infrastructure was of paramount importance: the island's eventual use as an airport made it especially desirable. The rest of the report set down in detail a surprisingly complete description of the plan of the fair, including plans for

SHANKEN

dredging and filling, fog calculations, how to bring water to the artificial island, and other technical details. Empirical data and expert opinion were thus added to the emerging preference for the shoals site (Day and Kelham 1934, 2–3). Day had the gravitas as an architect and administrator, and the technical chops as an engineer, to have his findings taken seriously (*Architect and Engineer* 1938, 38). The also-rans had little chance.

Day and Kelham quickly worked out the main aspects of what would become the Key Plan: "The palaces are grouped around a central tower . . . with intervening courts of great width." The tower would be "of commanding height," with the buildings to the southwest built "high enough to act as barriers to the wind, enabling the entire area, with the exception of the auto parking space, to be in the lee" (*Architect and Engineer* 1938, 15–16). Modifications would be made, but here was the kernel of the plan before the exposition had been approved, the site chosen, or an official administrative body sanctioned by the city to create the fair (Bottorff, n.d., 31). Arthur Brown Jr., acting in his double role as a city supervisor in San Francisco and an architect of international repute, exerted his influence. He helped orchestrate a set of studies that made the alternative sites seem expensive or impractical (Board of Supervisors 1935, 399, 1099–1100). Although many details remained, the project had the feeling of a fait accompli.

In April 1935, city leaders delivered an ultimatum: "If use of the shoals is refused it is safe to say there will be no exposition—unless the Board of Supervisors themselves promote and finance one" (Board of Supervisors 1935, 399, 437). The matter was put to a public referendum in May 1935—the same public that had rejected the expansion of Mills Field. San Franciscans came to the polls in a "record-breaking turnout" and the shoals site passed with a resounding majority (*San Francisco News* 1935).

Brown, in his role as supervisor, quickly motioned to appoint the Exposition Company, which already employed him as architect, to plan and conduct the fair on the shoals (Board of Supervisors 1935, 475, 1513). Day was immediately appointed director of the works; soon after Kelham became chief of architecture. The first dated sketch of the fair was made on July 8, 1935, days before the Exposition Company was made official. It was by Arthur Brown Jr., who was already tinkering extensively with the plan.

Artificial Islands

How did a group of conventional architects and civic leaders come to support and even obsess over a visionary plan to build an island in the bay for an airport and exposition? What appears at first blush to be an outlandish scheme was in fact a common way of thinking about land, airports, and municipal infrastructure. Much of the coastline of the San Francisco Bay had been reclaimed using the same methods needed to create Treasure Island. The marina was built on the tidal flats, marshes, and dunes that were "improved" for the 1915 exposition. With a number of holdovers from the earlier fair in charge of the GGIE, it is not surprising that they would again link civic improvement and reclamation to the exposition. The great bridge projects made dredging and filling a part of every-day life in the Bay Area.

Cities, moreover, had used fairs as pretexts to improve infrastructure and as a form of civic improvement. Most recently, the 1933–1934 Century of Progress Fair in Chicago—one of San Francisco's models—took place on Northerly Island, an artificial island built in the early 1920s that realized part of Daniel Burnham's Chicago Plan of 1909. Even before the island was finished, a plan to locate Chicago's airport there was widely approved by the business community, Mayor William Hale, and the Chicago South Park Commission.

Throughout the period, airports were proposed on reclaimed shoreline, including San Francisco's airport, which was extended into the bay from the original site of Mills Field. In fact, the shallows there were being dredged and filled using Works Progress Administration (WPA) funding at the same time that Treasure Island was being built. Experts favored shoreline sites because they were free of obstructions and open to easy expansion (Hubbard, McClintock, and Williams 1930, 22). In the late 1920s, San Diego and Portland both built airports on sites reclaimed from water, the latter by tripling the size of tiny Swan Island, which sat in the Willamette River, and connecting it to the mainland via a causeway, as would happen later at Treasure Island. The Chamber of Commerce knew this project well. In 1927, D. R. Lane, one of its members, flew the western airmail route and wrote a series of articles about the airports he saw for San Francisco Business. He found Portland's airport "most striking," in part because its financial situation resembled that of San Francisco, but Lane was especially enamored of the creative and spectacular reclamation of land so near the downtown (Lane 1927).

Other cities had used similar strategies. In Los Angeles, San Francisco's main competition for control of air-based commerce, Allen Field began operating as a civilian airport in 1927 on Terminal Island, an artificially enlarged island that had originally hosted the Los Angeles Terminal Railway. Day and Kelham later looked to New Orleans, where the newly finished Shushan Airport was built on land reclaimed from Lake Pontchartrain (1934). Creating land was one of the few ways that cities could find sites near commercial centers without resorting to eminent domain.

Simultaneously, an interest in floating airports or seadromes and island airports arose in the 1920s and gained momentum in the early 1930s, just as the Yerba Buena shoals were being proposed as a site for the airport. Engineer Edward Robert Armstrong widely published his ideas for a floating platform or seadrome akin to an oil platform that could be placed in deep water, allowing aircraft to island hop their way across the oceans (*Architectural Record* 1934, 344). The idea of island airports was widely disseminated in magazines like *Popular Mechanics*, architecture journals, and news magazines (see, for example, *Architecture* 1928; White 1929; Salamanca 1930). In 1933, the German airline Lufthansa retrofitted the *Westfalen*

SHANKEN

as an aerodrome and floated it to the mid-south Atlantic so that Germany's planes could jump between West Africa and South America. The next year, Norman Bel Geddes, the audacious industrial designer, proposed a floating airport for New York City (*Literary Digest* 1933, 14).

In these early years of aviation and city planning, the real and the visionary often blended. Treasure Island was part of this moment of overheated speculation, putting it in dialogue with national issues of aviation and land use, as well as international issues of commerce and culture. In an age when smaller airplanes could travel only hundreds of miles without refueling, a trail of small floating airports spanning the Pacific would have been a powerful vision, especially to the San Francisco business elite wishing to tap into the commercial potential of Pacific markets. They imagined their artificial island as the West Coast terminus of a great system spanning the Pacific. In other words, Baldwin's idea for a regional system of airports grew quickly into a vision for a network that would span the globe.

With the concept of island hopping coming into vogue, the idea of holding the exposition on the island also would have resonated on other levels. San Francisco, isolated on its peninsula, often thought of itself as an island. Competition between the cities of the Bay Area, moreover, made a mid-bay island all the more appealing as a way to calm interurban rivalries. A less obvious frame of reference is Pacific Island culture. Although the fair was not given its thematic name, Pageant of the Pacific, until 1936, from the beginning it aimed itself at cultures that ringed the Pacific Ocean—in part to distinguish itself from the New York fair of the same year. Treasure Island would thus join Angel Island and Alcatraz Island culture had grown in the late 1920s and early 1930s. San Francisco's business community sought a stable, peaceful Pacific theater. As Chamber of Commerce member Robert Newton Lynch wrote at the time,

When two intrepid flyers crashed into Molokai, having made the trip from San Francisco to the Hawaiian Islands in a single day . . . [they] annihilated the element of time in transportation across the Pacific. Heretofore the element of time has been the determining factor in solving and adjusting the relationship of nations . . . We have now come into an age when there will not be time to get ready for the inevitable. (1927, 6)

The ominous last sentence, written fourteen years before the attack on Pearl Harbor, shows the extent to which the San Francisco business community had anticipated the new dynamics of air travel. Preoccupied with the intertwined prospects of aviation and the Pacific, its members were willing to go to great lengths to defend their economic interests from competition and war. This dynamic between flight, Pacific commerce, the community of nations, culture, and the specter of war built Treasure Island. Its name famously invoked the gold dust that floated down the Sacramento River into the Bay in the nineteenth century. But it just as easily could have referred to the untapped commercial riches that lay west of the Golden Gate—a modern Gold Rush waiting to be mined by intrepid aviators.

Building the Island

Bids went out for the dredging in August 1935. The work proceeded at a blistering pace. The WPA provided funding, but it hinged on making land available for the first buildings no later than July 1936 (Corps of Engineers 1937; James and Weller 1941). Contracts were only advertised in February of that year, the same month that the overmatched WPA handed the work over to the Army Corps of Engineers. Dry land had to rise in mere months. The plan involved building a seawall to provide still water for the fill and shelter for the dredges. The perimeter acted like an enclosure dike and resisted the lateral movement of the fill (Corps of Engineers 1937, 11) (Figure 3.4). The workers then filled in the area from south to north. Land for the three permanent buildings—the Administration Building, Hall of Transportation, and Palace of Fine and Decorative Arts—emerged on the south edge of the island, where the shoals were shallowest. An aerial photograph from August 1936 reveals the first building foundations. These were to become the terminal and hangars for the airport.

By April 1936, the first bump of land appeared amid dredges as slotted pipes discharged sand. The *Sacramento* dredge made its first fill on the southwest corner of the shallows, and the *San Joaquin* dredge built the causeway, discharging sand

FIGURE 3.4 Construction of perimeter wall and first building foundation, August 27, 1936. Yerba Buena Shoals Project, National Archives and Records Administration, San Bruno.

through slotted pipe laid out along its length (Figure 3.5). The *Monarch*, a clamshell dredge, placed foundation for the upper section of rock wall and *Culebra*, a hopper dredge, collected material from a borrow area near Alcatraz Island and discharged it on the shoals. The *Multnomah* rehandled this material on the eastern side, extending it north, and pipeline dredges pumped it over the seawall. Meanwhile, derrick barges helped build the seawall, their cranes swinging cyclopean rocks from boat to shoal.

FIGURE 3.5 Boy on pipe discharging sand, July 28, 1936. Charles H. Lee Papers, Special Collections and University Archives, University of California, Riverside.

As the island slowly emerged, workers suspended a pipeline for water across the unfinished bridge. The two projects had been linked in the imagination; now they were to be connected as infrastructure. In August, piles had been driven into the new soil and foundations for the hangars rose improbably above the waterlogged fill. By September, the causeway had been filled, partially banked for its roadway, and a strip of land continued northward, forming a spit where the roadway would eventually continue. By the end of 1936, the perimeter was fixed everywhere but on the northern edge, where the shoals were deepest and the sand most liquid (Figure 3.6). About one-quarter of the island had emerged above the water.

The entire perimeter was firm by the first of June 1937 and buildings began to emerge. The land was mostly level, the terminal and hangars largely

FIGURE 3.6 Laying pipes on the emerging island, 1936–1937. Photo: Don K. Oliver. Donald D. Larson Collection on International Expositions, Special Collections, Fresno State University.

finished, and the outlines of the main buildings visible on the ground. But the northern part of the island was still waterlogged and unready to receive the thousands of cars that would park there. Then technical issues threatened to halt the project. The northern edge lay on the most plastic mud. A stretch of some five hundred feet began to heave and settle as much as fifteen feet in elevation (Corps of Engineers 1937, 19). Engineers trenched a four-hundred-foot cut to a depth of twenty to thirty feet, undercut the muddy bottom, and backfilled it with heavy hopper sand. The interior was compromised as well. There "the mud stiffened and would neither move ahead through the spillway" as they tried to push it out with sand from the borrow areas. Nor would it sink under the weight of the new fill (19). Instead, the concentrated mud simply rose above the sand, as high as eighteen feet, five feet above the planned height of the island. A dredge called the Pronto, then at work in the Sierra Nevadas, had to be dismantled, shipped to the site, "raised unit by unit over the rock wall," and reassembled over the mud (20). For days, as the Pronto dredged out the mud, the Sacramento filled the hole with heavy hopper sand and the island rapidly grew firm.

Other more delicate operations then stole the attention of the engineers and workers. Because they dredged soil from the bay and delivered it by saltwater suspension, it had to be leached and treated before it would be fertile. Time again became taskmaster. The soil had to be ready for planting by May 15, 1938. Treatment began in August 1937. Under the direction of Charles H. Lee, a leading hydraulic engineer in California and the chief of the Division of Water Supply and Sanitation for the GGIE, they lowered the water table by pumping, and then leached out salt, but they also had to replace soil that was resistant to leaching. The water table was highest in the center of the island, creating a dome of salt water in the fill. With few precedents for how to go about this work, after several false starts, they began drilling wells (see Lee 1938a, 13; 1940). Volume pumping began on January 11, 1938, and ended four months later. They drilled more than two hundred wells to a depth of twenty-five feet, spaced about sixty feet apart, and grouped around pumps, which drained millions of gallons of briny water from the sand (Figure 3.7). Simultaneously, they "backfilled with coarse sand to form a collecting envelope" (Lee 1938b, 4). This allowed them to pump water out of the ground and lower the water table. They then set up sprinklers to dissipate the clay, replaced areas of clay with soil when necessary, and amended it with gypsum.

Even as the water retreated, workers had to insert infrastructure. They laid forty miles of steel pipe in seven systems for the water supply (Lee 1940). On July 22, 1938, a few months before the fair opened, Lee found that the pipes had begun to corrode and leak. The same held for the gas lines. By September 1938, the fair due to open in February, the rate of leakage had increased to fifteen new leaks per week, a veritable crisis for an island exposition with one source of water. Lee found the cause of the pitting was soil corrosion: "pipes acted as conductors between sand and clay, which had different charges, picking up electric

Section A-A

Section A:A S FEATURES of well-point drainage system indicated on map of Exposition site. Each of the groups of points was connected to a pump discharging into the atorm drain system on the island. Only the main building units are shown and these are provided with permanent installation of well-points. Other buildings will occupy the remainder of the island, except for the parking area at the north. The test holes were used to determine water level. RESULTS of the well-point drainage are shown on the two typical profiles. Measured by means of the test holes the progressive lowering of the saltwater table is shown approaching or below the required EL 6.

plished and the other elements of the construction program which had to be carried forward simultaneously.

The absolute necessity for the installa-I ne absolute necessity for the instanta-tion of an elaborate drainage system was apparent from the studies showing the relatively small amount of natural drain-age which had taken place following the completion of the fill. Observations concompletion of the hil. Observations con-firmed the fact that the central section of the island would not lose its salt water content for many years, and that ground water would not be low enough to per-mit necessary work during 1938.

Sinking the points

r L Points were installed in sand-filled holes which were jetted down to a depth

of about 23 ft. below the surface of the fill. The installing of these points was a relatively simple and rapid operation, the crew of four completing from 10 to 20 installations in an 8-hr. shift. An A-frame of timber was used to

support the jet pipe. This pipe was 22 ft. long, of 1¼-in. diameter, and connected by rubber hose to the fire hydrants avail-

by rubber hose to the fire hydrants avail-able on the island. These hydrants, with 125-lb. static head, develop a jetting pressure of between 90 to 100 lb. The end of the jet pipe (see illustra-tion) was provided with an 8-in. diam-eter piece of pipe, open at both ends, which extended back from the discharge end for a distance of 2 ft. This outer shell was held in position by welded shell was held in position by welded

ş

FIGURE 3.7 Diagram of well-point drainage to leach sandy soil. "Record Well-Point Installation Used to Drain Exposition Site," Western Construction News (June 1938): 210.

FIGURE 3.8 Mature trees barged in to Treasure Island, 1938. Harry W. Shepherd Collection, Environmental Design Archives, University of California, Berkeley.

current from sandy areas and discharging it locally into clay balls . . . with resultant pitting at the points of discharge." It essentially acted like a wet cell battery, eating away the metal as it conducted between these two soil environments (Lee 1940, 316, 318).

The pressure on the engineers was immense. With only months to finish dozens of buildings and plant a million plants, leaks were springing up throughout the system. Lee convinced W. F. Day to use a process called cathodic protection, which involved changing the electrical charge of the soil, thus rendering the pipe negative to the soil. They introduced direct current into the surrounding soil by sinking used heavy pipe at some distance from the pipeline itself. These acted as anodes, which were guickly corroded, after which the charge flowed through the soil and back into the pipe, converting anodic areas to cathodic ones, and balancing out the charge (Lee 1940, 319).

After the soil was treated, 2,115 trees were barged in, the most abundant of which were acacia (630), eucalyptus (360), olive (271), palms

(186), and pittosporum (157) (Figure 3.8). Most were full-grown specimens, dug up from their locations and transported with their roots in attached soil encased in wooden boxes, in which they would be planted. This presented problems because many of the roots extended as far as five feet but had to remain above the water table, where they might come into contact with saline water (Lee 1938b, 4). Every hole had to be prepared with gypsum-enriched backfill surrounding each box to serve as a buffer against the migration of salinity. They drilled casing wells with gravel envelopes. If water were to seep into the well, the gravel was there to prevent briny sand from being carried with the water (Lee 1938b, 27). The island—now artificial in several ways—was ready.

A Pacific Island

As is well known, after the fair the Navy took over Treasure Island, which was almost immediately rendered unusable as an airport by the larger and faster planes developed to fight the war. There would be no Golden Gate Air Terminal. This apparent failure, however, is almost entirely overlooked, partly because the city put almost no money into it in the first place. Financially it was as dispensable as the fair. As infrastructure it became redundant, as well. Mills Field, now expanded with WPA funding, became viable and has served as San Francisco's airport since the war.

In the moment of its creation, however, Treasure Island provoked other issues. San Franciscans had been sold on the shoals site for the exposition based on a vision of a mid-bay airport, one that would unite the cities of the bay as it helped the region compete with other cities on the West Coast for dominance in the Pacific. Some of this vision played off of larger urban and regional concerns involving labor, economic growth, and interurban competition. In the mid-1930s, the stakes were high. As the fair was being proposed, the Waterfront Strike of 1934 paralyzed San Francisco. The fear of violence and communist agitation, let alone a work stoppage, would have ruined the fair. The city reached an agreement with the unions to guarantee that exposition workers would not strike so long as union labor was used and 60 percent of the workforce was drawn from public relief rolls (Rubens 2004, 20–23).

Treasure Island is the swan song of these political and economic processes. As bold as the bridges, exposition, and airport appear, they were born of anxiety. Before World War II, the intense competition between western cities for resources created a system of metropolitanism, by which cities essentially operated as city-states waging commercial wars for regional dominance. Growth became the central mechanism through which a city could make vast claims (Lotchin 1979, 360–362). This was not just a matter of elites and boosters having their way. Ordinary citizens elected booster mayors and ratified public works projects. This is particularly important for understanding the morass surrounding the San Francisco airport, which, as infrastructure, was as essential as the bridges to the growth of the city. The same citizens that supported two of the most dramatic bridge projects in the world balked at turning Mills Field into a major airport. Simultaneously, they backed building an artificial island for the fair and airport. In other words, San Franciscons sometimes rejected pragmatic local projects in favor of risky, visionary, and symbolic projects.

San Francisco's waning influence prompted this state of affairs. The grand projects reflect the last gasp of early twentieth-century urban competition—something San Francisco appeared destined to lose in the 1930s. The city no longer had the raw population necessary to compete with Los Angeles. The ebb of San Francisco's power spurred a self-sustaining dynamic in the city (Lotchin 1979, 364).

As the size of government grew in response to San Francisco's relative economic decline, more power over the creation and implementation of policy fell into bureaucratic and supposedly expert hands, like those of the chief engineer, the airport manager, and the head of the Public Utilities Commission. This windfall gave

the bureaucrats an incentive to favor still more urban competition, thereby placing further power within their spheres. (369)

Arthur Brown Jr. demonstrates this crossover from professional expertise to bureaucratic power, as does W. P. Day with his wealth of managerial expertise. Brown and Day were servants of the larger phenomenon of urban competition. Roger Lotchin aptly calls this a "defense mechanism" in a moment of "urban status anxiety." One of the outcomes of these urban battles in the early twentieth century was a remarkable string of public works, much of which brought employment to the Bay Area during the Depression (369) (Figure 3.9).

Interurban competition manifested itself most often in San Francisco's attempts to overcome its geographical limitations with bridges, highways, and tunnels (Lotchin 1979, 375). Air travel, of course, became an indispensable element of transcending the city's physical boundaries. A great airport linked to the bay's advantages would draw commerce regardless of the size of the city. This explains why the tone of the Chamber of Commerce was so urgent in the early 1930s, and why otherwise prudent city supervisors, businessmen, and architects put an airport in the middle of the bay. Finally, it also explains the compelling necessity of an exposition to celebrate the bridges and the coming of age of San Francisco as an international metropolis.

Might we see similar gambles, in spite of vast cultural, economic, and political differences between then and now, in how the city currently treats its infrastructure

A New Empire in the West -- Created by the Completion of the World's Mightiest Bridges

and resources? Conscience now disallows scraping the bottom of the bay to create new islands or filling it for an airport. Radical political antagonism to federal government makes the possibility of finding public funds for new bridges and tunnels remote. With regional thinking withered on the vine, the sort of infrastructure that could redefine a metropolitan area is also moribund—replaced, perhaps, by the California high-speed rail project, a vision that speaks to the end of the tournament of cities. Yet, Treasure Island still embodies the earlier impulses. How deeply impractical to house thousands of people on unstable landfill in the middle of the bay. linked only by a single causeway and ferries. Looking beyond the island to how the city goes about its business, what a thin economic premise it is to base a city's fortunes on the vicissitudes of silicon. Instead of great bridges, open to the multitudes. Google and Apple buses transform neighborhoods. The difference is dramatic, but the scale of the gamble is similar. Will the promise, hatched in the 1930s, of creating a global city through aviation be fulfilled through information technology? The early indications are bleak. Private projects backed by global resources have indeed replaced civic projects launched with federal funds. It is a global wager anted up with local assets. Time will tell whether these silicon bridges and tunnels will leave a legacy as enduring as the physical infrastructure of the 1930s.

References

- Advisory Planning Committee for the Bridge Celebration Founding Committee (Advisory Planning Committee). 1934. "Report to J. W. Mailliard, Jr." William G. Merchant Collection, Environmental Design Archives. University of California, Berkeley.
- Airport Committee of the Board of Supervisors. 1931. "San Francisco Airport: A Report." San Francisco: Airport Committee, Board of Supervisors.

Architect and Engineer. "World's Fair Builders: William P. Day." March 1938, 38.

- Architectural Record. 1934. "Transatlantic Seadrome Design by E. R. Armstrong." Vol. 76 (November): 244.
- Architecture. 1928. "Plan for a Floating Airport by Henri Defrasse." Vol. 41 (June 15): 185-186.
- Baldwin, Charles Hobart. 1930. "Proposed Airport of San Francisco." Architect and Engineer 103, no. 2 (November): 52–60.
- -----. 1932. The Urgent Importance of Taking Immediate Steps to Provide Airports for San Francisco. San Francisco: C. H. Baldwin.
- Bednarek, Janet R. Daley. 2005. "The Flying Machine in the Garden: Parks and Airports, 1918–1938." *Technology and Culture* 46, no. 2 (April): 350–373.
- Bottorff, H. C. n.d. "Closing Report, San Francisco Bay Exposition, Sponsor for the Golden Gate International Exposition." The Bancroft Library. University of California, Berkeley.
- Bulletin of the Beaux-Arts Institute of Design 4, no. 9 (1928): 5-13.
- Day, W. P., and George Kelham. 1934. "Report on Investigation of Sites for a Proposed Exposition to Commemorate the Completion of the Golden Gate Bridge and the San Francisco-Oakland Bridge." Manuscript. William G. Merchant Collection. Environmental Design Archives. University of California, Berkeley.
- Dohrmann, Fred. 1927. "The Future of the Waterfront—Aviation Landing and Elevated Highway." *Pacific Commerce,* January 5, 22–23.
- Goodrich, E. P. 1928. "Airports as a Factor in City Planning." Supplement to National Municipal Review 17:181.

- Hubbard, Henry V., Miller McClintock, and Frank B. Williams. 1930. Airports: Their Location, Administration and Legal Basis. Cambridge, MA: Harvard University Press.
- James, Jack, and Earle Weller. 1941. Treasure Island: "The Magic City," 1939–1940. San Francisco: Pisani Printing and Publishing.

Lane, D. R. 1927. "The Airport Problems of Other Cities." San Francisco Business, February 9.

- Lee, Charles H. 1938a. "Draining and Leaching Treasure Island." *Engineering News-Record*, October 13, unpaginated reprint. Charles H. Lee Papers. Water Resources Center Archives. University of California Riverside.
 - ——. 1938b. "Report on Soil Drainage and Leaching at Treasure Island." January 12, 4. Charles H. Lee Papers. Water Resources Center Archives. University of California, Riverside.
- —____. 1940. "Cathodic Protection on Domestic Distribution System at Treasure Island." Journal of the American Water Works Association 32, no. 2 (February): 305–338.
- Literary Digest. 1933. "A Mid-Ocean Port for Airplanes." June 3, 14.
- Lotchin, Roger W. 1979. "The Darwinian City: The Politics of Urbanization in San Francisco between the World Wars." *Pacific Historical Review* 48, no. 3 (August): 357–381.
- Lynch, Robert Newton. 1927. "Working for Peaceful Commerce in the Pacific." San Francisco Business, September 14.
- Nolan, John. 1928. "City Planning for Airports and Airways." SAE Journal 22:411-413.
- Rubens, Lisa. 2004. "The 1939 San Francisco World's Fair: The New Deal, the New Frontier and the Pacific Basin." PhD diss., University of California, Berkeley.

Salamanca, L. 1930. "Way Stations on the Ocean." National Republic 18 (November): 16-17.

- San Francisco Airport Museum. 1932. "1932 Concept of Golden Gate Air Terminal on Shoals." San Francisco: SFO Museum.
- San Francisco Board of Supervisors (Board of Supervisors). 1933. *Proceedings*. San Francisco Public Library.
- -----. 1935. Proceedings. San Francisco Public Library.

San Francisco Chronicle. 1929a. "Truth to Rouse City to Provide for Genuine Airport." March 27.

- ------. 1929b. "San Francisco Gets Elegant Black Eye upon the Air Map." April 6.
- ------. 1929c. "Air Base Not Ladies' Aid Job Club Told." November 1.
- . 1931. "Yerba Buena Airport Plan to Be Pressed." October 12.
- ------. 1932a. "Yerba Buena Selected for Air Terminal." May 17.
- ——. 1932b. "Yerba Buena Airport Site Urged on Rossi." August 20.
- ------. 1932c. "Civic Groups Boost Yerba Buena Air Site." December 28.
- -----. 1933. "Fair to Mark Completion of Spans Planned." July 13.
- ------. 1934. "Site Proposed for 1937 Bridge Fair." May 27.
- San Francisco News. 1934. "Groups Make Island Fair Site Protest." August 31. Oakland, CA: Vertical Files, History Room, Oakland Public Library.
- US Army Corps of Engineers (Corps of Engineers). 1937. "Yerba Buena Shoal Reclamation Project." Manuscript. The Bancroft Library, University of California, Berkeley.
- US Department of Commerce, Aeronautics Branch. 1930. Report of Committee on Airport Zoning and Eminent Domain. Washington, DC: Government Printing Office.
- White, P. W. 1929. "Bridging the Ocean with Man-Made Islands." *American Magazine* 208 (November): 46–49.