AIRPORT AGE: ARCHITECTURE AND MODERNITY IN AMERICA

by

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Abstract

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This study is a chronological and thematic examination of the architecture and design of the American airport over a seventy-year period, from their invention in the 1920s to the latest design developments of the 1990s. The airport is a new and quintessentially twentieth-century building type. Composed principally of airfield, control tower, hangars, terminal(s), administration and service buildings, as well as runways and access roads, it is a totally designed and extraordinarily complex architectural space. It is also a special social environment, and the airport functions as a modern heterotopia of both freedom and control. Flight and its land-based expression of the airport, particularly the passenger terminal, are integral to modern life, and, as this dissertation discusses, played an important role in the constitution of modernity.

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INTRODUCTION

> "We shape our buildings, and afterwards our buildings shape us."
> — Sir Winston Churchill, 1943

This study is about one of the twentieth century's most remarkable yet reviled places: the airport. To go to the airport today is to be subject to complete displacement; its invisible architecture and international icons decontextualize it from culture, society, and history. Yet the airport does have a history, one which has often been at the forefront of acculturating technology and creating the conditions for social change. Marshall Berman has observed that "to be modern is to be part of a universe in which, as Marx said, 'all that is solid melts into air.'"[1] The airport has been in many ways a fulcrum for this experience, and this thesis studies the architecture and design of airports as the preeminent modern building. Modernism, as David Harvey has defined it, is a "troubled and fluctuating aesthetic response to conditions of modernity produced by a particular process of modernization."[2] An airport is a place where a number of these

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[1] Marshall Berman, *All That Is Solid Melts Into Air* (New York: Penguin Books, 1988; New York: Simon & Schuster, 1982), 15.

[2] David Harvey, *The Condition of Postmodernity* (Cambridge and Oxford: Blackwell, 1989), 99.

processes—standardization, urbanization, technocentrism, and globalization, for example—converge in a way that was, and is still today, widely recognized as constituting modernity. This thesis examines how architectural style, location and planning, materials and structure, as well as interior design, fine art, and furnishings made the airport modern and contributed to the modern experience.

The subject of this study is airports within the United States. This focus has been chosen for two reasons. First, because the federal government initially considered them entirely a local matter, American airports developed quite differently from their State-directed counterparts in the rest of the world. Until the end of the 1930s with the building of LaGuardia, each airport was discrete, not yet a part of the transportation system, national network, or regional planning. One result of this laissez-faire policy is the diversity of expression in American airport design, particularly in terminals built before the Second World War. American airports illustrate current trends in architectural practice, their regional contexts, and the influence of local politics and corporate interests. In contrast to the nationalized airport, the American airport has strong ties to the professional, business, and municipal communities of which it is part.

Second, American airports are a type of space "produced", in Henri Lefebrve's sense, by social practices engendered by capitalism.[3] Despite the slow start of commercial aviation in the United States, the aerospace industry has become a significant driver of the American economy; aircraft and aviation

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[3] Henri Lefebvre, *The Production of Space,* trans. Donald Nicholson-Smith (Oxford: Blackwell Publishing, 1991; Paris: Editions Anthropos, 1974).

technology are two of the country's top export items. International travel, dependent of course on airports, is the United States' second largest export service. Today there are over 5,000 airports, with just under 200 counting as major airports. This number is more than thirteen times that of China, the country with the second highest number of airports. In fact, according to 2005 statistics, there are nearly three times as many airports in the United States than in all of the European Union countries combined.[4] The close relationship of architecture to the economy is showcased by the development of the American airport, which evolved concurrently with aviation technology, the military-industrial complex, and multinational corporations.

This study is also limited to roughly a seventy-year period, from the 1920s to the 1990s. During the 1920s, the Post Office established transcontinental service, which required the building of airports to service airmail carriers. 1926 saw the development of the first viable passenger aircraft, the Ford Tri-Motor, and significant federal legislation was enacted in support of commercial aviation. In 1927 Charles A. Lindbergh made his electrifying non-stop solo flight across the Atlantic. This accomplishment promoted aviation in America more than any other single event, and it ignited throughout the country a building spree of permanent land facilities for flight: the country's first airports. The final examples in this study are the new and renovated air terminals of the 1990s, and the last and largest

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[4] Statistics from *The World Factbook* (2005), available from https://www.cia.gov/cia/ publications/factbook/index.html; and United States Office of Travel and Tourism Industries, "The United States International Travel Industry," 2000, available from http://tinet.ita.doc.gov/analysis/keyfacts99.html Internet; accessed 22 August 2006.

new airport constructed in the United States, Denver International Airport, which opened in 1995. During this period, the airport went through a full range of development and there have not been substantially new evolutions to its form since DIA.

Reyner Banham, writing in the waning of the Jet Age, argued that the logical endpoint of airport architecture would be to "scrap the buildings"; he noted that in order to make sense visually, airport terminals must "seem to grow naturally as lightweight shells unencumbered by massive masonry or cultural pretensions."[5] Although airports are far from extinct either functionally or culturally as Banham had hoped, his projection of the airport's form has been realized in this latest generation of terminals. The aesthetic populism (to use Frederic Jameson's term) of contemporary airport terminals like Orlando and Denver, with their spectacular combination of the local, historical and high-tech, signals the end or last stage of modernity, and as such concludes this study.

Airports are news and there is a wealth of primary source material about them, including books but mainly articles and advertisements from periodicals. These range from general interest magazines such as *Scientific American* and *Life* to professional or industry journals such as *The American City* and *Airports*. In addition, airports in America had, at least until deregulation in 1978 and the era of mass air travel, a certain amount of glamour and prestige. Flying was special; it meant you were going places. Municipal airports were also symbols of

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[5] Reyner Banham, "The Architecture of Wampanoag," in *Meaning in Architecture*, eds. Charles Jencks and George Baird (London: Barrie and Rockliff, The Cresset Press, 1969), 108.

civic progressiveness and accomplishment. Airports are therefore well represented in the souvenir ephemera of postcards. Incidentally, postcards made up a significant proportion of early airmail, whose regular scheduled delivery played a significant role in establishing airports in the United States.[6]

There are three types of airport postcard images: aerial views, which often show the airfield; airside views, which usually include aircraft; and, somewhat less common, landside views of the terminal. Major airports will also have postcards depicting the terminal interior. Along with an image, postcards often provide information—in superlatives—that indicate what is to be appreciated about the airport. In some cases, a postcard may be the only extant or publicly available documentation of an airport. Even though they were certainly some of the most expensive structures erected, there are remarkably few records and documentary images of specific airport buildings. I have interpreted this as evidence that airports are not considered historical sites but always represent the modern moment, the now, if not the future.[7] Whenever possible then, I have illustrated an airport with contemporary advertisements or postcard images. I also want to insist on the nature of postcard representations: they are inexpensive and mass-produced images of a place that stood for neither of those

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[6] The first postcards printed as souvenirs were of the 1893 Columbian Exposition in Chicago. In 1907, the divided back postcard (which permitted both message and address on one side) was approved for use in the United States and postcards became common.

[7] Completely forgotten, for example, is the architect of the futuristic Will Rogers World Airport terminal in Oklahoma City, built in 1967. However, aviation sites (including categories for “wrecks” and “missile silos”) are listed in the National Register of Historic Places.

things. These cheap circulating cards are a form of consumption which broadened the cultural impact of aviation.

A few notes about the postcards used in this study: people saved them as souvenirs, as most cards are in fair condition but postally unused (if a card is postmarked, it is indicated in the caption). Although airport postcards are notably less valuable than those of just about any other collectible subject, such as rail stations or aircraft, a collectors' market now exists for them. Every day there are hundreds of aviation postcards up for auction on eBay; without eBay, my awareness and appreciation of the richness and range of this medium would have been very limited.

With a few exceptions, cards are shown actual size. Two printing companies dominated postcard production in the United States: the Curt Teich Company of Chicago, active from 1900-1978, and Tichnor Brothers of Boston, who were also established around 1900 and remained in operation until 1987. Curt Teich has a published dating system for most of the cards it produced and the date of the card can be determined with some certainty. The publication dates of Tichnor cards are unknown. The quality of a postcard varies according to its period and printing technique. Nearly all of the cards depicted in this study were printed in the United States after 1915, and there are four types. "White Border" postcards, produced from 1915-30, often are of poor quality (supposedly the white border was introduced to save ink during the War). "Linen" postcards date from 1930 to c. 1945 and are generally of good quality, with bright colors and on cardstock with a high rag content, which gives them a woven linen-like

texture. “Real Photo” postcards were cards produced by independent photographers who used blank cards for printing black-and-white photographs. Real photo postcards can range from early in the century to the 1940s but they are the rarest type of card. The last and largest category is “Photochrome” cards, which began production in the United States around 1939 and continue to the present. Photochrome is a color photolithographic process; this type of card was introduced into the United States by the Union Oil Company, which sold photochrome cards of local landmarks at its gas stations to promote car travel.

The mailed postcard today is a bit of an anachronism; digital forms have replaced it. In fact, most of these late twentieth-century postcards are too large for the mail. Airport postcards are issued now mainly as commemorative items, such as the 1996 postcard celebrating the seventy-fifth anniversary of the first airport in Miami (fig. 28a). Denver International Airport has produced several postcards of the Jeppensen Terminal, completed in 1995. It may be that these cards are an attempt to raise the controversial structure’s popularity or just an entry into the expanding nostalgia market.

Despite the evident popular appeal of airports, architectural periodicals have had very little to say about them. There are several explanations for this omission. One is the opinion, here stated by the artist Martha Rosler, that “Except for a few high-profile examples, the airport may not be usefully described in terms of ‘architecture.’”[8] From this viewpoint, the stringent functional

[8] Martha Rosler, “In the Place of the Public: Observations of a Frequent Flyer,” *Assemblage*, 25 (Dec. 1994): 69.

requirements of airports leave little for the art of architecture. This objection is merely a resurfacing of the old nineteenth century dichotomy between engineering and architecture, and makes no sense when one considers the necessary incorporation of engineered/technological systems in any twentieth-century building. By adopting the eminently convenient definition of architecture as any structure designed by an architect, I have avoided addressing this issue, except to regard it as substantiating the resistance in the architectural field to modernism.

A second cause for the scant critical attention, which follows from the first reason, is that an airport is rarely the work of a single architect or firm. As airports grew in size and complexity, and as there developed specialists in the design and construction of the airport (runways, hangars, lighting, and other systems such as air traffic control, baggage, security, etc.), the architect became part of an expert team. The collaborative nature of these projects and the constrained role of the architect in the design process do not fit into the mythology of the maverick creative genius.

Finally, architecture is static and immobile, an art that endures, whereas the airport is subject to constant alterations and accretions. I know of no air terminals that have remained in their original form; most are modified within their first decade. In addition, the post-war airport is a vast interconnected array of structures, roads, and runways; it is perceived more as a labyrinth apparatus than as a discrete work of architecture. These characteristics: loss of individual authorship, indeterminate form, and rapid change are peculiarly modern ones,

which make the airport not only an overlooked object of study but also a difficult one.

Thus while aviation and aircraft history are well studied, the airport itself is not. The *Encyclopedia of Urban America*, for example, has barely a single page on the topic of airports, despite the entry's opening sentence: "Not only have airports been a major force in urban growth strategies, but they have also profoundly affected the spatial development of metropolitan areas."[9] Airports almost never appear in the indices of academic studies in the disciplines of city planning, sociology, anthropology, or history. In architectural histories, the airport fares no better. When I began this project with a seminar paper in 2001, only two books had been published that addressed the airport as architecture: the excellent catalogue from the Art Institute of Chicago's 1996 exhibition, *Building for Air Travel: Architecture and Design for Commercial Aviation*; and Marcus Binney's 1998 picture book, *The Airport Builders*.[10] The situation is much changed five years later with a range of publications, some of the most interesting in the area of cultural studies.[11] An individual airport may have an apologist or, less usual, a detractor who has documented its development. These

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[9] Robert B. Fairbanks, "Airports," in *Encyclopedia of Urban America*, vol. I, ed. Neil Larry Shumsky, 1998. In comparison, "Amusement Parks" has more than three pages, "Correctional Institutions" and "Railroad Stations" each have two pages.

[10] John Zukowsky, ed., *Building for Air Travel: Architecture and Design for Commercial Aviation* (exh. cat., Chicago: The Art Institute of Chicago, 1996); Marcus Binney, *The Airport Builders* (London: Academy Editions, 1999).

[11] Examples are David Pascoe's *Airspaces*, 2001; Alastair Gordon's *Naked Airport*, 2004; and Gillian Fuller's and Ross Harley's *Aviopolis*, 2004.

are usually political histories, couched in terms of heroic struggle or as hard lessons learned from the airport's construction and growth.[12] Airports are in fact one of the best sources for information about themselves; their websites commonly include an airport history component and most are willing to share images and information about earlier terminal buildings.

Three dissertations were especially helpful in pointing me to primary sources and providing a thorough groundwork on important aspects—the legal, technological, and economic histories—of the airport in the United States. David Brodherson's work, entitled "What Can't Go Up Can't Come Down: The History of American Airport Policy, Planning and Design," discusses the complex legal and political context that led to the establishment of airports. He also examines airports as buildings by delineating architectural phases and the evolution of airport typology up to World War II. Deborah Gwen Douglas's dissertation, "The Invention of Airports: A Political, Economic and Technological History of Airports in the United States, 1919-1939," is a monumental study of the development of communities of experts and systems that make the airport the site of what she calls "intersecting technologies." Douglas shows how the airport evolved to require the collaboration of engineers, architects, city planners, and local and federal authorities. A third dissertation, "'Leaving on a Jet Plane': Commercial Aviation, Airports and Post-Industrial American Society, 1933-1970," by Douglas

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[12] For example, *A Dream Takes Flight: Hartsfield Atlanta International Airport and Aviation in Atlanta* by Betsy Braden and Paul Hagan, 1989; and *Denver International Airport: Lessons Learned* by Paul Stephen Dempsey, Andrew R. Goetz, and Joseph S. Szyliowicz, 1997.

Karsner, takes up where Brodherson and Douglas leave off. Using three case studies, Detroit, Tampa, and Tucson, Karsner documents how the phenomenal growth of post-war air travel radically altered the tourism industry, international business, and urban space. The dissertations by Brodherson, Douglas, and Karsner, which are contributions to the history of architecture and urban development, history of science, and American history, respectively, differ in their scope and intent from the present study. This dissertation, which is broader in timeframe, examines the American airport not only a result of policies, technologies, and industries, but also as an agent and embodiment of modernity.

Like these earlier dissertations, my study is both chronological and thematic. However, it is not strictly linear. Each chapter loops back to earlier examples as well as reaches forward to future expressions of an idea or form. This study is not comprehensive but examines the airport from five interrelated cultural perspectives. Chapter One discusses the complex economic, political, and technological factors that led to the invention of the airport as an entity and directed its development into a component of a larger system and network. In the United States, there were three significant players in the early history of airports: the military, the post office, and lastly, commercial aviation.

Chapter Two addresses how architectural training and practice in the United States affected the formulation of the airport's physical and symbolic expression. The field of architecture was in a transitional stage during the first wave of airport construction. American airports of the 1930s and 1940s illustrate how problematic this new building type was to the architectural community. One

difficulty was how to represent the future in a field that adhered to historicist traditions. The contrast between the designs of the industrial architect Albert Kahn and those of the New York society firm of Delano & Aldrich, both of whom are credited with creating the first airports in the country with passenger facilities, reveals their opposing responses. On one hand, Kahn saw the airport as utilitarian and without architectural character. Delano, on the other hand, repudiated his initial innovative form for the 1929 Miami airport to design a series of highly functional but formally conventional airports. The conservative nature of the profession is further demonstrated by the results of the 1929 Lehigh Portland Cement Company airport design competition. Although the material of cement was modern, the format and stipulations of the contest drew upon the established Beaux Arts model.

Another unsettling aspect was the change from academy to university and from atelier to firm as the field became professionalized as well as commercialized. Again, airports contributed to these changes by making it feasible for architects to establish national and international practices. Architects were some of the first frequent flyers, and aviation enlarged the scope of the business. In 1930, Frank Lloyd Wright observed with ambivalence, “Architecture today is a great orchestration of materials, methods, and men.”[13] Part of the history of the airport is that its scale and complexity demanded a greater degree of specialization and organization within the architectural profession.

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[13] Frank Lloyd Wright, “Architecture as a Profession is All Wrong.” *The American Architect* 138 (December 1930): 84.

The third chapter describes the symbiotic relationship between the city and the airport. The great majority of American airports were municipal projects. Cities invested in airports primarily for economic reasons but civic boosterism and the romance of aviation were also factors. Metropolitan areas and commercial aviation grew apace in the 1940s and 1950s. City and regional planners devised schemes to incorporate airports into the urban fabric. Visionary thinkers and architects also created utopian models for modern living. These imaginings were influential in conceptualizing the airport as an ideal city. Nevertheless, as airports became integrated into the transportation network and essential to business operations, roads and undesirable real estate development generally followed. The airport's economic power has given it the prerogative to shape cities and suburban land use, although it often has an adversarial relationship with its community.

The fourth chapter charts the airport's precipitous fall from an icon of humanity's (literally) highest aspirations to the epitome of modernism's worst features. During the Jet Age of the late 1950s and 1960s, the airport was seen as a kind of mini-United Nations and a permanent World's Fair pavilion. The air passenger terminal was increasingly divorced from the airfield and the control tower even as its architecture was more and more symbolic of flight. The ultimate representation of this phenomenon is, of course, Eero Saarinen's 1962 Trans World Airlines Flight Center at John F. Kennedy International Airport, which

resembles a bird rising in flight.[14] The billowing concrete shell roof of the TWA terminal, likely adapted from the Lambert-St. Louis airport, became a hallmark of air terminal architecture in the United States. A new form of art also appeared at the airport: kinetic art. Mobiles and other forms of kinetic art represented a new experience of time and space through motion. The popular mobiles and spectacular terminals document the increasingly commercial nature of Jet Age art and architecture.

In contrast to the idiosyncratic and organic forms of the late 1950s, a number of austere International Style terminals were built in the 1960s. These blank glass curtain wall boxes indicate the mounting standardization and normalization of corporate modernism. At first celebrated as evidence of globalization, their featurelessness was later equated with deterritorialization and other disembedding mechanisms of high modernism. The excitement and allure of flight dimmed in the 1970s, as highjackings and air traffic congestion brought both anxiety and boredom to the airport experience. Deregulation in 1978 created price wars among airlines in their efforts to expand routes and capture a greater market share. A decade later, air travel became a common experience for most people. Airports were slow to adapt to mass travel and higher levels of security. Terminals sprouted long tunnels, corridors, and labyrinthine extensions. Formerly open interiors were now darkened, partitioned and cordoned off. Choke points and security cameras further regulated but also deteriorated the airport

[14] Although according to legend, Saarinen's inspiration was an overturned half of breakfast grapefruit. Mark Lamster, introduction to Ezra Stoller, *The TWA Terminal* (New York: Princeton Architectural Press, 1999), 1.

experience. The air terminal now exuded the oppressiveness, dehumanization, authoritarianism, and tedium of late modern life.

The adoption of hub-and-spoke systems by individual airlines to create regional dominance affected the airport in unforeseen ways. A small number of major airports—Hartsfield-Jackson Atlanta, O'Hare, Dallas-Fort Worth, Denver, Los Angeles, and John F. Kennedy—became critical nodes that controlled the flow across the entire air traffic system. The final chapter of this study looks at the airport as a nexus not only for transportation but also for "glocalization". Since the 1970s, air terminal projects have tried to counter the placelessness of the airport through several strategies. The first is the concept of the airport as a point of interchange. The smooth transition from road, through the building, and into the aircraft is suggested by skein-like architecture that emphasizes non-stop movement. The second approach employs "place-imaging" strategies to contextualize the airport in its particular place. Regional building materials and styles are used and local crafts and businesses are displayed inside to identify the air terminal with its locale. The third method is the romantic high-tech style, which combines new or advanced materials and forms with abstract historical and regional references.

Airport terminals are intensively designed buildings with a complex relationship to society. As David Pascoe wrote, "they stage, so to speak, an engrossing image of the aspiration to break out of the element into which we are born and to move into that in which we breathe."[15] The air terminal represents not

[15] David Pascoe, *Airspaces* (London: Reaction Books, 2001), 15.

only air travel, one of the defining achievements of the modern age, but also highlights the liminal and transformative aspects of the modern experience.

FIELDS OF DREAMS

CHAPTER ONE

> It must be obvious that there can be no comprehensive commercial aviation in this country until airports are established.
> —F. Trubee Davison, United States Assistant Secretary of War, 1927[16]

"Ten percent of aviation is in the air, and ninety percent is on the ground," Clement M. Keys, director of Curtiss Aeroplane and Motor Company, once famously remarked. In the United States the airport has been the neglected stepchild of aviation, a cutthroat and cutting-edge industry extremely sensitive to technological, economic and political change. Like no other building type, and in a way that might be considered antithetical to the nature of architecture, the airport does not have a fixed form or identity. Logan International Airport (fig. 1), for example, inaugurated as East Boston Airport in 1923, opened its first passenger facility in 1929. Subsequently, the airport expanded more than seven times and completed ten major construction programs; it recently opened a new terminal (one of five) to replace an outdated 1949 structure. The current decade-long airport-wide modernization project is far from finished; at present, nearly every structure and road at is under construction.

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[16]Quoted in "Officials Plead for Airports," *American Architect* 132, no. 2532 (5 November 1927): 568.

The history of Logan's ganglia architecture is a microcosm of the development larger air transportation network. Passenger terminals, control towers, parking garages, highways, hangars, and runways—what today essentially constitutes an airport—were not established at once but evolved at different rates as needs and circumstances dictated. The growth of commercial aviation, for example, which necessitated the construction of terminals, was not a significant aspect of airport design until the end of the 1930s. This constant change and revision is a condition of modernity, that of flux and of the new. As Curator of Architecture John Zukowsky notes, "this obsession [on the part of the airlines] with what is most modern is both a strength and a weakness, since it often causes the industry to ignore or discard things that are not the latest in design or technology;" and it is one element that makes it difficult to "reconstruct" the history of airport architecture.[17]

The invention of the airport in the United States is the result of three interrelated factors: military needs for strategic national defense, the Post Office's airmail delivery requirements for a nationwide network of stops, and the airlines' demands for passenger facilities and systematized and standardized field operations. Federal policy followed to coordinate, direct, and regulate airport location, organization, functions, systems, and structures. The story of the establishment of airports is part of the history of aviation in America, whose development was profoundly effected not only by world wars, technological

[17] Zukowsky, *Building for Air Travel*, 24-25.

advances, and economic vicissitudes, but also by charismatic individuals and public sentiment.

THE MILITARY AND AMERICA'S FIRST AIRPORTS

In 1905, only two years after Orville Wright's first heavier-than-air, engine-powered flight at Kitty Hawk, a small group of air enthusiasts formed the Aero Club of America.[18] That same year, the Wright brothers successfully tested a wood and cloth biplane called the Flyer III, considered the first practical airplane. The next twelve years, until the United States entered World War I, are a series of "firsts" in American aviation history, such as the first airplane factories (The G. H. Curtiss Manufacturing Company and the Wright Company, both in 1909), the first military aircraft (the Wright Model A biplane delivered in 1909), the first coast-to-coast flight in the United States (Calbraith Perry Rodgers, 1911), the first stunt flying (loop-the-loops by Lincoln Beachey, 1911), the first licensed female pilot (Harriet Quimby, 1911), the first seaplane (1911 by Glenn L. Curtiss), the first parachute jump (Albert Berry, 1912), and the first scheduled flights by an airline (1914). Fast-paced developments in aircraft technology and highly publicized, record-setting flights helped to popularize aviation.

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[18] This important group issued pilot's licenses, annually awarded the coveted Collier Trophy for achievement in American aviation, and was the North American representative of the Fédération Aeronautique Internationale. The Club reorganized in 1922 to become the National Aeronautic Association. The NAA took on the responsibility of verifying all flight records set in the United States.

At this time, there were no airports, only airfields, and there were only a handful of these. A fallow field served most aviators at this time. Public parks, with level and fast-draining playing fields made ideal sites for aviation club meets. Specially prepared fields followed the organization of public spectacles for airplane stunts and races. However, these “aerodromes”—a European phenomenon—often involved no more than temporary wooden hangars and a grandstand around a turf or cindered course for takeoff and landing.

When the United States entered the First World War in 1917, the country had no standardized airfield design or airport architecture, nor was there any type of technical expertise on which to draw. The Army hired Detroit architect Albert Kahn to design a generic airport that was low cost and could be rapidly built and easily replicated anywhere that had suitable site conditions. Kahn’s plan, produced in ten days, was taken directly from the Canadian Royal Flying Corps base of Camp Borden in southern Ontario built the previous year.[19] The plan featured a one- or two-mile-square field that had three rows of buildings on one side: the hangars necessarily adjacent to the field, followed by the equipment maintenance and repair shops, and then the landside administration building and barracks.

Kahn’s plan successfully met the Army’s pressing circumstantial and practical requirements. The square field, being unpaved and thus “all-way”, could support two squadrons (100 planes). Furthermore, having all the buildings to one

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[19] Deborah Gwen Douglas, “The Invention of Airports: A Political, Economic and Technological History of Airports in the United States, 1919-1939” (Ph.D. diss., University of Pennsylvania, 1996), 403-04.

side of the field was optimal for handling the multidirectional takeoff and landing of small fighter and reconnaissance planes. Most important, the entire plan could be constructed in as little as sixty days using civilian contractors.[20]

Undoubtedly the Army selected Kahn because of his experience in devising modular construction systems for building factories for the automobile industry. And although the emphasis was on speed of construction and not, as historian Deborah Douglas has noted, "a display of engineering or architectural virtuosity,"[21] a number of these early military air bases are now recognized for their engineering and architectural merit.[22] For example, Kahn improved the wooden roof truss system for hangars in such a way that they could be built more easily using shorter pieces of wood which resulted in a savings of time and materials. This design was called the Signal Corps Mobilization Hangar and its distinctive gambrel roof was echoed in the subsequent standard hangar design: the U.S. All-Steel Hangar by the Signal Corps' Construction Division. [23]

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[20] Scott Field (Belleville, Illinois), for example, was purchased from the city on June 14, 1917. Construction of the airfield, 59 buildings, and railroad spur commenced immediately and was completed on September 1, 1917. 375th Airlift Wing, "Scott Air Force Base History;" available from http://public.scott.amc.af.mil/375aw/history.htm; Internet; accessed 21 October 2003.

[21] Douglas, "The Invention of Airports," 404.

[22] The National Park Service nominated Langley AFB for designation as a historic site under both aviation history and for its architectural importance; Jody Cook, "A Place Called Langley Field; National Significance in American Military and Civil Aviation," *Cultural Resource Management* 2 (2000): 27-31. Brooks, Rockwell, and Scott Fields have NRHS designation for their architectural, engineering, and event significance.

[23] Kahn's hangar design was still in use during World War II; e.g., the hangar constructed in 1939 at the Wildwood, New Jersey Naval Station. Out of the

America lagged behind Europe in aircraft design and aviation facilities, yet the technical and engineering innovations of United States hangar design were of great interest internationally. Two military airship hangars at Orly, concrete parabolic arches designed by the French engineer Eugène Freyssinet in 1916, were widely admired for their permanent material and graceful form that were seen as appropriate both functionally and symbolically. Kahn's wooden and metal truss hangars were also elegant and expressive with their exposed skeleton and taut skin. In 1929, the Wilbur Watson Engineering Company of Cleveland, Ohio, constructed an airdock for the Goodyear Zeppelin Corporation's plant in Akron, Ohio, to replace Kahn's United States Navy airship hangar of 1917 (fig. 2a). The Goodyear airdock is a parabolic steel structure of awe-inspiring dimensions: 1,175 feet long, 325 feet wide, and 211 feet high (366 x 100 x 64 meters). At the time it was built, the airdock at Akron was the largest building in the world without interior supports. Its height is equal to a twenty-two story building and its interior space so vast that fog can form near the ceiling. The curved shape deflects crosscurrents and, because the entire structure is mounted on rollers, the structure "breathes" as it expands and contracts with temperature changes. Architects such as Ludwig Mies van der Rohe, Le Corbusier, and Edward Durrell Stone were profoundly affected by airport

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hundreds built, the only extant hangar by Kahn is Hangar 9 at Brooks Air Force Base, San Antonio, Texas. Michael A. Pedrotty, Julie L. Webster, Gordon L. Cohen, and Aaron R. Chmiel, *Historical and Architectural Overview of Military Aircraft Hangars: A General History, Thematic Typology, and Inventory of Aircraft Hangars Constructed on Department of Defense Installations,* Technical Report, 01 Sep 99 (Champaign, Ill.: U.S. Army, Corps of Engineers), CERL, Report Number 98/105.

structures, particularly by the vast interior void of the hangar. Albert Kahn himself was likely influenced by the galvanized steel truss system used to create the Akron airdock's huge void in his 1937 open design for the Glenn Martin aircraft factory near Baltimore, Maryland.[24]

Until the 1940s hangars were an area where architecture and engineering overlapped. Hangars, because they consisted of durable component parts, were standardized and shipped as kits all over the world, making them one of the first aviation-related businesses. Hangars appear frequently in magazine advertisements and architectural periodicals contain articles on hangar design and construction. "The hangar has come into its own," one architect stated in 1929; "It has 'gone' commercial, become complicated and 'glorified.' Now it is a problem which requires the services of the architect. . ."[25] Possibly the last hangar illustrated on a postcard was Hangar No. 1 at Washington National Airport, which was designed by Howard Lovewell Cheney and opened 1941 (fig. 2b). Its simple elliptical form bisected by a retractable glass curtain door is strikingly modern and a precursor of later terminal design. This was an era of factory construction in the United States, but the culture-wide fascination with hangars resides in that it is an enclosure of emptiness. It is likely that Le Corbusier had a hangar in mind when he declared at the 1946 Congrès de

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[24] Louis Bergeron, *Industry, Architecture, and Engineering: American Ingenuity 1750-1950,* trans. Jane Marie Todd (New York: Harry N. Abrams, 2000), 106.

[25] Louis M. Steuber, "Commercial Hangars," *American Architect* 136, no. 2573 (July 1929): 81.

l'Aviation Français symposium, "The beauty of an airport is in the splendor of its space."[26]

In contrast to airfield structures such as hangars, the nonservice, pre-World War II buildings at Langley Field, Virginia; Scott Field, Belleville, Illinois; Brooks Field, San Antonio; and Rockwell Field, San Diego; to name a few, were not merely utilitarian but were built in a variety of revival styles such as Renaissance, Tudor, Colonial, and Spanish (fig. 3).[27] A National Park Service survey of historic buildings at Langley Field found more than 35 buildings dating from 1917-1920, many of which are ornamented with terracotta tiles and decorative brickwork.[28]

Following the war the army continued to lead developments in aviation, albeit despite controversy within the armed forces over the military role of aircraft.[29] It was during the interwar period that aviation steadily grew in military importance mainly due to private sector development of aircraft and navigational

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[26] Author's translation. "La beauté d'un aéroport, c'est la splendeur de l'espace!" Le Corbusier, "1946: L'Architecture et les aéroports modernes," in *Oeuvre Complète: 1938-1946,* ed., Willy Boesinger (Zurich: Les Editions d'architecture, 1946), 190-191.

[27] Paul R. Green, "Conserving Aviation Heritage Resources in the U.S. Air Force," *Cultural Resource Management* 2 (2000): 24.

[28] Cook, "A Place Called Langley Field," 30.

[29] The Navy wanted to discontinue efforts at developing fighter aircraft and urged the Federal government to concentrate on building battleships. Army General and Air Service pilot Billy Mitchell strongly objected to the Navy's course of action. At Langley Field in 1921 Mitchell ran a series of highly publicized tests using bombers and scrapped battleships that demonstrated unequivocally the superiority of air power.

aids. Eventually, aviation would become the greatest beneficiary of the United States' burgeoning military-industrial complex. Reyner Banham commented darkly that,

> Air transportation began as an army-surplus operation and—in ways both subtle and obvious—has remained one ever since. With a few happy exceptions, airliners have been converted bombers, unsuccessful bombers, prototypes of bombers, or by-products of bomber-development programmes. While the aircraft have dragged along in the wake of military development, airports have dragged along behind the aircraft, never up to date, never completed, always inadequate, always sprawling slummily into their surroundings in a manner that reveals, only too clearly, the standards of hostilities-only expediency carried over into peace-time operations.[30]

The precedents set by military airports were indeed significant for several reasons. First, Army engineers were the only trained experts in airfield construction. Their advice, and that of Army Air Service pilots, was elicited for the design of civil airports. Several Army engineers, such as Colonel Stedman Shumway Hanks, became very prominent in the civilian aviation industry through their publications and consulting activities.[31] Second, a number of military airports, such as Logan, were decommissioned and sold to cities; or, as was the situation at Columbia, North Carolina, and Salt Lake City, Utah, the Army retained a squadron at the airport that saw both military and civilian use. Third, the Army disseminated pamphlets and airport plans to municipalities in an effort to standardize airport design. The Air Service did not have the funds to build

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[30] Reyner Banham, "The Obsolescent Airport," *Architectural Review* 132, no. 708 (October 1962): 252.

[31] In 1927 Hanks founded the American Airports Corporation to offer technical and engineering advice on airport design and construction. The AAC worked with numerous cities, including Newark, on airport planning.

airports, so the Army did all it could to encourage cities to construct airports that it could commandeer if the need arose. Naturally, its recommendations suited military objectives and requirements, specifically on the strategic location of an airport and an airfield design that could support military aircraft.[32] Fourth, the application of historic and regional styles of architecture to the airport, along with traditional building materials, aligned it with existing civic architecture. As a result, instead of creating a new form of expression for the new experience of flight, historicism brought aviation within the realm of the familiar. Traditional architecture both reassured people of aviation's stability and reinforced the idea of the airport as a public utility. As the editorial page of the inaugural issue of *Airports* magazine advised, "Today we need not sacrifice the artistic to secure the practical. Airports must be made inviting. First, for the visiting public who come to learn what it is all about. Second, for the welfare of the community, for the airport is, after all, a public institution."[33]

Another after-effect of the war was the surplus of military aircraft that flooded the market. Many ex-army and navy-trained pilots purchased the low-cost planes and went on the road performing demonstration flights. Thus began the barnstorming era during which pilots amazed audiences throughout the country with aerial stunts such as flying through barns. The barnstormers' daredevil feats fostered the continued development of light, fast, easily maneuverable single- or tandem-seat airplanes, aircraft suitable for dogfights,

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[32] Douglas, "The Invention of Airports," 12, 428, 430, 470.

[33] "The Airport Beautiful" *Airports* 1, no. 1 (April 1928): 32.

racing and acrobatics but not for durability, passengers and freight. In fact, the grandstanding of the barnstormers, whose shows often included a staged crash, encouraged the perception that flying was dangerous and initially impeded the growth of passenger airlines.

Flight remained a recreational activity—mainly a spectator sport—well into the Depression. Also, it was not uncommon for a city to finance the purchase of private land for a municipal airport by classifying it as a public park. At the 1928 annual convention of the American Institute of Park Executives, Minneapolis' Superintendent of Parks, Theodore Wirth, outlined four reasons for putting the airport under the jurisdiction of the parks department: one, that the Supreme Court of Kansas had ruled that municipal airports served recreational as well as commercial interests; two, that the parks department had lands suitable for an airport or the power to acquire them; three, an airport, "in order to serve its purpose well and to be a credit to the municipality" must have attractive and well-cared-for grounds and facilities as in any park; and four, to ensure that the airport had true public access and was properly supervised.[34] When the East Boston Airport was given to the city of Boston in 1928, for example, it was under the management of the Park Department until the city ceded authority back to the State in 1941. When Harvard University published a pioneering study on American airports in 1930, 21% of airports surveyed were administered by a city's Park Department and the same percentage were built on park land

[34] Theodore Wirth in "Who Shall Own and Operate the Airports?" *American City* 39 (December 1928): 110.

(surprisingly, only three airports—Des Moines, Spartanburg, and Wichita—were both park-owned and operated). The Harvard study noted that, “It is said that the Park Department should administer the airport because the requirements are similar to those met in park development and administration. Thus for both airports and parks a large tract of land must be cleared, graded, drained, surfaced, and landscaped. Structures must be erected and concessions leased or operated, and provision must be made for the handling of large crowds.” However, the authors cautioned, “It seems clear on principle that use for an airport is not a park use. A park is intended for recreation, an airport is a facility of business and commerce.” They concluded their report with the prescient evaluation that flying for amusement “is a minor purpose and not the essential end and aim of aviation.”[35]

LINDBERGH

However, the importance of celebrated aviators in creating an “air-minded” public should not be minimized. In addition to providing Americans with their first experience with flight, barnstormers expanded the applications of aviation to include aerial photography and surveying, crop dusting and irrigation, emergency service, freight delivery, and joy riding. Charles Lindbergh, by crossing the

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[35] Henry V. Hubbard, Miller McClintock, and Frank B. Williams, *Airports: Their Location, Administration and Legal Basis.* Vol. I, The Harvard City Planning Studies (Cambridge, Mass.: Harvard University Press, 1930), 166, 57, 120.

Atlantic Ocean at its widest point in 1927, became one of the most famous men of all time.[36] This solo flight and his subsequent nation-wide promotional tour electrified an American public that had been, in comparison to Europe, lukewarm to aviation. The more than a dozen Hollywood films that immediately followed Lindbergh's flight, such as *Wings,* 1927; *Across the Atlantic*, 1928; *Young Whirlwind,* 1928; *The Aviator,* 1929; *Flight,* 1929; and *Young Eagles,* 1930, further glorified the courage and daring of early aviators.

One result of the "Lindbergh Effect" was the exponential growth of airports. Cities that had had only a landing field to welcome Lindbergh on his transatlantic flight or victory tour, such as San Diego and St. Louis, found their constituents eager to build an airport (San Diego named their new airport Lindbergh Field and it was dedicated by the great man himself). From 1927 to 1929 the number of municipal airports in the U.S. nearly doubled, from 240 to 453.[37] However, an analysis of the data shows that approximately half of these were not strictly speaking airports but were rated "intermediate landing fields," as they were not equipped for the receipt or discharge of passengers or cargo.[38]

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[36] Historian Joseph Corn cites a study that found that more poems have been written about Lindbergh and his transatlantic flight than any other person or event in Western history. Joseph J. Corn, *The Winged Gospel: America's Romance with Aviation, 1900-1950* (New York: Oxford University Press, 1983), 23.

[37] Records of the Department of Commerce, reprinted in Hubbard *et al.*, *Airports,* 138.

[38] Ibid., 88; and Donald Duke, *Airports and Airways: Cost, Operation and Maintenance* (New York: The Ronald Press Company, 1927), 11, 53.

Nonetheless, the spate of record-breaking long-distance flights by Lindbergh, Amelia Earhart, Charles Kingsford Smith, and other intrepid pilots of the 1930s demonstrated that aviation was in fact becoming a form of transport. Another striking example of the Lindbergh Effect was the more than 400% increase in passengers carried on American airlines between 1927 and 1928.[39] The fledgling airlines were able to successfully expand the passenger market by capitalizing on the new romance of flight.

In Europe commercial aviation began soon after World War I with converted military aircraft. Several state-subsidized aviation companies in France, Holland, and Germany had established regular passenger service as early as 1919, and during the next decade airliners specifically for passenger travel underwent intensive development as nations competed for air dominance. The situation was quite different in the United States, where automobile mogul Henry Ford introduced the first viable passenger airplane in 1926.

Ford initially became interested in air transport as a means to quickly deliver key personnel and parts to his automotive factories to keep the assembly lines running. But he envisioned making an airplane for the ordinary person as much as he had done with the automobile. Ford was also convinced that the future of commercial aviation depended on the development of a reliable airplane purpose-built for carrying passengers. In 1924 Ford and his son Edsel purchased William B. Stout's Metal Aircraft company, which had pioneered in the production

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[39] Passengers flown on scheduled, regularly operated services increased from 12,594 in 1927 to 52,934 in 1928, in Alexander Klemin, "American Passenger Air Transport," *Scientific American*, October 1929, 325.

of all-metal aircraft. Airplanes had wooden or wood and fabric-covered wings; the more rugged metal construction was an innovation of German designer Hugo Junkers. Another design contribution from Europe (the Dutch-made Fokker F.VIIa-3m) was powering an aircraft with three engines. Tri-motors were safer, since stalling occurred frequently, as well as easier to balance and maintain a level, more comfortable flight. The Ford Tri-Motor, thus combined the best of European passenger aircraft design: it was an all-metal, three engine, cantilevered wing, closed cabin, open cockpit monoplane that held six passengers (fig. 28a).[40]

The Ford Tri-Motor was readily adopted by the fledgling airlines; it was affectionately called the "Tin Goose", a reference not only to its metal body but Ford's popular Model T automobile, the "Tin Lizzie."[41] In particular, the Tri-Motor gained fame as the aircraft used in the first cross country passenger flights offered by Transcontinental Air Transport, an enterprise headed by Clement M. Keys. TAT signed on Charles Lindbergh as consultant to create a continuous coast-to-coast passenger route that combined air and train travel.[42] Lindbergh

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[40] The Ford Tri-Motor was produced until 1933 and was so durable that it is still in limited use today. Later versions had a closed cockpit and held up to fourteen passengers.

[41] There was also a "Tin Bubble": the first goal of the relocated and newly-built aviation engineering laboratory was to develop an all-metal airship. Only one was ever produced, the Tin Bubble, officially known as the ZMC-2 (Zeppelin Metal Clad 2) of 1929 for the United States Navy. Timothy J. O'Callaghan, *Henry Ford's Airport and Other Aviation Interests, 1909-1954* (Ann Arbor: Proctor Publications, 1993), 12.

[42] There were no night flights, as pilots could fly under visual conditions only.

spent over a year plotting the route and promoting the municipal acquisition of airfields at Columbus, Indianapolis, Albuquerque, and elsewhere. According to Keys, not a single airfield met Lindbergh's requirements, and a substantial amount of the company's capital went into the building of runways, lighting systems, radio communications, weather stations, fire and fueling depots, and passenger facilities.[43] The resulting "Lindbergh Line" that ran from New York's Penn Station to Los Angeles involved traveling by Pullman car during the evening followed by daytime flights for an estimated 48 hours of travel—less than half the time the journey took by train alone.

Keys, in a 1928 address to the New York Railroad Club seeking its endorsement for his venture, identified three reasons why passenger travel by air was bound to be a success. First, he noted, it would be the fastest means available for those traveling because of a long-distance emergency. Second, it would be useful to businessmen; and third, travel by air would be attractive simply because it offered an unprecedented adventure. Keys observed that, "In America, the last of these three may be more important than the other two, for we are a nation of sightseers and of seekers after new things."[44] A 1929 advertisement in *Scientific American* for the Lindbergh Line bore this thinking out;

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[43] Clement M. Keys, "What the Rail-Air Business Means," address given to the annual meeting of the New York Railroad Club, 13 December 1928. Printed in *Pennsylvania Railroad Information* (January 1929): 7.

[44] Ibid., 6.

it detailed the Ford Tri-Motor's safety features as it touted the transcontinental journey as "one of the greatest of all human experiences."[45]

Despite its effective publicity campaign, The TAT company declined in profitability after its inaugural year. The wealthy, adventurous people targeted by Keys were an insufficient market base and operational costs were too high. There was little aviation infrastructure such as weather forecasting, radio communications and airfield procedures; as a result, flights were frequently cancelled because of bad weather and equipment failure, causing critics to call the service "Take A Train." In 1930 Transcontinental Air Transport merged with Western Air Express to become TWA.

The vision of TAT was an exception during this early period. The city of Grand Rapids, Michigan, for example, was a pioneer in establishing an airport with a terminal in the mid 1920s (it followed, of course, the airfield and hangars, which were built in 1919-1920). Yet it was not until 1926 that Grand Rapids had regularly scheduled airline service, and it was two years later that the first shipment of Grand Rapids furniture—the region's major industry—was transported by air. This was a media event; the furniture was accompanied with fanfare by Miss Grand Rapids.[46] The data from the Harvard study shows the

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[45] Ford Motor Company advertisement, *Scientific American*, December 1929, 4.

[46] The Grand Rapids Municipal Airport was one of Lindbergh's stops on his 1927 publicity tour. This event gave the airport prominence and city established a record of state-of-the-art facilities and equipment. Although freight service was initiated in the 1920s for shipping knocked-down furniture, all-cargo freight did not begin until 1947. Gerald R. Ford International Airport, "Historical Timeline;" available from http://www.grr.org/About/timeline.html; Internet; accessed 17 October 2003.

continued dominance of general rather than commercial aviation: out of 80 airports surveyed, only 46 had facilities for passengers or cargo, whereas 69 had flight schools, 67 offered sightseeing rides, and all 80 were used by private planes.[47]

THE POST OFFICE

It was arguably the Post Office, rather than the military or famous aviators, that contributed most to the development of commercial airlines and a nationwide system of airports. Airmail delivery began in 1918 as part of the Army's effort to keep its Air Service from disbanding by demonstrating a peacetime use for pilots. However, Army pilots were not always familiar with U.S. geography nor were their planes designed for long-distance flight or for carrying freight. In fact, the first demonstration flight from Washington, DC, to New York City was a debacle; the pilot became confused and headed south to Virginia, landing upside-down in a field only a few miles from takeoff. The Post Office soon contracted civilian pilots and companies to deliver the mail, a practice that was to have enormous consequence for the aviation industry.

Despite this inauspicious beginning, within two years the Post Office established transcontinental airmail service from New York to San Francisco. In

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[47] Hubbard *et al.*, *Airports,* 5.

1921, the transcontinental route expanded to fifteen stops. Each segment on the route was a short day flight due to the limitations of aircraft and navigational devices. Nevertheless, a letter traveling coast to coast by air saved considerable time over the same letter traveling by train.[48] Cities that were part of the transcontinental and other routes, such as Boston, Cleveland, Chicago, Dallas, Miami, and St. Louis were required to provide airports that were well marked (i.e., easily visible from the air) and that had facilities for aircraft fueling, maintenance and repair.

Like the Air Service, the Post Office had no money for airports. The burden fell upon the municipality to make the sizeable appropriations of land and money to build and maintain an airport. Major cities and many smaller ones did just that by 1930, local officials selling the airport to their constituencies in the name of progress and civic boosterism. Aviation supporters warned their cities not to get left behind. Although air transport had yet to demonstrate its potential, communities that had benefited from or missed out on the railroads were not difficult to convince. A typical article encouraging municipal airports was written by William E. Arthur, manager of the Airport Division of The Austin Company, and appeared in the October 1929 issue of *Scientific American* with the explanatory title of “How Shall We Design Our Airports? ‘Landing Fields’ No Longer Suffice; Complete Airports With Every Possible Facility Must Be Designed and Built.” Arthur claimed that, “every community, in order to stay on

[48] Estimates as to the amount time saved are quite variable, ranging from 22 to as much as 61 hours.

the map, is faced with the literal necessity of establishing an airport."[49] A survey conducted by the New York State Bureau of Municipal Information in 1927 demonstrates the strong community support that existed for aviation at this time. The report found that of the state's 25 municipal airports, the city council, city officials, or a citizens' committee had instigated nearly all of them.[50] Smaller cities, in particular, tried to attract the aviation industry itself with a well-equipped airport. Aviation was a rapidly growing area: at its height in the mid 1920s, the automobile industry had only 108 manufacturers, whereas by January 1929 there were 232 aircraft manufacturing companies in the United States. In 1921, the aircraft industry produced 302 airplanes, 5000 in 1928, and 7000 in 1929.[51]

"Your City, a Port of Call," the lead article in the inaugural April 1928 issue of *Airports* magazine, begins with the statement, "The necessity of airports is so well recognized today that only a few municipalities of any importance have

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[49] The Austin Company, based in Cleveland and still in operation today, became one of the major airport construction management companies in the United States. William E. Arthur, "How Shall We Design Our Airports?" *Scientific American*, October 1929, 298.

[50] "How Existing Airports Have Been Established and Are Now Managed," *American City* 38 (January 1928): 118.

[51] Figures on the automobile industry from Antique Automobile Club of America, "Automotive History—1920-1929," available from http://www.aaca.org/history/cars_30.htm; Internet, accessed 16 February 2004. Figures on the aviation industry from Tim Brady, ed. *The American Aviation Experience: A History* (Carbondale and Edwardsville, Ill.: Southern Illinois University Press, 2000),144. A contemporary source cites slightly different figures: The number of airplanes manufactured in 1928 was 4,500 and estimated to be 9,000 in 1929 by Reginald M. Cleveland, "What is the Future of Aviation," *Scientific American*, October 1929, 313.

delayed their plans for at least the first requisite—a landing area."[52] This article, written by the Assistant Secretary of Commerce for Aeronautics William P. MacCracken, underlines the federal government's role in seeking municipal support for airports. In addition to conducting what amounted to a public relations campaign to encourage commercial aviation, two key pieces of legislation came into effect. In 1925 Congress passed the Airmail Act, also known as the Kelly Act after Representative Clyde Kelly, that led to the open bidding on contract airmail routes (CAM) by commercial companies.

In actuality, the Kelly Act sanctioned a procedure the Post Office already had in practice. However, it helped to institute airmail delivery and air routes. The expansion of existing air routes and the establishment of new ones assisted the tremendous boom in airport building that occurred after 1927.[53] More significantly, CAM routes were profitable because the companies were paid on the basis of weight to mileage. Since the mail had to be delivered on schedule, a pilot could, and often did, weight mailbags with bricks and receive payment from the Post Office for a heavy load. In fact, airmail delivery was more lucrative than transporting passengers, which meant that any passenger traveling on a CAM route faced the possibility of being jettisoned if the company had the opportunity

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[52] William P. MacCracken, Jr., "Your City, a Port of Call" *Airports* 1, no. 1 (April 1928): 5.

[53] National Register of Historic Places, "Aviation in American History," *National Register Bulletin: Guidelines for Evaluation and Documenting Historic Aviation Properties;* available from http://www.cr.nps.gov.nr.publications/bulletins/av2.htm; Internet; accessed 2 September 2001.

to pick up airmail.[54] Remunerative airmail delivery also encouraged aircraft manufacturers (often a part of the same companies that delivered mail) to develop larger and more reliable airplanes. For example, in 1926 the Douglas Aircraft Company produced the M2 airplane for the Post Office; it carried twice the load at a faster speed than the previous model, the DH4.[55]

Flying was still a dangerous occupation: out of forty pilots originally hired by the Post Office in 1919, only nine were living in 1925.[56] The initiatives of private individuals in improving these odds were especially significant in the United States, where there was no direct funding of aviation. Of these, the achievements of two father and son duos, Henry and Edsel Ford and Daniel and Harry Guggenheim, stand out.

FORDS AND GUGGENHEIMS: PATRONS OF AVIATION

In 1925 the Fords offered the Edsel B. Ford Trophy in support of the Airplane Reliability Tour organized by the Detroit Board of Commerce. The stated aim of the contest was "to end the dominance of the military and the emphasis on thrills and stunt flying, and demonstrate the reliability of travel by air on a

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[54] Roger E. Bilstein, *Flight in America, From the Wrights to the Astronauts.* 3rd ed. (Baltimore: Johns Hopkins University Press, 2001), 56-57.

[55] Brady, *The American Aviation Experience,* 134.

[56] Bilstein, *Flight in America,* 52.

predetermined schedule regardless of intermediate ground facilities."[57] The tour made a circuit that started and ended at the new airport at the Ford factory in Dearborn, Michigan, with stops at thirteen cities, including Chicago, Omaha, Kansas City, St. Louis, Columbus, and Cleveland. The competition was not for the trophy *per se* but to earn a perfect score. The scoring method, called the Figure of Merit Formula, was based on load carried (i.e., passengers), speed, engine power, and "stick and unstick" times (landing and takeoff capability) applied to time. Short takeoff and landing (STOL) aircraft rated highly because emergency landings were frequent and even designated airfields were small.[58] The larger cities on the Ford Air Tour had actual airports, but only Cleveland had a municipal airport. Smaller cities on the route, such as Des Moines, had no facilities and hardly an adequate landing field. Thus the phrase in the competition brief, "Regardless of intermediate ground facilities," was one of the greatest challenges for the competitors.

The annual Ford Air Tours had three benefits. First, they introduced many Americans to the idea of passenger flight, not only through the publicity they generated in the news (journalists were often the planes' passengers) but also because people had the chance to view the aircraft up close whenever they came to one of the cities on the circuit. Second, the tours also provided a much-needed impetus to the aviation industry to develop commercial aircraft, especially when foreign airplanes, such as by Fokker and the Junkers, outperformed

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[57] Quoted in Lesley Forden, *The Ford Air Tours, 1925-1931* (New Brighton, Minn.: Aviation Foundation of America, 1972, ed. 2003), 2.

[58] Ibid., 157.

American ones. The Fords in fact purchased the tri-motored Fokker airplane that won the 1925 tour and its design contributed to that of the Ford Tri-Motor. Third, the tours provided yet another incentive for cities to build public airports in order to get on the air map and to serve commercial aircraft.

The Guggenheims, whose wealth came primarily from mining, also promoted commercial aviation, although solely as a philanthropic concern. Harry Guggenheim had served as a pilot during World War I and had observed the advanced state of aviation in Europe. In 1925 the Guggenheims began founding aeronautical laboratories, research centers, and schools of aeronautical engineering throughout the United States. The following year they established the Daniel Guggenheim Fund for the Promotion of Aeronautics to further the cause of aviation to the American public chiefly by supporting research into designing safer aircraft.[59] These institutions played an important role in aerospace development up to the present day. For example, a model of the Akron airdock was tested in the wind tunnel at New York University's Daniel Guggenheim School of Aeronautics (fig. 2a). A special focus of the Guggenheim laboratories was developing navigational equipment for "blind" flying (piloting an aircraft through instrumentation alone). On September 24, 1929, Army pilot Jimmy Doolittle made history when he completed the first blind flight at the Guggenheim-established Full Flight Laboratory at Mitchel Field, Long Island.

In addition to their efforts in improving aircraft technology, the Guggenheims established a "Model Airway" in 1928 in conjunction with the start-

[59] The Guggenheim Fund also sponsored Lindbergh's three-month flying tour of the U.S. in 1927.

up airline Western Air Express. The Model Airway, with stops at San Francisco, Oakland, and Los Angeles, was meant to demonstrate that passenger flight could be safe, comfortable, and to schedule; in short, that air travel could be a viable enterprise and not just an adjunct to airmail service. For the airway, the Guggenheims funded the purchasing of Fokker Trimotors, created a meteorological service for the route, and ensured more than basic customer amenities for passengers. Although Western Air Express absorbed the route into its regular schedule of flights only one year later, the Model Airway was not a financial success and showed the clear the need for Federal involvement.

In 1926 the Air Commerce Act was passed to give greater stimulus to commercial aviation. The first Federal law to regulate aviation, its purpose was to institute national standards for air safety as well as guidelines that would aid the development of commercial aviation. It legislated the licensing of aircraft and aviators and the marking of all aircraft. It mandated federal authority to set aircraft operating requirements and air traffic rules and to provide a national rating of airways and airport facilities. Finally, it created within the Department of Commerce an Aeronautics Branch (later called the Bureau of Air Commerce) to implement the new regulations.

The effects of the Air Commerce Act were felt almost immediately. First, the Aeronautics Branch began to manage the air routes. This assertion of federal control was a priority to ensure equitable access to routes and ports that were becoming dominated by single carriers, to aid in national defense, and to make the routes safer. In particular, the rapid increase in congested and unmarked

airways had created a hazardous situation. The Aeronautics Branch oversaw the marking of more airways and the equipping of navigational aids, such as radio range beacons, airway and airfield lighting, and airport control towers. Federal supervision brought rapid progress crucial to the creation of nation-wide aircraft guidance and communications systems. In 1928 the Aeronautics Branch was awarded the prestigious Collier Trophy for its success in improving air navigation and safety.[60]

Second, the Aeronautics Branch published a number of bulletins and reports on airports: their construction, management, zoning, concessions, field rules, safety codes, and the like, that were intended to provide current information, establish uniform guidelines for construction, and standardize procedures for operation. For example, the department devised an airport rating system primarily as a way to instruct municipal engineers and architects on how to provide an airport appropriate to their city's needs. The system rated an airport in three areas: its general facilities and equipment (A, B, C, or D), the amount of "effective landing area" (A-D before 1930, then 1-4), and its lighting equipment (A-E, or X). According to this system, an airport with the highest rating, AAA or A1A, would have administration, cargo, and passenger facilities, fully equipped hangars, maintenance buildings and a pump station, an airfield that allowed for 2,500 feet of landing space in all directions or some sort of similar configuration

[60] The Collier Trophy was established in 1911 by Robert J. Collier, the publisher, pilot, and president of the Aero Club of America (now the National Aeronautic Association) as an annual award for achievements and advancements in American aviation.

(more space was required if an airport was at high altitude), and all-night illumination through a comprehensive lighting system of beacons, airfield flood lamps, boundary and obstruction lights. The Department had publicized its recommendations and plans for the "model airport" in *American City* and other professional periodicals as early as 1927, and in 1929 it published these in greater detail in an official circular.[61] An example of an "AAA" airport plan is San Diego's Lindbergh Field, which was designed in consultation with the Aeronautics Branch in 1928 (fig. 4).

Oakland, California, was another city that constructed an airport to meet the department's recommendations.[62] Its administration building, while externally almost as utilitarian-looking as the adjacent hangars, had a mahogany-trimmed interior with facilities for passengers furnished with the standard wicker chairs, a hospital equipped for emergency operations, weather reporting, post office, and even a separate lounge and shower room for pilots. The city produced a promotional pamphlet on its airport and the plan and design of Oakland Municipal Airport were discussed and illustrated in professional periodicals such as

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[61] "Another Design for a Model Airport," *American City* 37 (November 1927): 642.

[62] According to Deborah Douglas, Oakland was the first airport designed in accordance with the rating system, although it was constructed one year before the ratings were published. Douglas, "The Invention of Airports," 480-484. San Diego's Lindbergh Field, constructed in 1928, claims to be the first built and certified to the new federal standards; San Diego International Airport, "Official Historical Timeline;" available from http://www.san.org/airport_timeline.asp; Internet; accessed 20 November 2003.

Airports.[63] Soon a number of cities followed its lead, such as Boston, Oklahoma City, and El Paso. However, no airports applied for federal inspection until 1930; and few went so far as certification. Even Oakland, which would certainly have received the highest rating, did not seek certification.[64]

Although the ratings system seemed a step forward in developing a uniform system of airports, in actuality it stopped short of this goal. Because inspection and certification were voluntary, cities were unwilling to risk receiving anything less than the top rating. In 1931, the Director of Aeronautic Development Harry H. Blee, claimed that many cities were merely waiting to apply for certification until they could upgrade their airport facilities to qualify for an "A1A" rating. He further noted that the twelve states on an upcoming airport inspection tour had initially spent $32,000,000 on municipal airports, and that they anticipated an additional expenditure of $6,000,000 on improvements.[65] Nonetheless, a December 1932 article in *U.S. Air Services* reported that less

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[63] Oakland, California, Board of Port Commissioners, *Oakland Municipal Airport* (Oakland: Board of Port Commissioners, 1928) and "Oakland's Administrative Building," *Airports* 1, no. 2 (June 1928): 14-15.

[64] Pontiac Municipal Airport, Michigan, rated A1A, was the first to received certification. Myron D. Stokes, "Oakland County International Airport Takes Its Place in Aviation History: 75 Years of Progress—1928," *e Motion Reports 2003*; available from http://www.emotionreports.com/ptkairport/ptkairport.htm; Internet; accessed 8 November 2003.

[65] "Municipal Airports Making Improvements to Obtain High Ratings," *American City* 45 (July 1931): 126.

than five percent of the country's civil airports were rated by the end of that year.[66]

Perhaps the greatest effect of the airport ratings and airways safety measures was that the popular image of aviation began to change from romantic and risky to stable and secure. [67] An example of this shift in public opinion was that an air pilot was a recognized vocation by the end of the decade. Aviators went from being classified as "showmen" in the Census of 1910 to "transportation and communication" professionals in the 1930 census; by 1932 the federal government began to issue a special license to airline pilots.[68] In this way the Air Commerce Act was highly effective and provided the necessary support to ensure passenger safety and inspire public confidence in commercial aviation. In 1930, Harry Guggenheim announced that he was concluding the Guggenheim Fund, for the air age had arrived. "The airplane," Guggenheim wrote, "is no longer merely a sensational instrument. . . but this pioneering period has come to an end. The airplane is on the point of becoming a common carrier which will have a very vital effect upon our systems of transportation."[69] So too, the Ford Airplane Reliability Tour had its final competition the following year.

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[66] "Why Not Compulsory Ratings for Airports?" *U.S. Air Services* 17 (December 1932): 19.

[67] David Brodherson, "What Can't Go Up Can't Come Down: The History of American Airport Policy, Planning and Design" (Ph.D. diss., Cornell University, 1993), 62.

[68] Bilstein, *Flight in America,* 100.

[69] Harry F. Guggenheim, *The Seven Skies* (New York: G.P. Putnam's Sons, 1930), 116-117.

THE DOCK CONCEPT

What arguably had the most impact on airport design and development in the United States was the “dock” concept entailed in the Air Commerce Act. This principle clarified federal and municipal authority vis-à-vis the airport. It took as its model the maritime system, in which the city built, operated, and maintained the port while the federal government did the same for the waterways and also provided maps, markings, weather information, and other safety measures. In fact, the Airways Division formed by the Aeronautics Branch to oversee air safety and investigate accidents was part of the Bureau of Lighthouses until 1933. This was not an illogical categorization for aviation and waterways were closely connected at this time. The Navy trained its own pilots and built some of the first military airports, and the Navy’s Curtiss flying boats were the only American aircraft used in combat during World War I. Nautical terms, such as ship, port, and pilot, were also applied to aviation. Many early airports were located with access to water in order to accommodate seaplanes. Pan-Am’s large “Clipper” seaplanes defined luxury travel during the 1930s and established transoceanic passenger travel by air.

As a result, the airport often came under the authority of the city’s harbor commission or port authority. More significant, the dock concept made the

municipality responsible for the airport and the federal government for the airways and general safety. A major airport could now have as many as four federal agencies on site: air traffic control, post office, weather bureau, and customs; yet the federal government could not explicitly build, own, or maintain an airport.

The dock concept is also evidence of the kind of associationalist government prevalent during the period, where the federal government saw its role as largely advisory.[70] Its application to airports created a very different situation in the United States from that in Europe, where state investment and oversight were major factors affecting airport development. Aeronautics expert and associate editor of *Scientific American* Alexander Klemin considered the United States policy to have a deleterious effect on commercial aviation. He observed in a 1929 editorial: "With no subsidies, no government regulation, and no tourists, American operators naturally hesitated to enter the field of passenger air transport."[71] In contrast, European governments recognized that commercial aviation required planning, funds, and infrastructure that were beyond the means of local government. In particular, Germany's state-sponsored aviation industry produced aircraft and airports that led the world and were regularly featured in American periodicals. A typical example is the sophisticated Hamburg airport by

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[70] Janet R. Daly Bednarek, *America's Airports: Airfield Development, 1918-1947* (College Station, Tex.: Texas A&M University Press, 2001), 42, 45.

[71] Klemin, "American Passenger Air Transport," 324.

architects Friedrich Dyrssen and Peter Averhoff that appeared in the August 1930 issue of *Architectural Record* (fig. 5).

Nevertheless, most Americans concurred that the airport should be a local concern because the community could expect to profit from the economic advantages it provided. The 1930 Harvard City Planning Study on airports, however, echoed the conclusion drawn by city planners that although aviation had profited, communities had yet to see a return on their investment in a municipal airport: “Aviation has indisputably been benefited by the municipal airport. The number of adequate airports has been tremendously increased. Municipal ownership has given an air of permanence to aviation ventures which has encouraged commercial investment.” They further noted that, “It is apparent that the municipal airport has played an important part in the development of air transportation in the United States by supplying an indirect subsidy in the form of essential terminal facilities.”[72] Indeed, what was a poor policy for airports and the development of a national system of air transport worked well to foster a competitive environment unhampered by government bureaucracy. Lacking the security of a nationalized industry spurred the aviation industry to be innovative in order to stay in business. Despite the fact that its airport facilities continued to lag far behind those of Europe, the United States quickly assumed the lead in aviation by the late 1920s.

The United States government’s hands-off approach changed during the following decade of the Depression. Cash-strapped cities could no longer

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[72] Hubbard *et al.*, *Airports,* 50, 53.

manage the necessary airport upgrades and expansions to keep pace with the rapid changes in aviation. These occurred simultaneously in three areas: first, heavier and larger planes with landing gear required runways that were longer, wider, marked and paved; second, two-way radio communication, radio and light beacons, and twenty-four hour lighting systems were now indispensable for all-night and all-weather flying; and third, the increase in passenger travel necessitated facilities for public use as well as better access to and from the airport.

Airfield improvements were the most expensive, and demanded the services of a specialist engineer. They were also the most necessary, since the new airliners could not land on the standard sod fields, nor was the usual all-way landing area advisable as airports experienced an upsurge in air traffic. The municipal airport at St. Paul, Minnesota, for example, was temporarily taken off the airmail route and consequently lost most of its airline service until the city was able to upgrade its airfield to handle the larger transport planes.[73] Even airports that were built to the highest standards in 1928, such as Oakland and San Diego, faced unforeseen major field expansion expenses only three years later. And despite the dramatic growth in the number of air travel passengers—the number tripled between 1929 and 1932—commercial airline business was still insufficient to make most municipal airports profitable. The equipment, space, and facilities now needed also generated problems with residences and businesses adjacent to the airport as private property was claimed for airport expansion and all-night

[73] "St. Paul Bond Issue for Holman Airport," *American City* 53 (October 1938): 13.

lighting and increased traffic became a nuisance. Consequently, many municipal airports that were built in the late 1920s became inadequate and were abandoned rather than improved; and after the financial crash many cities were unable to complete airport construction. Already in December 1930 Charles Gale noted the trend in an article in *Aviation*; he found that less than half of reported municipal airport projects—only 678 of 1,632—had reached completion by July 1, 1930.[74]

COMMERCIAL AIR MAIL ROUTES

In contrast, the airline industry was booming. The passage of the Airmail Act of 1930 (McNary-Watres Act) substantially increased the profitability of airmail delivery. The aim of the legislation was to support commercial aviation by encouraging aircraft development and the transport of passengers. The Airmail Act accomplished this through three provisions. First, the method of payment to the airlines was revised from weight-mileage to volume. Thus the more a plane could carry, the larger the payment, with the result that any passengers carried by an airmail plane both filled the load and generated additional income from ticket sales. Second, congress allocated money to the Post Office to purchase the most advanced engine, aircraft, and navigational equipment. Third, the Post

[74] Charles H. Gale, "America's Airport Problem To Date," *Aviation* 29 (December 1930): 330-331.

Office was given complete authority over the designation of CAM routes. This control effectively determined the routes for passenger travel as well, since passenger transport on its own was not profitable.

Instead of an open bidding process, Postmaster General Walter Folger Brown consolidated the CAM transcontinental routes to three and awarded them to four large companies. This action forced several smaller companies that had regional routes to merge. For example, Transcontinental Air Transport and Western Air Express formed TWA for the central route of New York to Los Angeles; and it caused others to submit to hostile buyouts, such as the take-over of Southwest Air Fast Express in Texas by American Airways, to create the southern route under one large company. The resulting airlines—Eastern, American, TWA, and United—became known as the “Big Four” and they dominated the airways in the United States for more than fifty years.

Although the Airmail Act greatly limited commercial aviation, it also protected it and stimulated the production of larger and safer planes for which, at the time, there was no other market than the Post Office. The next several years were banner ones for aircraft development: in February 1933 the Boeing introduced the B-247 for United, a 10-passenger plane; in July 1933 the Douglas DC-2, which held 12-14 passengers, was developed for TWA, Eastern, and American airlines; and one year later the DC-3, a 21-passenger plane rolled off the production line. Each of these planes was much larger and far more cost efficient than its predecessor. The DC-3, the standard airliner until the end of World War II, lowered operating costs so much that for the first time a flight could

be profitable carrying only passengers. However, during the Depression, the airlines flourished on airmail delivery. For example, in 1933 the airlines made approximately $34 million in profit from Post Office subsidies alone.[75]

The benefits reaped by the major aviation companies did not go unnoticed and, following a journalist's tip-off, a senate committee investigated the Post Office's practice in awarding CAM routes. The subsequent scandal over the so-called Spoils Conferences led to the cancellation of all CAM routes in February 1934 and President F.D. Roosevelt commanded the Army Air Corps to fly the mail. However, Army pilots were inexperienced and military aircraft ill-equipped for cargo. There were so many pilot fatalities that Roosevelt had to rescind his order within weeks. The Airmail Act of 1934 (Black-McKellar Act) was quickly passed to remedy the situation. The Act stipulated that neither monopolistic companies (combined airline and aircraft or aircraft parts manufacturing companies) nor companies that flew competitive routes could bid for a CAM route. In addition, the Act forbade any of the companies awarded a CAM route at the Spoils Conferences from participating in the bidding. The 1934 Airmail Act precipitated the break-up of large amalgamated companies such as the United Aircraft and Transport Company, which fractured into United Airlines, Pratt and Whitney, and Boeing; but other airlines that had held CAM routes evaded the prohibition by simply reorganizing and renaming themselves.

Changes to CAM routes would have a significant impact on municipal airports. Aviation historian Deborah Douglas has argued that,

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[75] Brady, *The American Aviation Experience,* 174-175, 177.

> The airport is a key component in a technological system that is a means of both transportation and communication. During its formative period, 1919-1939, most Americans came to believe that the airplane was unable to achieve its potential without an elaborate network of facilities. It came to be understood that the commercial value of the airplane was not its potential to go 'anywhere' but rather the fact that it went 'somewhere'—somewhere individuals already wanted to go, and that it did so quickly, reliably, and safely.[76]

However, the history of many municipal airports suggests that this statement is only partially true. A case can be made for the idea that, to modify Bob Perelman's line, "the plane takes you where it goes." For a number of cities on the CAM routes were not places people wanted to go but simply necessary refueling stops on the way to a destination. For example, the Post Office dropped the cities of North Platte, Nebraska; Bellefonte, Pennsylvania; and Rawlins, Wyoming from the airmail routes when improvements in aircraft fuel capacity and instrumentation made these stops unnecessary. Others, such as the line from Elko, Nevada to Pasco, Washington (a route described by a Post Office official at the time as "starting nowhere and ending nowhere"), were later replaced by more important destinations, in this case by Salt Lake City and Seattle.[77]

On one hand, at Bellefonte, Pennsylvania, city officials went to great lengths to defeat the larger rival town of Lock Haven to be named an airmail port in 1918. Even though Bellefonte lost airmail business after 1926, the airport survived, largely due to its selection in 1932 as the site of one of three radio

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[76] Douglas, "The Invention of Airports," 2.

[77] Charles S. Davey, "The Beginnings of Commercial Aviation," *Beehive History* 8 (1982); available from http://historytogo.utah.gov/aviation.html; Internet; accessed 12 November 2003.

weather stations on the central transcontinental route.[78] Yet Bellefonte remained considerably smaller than neighboring Lock Haven, with about one-third the population. Today both towns retain limited public-use or general aviation airports, without airline service. The city of Pasco, Washington, fared somewhat better because the Navy built an air training station at the airport prior to World War II. Following the War, the Navy transferred the improved facilities to the town. The steady growth of Pasco and the nearby cities of Richland and Kennewick resulted in the continued expansion of and investment in their airport.[79] Now known as the Tri-Cities Airport, it is served by four airlines.

On the other hand, a vivid illustration of the power of the Post Office in airport history is the story of New York City's first municipal airport, Floyd Bennett Field. In 1929 the Post Office named Newark Airport an airmail terminus; one year later it was already one of the busiest airports in the world. Anxious that New York, rather than New Jersey, receive its due economic benefits, Mayor Jimmy Walker spared no expense in the construction of Floyd Bennett Field on Jamaica Bay, which was a project of the City's Commissioner of Docks. When the airport opened in 1931, it boasted a seaplane base and the most modern equipment and facilities of any airport in the country, in particular excellent night lighting and extensive concrete runways (fig. 6). The airport played a prominent

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[78] Romayne B. Naylor, *et al.*, "Airmail Service," *Bellefonte Through the Years*; available from http://Bellefonte.topcities.com/airmail/index.html; Internet; accessed 12 November 2003.

[79] Port Authority of Pasco, "History," *Tri-Cities Airport: A Port of Pasco Facility*; available from http://www.portofpasco.org/ap/ap_history.htm; Internet; accessed 12 November 2003.

role in the Golden Age of Aviation, for many celebrated pilots such as Wiley Post, Amelia Earhart, Jimmy Doolittle, Laura H. Ingalls, and Howard Hughes chose to fly from Floyd Bennett Field.

The airport was, however, several miles further than Newark from downtown New York and the central post office. The city considered—but ultimately did not—widening the traffic routes to the airport and installing a system of pneumatic tubes to transfer the mail to counter the additional distance.[80] Consequently, the following mayor, Fiorella LaGuardia, was unsuccessful in attracting commercial aviation to the airport. Once, in a highly publicized stunt, LaGuardia insisted on a return flight that he be flown to New York, the destination written on his ticket, rather than land in Newark. Nevertheless, in 1936 the Post Office delivered its final refusal to designate Floyd Bennett Field as an airmail terminus. This decision had a domino effect: the airport was subsequently rejected by the Weather Bureau and the Customs Office denied it port of entry status. The airlines, too, followed suit, and LaGuardia attempted to cut the city's losses by leasing the airport to the Coast

[80] The pneumatic tubes were a suggestion of Friederich-Karl Freiherr Von Koenig-Warthausen, correspondence to H. Meyer, Deputy Commissioner of Docks, New York City, 8 April 1931; New York Municipal Archives. A pneumatic tube system existed at this date at Schipol Airport, Amsterdam, to transport flowers; but closer to home, post offices in New York and Brooklyn had been using a pneumatic tube system for thirty years. Well into the twentieth century, approximately thirty percent of first class mail reached New York post offices by pneumatic tube.

Guard and the Navy. The Navy used the airport until 1986, whereupon it was abandoned.[81]

LaGuardia finally got New York City its airport with North Beach Airport in 1939. North Beach, Queens, was significantly closer to the city's Central Post Office than Floyd Bennett Field. But the tables had turned; the Post Office now followed the airlines' lead as passenger transport became more lucrative than mail delivery. North Beach Airport was built to serve the new DC-3 and to satisfy the expectations of a rapidly expanding traveling public (figs. 7 and 8). Opening in time for the nearby World's Fair, it quickly surpassed Newark in the number of passenger flights.[82] Within two months of the airport's inauguration, the New York City Council renamed it LaGuardia Field, "as a testimonial to the Mayor of our city who conceived of this great airport and who was solely responsible for its development."[83]

LaGuardia Field was not only a remarkable political feat but also heralded a new era in American aviation. The New York municipal airport was the first fully planned airport as part of a growing national system. As such, it combined the

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[81] Today Floyd Bennett Field is preserved as part of the Gateway National Recreation Area.

[82] The popularity of North Beach Airport demonstrates that the profitability of passenger transport now exceeded that of airmail delivery. In fact, Newark Airport's loss of airline contracts to North Beach caused it to close temporarily, from May 1940 to June 1941, until three of the four airlines resumed passenger service to Newark. Bednarek, *America's Airports*, 113.

[83] Resolution of the New York Board of Estimate and the City Council, 2 November 1939, in Geoffrey Arend, *Air World's Great Airports: LaGuardia, 1939-1979* (New York: Air Cargo News Inc., 1979), 21, 23.

expertise of architects, engineers, city planners, as well as local, state, and federal agencies.[84] Mayor LaGuardia hired the respected New York firm of Delano & Aldrich as architects and the Works Progress Administration assumed joint responsibility for the project. The complexity of the undertaking—technically and jurisprudentially—is illustrated by the over one thousand drawings Delano & Aldrich produced for the airport. The architects had to make numerous changes to accommodate all of the parties involved. In fact, LaGuardia Field became the largest single project undertaken by the Works Progress Administration.[85] This airport is the crowning example of how the federal government modified the dock concept to provide cities with the necessary assistance to meet the demands of commercial aviation.

NEW DEAL PROGRAMS

When Franklin Roosevelt assumed office in 1933 he quickly formed the Public Works Administration and the Civil Works Administration. These agencies were committed to, among other things, assisting municipalities with airport improvements and construction. The requirements for applying for federal aid for

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[84] Douglas, "The Invention of Airports," 576, 594; and Bednarek, *America's Airports*, 113.

[85] United States, Works Progress Administration, *New York Municipal Airport* (New York, 1939?), 4. The drawings are now part of the Delano & Aldrich Collection in the Drawings and Archives Collection of Avery Library, Columbia University.

an airport project were that the airport had to be city leased or owned and that eighty percent of federal monies had to go to labor and twenty percent to the cost of materials. The city and state had to purchase the land and additional materials as well as supply the construction equipment.

According to an August 1934 article in *American City*, over 800 airport projects were already under way, and another 1,400 proposals had CWA approval.[86] The short-lived CWA built 585 new airports. The Federal Emergency Relief Administration, which provided relief through the states, assumed many of these projects in 1934 and spent an additional $17.6 million on airports. The PWA built a mere seventy airports, but because it was not limited to using 95% of local labor, its airport projects were more complex than those of the other assistance programs, such as the construction of administration and field buildings and the installation of lighting, radio, and instrument-landing systems.[87] Most of these projects were West Coast airports, many of them Naval fields, as concerns for national defense increased at the end of the decade.[88] The program that provided the greatest assistance to municipal airports was the Works Progress Administration, which was involved in more than one thousand airports. Because it used mostly unskilled labor, the work done at airports was generally

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[86] "Airport Construction Under the CWA Program," *American City* 49 (August 1934): 9.

[87] John Walter Wood, *Airports: Some Elements of Design and Future Development* (New York: Coward-McCann Inc., 1940), 345.

[88] Douglas G. Karsner, "'Leaving on a Jet Plane': Commercial Aviation, Airports and Post-Industrial American Society, 1933-1970" (Ph.D. diss., Temple University, 1993), 28.

airfield grading and enlargement. Nevertheless, in 1940 the architect and airport design expert John Wood extolled,

> The magnitude of the aid furnished to American airports by the WPA is indicated by the fact that 179 regular air-line stops, or approximately 90 per cent of the total in the United States, have been constructed or improved by its projects, and of the total amount of money spent on construction of airports in the United States to date well over one-third has been contributed by the WPA.[89]

While the WPA tended to fund large airport projects at major cities such as Chicago, Cleveland, New York, and San Francisco, CWA and FERA monies mostly went to small municipal airports. The disbursement of federal work relief funds was not impartial, but subject to the lobbying by small cities left off the CAM routes, the strength of Southern senators in Congress, and the pressure brought to bear by airlines such as Northwest in trying to assemble CAM routes. Later, priority was given to airports that had potential military value.[90]

An important figure who argued for the proliferation of small airports was Roosevelt's Director of Aeronautics Eugene Vidal. Vidal's approval was necessary for an airport project to receive work relief funding, and he actively encouraged small communities to apply.[91] Although Vidal had been a

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[89] Wood, *Airports*, 344.

[90] Karsner, "'Leaving on a Jet Plane'," 15-18; Douglas, "The Invention of Airports," 140-142; "Progress in Airport and Airway Development," *American City* 53 (December 1938): 13, and Work Relief Administration, "Press Conference, Howard O. Hunter, August 22, 1940, 3:00 P.M.," *Work Relief Administration Press Conferences*; available from http://newdeal.feri.org/workrelief/hun04.htm;Internet; accessed 25 November 2003.

[91] "PWA to Finance 2,000 New Aircraft Landing Fields Throughout the United States," *American City* 49 (January 1934): 72.

commercial airlines executive, he did not view flight as a potential form of mass transport; rather, he envisioned an airplane in every garage. Many other leaders in the aviation industry shared his perspective. In 1929 Francis Keally, an architect who was considered an early expert on airport design, envisioned that major cities such as New York would require "a Grand Central Station of air traffic, with hundreds of planes carrying commuters from their homes 100 to 200 miles away."[92] Yet a decade later Major A.B. McMullen, a well-known Canadian aviator, also prophesied that "millions of people will soon be using the airplane as millions are now using the automobile and many airport buildings will be necessary to accommodate them."[93] In agreement was also Army Air Service veteran and airport consultant Stedman Shumway Hanks published articles and books on how to build your own runway into the 1940s.[94] Col. Hanks predicted that community runways would become the highways of the future; he advised local commercial interests to build strip malls along runways.

Vidal is best remembered for his "poor man's airplane" campaign. He tried to obtain government funding to develop a $700-$1,000 all-metal airplane priced competitively with the average automobile. This aircraft would have marked a tremendous advance in aviation technology as airplanes in the $1,000 range

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[92] Francis Keally, "Tomorrow's Airports," *American Architect* 135 (5 May 1929): 596.

[93] A.B. McMullen, "The Development of Airports," *Pencil Points* 21 (October 1940): 620.

[94] Stedman Shumway Hanks, *Aviation Gets Down to Earth* (Boston: Aviation Information Service, 1940); and "'Flight Strips' for Civilian Use," *Landscape Architecture* 34 (April 1944): 80-89.

were fabric-covered with only basic instrumentation. Despite the publicity generated for an affordable airplane, the Bureau of Air Commerce had no funds for development, and Vidal was denied PWA money on the grounds that a small, inexpensive airplane could not be considered a public work. Unfazed, in 1934 Vidal announced a "flivver" competition to produce an aircraft for the Bureau's use that would address one or more of the four factors that deterred the adoption of personal airplanes: expense, ease of operation, safety, and convenience.

Although none of the prototypes submitted to this competition went into mass production, primarily because of their high cost, there were some interesting results. One was the Arrowbile designed by Waldo Waterman in 1936-37. His earlier Arrowplane had been one of the flivver competition's winning designs. The Arrowbile, like the Arrowplane, was a hybrid automobile and airplane that incorporated Studebaker, Ford, Austin, and Willys parts. The Arrowbile was an aircraft that could also be used for ground travel; it had a lightweight, removable wing. Studebaker bought the company and produced five Arrowbiles for publicity purposes but was unable to lower its $3,000 price tag.[95] Design team Carl Hadden and Dean Hammond, of Hammond Aircraft Corporation, built the second winning aircraft, the Hammond Y. This airplane, and its later model the Stearman-Hammond Y, also made the airplane's controls and handling similar to that of the automobile. The Stearman-Hammond Y had a

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[95] National Air and Space Museum, "Waterman Aerobile #6," *Aircraft of the Smithsonian* (Washington, DC: National Air and Space Museum, Smithsonian Institution, 1998-2000); available from http://www.nasm.edu/nasm/aero/aircraft/waterman.htm; Internet; accessed 24 November 2003.

carpeted and upholstered interior and it was much like stepping into a car. In addition, it was so easy to fly that an experienced driver could solo after only a few hours of instruction.[96]

However the only experimental airplane that had real commercial appeal was the ERCO Ercoupe. The original airplane submitted to the flivver competition was called the W-1, after its main designer Fred Weick. At the time Weick was the assistant chief of the aeronautics division of the National Advisory Committee on Aeronautics (NACA, the forerunner of NASA), but he later joined the Engineering and Research Corporation to continue refining the W-1. The subsequent ERCO Ercoupe, first flown in October 1937, met all of Vidal's criteria for a cheap, foolproof airplane: it was inexpensive to operate and maintain, easy to fly, the safest aircraft built to date, and its compact design and handling characteristics made it possible to land in small fields.[97] Even so, the Ercoupe caught the public imagination largely through its unique marketing strategy. It was displayed in the men's department of Macy's stores and advertised as

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[96] National Air and Space Museum, "Stearman-Hammond Y," *Aircraft of the Smithsonian* (Washington, DC: National Air and Space Museum, Smithsonian Institution, 1998-2000); available from http://www.nasm.si.edu/research/aero/aircraft/tear-ham.htm; Internet; accessed 24 November 2003.

[97] The Ercoupe went 115 mph, carried two passengers, and consumed just over four gallons of gas per hour. In comparison, the popular Cessna 152, introduced in 1978, goes 105 mph, carries two passengers, and burns six gallons per hour. Virginia Aviation Museum, "1946 ERCO Ercoupe;" available from http://www.eaa231.org/Museum/Ercoupe/Ercoupe.htm; Internet; accessed 25 November 2003.

"characteristically incapable of spinning."[98] Although few were sold before World War II (and no metal ones during the war because of materials restrictions) it was briefly popular after the war, when up to thirty-four a day were produced.[99] But as times changed the demand steadily decreased and manufacture of the Ercoupe ceased altogether in 1970.

One of the aircraft that Vidal actually ordered for the Bureau's use was the autogiro manufactured by the Pitcairn Autogiro Company (fig. 9). The autogiro had several features that made it attractive to non-professional pilots: small, top-mounted removable rotary blades, side-by-side seating as well as storage space in the cabin, and a road speed of twenty-five miles per hour. In addition, the autogiro, with it blades removed, could fit into an ordinary garage.[100] Harold Pitcairn, company vice-president James Ray, and the inventor of the autogiro, the Spanish engineer Juan de la Cierva, demonstrated its capabilities before large audiences in the United States, and several famous aviators, such as Amelia Earhart, also piloted the autogiro. One of the autogiro's most publicized

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[98] A spin occurs when an airplane's longitudinal axis becomes nearly vertical, causing the plane to drop rapidly while rolling. The Ercoupe's unique control system automatically corrected the plane's vertical axis (the yaw) and the nose wheel, which was linked to the rudder and ailerons, combined with limited elevator travel, made it easy to adjust the longitudinal and lateral axes (the roll and pitch).

[99] Roger Guillemette, "ERCO Ercoupe," *U.S. Centennial of Flight Commission*; available from http://www.centennialofflight.gov/essay/GENERAL AVIATION/ERCO/GA12.htm; Internet; accessed 25 November 2003.

[100] National Air and Space Museum, "Pitcairn AC-35," *Aircraft of the Smithsonian* (Washington, DC: National Air and Space Museum, Smithsonian Institution, 1998-2000); available from http://www.nasm.edu/nasm/aero/aircraft/ pitcairn_ac35.htm; Internet; accessed 26 November 2003.

moments was when Jim Ray landed it on the south lawn of the White House to accept the 1930 Collier Trophy on behalf of the Pitcairn company. Nearly a decade later the autogiro was still avant garde, for the architect William Lescaze depicted one on the roof of his House for the Year 2039 Project done for the 1939 World's Fair (fig. 10). However, the autogiro, despite its popularity and functionality, saw only limited production during the lean years of the Depression. The helicopter, perfected by Igor Sikorsky in 1939, superceded the autogiro in time for use during World War II.

The utopian vision of Eugene Vidal and other major figures in the aviation industry during the 1930s, while failing to make owning an airplane as affordable and available as the family car, nevertheless provided the foundation for the light plane industry as well as encouraged the growth of small airports and the development of military aircraft.[101] Today, airports serving general aviation—nonscheduled light plane flights primarily for business trips but also for pleasure, agricultural uses, law enforcement, emergency rescue, land survey and aerial photography—make up more than 75% of all public airports in the United States.[102] Recent years have also seen a dramatic increase in private fly-in communities, such as Spruce Creek and Jumbolair Estates (both in Florida), where there really is an airplane in every garage.

In 1938 the government acknowledged the increasing importance of aviation to national defense and to commerce with the Civil Aeronautics Act. This

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[101] Bilstein, *Flight in America,* 109, 114-116.

[102] Public airport as defined by FAA's National Plan for Integrated Airport Systems.

legislation replaced the Bureau of Air Commerce with the separate agency of the Civil Aeronautics Authority. The 1938 Act also created the Air Safety Board, which, although within the CAA, was given independent powers to investigate accidents and recommend actions to increase air safety. The Air Safety Board supported the federal implementation and operation of air traffic control centers. The first ATC centers were built and run by the airlines in 1935 and 1936 in response to heavy flight loads experienced at the airports of Newark, Cleveland, and Chicago. These were taken over by the agency, which gradually assumed permanent control of all airport centers and towers. Air traffic control was not only vital to air safety but also to establishing a national system of airports and airways.

Looking to define this system, Congress charged the CAA under the Civil Aviation Act to undertake a survey of all American airports. The survey, presented in 1939, found that the United States had only a few airports that met the highest criteria of Class IV and just 76 Class III airports that were suitable for commercial airline use. Although the government had contributed extensively to the construction and improvement of airports and landing strips through work relief programs, the survey advised that the country would shortly need close to five hundred new airports. With the onset of the War, the military requested the militarization of some 4,000 airports. Congress eventually approved $40 million to be spent on airports of military value through the Development of Landing Areas for National Defense program. DLAND airports tended to be in small

coastal cities and in southern states, where the location was strategic and the climate allowed for year-round flight training.

Most important, the Civil Aviation Act marked a significant shift in federal policy toward airport construction and development. Despite the New Deal programs, cities were unable to maintain and expand their airports as necessary. The American Municipal Association and the United States Conference of Mayors both issued statements at the end of 1937 that sought permanent assistance from the federal government for publicly owned airports.[103] In his 1940 survey of world airports, John Wood found the critical problem of American airports to be the lack of planning for expansion, with the result that inadequate airports were hindering the growth of commercial air travel.[104] To address this issue, the CAA modified the dock concept by recognizing public airports as a vital part of the national air transportation system and therefore placing them under federal jurisdiction. Cities now had to receive federal approval for airport building projects or equipment expenditures, but they could also apply for government funds for anything deemed indispensable to the airport's operation and safety. Although municipalities were still required to own and manage their airports, they were released from some of the financial burden.

In 1940, the Civil Aeronautics Authority was once again reorganized to better regulate the airlines. Its name was changed to the Civil Aviation

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[103] "A Year-End Message from the American Municipal Association" and "Federal Aid for Airports," *American City* 53 (January 1938): 5, 11.

[104] Wood, *Airports*, 3.

Administration, and it created a Civil Aeronautics Board to restrict competition among the airlines principally by controlling the number of flights and the airports for which an airline could operate through the issuance of "certificates of public convenience and necessity." The actions of CAB thus validated Postmaster Walter Folger Brown's forced consolidation of small airlines to favor large, financially stable companies at the 1930 Spoils Conferences. Brown's reputation was quickly rehabilitated as it became clear how limited competition and government incentives were beneficial to commercial aviation in ways that had also served the public interest.[105] During the 1930s, passengers traveling by air more than doubled every other year, from 475,000 passengers in 1932 to over four million in 1941.

Established airline companies and designated routes also affected the airport, as corporate identity became a factor in developing a loyal clientele. In the 1920s and early 1930s, it was common practice for the largest companies to own and operate their own airport. Pan American's Dinner Key airport in Miami, built by Delano & Aldrich in 1934 (fig. 11), and United Airport at Burbank, California, built by the Austin Company in 1930 (fig. 12), were two of the most sumptuous airports of the decade. Privately owned airports, however, were not eligible for federal assistance and so had all but disappeared by 1940. In their place, airlines built terminals at major municipal airports. Idlewild (later John F. Kennedy) airport's "Terminal City," completed in 1962, is the best example of

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[105] T.A. Heppenheimer, *Turbulent Skies: The History of Commercial Aviation* (New York: John Wiley & Sons, Inc., 1995), 63-64; and Robert F. van der Linden, *Airlines and Air Mail: The Post Office and the Birth of the Commercial Aviation Industry* (Lexington, Ken.: University Press of Kentucky, 2001), 185.

each airline projecting a corporate identity through a separate terminal building. More typically, airlines built brand identity through company colors, logos, and other stylistic features that marked their passenger ticketing and check-in counters and gates areas within the terminal.

Airports of the 1930s and 1940s had a single building that served all arrivals and departures on one level (LaGuardia was the first airport to separate incoming and departing passengers). For the air terminal interior plan, architects and engineers followed the precedent of the railroad station, which consisted of a large open waiting and reception area with opposite landside and airside entrances. To access an airplane, passengers exited through a turnstile and onto the apron. The 1940 CAA-recommended design for an administration building at a large airport presents an elaboration of this simple plan by placing offices, restaurants, and other services along corridors extending from each side of the main hall (fig. 13).

This plan worked well until the introduction of the large propeller planes such as the Douglas DC-6 and the Lockheed Constellation. Already in the design stage in 1939, the war accelerated their development and production. Although civil flights virtually ceased during the war, commercial aviation later reaped the benefits of wartime modernized airports and advances in navigation technology (in particular radar), communications equipment, and aircraft design. The four-engine propliners could carry three to five times the passengers of the DC-3, and their pressurized cabins, greater engine thrust, higher-octane fuel, and tricycle landing gear made flying faster, safer, and much more comfortable.

The New Deal programs prepared municipal airports for the DC-3, but the propliners required even longer runways and more apron space. Following the war, the Federal Airport Act of 1946 sought to alleviate airfield insufficiencies by granting money to eligible civil airport projects. This grant program continued, with modifications, until 1970 when it was replaced by the Airport and Airway Development Act, which expanded the criteria to include air navigation facilities and airport security equipment. Unlike previous grants programs, the Airport Development Aid Program created by the 1970 Act was not funded by Congressional appropriation but by taxes levied on aircraft, airfares and tickets, airfreight, and aircraft fuel.[106]

Because passenger terminals were not considered essential to air safety and operation, they did not receive federal funding. Nor had passenger facilities benefited from airport militarization. Yet the unprecedented and unexpected economic prosperity of the postwar period saw a steep increase in commercial air travel. Even recently built (but prewar) airports such as LaGuardia Field and Washington National were unprepared for the double hit of more flights carrying more passengers. The propliners were finally able to provide a pleasurable flying experience equivalent to that of Pan Am's Clipper flying boats of the previous decade, which had spacious streamlined interiors by designer Norman Bel Geddes. Because air travel was first class and at set rates and routes, the airlines competed for their customers not through ticket price but by offering

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[106] In 1982, the Airport Improvement Program succeeded the ADAP of 1970. The AIP extended federal funding to land purchase, some aspects of terminal buildings, weather observation systems, friction measuring equipment, safety equipment, and noise abatement studies.

comfort, style, and service. The 1949 Boeing 377 Stratocruiser, for example, was a converted military transport airplane. Designer Walter Dorwin Teague created for Pan Am a chic modern interior that had sleeping berths as well as a bar and lounge in the plane's lower level reached by a spiral staircase (fig. 14). The service and amenities of the flight were rarely matched by the ground facilities. In the end, the spacious and club-like atmosphere of the Stratocrusier proved too costly to maintain, particularly as jets initiated the age of mass travel.

POST-WAR PROSPERITY AND PROBLEMS

The history of Chicago Municipal Airport (later renamed Midway) is instructive. An International Style building, city architect Paul Gerhardt, Jr., published his design to acclaim in the February 1932 issue of *Architectural Record* (fig. 15). Yet within fifteen years this airport was completely inadequate. A 1946 travelers' guide in *Fortune* magazine rated Chicago's airport as "the worst" and "a slum." The most pressing problems were undirected crowds and lack of places to sit and things to do while waiting. The *Fortune* reviewer commented, "To rest the thousands there are exactly twenty-eight broken-down leather seats. One must line up even for the rest rooms. The weary travelers sit or even lie on the floor."[107] The following year Chicago opened a new terminal building (fig. 16). Also designed by Gerhardt, this time he expanded the CAA

[107] "Airports," *Fortune*, August 1946, 78.

model to accommodate three passenger entrances. The real innovation, however, was the inclusion of multiple gates to aircraft along the corridors, which created the first linear terminal.[108]

Although this design was a considerable advance, all passenger operations remained on one level and only fifteen planes could occupy the apron at one time. Consequently, Chicago Municipal Airport was at capacity when it opened, and its urban location left it with no more room for expansion. The Nathan Hale Elementary School, for example, had existed in relative isolation at the airfield's southwest corner during the 1930s (fig. 15a). A decade later, with the extension of runways and larger planes in use, children were playing only a hundred yards away from an active runway of the world's busiest airport. The situation was complicated by the fact that the city leased the airport's land from the Board of Education. The political situation was such that Mayor Martin J. Kennelley announced that business interests were less important the safety of children, and that the two runways closest to the school would have to be shut down during school hours until a new school could be built.[109]

With the airfield's perimeter now crowded with homes and businesses, however, the city came to the conclusion that its only option was to purchase land outside of the metropolitan area for a new airport, the future O'Hare. Municipal airports throughout the United States experienced a similar strain on their facilities as well as the first community conflicts over noise, expansion, and

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[108] David Brodherson, "'An Airport in Every City': The History of American Airport Design," in *Building for Air Travel*, 82.
[109] Christopher Lynch, *Chicago's Midway Airport: The First Seventy-Five Years* (Chicago: Lake Claremont Press, 2003),105-109.

safety. A number of cities, such as New York, Los Angeles, and Atlanta paralleled Chicago's actions and anticipated constructing larger airports farther away from the urban core. Nevertheless, these new airports would repeat the same cycle as their earlier city counterparts when the first commercial jet, the Boeing 707, came into service in 1958.

At the same time, airlines sought ways to increase passengers. By the end of the 1940s, several small companies were experimenting with offering coach service through special excursion rates and family packages. Airline companies that operated intrastate or were not large or financially stable enough for federal certification were not subject to CAB's rate and route restrictions. However, they could not compete with the certified airlines by offering regular, scheduled airport service. As a result, they flew whenever an aircraft was full and at off-peak hours, which gave rise to the name of "fly-by-night" operators. The "nonskeds", as they were called, turned these limitations to their advantage by offering coach fares during holiday periods to popular tourist destinations. Although the major airlines were initially divided over the issue of coach service, the success of the nonskeds demonstrated the market potential for mass travel. Certified airlines soon petitioned CAB for permission to lower their fares. In a 1949 *Aviation Week* editorial, National Airlines' president Ted Baker noted that "there is a sound basis for a non-luxury, low-rate service . . . . Fully 95 percent of the million and a half people who vacation in Florida during the winter travel to

the state by other transportation than the three airlines serving the area. Lowered fares would tap this huge potential."[110]

Before the end of the 1950s, the airplane would surpass both the train and the ocean liner in number of passenger miles. The airplane became the conveyance of choice particularly for transcontinental and intercontinental travel. Pan Am, which before the war had been the country's sole international airline, was forced to relinquish several of its lucrative routes to other U.S. airlines as the demand for international travel grew. The formation of the influential International Civil Aviation Organization (ICAO) and the International Air Transport Association (IATA) in 1944 and 1945 was the result of opposition from Britain and other European nations to U.S. dominance of world airways. IATA and ICAO determined transcontinental routes, rates, and other regulatory measures; ICAO published a series of manuals that were instrumental in creating an international system of communication, navigation, and safety procedures.

The real spur to international travel was the jet. The jet-engine aircraft, like subsequent developments in aviation, was a product of the post World War II military-industrial complex; jets were first used in combat in the Korean War of 1950-53. Unlike the piston-engine propliners that converted easily to civilian use, early military jets were not suitable for commercial aviation. The adoption of jets by the airlines was hampered by several factors. Inefficient fuel consumption made them prohibitively expensive, short ranged because they needed to refuel often, and difficult to operate—they were tricky to start and especially to restart

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[110] Ted Baker to Robert H. Wood, "The Trend to Mass Air Travel," *Aviation Week* 51 (29 August 1949): 42.

while in flight. The requisite high speed made take-off and landing risky. Also, jets had to fly at a very high altitude to maintain adequate cabin pressure. Little was known about the meteorology above 30,000 feet, and nothing about radiation or other conditions that might affect health. Not least, the jet required special ground conditions unavailable at civil airports. Its powerful suction destroyed tarmac equipment, and the high temperature of its wake melted asphalt runways. In addition, their noise level was intolerable to the residential communities that ringed many municipal airports.[111]

When Boston's Logan Airport expanded rapidly in the 1950s to handle jet aircraft, it encountered for the first time in its history intense opposition by nearby residents (fig. 1c and d). The airport, only three miles from downtown, had been built on tidal mud flats in the well-established neighborhood of East Boston. Forty years later it occupied two-thirds of this residential area. As Dorothy Nelkin noted in her study of this conflict:

> Airport operators are caught between their involvement in a nationally coordinated system of airport planning and their immediate presence in particular neighborhoods, between client demands for expanded airport capacity and neighbors' concern with peace and quiet. Their decisions also affect environmental and land-use planning, housing and community development, public health, employment and location of industries. . . In short, airport development has profound implications for both the structure of economic development and the quality of life in an area. Furthermore, controversies concerning airport siting and expansion, which are taking place all over the world, have become an interorganizational problem involving relationships among municipal, state and federal governments, agencies and private interests.

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[111] Najeeb E. Halaby, "The First Forty Years of Jet Aviation," in *The Jet Age: Forty Years of Jet Aviation,* eds., Walter J. Boyne and Donald S. Lopez (Washington, DC: National Air and Space Museum, Smithsonian Institution Press, 1979), 112-113.

She summarized, “jetports remain among the most controversial of modern technological facilities.”[112]

Both Russia and Britain developed feasible commercial jet-engine aircraft and offered limited but regularly scheduled passenger jet service a full decade before the United States. However, serious flaws in the design of the British passenger jet, the de Havilland Comet, caused several air disasters and led to the grounding of the fleet in 1954. When the redesigned Comet reentered service four years later, Boeing was ready to take the lead with the 707. The 707 held more than double the Comet’s number of passengers and had a higher cruising speed. Boeing quickly followed its success with the improved 727, which became the most popular jet aircraft in the world and remained in production until 1984.

Jets instantly made many airports obsolete. Even the new airports of the 1950s, such as O’Hare and Idlewild, embarked on extensive runway and terminal expansions to accommodate jets. In response to the immediate preference for the heavier jet-engine aircraft over the piston-engine propliners, the successor to the CAA, the Federal Aviation Agency, undertook a new National Airport Plan, and the Federal-Aid Airport Program assisted municipalities in making the necessary airfield changes and in developing noise abatement procedures. Yet as one of the first jet pilots, Najeeb E. Halaby, remarked: “The main emphasis of the political executives was on the runway rather than all the other facilities for

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[112] Dorothy Nelkin, *Jetport: The Boston Airport Controversy* (New Brunswick, NJ: Transaction Books, 1974), 5, 15.

handling the flood of new passengers—we found to our later discomfort."[113] A series of magazine articles in the 1960s documented the crowded conditions at terminals as well as the traffic jams caused by too limited access to airports.[114]

One acute problem was the long distances passengers had to travel between and within terminals at major airports. The recommended distance from airport entrance to aircraft gate was 600 feet. By the end of the sixties, however, the average distance a passenger walked within the airport was more than 2,000 feet; at O'Hare, a terminal lauded for its "elastic" design, this distance was nearly 5,000 feet or six city blocks (fig. 17).[115] Although passenger and ground transportation circulation was outside of the FAA's jurisdiction, its model airport near Washington, D.C., Dulles International, suggested some solutions to this congestion (fig. 19). Designed by the firm of Eero Saarinen, Dulles was the country's first jet port. As part of the planning process, Saarinen conducted time and motion studies on passengers, planes, and vehicles. The resulting landmark design integrated these three forms of traffic.

Dulles's most innovative feature was the mobile lounges that brought passengers to airplanes (fig. 19b). Mobile lounges were more cost-effective and

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[113] Halaby was appointed head of the Federal Aviation Administration by President Kennedy in 1961; in 1965 he became senior vice president of Pan Am and later its chief executive officer and then chairman until 1972. Halaby, "The First Forty Years," 115.

[114] For example, Reyner Banham, "The Obsolescent Airport," 252-253; Wolf Von Eckardt, "Redesigning American Airports," *Harper's* 234 (March 1967): 66-75; and "Special Report: Can Airports Cope with the Jet Age?" *Business Week*, 22 July 1967, 54-73.

[115] Von Eckardt, "Redesigning American Airports," 68.

safer than taxiing jets. They also eliminated the need for the equipment that pulled jets to the terminal and replaced the Jetway (fig. 18), a passenger loading device that is a moveable sleeve connecting a jet to a terminal gate (although it was not in significant use yet). The mobile lounge was widely praised as an excellent solution to ground congestion. Yet for a number of reasons—its initial expense, the potential loss in airport concessions and advertising revenue, and its unpopularity with passengers who must wait in a restricted space—the mobile lounge was rarely implemented at other airports. In a 1962 article titled "The Obsolescent Airport," Reyner Banham described this process of airport sprawl: "Abruptly, the marginal location of the buildings ceased to be logical or necessary. . . and large buildings could be tolerated in many locations—even in the very center of the field—where they could not have been considered before. Like demented amoeba, the airport turned itself inside out and the original compact cluster of buildings disintegrated."[116] The loss of a rational center/perimeter relationship that was a casualty of ad hoc airport expansion has had in some cases the effect of reviving the use of mobile lounges at major airports with "infield" terminals. In most cases, however, and airports added lengthy linear and finger terminals, as well as satellite terminals accessed by pedestrian tunnels.

Although there were a number of outstanding jetports built in the 1970s—among them Dallas-Fort Worth (fig. 51), Kansas City International, and Tampa International (fig. 73)—most airports did not have the budget to completely

[116] Banham, "The Obsolescent Airport," 252.

rebuild. Consequently, outdated structures were replaced, renovated or extended in a piecemeal and ad hoc manner. In 1970 Congress stepped in to address the problem of stop-gap building at airports with the Planning Grant Program. This program financed the making of airport master plans; unfortunately, it was consistently underfunded.[117] The poor conditions at airports were exacerbated by the introduction of the Jumbo Jet in 1970 and the deregulation of American airlines in 1978.

AIRCRAFT ADVANCES AND THE ERA OF MASS AIR TRAVEL

The French-British Concorde and the Boeing 747 were both products of the 1960s. The Concorde marked the ultimate in aerospace technology and luxury "jet set" travel. It was an unprecedented joint project between the French and British government—their response to the U.S. and U.S.S.R. space race—that produced a supersonic aircraft capable at flying at Mach 2.2, twice the speed of light or roughly the rate of a speeding bullet. Work on the Concorde began in 1962 but changes in government, currency fluctuations, and a lengthy testing period delayed commercial inauguration until 1976—six years after the introduction of its closest rival, the Boeing 747 jet. Because of its exorbitant development costs, which reached £1 billion, only twenty Concordes were built,

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[117] Ben Castellano, "A Chronology of Milestones in Federal Aid to Airports," *FAA Airports 50th Anniversary*; available from http://www2.faa.gov/arp/annivers.htm; Internet; accessed 26 November 2003.

of which fourteen saw commercial service. The Concorde's delta or triangular wings, tilted needle-shaped nose, and elongated body made it appear both graceful and powerful (fig. 20). The Concorde immediately inspired intense admiration and became, according to the London Design Museum, one of the twentieth-century's most beloved engineering designs. *Airport Forum* anticipated in July 1975, that the Concorde would revolutionize flight and that 1976 would be remembered as the "Year of the Concorde." "There can be no doubt," an editorial put forth, "that civil supersonic air services will establish themselves in the long run."[118]

Despite this prediction and the prevailing technological determinism, the Concorde did not become a commercial success. A major detriment was the loud sonic double-boom—even *Airport Forum* admitted that it "exceed[ed] anything so far heard"—which occurred when Concorde passed through the sound barrier during take-off. Many airports, because of noise-abatement agreements with their neighbors, could not permit Concorde flights. In addition, the Concorde had special runway and field requirements, which curtailed its use at all but the largest airports. Another factor was the political resistance the Concorde faced from the United States government, which strongly supported the adoption of the American Boeing 747. Until the crash on 25 July 2000 of Air France flight 4590 that killed 113 people, the Concorde had the best safety record for any aircraft. (The 747, incidentally, has caused the most air travel deaths, although largely due to human errors, not design flaws.) In the aftermath of this accident,

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[118] "Year of the Concorde," *Airport Forum* 5 (July 1975), 3.

however, it was decided to do a costly overhaul of the aged Concorde fleet. Unhappily, the date the Concordes resumed flight was 11 September 2001 and the maintenance expense proved too high to keep the fleet in service. The last Concorde flew on 24 October 2003.

Thus it was the Boeing 747, which carried nearly four times the number of passengers as the Concorde and previous jets, which came to represent the most modern means of mass transport. Although lacking the Concorde's beauty, the 747 also has a distinctive form; the slight hump created by its upper deck cockpit makes it easily recognizable. The pragmatic design maximizes both passenger and freight loads; and its wings were swept back at an angle to allow this much wider aircraft to utilize existing airport hangars and jetways. *Fortune* magazine named the Boeing 747 "machine of the year" in 1972, and it was selected for Air Force One as the aircraft used by the United States President (fig. 21). Nicknamed the Jumbo Jet, the 747 can carry more than 500 passengers and fly non-stop for extraordinary distances. Norman Foster, pilot and architect of Stansted Airport in London (1991) and Chek Lap Kok Airport in Hong Kong (1998), claims his favorite work of architecture is the Jumbo Jet. "It exudes confidence, style, technology and friendliness in a way that very few others have managed," Foster asserts, "There is a lot to learn from this building. In one sense you could say that it is the ultimate technological building site."[119]

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[119] Norman Foster, "Boeing 747," in *Building Sights*, eds., Ruth Rosenthal and Maggie Toy (London: Academy Editions, 1995), 53, 55.

Nevertheless, only very large airports had the runway space, fueling capabilities, passenger facilities, and personnel to handle the Jumbo Jet. The Boeing 747 hastened the creation of the “hub and spoke” airport system, in which flights originating from a small airport feed into a major airport, or hub. The jet not only carried more passengers, it also reached its destination quicker. The statistics are remarkable: in 1955 there were approximately 41 million airline passengers traveling in the United States, in 1976 the same number of passengers arrived at O’Hare alone; in 1932 there were 700 airline flights per day, in 1978 there were that many flights each hour.[120]

To fill jets and add flights, the airlines were in favor of federal deregulation. In 1978, CAB loosened its control of route structures, flight numbers, and fare restrictions. The airlines now drew up their own routes based on profitability and competed for gate and terminal space at major airports. To mitigate the fear of small municipalities of losing air service, deregulation legislation included a subsidy program called Essential Air Service (EAS) that paid airlines to continue to serve small and outlying airports for up to ten years. In 1987 the Airport and Airway Safety and Expansion Act extended this program, but the subsidy was reduced to the point that airline service was stopped or curtailed at unprofitable airports. Just as often, however, regional airlines sprang up in underserved areas and formed agreements with the nationals for trunk line service.

Deregulation resulted in reduced airfares that dramatically increased ticket sales. However, profitability peaked already in 1979, as price wars and rising fuel

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[120] Bilstein, *Flight in America,* 285-286.

costs offset the high number of passengers. Revenues fell throughout the 1980s, as inflation, the air traffic controllers' strike of 1981, and overexpansion adversely affected the airlines. The most noteworthy casualty was Pan American Airways. This airline was one of the earliest and celebrated in American aviation history. The visionary entrepreneur Juan Trippe directed the company from its inception in 1927 until the age of the Jumbo Jet. Pan Am started as an airmail delivery service from Florida to Cuba. Under Trippe's firm management and with the blessings of the United States government, Pan Am grew into the world's largest airline by 1930.[121] During the next three decades, Pan Am led the airlines in aviation technology as it established tourists as an significant market for commercial aviation. Its fleet of flying boats, the glamorous Clipper Ships of the 1930s, made Pan Am synonymous with luxury travel. In 1956 it introduced the jet age to America with non-stop New York to Paris flights. In the next decade Trippe spurred Boeing to offer a challenge to the French-English Concorde project. Boeing's solution, the 747, came to rule the sky. But Pan Am could not recoup the purchasing price of its 747s as fuel prices unexpectedly soared. Deregulation exacerbated Pan Am's fragile financial state, as it could not offer competitive fares on the transatlantic routes that it had monopolized before the

[121] The federal government considered Pan Am its "chosen instrument" for economic expansion in the Caribbean and Latin America and awarded it every foreign airmail contract. Asif Siddiqi, "Pan American: The History of America's 'Chosen Instrument' for Overseas Air Transport," *U.S. Centennial of Flight Commission*; available from http://www.centennialofflight.gov/essay/ Commercial_Aviation/Pan_Am/Tran12.htm; Internet; accessed 21 January 2005.

1978 law went into effect. In 1991, after a decade of losing money and selling off its assets, Pam Am declared bankruptcy.

New aircraft continued to be introduced, but the costs of development now tended to be shared by an international consortium to reduce the financial risk. For example, the French, German, and British governments cooperated to produce the successful Airbus, a wide-body short-haul aircraft; and Boeing produced a similar airplane, the 767, in conjunction with an Italian manufacturer, Aeritalia, as well as the slender 757 jet.

Deregulation and the fluctuating fortunes of the airlines also changed the airport experience. As ticket price proved to be the decisive factor in winning customers, the airlines had to reduce costs to remain profitable. Thus terminals deteriorated and customer service declined even as greater numbers of people were flying. The hub and spoke airport system was also more susceptible to delays than direct routes, and passengers often spent hours waiting in terminals with inadequate “reservoir” areas. However, some smaller or reliever airports experienced a renaissance following deregulation as they were picked up by new regional airlines. For example, the tiny Theodore Francis Green Airport in Warwick, Rhode Island (fig. 69a), some sixty miles southwest of Boston, is now an international airport and bills itself as the “Hassle Free Gateway to New England.”[122] Airline passengers, frustrated by the frequent delays, long walking distances, and dismal interiors of major airports were also a factor in the

[122]Theodore Francis Green International Airport website, available at http://www.pvdairport.com/welcome.aspx; Internet; accessed 21 August 2006. In 1996 a new terminal replaced the 1961 structure.

revitalization of a number of airports when a choice was available. The proliferation of cut-rate airlines targeting a specific region and clientele offered more consumer choice, and they also created the demand for smaller aircraft that could operate well on short or congested airfields. Redesigned turboprop and STOL (short take-off and landing) aircraft assisted in the revival of convenient urban and regional airports, such as Chicago's Midway and Washington's National Airport, which were too small and close to residential neighborhoods to handle Jumbo Jets.

Other signs of the revival of the aviation industry are the great diversity of aircraft in production today. For example, there are the VLJs (very light jets) made by Cessna and other civil aircraft companies. Marketed to businesses as an affordable jet, VLJs are manageable enough for small airports that are less crowded and more convenient without having to sacrifice the speed of jet travel. Requiring only a single pilot, it is predicted that VLJs will initiate "on-demand" air taxi services when they are approved for use in 2006. At the other extreme is the Airbus A380, which began development in 1993. Nicknamed the Superjumbo, the A380 is a double-decked wide-body jet capable of holding over 850 people. When it enters service in 2007, it will be the largest passenger aircraft in the world, easily surpassing the carrying capacity of the Boeing 747.

Yet the most drastic changes to passenger terminals were due to the implementation of stricter security measures. A series of sensational airplane hijackings in the United States that began in the 1960s with hijacking of aircraft to Cuba and the international adoption of higher levels of baggage and passenger

screening due to the rise in terrorist violence resulted in the further segmentation and alteration of passenger terminals. Visitors and passengers were separated and equipment installed and barriers erected for the more stringent screening and partitioning of baggage and passengers.[123]

When the economy and the aerospace industry began to recover in the 1990s, airport building was renewed on a grand scale. City officials came under pressure from airport managers, their constituents, and the airlines to replace and redesign outmoded and overcrowded terminals. At times, expansions or terminals and additions exacerbated the loss of a rational layout and internal logic of the already tentacular structures and labyrinth interiors. In many other instances, however, the improved economic outlook allowed many airports to build anew. For the next two decades, terminal construction and reconfiguration occurred across the country at major historical airports, such as John F. Kennedy and Logan airports, as well as at small and secondary airports, such as at Martha's Vineyard and Cincinnati airports.

RENEWAL

The immense airports built in South East Asian cities by internationally renowned architects such as Norman Foster opened the way for a

[123] The terrorist violence of 11 September 2001 has intensified security measures at airports in ways that are still evolving but will no doubt lead to lasting operational and structural changes at air terminals.

reconsideration of the airport as architecture and as a regional and national symbol. An example of this shift in the United States is Denver International Airport, which opened in 1995. The Denver Municipal Airport (Stapleton), which DIA replaced, had long been unable to cope with the tremendous increase in passenger and plane traffic. Because it was central hub, delays at Stapleton affected the entire system, and the city began to address the situation in the late 1970s. Eventually, the decision was made to build a new airport whose focal point was to be a passenger terminal that would uniquely represent Denver. The solution of local architects C.W. Fentress and J.H. Bradburn is a metal and glass structure covered by a tent of Teflon-coated fiberglass (fig. 22). The white peaks of the roof repeat the Rocky Mountains skyline and associate the building with Native American teepees. In addition, the granite paved floor patterns of the interior serve as a way finding system and also refer to the surrounding mountains. They also included a sophisticated computerized baggage handling system and light rail passenger transport.

The building of DIA was a long and contentious local issue and the airport made national news on more than one occasion due to allegations of contractual improprieties and the initial problems it experienced with its automated baggage handling system (it was eventually replaced by a less automated but more reliable system). The airport's opening was delayed by more than three years, during which there was a national decline in the number of flights, and the project went one billion dollars over budget. In 1991, the chairman of American Airlines, Robert L. Crandall, criticized the new airport in a *Time* magazine interview as a

"field of dreams," a sentiment that reflected popular opinion. Federico F. Pena, who was mayor of Denver when the airport project initiated and who went on to serve the Clinton administration as Secretary of the Department of Transportation, fought a major public relations battle to keep the project from derailing entirely. He explained, "This was a visionary project that was preparing the city and state for the next century."[124] Indeed within one year after opening, the airport was widely acknowledged as successful both as a transfer point and as a particular place. United spokesman Tony Molinaro called Denver airport, "an arrival machine" for the airlines, which accounts for seventy-five percent of the airport's traffic.[125] It has demonstrably improved the overall efficiency and capacity of the national airways system and its Teflon peaks, visible from one hundred miles away, are now a well-recognized symbol of Denver.

Denver International Airport is to date the largest airport project in America and the world's largest inland port. It remains unique because of its size, but it is its representation of place through modern forms and materials that has generated critical attention and inspired the architecture of many other new air terminals throughout the United States. The airport, no longer an afterthought, has claimed its place as one of the most significant building types of the twentieth century.

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[124] Adam Bryant, "Denver's New Airport Still a 'Field of Dreams'," *New York Times,* 11 May 1994, C3.

[125] Quoted in James Brooke, "Now Denver's Airport is Toasted, Not Roasted," *New York Times,* 8 March 1997, B1.

TOWARDS A NEW ARCHITECTURE

CHAPTER TWO

> 'CONTACT?' calls the mechanic, after he has turned the propeller over slowly, to build up compression in the cylinders of the engine.
> 'Contact!' replies the pilot and turns the ignition switch on his instrument board.
>
> And then the mechanic swings the propeller, a spark spits into the pent-up gas in a cylinder head—and the motor starts.
> It is the time-honored ceremony of starting an airplane, a rite filled with all the eager zest of flight.
>
> But it has a meaning, too, for architects and architecture.
> Here is aviation, the most completely modern of modern institutions. It is bound to no architectural traditions. It is free to express itself in absolutely new terms and forms. And its architectural possibilities are as colorful and abundant as the most swashbuckling architect could desire.
>
> If architecture misses the appeal of aviation, if aviation's challenge of 'Contact!' goes unanswered, aviation will go ahead, served on the ground only by glorifications of the squalid shacks and sheds in which it has grown up.
>
> New materials, filled with strength, beauty and infinite usefulness, are at architecture's command. New designs, new forms and new meanings await architecture's interpretation.
>
> Contact!
>
> — Wyatt Brummitt, 1929[126]

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The invention of the airplane and the development of commercial aviation corresponded to, and for many was the most potent symbol of, the substantive changes to how Americans lived, worked, and thought about the future during the

[126] Wyatt Brummitt, "CONTACT! The Challenge of a Pilot to his Mechanic has a Meaning for Modern Architecture," *American Architect* 135 (5 April 1929): 431-432.

inter-war period. It was at this time that the United States became an increasingly urbanized and industrialized nation that began to play an important role in world affairs. This process of modernization is exemplified by how aviation was incorporated into public life through the construction of municipal airports.

Prior to 1927, no architects were involved in the construction of municipal or commercial airports in the United States, although there was considerable interest in aviation and its building possibilities among architects. There are several reasons for their exclusion. One factor was that flying in the 1920s was more of a sport and an entertainment than a means of conveyance. Consequently, aviation was generally thought to have few practical or public applications. The demonstrated importance of the airplane to both mail delivery and military use slowly modified these views.

Even so, airmail and the war also created circumstances that caused cities to overlook architects when it came to building airports. For example, following World War I a number of Army-trained engineers and pilots served as consultants in airport design and planning or formed companies specializing in airport construction. In addition, the Army and Navy had hired local construction companies to quickly erect military air bases according to Albert Kahn's 1917 plans and these contractors then became experienced in building airports. Furthermore, because the landing field was the airport's essential feature, municipal airport projects usually came under the purview of city highway or recreation field engineers in the departments of transportation or parks. Finally, the temporary sheds characteristic of early airports were in fact the most

appropriate structures, since passenger transport was practically nonexistent and municipal airports leased field usage to flight schools and other general aviation activities.

The East Boston Airport of the mid 1920s, illustrated in figure 1a, shows wooden biplanes in front of simple hangars, probably of corrugated sheet metal.[127] An advertisement by the H.H. Robertson Company of Pittsburgh in the November 1928 issue of *Airports* pictures an "air shed" interior and touts the benefits of treated corrugated metal. One advantage is that a shed of lightweight metal can be easily moved, which "counts a lot the way airports are growing and shifting around." The ad further counsels, "let Robertson engineers suggest their solution of any airport building problems . . . They have experience gained in hundreds of hangars."[128] As this advertisement implies, the airport at this time was a site of "container" buildings rather than of representational architecture.[129]

It was standards set by the Post Office to ensure scheduled airmail delivery that provided the first impetus for permanent, public buildings at airports. Facilities for personnel and pilots, as well as for equipment maintenance and storage, were necessary. Although the Post Office could not build airports or

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[127] Many hangars at this time were only fabric covered. One of the first improvements the Park Department did when it was made responsible for East Boston Airport in 1928 was to build permanent hangars of brick and concrete. William P. Long, Chairman, Park Department, Boston, "The Development of the Boston Airport," *American City* 48 (April 1933): 52.

[128] H.H. Robertson Company advertisement, *Airports* 1, no. 7 (November 1928): 4.

[129] Reyner Banham discusses the functionality of container architecture in seaports, rail freight yards, and airports in "The Architecture of Wampanoag," 101-108.

support aviation directly, it promoted aircraft safety, improved navigational equipment, and increased carrying capacity through federal legislation regulating the private companies that carried the mail.

In addition, scheduled airmail delivery encouraged established flight routes that eventually led to a nationwide network of airports by the beginning of World War II. As aviation historian Deborah Douglas points out, an essential functional difference between the military's and the Post Office's use of the airport was that for the military the airport operated as a base whereas the Post Office needed to fly from point to point; and so the Post Office's designation of airports on the airmail route as "permanent sites" is a crucial milestone in their development.[130] Many technical advances occurred on the ground as well. Although experimentation was initially undertaken to speed the delivery of the mail, these improvements also assisted air passenger travel. Tarmacs, night lighting, radio beacons, control towers, and weather reporting are some of the major airport changes that helped to make flying safer, while access roads, car parks and passenger terminals with restaurants and observation decks helped to make traveling pleasanter and attracted visitors.

The decade of the 1930s, in particular, saw a dramatic increase in air passengers, from 43 million revenue passenger miles flown in 1929 to 677 million in 1939.[131] Although unable to keep pace, the number of municipal

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[130] Douglas, "The Invention of Airports," 397.

[131] Brady, *The American Aviation Experience,* 177; Bilstein, *Flight in America,* 104.

airports also multiplied substantially, from 414 in 1927 to 1,046 in 1939, an increase of more than 150%.[132] The airlines had literally taken off with the introduction of the DC-2 and DC-3 airplanes in the early 1930s. This rapid expansion of the commercial airlines had two effects on the airport. One result was the rise of professional expertise in airport design and construction. This development went hand-in-hand with the evolution of the airport from sidelined multipurpose sheds to a defined spatial organization and specialized buildings, the most prominent of which became the passenger terminal. A second consequence was the use of architecture to establish aviation as a stable enterprise and flying as a safe, as well as an extraordinary, experience.

FEAR OF FLYING

Fear of flying was in fact a major detriment to the growth of air passenger travel in the United States. Flying represented both risk and a novel form of independence. Marshall Berman, in his examination of modernity *All That Is Solid Melts Into Air*, noted that an inevitable consequence of contemporary life is individual freedom but that the response to this freedom is usually fear and

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[132] U.S. Congress, House, Committee on Interstate and Foreign Commerce, *Airport Survey;* H. Doc. 245, 76th Cong., 1st sess. (Washington: Government Printing Office, 1939), 16; as reprinted in Douglas, "The Invention of Airports," 598. However, the definition of what constituted an airport is unclear, as an earlier Department of Commerce survey lists only 240 municipal airports at the end of 1929; *cf.,* Hubbard, *et al.*, *Airports,* 47.

evasion.[133] Donald Duke, an Army Air Corps pilot and early aviation enthusiast, alluded to this fear of freedom in his 1927 manual *Airports and Airways: Cost, Operation and Maintenance*:

> Earthbound by instinct, it has taken a generous endowment of courage and determination to get our featherless creatures into the air for their first flight; however, once above the sordid traffic of a Stop-Go, No Parking, Detouring humanity, these individuals, relaxing in the well-upholstered seats of today's airliner, enjoy as much freedom from care and apprehension as afforded by any other vehicle of transportation and with an added perspective beyond comprehension of the uninitiated. Aviation . . . . has a future mission of infinite possibilities and is already bringing changes in our daily habits more revolutionary than followed the railway, telephone and automobile.[134]

In 1932, Franklin Delano Roosevelt decided to fly to Chicago to accept in person the Democratic Party's nomination for president. Roosevelt correctly calculated that such a daring gesture would convince the delegates—and the public—that he was up to the job. Indeed, as Arthur Schlesinger, Jr. wrote in his biography *The Crisis of the Old Order, 1919-1933*, the Ford Tri-motor used by Roosevelt was itself interpreted as "a symbol of the new spirit of decision demanded by troubled times." In his acceptance speech, Roosevelt averred that while his choice to appear at the convention was "unprecedented," the circumstances demanded bold action. The Democratic Party, he continued, must be "the bearer of liberalism and of progress."[135]

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[133] Berman, *All That Is Solid*, 10.

[134] Duke claimed that his was the first book published on the topic of airports. Duke, *Airports and Airways*, 6.

[135] Arthur M. Schlesinger, Jr., *The Crisis of the Old Order, 1919-1933* (Boston: Houghton Mifflin, 1957), 312-313.

Roosevelt's implicit association of aviation with a positive view of progress exemplifies what Berman and architectural historian Hilde Heyman have defined as a pastoral concept of modernity: "A pastoral view denies the contradictions, dissonances, and tensions that are specific to the modern and sees modernity as a concerted struggle for progress, uniting workers, industrialists, and artists around a common goal." Its opposite, the counterpastoral perspective, "regards modernity as characterized by irreconcilable fissures and insoluble contradictions, by divisions and fragmentation, by the collapse of an integrated experience of life, and by the irreversible emergence of autonomy in various domains that are incapable of regaining their common foundation."[136]

These two viewpoints collided particularly in their reaction to new technology; for example, the airplane was considered by some as the instrument of peace and perfection and by others as the harbinger of destruction and decline. Le Corbusier's homage to flight, a 1935 book entitled *Aircraft*, exemplifies the optimistic view of aviation common at the time. In the preface, he describes how the first flights signaled not only technical progress but also spiritual advance. "Everything was prodigiously accelerated," he notes, "One sunny afternoon August Perret, with whom I was working, burst into the atelier, brandishing a freshly printed *Intransigeant*. 'Blériot has crossed the Channel! Wars are finished: no more wars are possible! There are no longer any

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[136] Hilde Heyman, *Architecture and Modernity* (Cambridge, Mass.: Massachusetts Institute of Technology, 1999), 13. Heyman's definitions are extrapolated from Berman's discussion of Baudelaire: Berman, *All That Is Solid*, 134-142.

frontiers!'"[137] Yet an equally negative perspective also existed. British aeronautical engineer Sydney Veale related the words of an American senator pronounced only a decade later: "'I don't think there is any question that the Wright brothers, high as were their motives, probably contributed more to the disasters of mankind than any other two men who ever lived in the history of the world.'"[138]

This counterpastoral viewpoint was supported by a series of highly publicized crashes, which caused a serious setback to the United States' fledging airlines industry. In 1935 the humorist Will Rogers, called the "most popular man in America," along with his pilot, the famous aviator Wiley Post, died in a plane crash on a trip to Alaska. In the same year, the crash of a Transcontinental and Western Airways DC-2 flight claimed as a victim the highly regarded Republican senator from New Mexico, Bronson M. Cutting. Then, in the winter of 1936-37, the airlines experienced a record of five fatal crashes within a 28-day period. This was immediately followed by the spectacular explosion of the Hindenburg zeppelin as it attempted to moor at Lakehurst, New Jersey. The photographs of the Hindenburg ablaze made news around the world and brought an abrupt end to the airship age. These incidents were the impetus behind the 1938 Civil Aeronautics Act that created the Air Safety Board to investigate accidents.[139]

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[137] Le Corbusier, *Aircraft* (New York: Universe Books, 1988 reprint of 1935 edition), 7.

[138] Sydney E. Veale, *To-Morrow's Airliners, Airways and Airports* (London: Pilot Press Ltd., 1945), 9.

[139] Bilstein, *Flight in America,* 98.

Despite the widespread belief that air travel was particularly hazardous, it was even at this time safer to travel by air than by automobile.[140] To change public opinion, the airlines began to burnish their image in three ways: by educating the public on the advantages of air travel and on how safe it really was, by making the experience of flying more pleasurable, and by improving ground facilities to accommodate passengers.

In the mid 1930s, the airlines changed their advertising format from the factual presentation of flight schedules and prices to promoting the benefits of air travel. American Airlines ran a series of ads aimed at the businessman that drew attention to the time and cost savings of air travel. The ads pointed out how such savings would enable the executive to spend more time with his family while conserving company money. Another frequent appeal to potential first time flyers was to the desire to appear progressive. One typical ad copy reads,

> Most everyone who flies has at one time said: '*I'll* never fly!' But wisdom whispered: 'Don't be too sure. Better try it and see.' And so they flew . . . and alighted from their first flights, elated, discoverers of a new world! You, too, have only to try it to know that the sooner you adopt it, the sooner you catch up with other modern folks![141]

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[140] In 1936, which had a record number of air passenger deaths, the Air Transport Association reported 67 fatalities on U.S. Air Carriers or 13.58/100 million aircraft miles, whereas in 1935 there were 34,494 highway fatalities in the United States or 15.09/100 million vehicle miles of travel. Data available from http://www.air-transport.org/econ/print.aspx?nid=6243 and the U.S. Census Bureau, *Statistical Abstract of the United States: 1999*, available from http://www.census.gov/prod/www/statistical-abstract-us.html; Internet; accessed 30 April 2004.

[141] American Airlines magazine advertisement of the 1930s reproduced in Bilstein, *Flight in America,* 105.

The airlines' new "lifestyle" advertising, rather than the usual informational emphasis, made them innovators in this medium.[142]

Aviation and flight were also heavily promoted at the World's Fairs. The 1933 Century of Progress exposition in Chicago had the thrilling "Sky Ride", for example, which was really just a cable-car ride; yet its logo contrasted the log cabin and Pony Express with the skyscraper and airmail plane. The theme of the fair was scientific advancement; and the technological imperative was declared in exposition's motto: "Science Finds—Industry Applies—Man Conforms." A few years later, at the 1939 New York World's Fair, which was billed as "Building the World of Tomorrow," the futuristic Aviation Building by William Lescaze drew admiring crowds. Here the airlines handed out DC-3 charms and operated a ticket booth selling flights—of which more than half the tickets sold were for first-time flights—but the primary goal of the exhibit was to present information on the safety and reliability of air travel.

The introduction of the stewardess was another attempt by the airlines to change perceptions about flying. The short-lived TAT line of the late 1920s, which combined plane and train travel, had had stewards on aircraft, but they were there simply to provide passengers with the same standard of service as was available on the trains. Stewards were not economically feasible when an airplane only held a dozen passengers. A few years later as passenger numbers began to plateau, the concept was revisited to address the public's fear of flying. The idea was that if was demonstrably safe enough for a young woman to fly,

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[142] Karsner, 43-47.

then the wives of businessmen would not object to their husband's taking an airplane. Initially, a few trained nurses held the position of stewardess and they dispensed paper bags, chewing gum, aspirin and ammonia pills to airsick passengers. Although stewardesses were trained in emergency procedures, the role soon devolved to that of "air hostess", as stewardesses were often called, or more accurately as a United Airlines executive put it, "window dressing."[143] By 1936 American Airlines employed 100 stewardesses and United 164. The airlines realized that the stewardess was their best form of customer relations and developed strict hiring policies based on youth, physical attractiveness, and even upbringing. Braniff Airlines, for example, stated that women seeking employment as a stewardess had to meet the following qualifications: "Applicant must be of perfect physical condition, well proportioned, no disfigurations. Unquestionable family background. Irreproachable character. Poise, self-confidence, tact, diplomacy. Pleasant personality. Ability to deal with people."[144] The stewardess became a highly visible and successful aspect of air travel that contributed to changing its perception from one of risk and discomfort to that of pampered luxury.

In addition to attentive customer service, aircraft cabin design underwent a transformation. The airlines saw the first class Pullman train car as their main competitor. Consequently the interiors of passenger aircraft began to imitate its

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[143] Quoted in Charles E. Planck, *Women with Wings* (New York: Harper & Bros., 1942), 190.

[144] Ibid., 197.

wood-paneled walls, brass fixtures, and leather upholstery. The Boeing 80A, in service in 1928, was even called the “Flying Pullman.”[145] When TWA inquired in 1932 if Douglas Aircraft Corporation could manufacture an airplane of equivalent capabilities to that of United’s Boeing 247, the company specified that the passenger cabin had to be inviting, “with comfortable seats and ample room.”[146] Two years later, Pan Am hired industrial designer Norman Bel Geddes to design the interiors of their famous China Clipper seaplane. This set a precedent that other airlines followed; later the work of the designer extended far beyond the plane cabin to include, for example, the stewardesses. Designers helped to create a comprehensive corporate identity that branded individual airlines.

The modernity of the aircraft, with its streamlined elegance, was usually at odds with the architecture of the passenger terminal. The country’s first airport buildings of the late twenties and thirties were rarely avant garde but instead offered an architecture of reassurance. At Newark, for example, which was the world’s busiest airport at the end of 1930, the administration building did not operate as a terminal, rather each of the four airlines serving the airport built its own hangars to receive passengers as well as aircraft. These “depot hangars” were typically without architectural pretensions, such as the American Airlines example at Newark (fig. 23a), and often did not even offer a public toilet; the passenger had to make the trek to the distant administration building. In

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[145] Zukowsky, *Building for Air Travel*, 105.

[146] Quoted in Heppenheimer, *Turbulent Skies*, 50.

opposition to these make-shift buildings, the architect Louis M. Steuber admonished,

> Aviation attracts the highest class passenger in the world. The Depot Hangar, therefore, should have the atmosphere of a club rather than a public station. . . Much thought should be given to the comfort of the passenger and the control of the public on the field. The Depot Hangar should include, in addition to the waiting room, lounge, observation deck, public toilets and rest rooms, general offices and shop: sleeping accommodations for pilots and mechanics, a large machine shop with a stock room, and a classroom. Accessory and 'tog' shops have proven very profitable at flying fields.[147]

Thus the United Airlines hangar drew special attention for its solid red brick structure and handsome Federal-style portico, which was further set-off from the airfield by a planter filled with flowers; the hangars were inconspicuously incorporated into the sides and rear of the building (fig. 23b).

The traditional architectural styles found at American airports were also in direct contrast to the modern aesthetics applied to airport design in Europe and elsewhere. The American architectural press, aviation periodicals, and popular magazines illustrated European airports, in particular Schipol (Amsterdam, 1926, Dirk Roosenburg, architect), Tempelhof (Berlin, 1926-29, Paul and Klaus Engler, architects, demolished, new terminal by Ernst Sagebiel, 1936-39), and the new Le Bourget (near Paris, 1936-37, Georges Labro, architect). The early airports of Tempelhof and Schipol were especially influential for subsequent airport design (fig. 24). Both were low, unadorned brick buildings with long window strips that emphasized their horizontality. Both also featured curved structural elements: Schipol was noted for its rounded control tower and Tempelhof for its long arms

[147] Steuber, "Commercial Hangars," 81.

that embraced the airfield, an element taken from Hamburg's Fuhlbüttel Airport of 1929 (fig. 5a). The curved façade, which welcomes incoming airplanes, and rounded, "aerodynamic" corners became common features of airport terminals.[148]

Despite these well-known European models, American airports were generally built in regional or traditional styles.[149] In his dissertation on airport design, Wood Alexander Lockhart remarks that, "the lessons from Europe were either forgotten or ignored, as planners and designers sought to solve new airport problems in terms of 'fashionable' American taste. This was not the architecture of Louis Sullivan and Frank Lloyd Wright, but rather the eclectic design of the Academic Reaction."[150] A contemporary viewpoint supplies the rationale for this apparent rejection of Modernism. In an 1931 *Aero Digest* article, Harold Vandervoort Walsh, an assistant professor of architecture at Columbia University, argued that an airport that was merely efficient and functional would never succeed in overcoming the public's fear of flying. Instead, the architecture of the airport must appeal to the passenger's mental as well as physical comfort:

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[148] Wolfgang Voigt, "European Airports, 1909-1945," in *Building for Air Travel*, 34; and Paul Smith and Bernard Toulier, *et al., Berlin, Tempelhof; Liverpool, Speke; Paris, Le Bourget: Airport Architecture of the Thirties* (Paris: Éditions du patrimoine, 2000), 18.

[149] There are a few of exceptions, however, such as Great Falls, Montana, airport, which was built in 1939 and clearly influenced by the work of Le Corbusier.

[150] Wood Alexander Lockhart, "Airport Development and Design: A New Architectural Problem" (Ph.D. diss., Northwestern University, 1972), 63.

"out of all the buildings in a community," Walsh claimed, "the airport should be the one most symmetrical, most symbolic of the unity required for safe flight."[151]

FUNCTIONAL AND REPRESENTATIONAL AIRPORTS

An example of the division that developed in the United States between the airport's functional and representational aspects is Albert Kahn's Ford Airport and Dearborn Inn. The airport, built in 1927 for Henry Ford at the site of his airplane factory in Dearborn, Michigan, was one of America's first architect-designed commercial airports. Although Ford Airport had opened in 1924, the terminal building was not constructed until 1927. It was erected for passengers traveling from Detroit to Grand Rapids on the newly formed Stout Air Service. The terminal boasted a spacious waiting room with rattan tables and chairs, a second-floor observation deck, as well as separate restrooms for men and women. These modest amenities distinguished the terminal as purpose-built for passenger comfort, and it was praised in 1928 as "the best passenger station yet built in America."[152]

The terminal was built in a modernized "Spanish" style of buff-colored brick and had a red-clay tile roof, as did the adjacent airplane factory and

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[151] H. Vandervoort Walsh, "Architectural Principles Applied to Airport Design," *Aero Digest* 19 (August 1931): 35-36.

[152] D.R. Lane, "Passenger Facilities at Airports," *Airports* 1, no. 4 (August 1928): 27.

hangars (fig. 25). These structures, also designed by Kahn, had opened the previous year to replace Stout's factory, which had burned down in January 1926. The two long horizontal structures had gently-pitched roofs; the factory featured a projecting central entrance marked by a tall smokestack. The aerial view reveals one of their remarkable aspects: the factory's steel and glass roof, which extended unsupported 124 feet across and was nearly 500 feet in length. The hangar also had an open interior by means of four steel pylons at the structure's center, which supported the roof and permitted the glass doors to be of extraordinary width and to retract completely into the building.[153]

In 1931 Ford again hired Kahn to add a hotel across the street from the airport to accommodate pilots, crews, and passengers (fig. 25c). Although Edsel Ford is recorded as arguing that because aviation was modern, therefore its buildings should be in a modern style, his father insisted that the hotel be built in an early American style (the terminal and factory were taken as modern).[154] The resulting Dearborn Inn was a red brick Georgian-Revival building that contained 179 guest rooms, a grand ballroom, and was decorated with reproduction colonial furniture (fig. 26).[155] While the architectural style and furnishings represent Henry Ford's personal tastes—he was an early American history enthusiast—they are also consistent with Kahn's earlier military air bases, whose

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[153] O'Callaghan, *Henry Ford's Airport*, 51-53.

[154] Ibid., 58-59.

[155] Henry Ford Estate, "Historic Ford Landmarks," Regents of the University of Michigan, 2003; available from http://www.hfha.org/landmarks2.htm; Internet; accessed 25 August 2003.

administrative facilities were built in a variety of traditional, and quintessentially American, architectural styles (fig. 3). In a 1932 article entitled, “The Approach to Design,” Kahn, clearly writing in opposition to the International Style of architecture exhibited at the Museum of Modern Art, defended his strict division of utilitarian and representational architecture. The factory building, he claimed, was simply the result of “sound engineering” that was in keeping with its function. But other types of buildings “afforded a more architectural character” where “tradition is to be cherished not abandoned.”[156] In the case of the Ford Airport, however, the buildings are neither purely functional nor without historical references.

The typical airport passenger lounge of the period, such as seen in a 1927 photograph of the Grand Rapids Municipal Airport in Michigan, is, like the Ford station, of a somewhat indeterminate nature (fig. 27). The small, homey room has a few pieces of chintz-cushioned rattan furniture informally arranged around a log-burning fireplace, complete with candle sconces and frilly-shaded reading lamps. Other than the bare white walls and roller shades, this room could be the lounge of a country vacation lodge.

The element linking the passenger lounge to both leisure and aviation is the wicker furniture, which could be found at airports as diverse Albuquerque, San Francisco, and Washington, DC. And until replaced by plastics, early airliners were equipped with wicker seats. Wicker or rattan has a rustic character

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[156] Albert H. Kahn, “The Approach to Design,” *Pencil Points* 13 (May 1932): 300.

and a tropical origin.[157] As a material, it is lightweight and flexible but also sturdy and durable. In addition wicker is inexpensive, easy to clean, and water resistant. Rattan canes, which can be bent, bundled, wrapped, tied, and woven together, afford many shapes and decorative possibilities. By the end of the nineteenth century, wicker furniture was associated in Europe and North America with the veranda, conservatory, and vacation settings (as well as the sanitarium because of its hygienic qualities). As with the United Airlines hangar at Newark Airport (fig. 23a), American architects and their clients, the airlines, sought to provide air passengers with the comfort and security of the familiar, as well as associate flying with leisure and vacation.

In an address given to the Architectural and Allied Arts Exposition on April 17, 1929, Francis Keally urged his fellow architects to become involved in airport planning to improve the quality of passenger service. He argued that, “The future of aviation rests on the ground. It is there that planes must take off and land. It is there the passenger’s confidence must be inspired . . . And it is there that experience and vision must be merged to put aviation on a solid foundation.”[158]

If not many architects took Keally’s advice seriously, there is evidence that the airlines did. The Union Air Terminal at Burbank, California and the Pan American Airport at Miami, for example, were built, owned and operated by an individual airline, although both later became municipal airports (figs. 12 and

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[157] Wicker was used for furniture in the ancient world but it did not become widely used in “Europe until the mid-nineteenth century. Nineteenth and early twentieth century wicker was commonly made of rattan, a vine native to Southeast Asia.

[158] Keally, “Tomorrow’s Airports,” 595.

28).[159] These airports represent early attempts at establishing both a corporate identity and the stability of air travel. Pan Am, probably in an appeal to its wealthy clientele, hired the socially connected New York architectural firm of Delano & Aldrich to build its Miami airport. Pan Am retained Delano & Aldrich again in 1934 for a new seaplane facility at nearby Dinner Key (fig. 11). Later, the firm was also responsible for the design of Pan Am's international airports, hotels, and related facilities. Delano & Aldrich, known for their classically inspired luxury apartment buildings and houses, had never before designed any type of transportation building. Interestingly, the principal, William Delano, presumably never saw the Pan Am buildings he designed outside the United States because he never flew on an airplane.[160] His position on architecture was also thoroughly grounded. Delano, in "My Architectural Creed," published in *Pencil Points* in 1932, argued that evoking an emotion was as important to architecture as functionality. "I still believe," he emphasized, "in spite of vociferous shouts of some Modernists to the

[159] The site 1929 Pan Am Field, long demolished, is now part of the site of Miami International Airport. The 1934 Dinner Key airport survives as Miami's City Hall, with most of its interiors intact. Union Airport is now named the Bob Hope Airport. The original terminal still exists but post-war renovations removed the Spanish Colonial features. In 2000, the Burbank-Glendale-Pasadena Airport Authority applied to the city of Burbank to demolish the 1930 building and build a new terminal, which is to resemble the original in style and structure. Due to the events of September 11, 20001, however, construction has been delayed indefinitely.

[160] William E. Brown, Jr., "Pan Am: Miami's Wings to the World," *Journal of Propaganda and Decorative Arts* 23 (1998): 150; Peter Pennoyer and Anne Walker, *The Architecture of Delano & Aldrich* (New York & London: W. W. Norton & Company, 2003), 174.

contrary, that an impression of enduring stability is one of the most essential qualities of great Architecture."[161]

The 36th Street Miami airport, dedicated in January 1929, was the firm's first airport (fig. 28). It was an unusual structure: a curved roof supported by double-height steel-encased concrete pylons, a form that echoed the monumental airship shed. Delano stated, "I do *not* believe that because sunlight is considered beneficent to human beings, the wall of the rooms in which they live and work should be built entirely of glass."[162] Despite his opposition to the transparency and dematerialization that characterized avant garde architecture, the second storey had a terrace dining room overlooking the airfield through an enormous window wall. However, this building was eminently of a practical nature. The plan placed the administrative office on the second floor, across from the restaurant and with a clear view of passenger activity below from the balcony (fig. 29). Delano was particularly concerned with circulation— pedestrian, vehicular, and airplanes—and the terminal interior was organized to efficiently process passengers. Remarkably, Delano separated arriving and departing passengers, something not done consistently in subsequent airports until the 1940s. The use of retractable awnings to protect emplaning and deplaning passengers was also unique at the time. Contemporary architect and aviator W. D. Archer commented, "This station embodies complete facilities for the handling

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[161] William Adams Delano, "My Architectural Creed," *Pencil Points* 13 (March 1932): 145.

[162] Ibid.

of passengers, mail, customs and airport personnel under one roof, and is the first completely equipped station built in America."[163] The airport was widely praised for its beauty, practicality, and modernity.

For the Dinner Key terminal, Delano & Aldrich retained the interior configuration of the 36th Street airport. The building, as before, was a steel-framed concrete and stucco structure but its symmetrical form was not unusual or associative (fig. 11a). Instead, its interior decoration carried out the theme of aviation. A painted frieze of historic aircraft featured Leonardo da Vinci's sketch of a flying machine and the steel-beamed ceiling was also brightly painted with different aircraft. The focal point of the passenger lounge was, however, a huge revolving globe (fig. 11b). This attraction was 31-1/2 feet in diameter and of painted steel. It was aligned so that its axis paralleled that of the earth beneath it and its North Pole pointed to the North Star; thus a two-minute rotation brought Miami to the top of the globe and so allowed an observer, as a postcard described, "to orient himself with reference to the rest of the world." A winged globe, with Miami at eye level, was Pan Am's logo for many years. A large globe was included in subsequent airports designed by Delano & Aldrich, notably at LaGuardia Airport, and the general decorative scheme—a romanticized history of aviation in combination with maps, globes, and astrological symbols—became quite typical of pre-war American terminal interiors. Not only the interior decoration, but also the building's symmetrical winged form, modern materials, and centrality within the airport's overall plan—the terminal was flanked by an

[163] W.D. Archer, "Practical Airports," *American Architect.* 136 (20 July 1929): 76.

equal number of hangars—led the firm's biographers of Peter Pennoyer and Anne Walker to claim that these features as developed by Delano & Aldrich formed an "airport vernacular."[164]

The Union Airport at Burbank, owned by United Aircraft and Transport Corporation,[165] represents a regional architectural style rather than an attempt to create a standard airport type (fig. 12a, b). The 1930 administration building was in the Spanish Colonial style with a stucco exterior, red clay-tiled roof, and arcaded loggias. The control tower masqueraded as a campanile and the interiors had exposed-beam ceilings, large wooden posts, and mission-style furniture.

This large airport, with its hangars and other aviation support facilities, runways, roads and landscaped grounds, was comprehensively designed and constructed by the Austin Company. One of the first full-service construction and engineering firms, the Austin Company offered engineering and construction expertise and specialized in prefabrication techniques, which it registered as The Austin Method. The firm, which originated in Cleveland in 1878, had long been involved in building for aviation. In 1918 it built the Curtiss Aeroplane and Motor Company in Buffalo, New York. The Curtiss plant for assembling aircraft was at

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[164] Pennoyer and Walker, *Architecture of Delano & Aldrich,* 71.

[165] The United Aircraft and Transport Corporation, formed in 1929, was the holding company of Boeing Airplane Company, Chance Vought Corporation, Hamilton Aero Manufacturing Company, the Pratt & Whitney Aircraft Company, and several airlines which were eventually consolidated as United Airlines. United's principals were William E. Boeing and Frederick Rentschler. In 1934, United was found to be in violation of the new anti-trust laws and its constituent companies became independent.

the time the largest manufacturing facility in the world. By 1930 the Austin Company had sixteen regional offices—including three in California—and maintained a full-time Airport Division. The company expanded to Europe where it was responsible for the design of a number of aviation facilities. Still visible today is its patented "Star of David" runway pattern at London's Heathrow Airport applied by the architect Frederick Gibberd in the 1940s.

In keeping with the Austin Company's brand, the service structures of United Airport were thoroughly modern. Its main hangar was of steel construction and had large expanses of glass and an astonishing 75,000 square feet of aircraft storage space. Yet the administration building, which included the passenger terminal, a tea room, restaurant, concessions and other public amenities, was a conventional timber-framed masonry structure which utilized reinforced concrete solely in the third floor control tower. There was no architect associated with the United airport; rather the design is the work of engineers, who nevertheless relied on a historicist style and traditional planning as much as any Beaux-Arts architect. In 1930, United Airport was described as "the last word in practicability and excellence," with a terminal building that was "architecturally attractive" and provided "every convenience for passengers and others."[166] By 1940, however, John Walter Wood disparaged both the design and the style of the terminal:

> The station has an unnecessarily complicated plan, no separation of outgoing and incoming passenger traffic, and a passenger concourse

[166] "United Airport Bespeaks Aviation's Progress," *Airports* 4 (July 1930): 26, 33, 26.

> which is small in proportion to the size of the building. On the first floor valuable airport frontage was allotted to the station toilets, and no provision was made for the future expansion of the station. The control room on the upper floor of the tower, which is on the roadside instead of the field side of the building, was found inadequate; so the present penthouse control room was added.
>
> The use of a pseudo-Spanish colonial style of architecture is not particularly appropriate for a structure serving the most up-to-date form of transportation.[167]

In 1940, there were some twenty airports in the vicinity of Los Angeles, but Union Air Terminal was the area's primary airport until World War II. It was purchased by the neighboring Lockheed Aircraft Corporation and used for the production of military aircraft. Following the War, the airlines transferred service to Los Angeles Municipal Airport (formerly Mines Field and now LAX). Notably, the region's major airports of Union, Glendale's Grand Central, and Los Angeles Municipal, were all in the Spanish Colonial style, as were many public and commercial contemporary buildings in Southern California, such as libraries, gas stations, and department stores. The choice of a regional architectural style was clearly meant to naturalize the new enterprise and technology.

Other early airports, like Newark, existed as quasi-public corporations in which the airlines and other commercial enterprises were responsible for their own management and buildings on public property. Because of the extraordinary expense of construction and operation, the jurisprudentially complex arrangement of Newark would continue at large airports to greater or lesser degrees. However, the economic impact of the Depression, as well as the increased legal issues involving air rights, zoning, and liability, caused airline-

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[167] Wood, *Airports,* 85.

owned airports to decline during the 1930s. The courts had by then determined that an airport, if established through the agency of the government (in the United States this was almost always the municipality) for the encouragement of commerce and transportation, is a “public purpose” and the result of both “public opinion and public need.” The idea of public purpose could extend even to an airline, which, if “holding itself out to the public as a common carrier of persons or goods or both is a public utility, and the port owned and operated by it partakes of this public character.”[168]

The declaration of the municipal airport as serving the public purpose and the airlines as a public utility was a necessary step to easing financial appropriations for the acquisition of land for the purpose of building an airport, its construction costs, and its maintenance.[169] Defining air space and controlling the areas surrounding the airport were soon leading issues in aviation law. As commercial aviation grew, with more flights by larger aircraft, airports increased and lengthened runways and added terminals and access roads. This increase of activity at the airport was compounded by the development of adjacent areas as the city and airport both expanded. Near the airport, however, the nuisances increased considerably, as did the restrictions, such as on the height of structures or the production of steam or smoke that might reduce visibility.

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[168] Hubbard, *et al.*, *Airports,* 117.

[169] Municipalities usually issued bonds to finance airport, thereby incurring indebtedness. This process was challenged in a number of states in 1928 as being unconstitutional; the state courts consistently ruled in favor of the municipality. “Municipal Corporations—Municipal Airport as City Purpose,” *Virginia Law Review* 15, no. 5 (March 1929): 491.

However, because of its status as a public utility, state courts generally (although not always) held a municipal airport less responsible for the noise, traffic, and other negative effects that resulted from its operations.[170]

The staid architecture of early municipal airports reflected their new position as a public utility. For many communities, the construction and operation of an airport was a contentious issue. The city of Omaha, Nebraska, for example, spent six years rebuilding its airport largely because of voter opposition. The original airport at Omaha was a landing field and hangar built by the chamber of commerce on land leased from another civic organization. The field was important as a stop on the transcontinental airmail route, but by 1924 it no longer met the Post Office's lighting and equipment requirements for night flights. The Post Office transferred service to the nearby Army Air Service base of Bellevue until the city could upgrade its airport. Unfortunately, a tornado destroyed the city hangar and most of its aircraft before construction could begin. The city then decided it was time to start anew and build an airport on city-owned land. While the new airport was supported by Omaha's elite, such as the members of the chamber of commerce who were concerned that the neighboring city of Lincoln would assume their place on the airmail route, the majority of the townspeople saw it as a financial drain that they could ill afford. Consequently, although it had the authority to issue bonds to purchase property for an airport, the chamber of commerce convinced the city to pass an ordinance to acquire the selected land as a park to avoid making it a bond issue that would be put to a public vote.

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[170] Paul Barrett, "Cities and Their Airports: Policy Formation, 1926-1952," *Journal of Urban History* 14, no. 1 (November 1987): 126-127.

However, as part of the city's parks, the airport was without financial allocation and the project languished. In 1926 the city switched the airport to the Department of Street Cleaning and Maintenance, which was headed by an aviation enthusiast who found funding to continue construction. A visit to Omaha by Charles Lindbergh the following year brought the airport much needed attention and led to a public subscription that raised sufficient money to finish the hangar in 1928. Funding for the airport finally became a bond issue; it passed by only a slender margin and the airport was completed two years later.[171]

It is unsurprising then that the administration building at the new Omaha airport was a stolid, unpretentious structure (fig. 30a). While of no particular traditional style, the Omaha Municipal Airport was nonetheless a recognizably public building. Its characteristics—red brick and white masonry structure, a massing of the central block flanked by two wings, symmetrical façade with classical detailing and prominent entrance—were shared to some degree by many other public buildings in Omaha, such as the Union Pacific Railroad Headquarters, the downtown YMCA building, the City Hall and adjacent Omaha Bee Newspaper Building, the Brandis Theatre, General Hospital, and public high schools (fig. 30b). Located only four miles from the downtown but nonetheless on the city's edge, the architecture of the airport connected it with other metropolitan buildings and included it in the urban fabric. Omaha Municipal Airport was by no means unusual in its architectural treatment. Municipal airports across the

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[171] Leslie Valentine, "The Development of the Omaha Municipal Airfield, 1924-1930," *Nebraska History* 62 (Winter, 1981); in Bednarek, *America's Airports,* 89-90.

country, such as at Kansas City, Boston, St. Louis, Minneapolis, Knoxville, and Louisville, which were often built by city architects, were featured in popular postcard folders of these cities with other prominent public buildings. Thus the parallel was not drawn to the region's history and culture in these examples but to the airport's public nature. In this way the first buildings at American airports again appealed to the known and the familiar.

INFLUENCE OF THE ÉCOLE DES BEAUX-ARTS

As the airport became a public place, it began to be considered an architectural problem. The airport, it was generally agreed by the end of the 1920s, was no longer purely an engineering problem, but now necessitated the services of an architect to provide the proper organization to the site and suitable character to its structures. Architect Tyler Stewart Rogers suggested in his 1929 article in *Airports* that the growing pains felt by many of the airports of the period were due to their lack of planning and the ad hoc nature of their buildings. He echoed the opinion of Albert Kahn when he posited that it was the role of the architect to create a general plan and to designate areas and structures which were "of a service character" and those which were of "a public and . . . monumental character."[172] Even firms such as the Austin Company, which was

[172] Tyler Stewart Rogers, "Airport Architecture and Planning," *Airports* 2, no. 5 (May, 1929): 17-18.

known for its industrial structures, began to employ architects for the airport's public spaces. The avant-garde Cleveland architect Robert Smith Jr., for example, provided futuristic airport designs for its *Fortune* magazine advertisements of the 1930s.[173]

Although Rogers anticipated that the airport of the future would be modern in style, he also found it "logical" that airport buildings be "designed for permanence" as well as have a "satisfactory appearance from the air."[174] Rogers' emphases on plan, permanence, character, and monumentality were not, however, attributes that are particularly identified with the modern movement in architecture but rather represent tenets of the prevailing Beaux-Arts style. Consequently, despite all predictions to the contrary and the dissemination of modern designs at European airports, it was the Beaux-Arts style that would dominate American airport architecture until the close of the Second World War.

The École des Beaux-Arts in Paris had a profound impact on architectural training and practice in America. It served as a model for schools of architecture established in the late-nineteenth century in the United States; its influence remained strong until supplanted—not without struggle—by European Modernism just before the Second World War. The École system consisted of

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[173] Robert Smith Jr. is best known as the designer of the Armco-Ferro House of Tomorrow for the 1933 Chicago Century of Progress Exhibition. This "frameless" house was built of bolted together corrugated steel plates, which were covered by a façade of porcelain-enameled steel panels. This construction system inspired the revolutionary pre-fabricated Lustron houses manufactured by the Lustron Corporation after World War II. National Park Service, "Armco-Ferro House," *Indiana Dunes National Lakeshore*; available from http://www.nps.gov/indu/History/Armco-Ferro%20House.htm; Internet; accessed 16 February 2006.

[174] Rogers, "Airport Architecture and Planning," 41-42.

four stages: an *aspirant* joined the atelier of a professional architect and prepared to pass the entrance exams; then as a pupil or *élève* proceeded through the second and first classes by earning enough points (*valeurs*) through successful participation in a certain number of competitions called *concours*, mainly in architectural composition, that were held throughout the year. The culmination of the program was the annual competition for the *Grand Prix de Rome*. The august Académie des Beaux-Arts awarded this prize of a residency at the Académie française in Rome to only one student; this competition was not open to foreign students. However, after 1867 another competition was instituted that awarded the *diplôme*; it was open to any eligible student, and the diploma demonstrated successful completion of studies and professional competency.

The two most important elements of the École system were the ateliers that prepared and trained students and the *concours* by which they gained proficiency and recognition. An atelier, while headed by an experienced architect, was not his office but was strictly a studio for student instruction. It was managed by an older student who held the title of master; students thus benefited both from assisting each other and from the tutelage of the master as well as their patron. There were several different *concours*, but the most common were the *esquisse* (sketch) and the *projet rendu* (rendered project). For sketch competitions, a student received the program and had twelve hours to produce a drawing. For rendered project competitions, a student was allotted the same amount of time to make a sketch but then was given an additional two months to complete several larger and more finished drawings. The jury compared the final

drawings to the preliminary sketch and the two had to correlate or the work was taken out of competition. This policy ensured that the work submitted was the student's own in conception and execution.

There were several effects of this educational process. At the atelier, knowledge was passed down from patron and master to students. The ateliers therefore tended to transmit accepted and approved approaches to architectural problems. Because students at each atelier worked collaboratively, they also created close architectural fraternities that not only provided the young architect with a professional network but also reinforced received ideas and practices. The *concours* submissions, all based on an initial idea, emphasized the *parti*, or overall conception. The fact that competition submissions were renderings placed a high value on drawing skills, which resulted in a reliance on paper architecture. The programs for the *projets rendus* also reflected the École's goal of producing architects capable of executing large-scale building projects for the state. Thus the programs typically required vast ensembles of buildings with a rational distribution of parts as well as a formal disposition that integrated structures and grounds, although it is important to point out that the projects were not based on actual sites. Classicism, or a generalized historicism, naturally predominated since the highest honor was winning the Grand Prix of several years of study in Rome. In addition, because the competition juries consisted of École-trained architects and Academicians, students submitted entries that appealed to their conservatism. The characteristics of competition drawings are symmetrical organization, with an emphasis on axiality; the expression of

caractère (the building's qualities) through the eclectic employment of historical referents; and a concern for the tableau, or how the parts of buildings and the massing appeared from various angles and especially in relation to light and shadow. In general, the emphasis was on developing a legible plan through symmetry and massing, whereas ornament was considered the "dressing" which communicated a building's purpose.

In the United States the Beaux-Arts model promulgated both a methodology and a style that dovetailed not only with the needs of the relatively young profession of architecture but also with those of the new technology of aviation. Both were trying to gain public acceptance and prestige. Architecture schools at American universities instituted a modified Beaux-Arts curriculum. In the late nineteenth century, a group of École-trained American architects formed the Society of Beaux-Arts Architects. Architectural firms, such as Richard Morris Hunt's and Delano & Aldrich, had an organization and operation that was closer to the atelier than that of a business office: the work was collaborative and the principals both supervised and mentored their younger colleagues.

It was the Beaux-Arts Institute of Design, established in 1916 in New York City, which made the École experience accessible to American students who could not go to Europe. In addition, and in contradistinction to the monopolistic character and restricted participation of the French École, the BAID offered evening lectures and classes and held open competitions. Each month architectural composition competitions were announced and the eight- to twelve-

person juries composed a virtual Who's Who in American Architecture.[175] The award-winning entries were published in its *Bulletin* and often in other architectural periodicals as well, such as *American Architect* and *Pencil Points*. One indication of the French school's stature in the United States is that the ultimate BAID competition award was study in Paris rather than Rome. By paralleling the École's educational system of practical training, lectures, and *concours*, the BAID sought to elevate the professionalism of architects at a time when recognized schools of architecture in the United States were few. Such was the influence of the Beaux-Arts model that many American architectural schools used the BAID competitions to evaluate their students' work.[176]

The BAID was in fact at its height during the early years of architect-built airports; in 1929-1930, the organization judged nearly 10,000 drawings from forty-four schools.[177] And, while a few critics deplored the use of academic classicism at airports, many more argued for its appropriateness. Harold Vandervoort Walsh, for example, maintained that engineers, although needed for

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[175] For the 1924 *esquisse* competition for an aeroplane reception station, the jury included Frederick Charles Hirons, Raymond Hood, Benjamin Wistar Morris, and Whitney Warren.

[176] There were schools in the United States, such as Illinois Institute of Technology and Massachusetts Institute of Technology, which followed the German engineering school model of architectural training. The German system emphasized practical construction experience and technical knowledge rather than the Beaux-Arts' historical and "pictorial method." Joseph Hudnut, Associated Collegiate Schools of Architecture, minutes, 21 (1934): 6, quoted in Rosemarie Haag Bletter, "Modernism Rears its Head—The Twenties and Thirties," in *The Making of an Architect: 1881-1981.* Richard Oliver, ed. (New York: Rizzoli, 1981), 111.

[177] Ibid., 104.

the technical aspects of airport construction, lacked the academic training necessary to properly organize and "theme" airport structures. "Without this method of study," he declared, "elegant proportions, fine arrangement and dignified planning are next to impossible to obtain."[178]

At the early date of 1924, the New York Beaux-Arts Institute of Design held a competition for the design (*esquisse*) of an Aeroplane Reception Station. This structure was not meant for the traveling public, however, but for arriving dignitaries. As the competition description reads, "It will soon become customary for people to cross the ocean by aeroplane, and among the foreigners visiting us, there will always be a number of distinguished persons" who will require special facilities for their ceremonial welcome. The specifications for the station stated that it was to be located between a river and an airfield "near a great city." The grounds were to include a formal garden that formed an esplanade from the parking lot to the station and to the river. The station itself should contain a grand salon and several "retiring rooms" as well as places for various services such as the press and telephones. The competitors are further directed that, "The treatment of the entire composition will be of a very dignified and rather formal design in view of its distinguished function, and emphasis should be placed on the fact that its appearance and disposition as seen from the sky is of almost primary importance."[179]

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[178] Walsh, "Architectural Principles Applied to Airport Design," 36.

[179] "The Beaux-Arts Institute of Design," *American Architect* 125, no. 2438 (January, 1930): 127.

Although it lacked historical precedents, the airport was in many ways the ideal Beaux-Arts project. It required a comprehensive plan and a rational organization of all of its structures and grounds, for each element at the airport needed to be not only related but also clearly differentiated. The Beaux-Arts indifference to specific site conditions was in this case a non-issue, since an airport demanded a site that was a virtual blank slate. The passenger terminal, as the point of interchange between landside and airside operations, provided a focus for the scheme and public character. These essential elements of airport design lent themselves well to the *parti*, or the expression of the program's requirements, the central tenet of Beaux-Arts design. William Boring, dean of Columbia School of Architecture from 1915-1933 and founding member of the BAID, defended the primacy of the *parti* when he noted with distaste the changes occurring in European architectural education, which placed greater emphasis on technical training: "Knowledge of structural materials and their uses, excellent craftsmanship, even good detail are not the broad basis of good design . . . The disposing of masses after analysis of the problem is more important. Planning in its broadest sense is the basis of architecture."[180] From Boring's perspective, however, the plan was not merely a practical matter, the aesthetic and symbolic associations it suggested were equally important. And the program of the BAID 1924 competition for an aeroplane reception station indicates this concern for architecture's representational qualities by stressing the decorous character of the station in its details and its entirety.

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[180] William Boring, "Professor Boring of Columbia University on Architectural Education," *American Architect* 126, no. 2457 (22 October 1924): 388.

On one hand, these considerations were very advanced for this period. Airports of the 1920s were largely undefined—in plan, character, and type. They often grew haphazardly, were built on inadequate sites or without consideration of their proximity to the city. Few had anticipated the impact the airlines would have on the airport. For example, hangars were the dominant structures and any passengers were accommodated there or, if there was one, at the administration building. As air travel expanded, the airport added and adapted buildings by accretion. Unable to expand internally or externally to incorporate new technologies and ventures or inconveniently located, airports were moved, demolished and rebuilt. The New Orleans, for example, shifted its municipal airport twice between 1928 and 1933, both times moving it closer to the city center to make the airport more convenient for commercial transport. On the other hand, Beaux-Arts plans were often at fault in restricting expansion. Symmetry, axiality, monumentality, and an organization and relationship of structures based on their symbolic and public importance resulted in fixed and inflexible plans. At the very least, the scheme's legibility was lost when expansions and additions were made but often cities just started over. Only a dozen years after its grand Beaux-Arts airport was built, New Orleans was forced to relocate its municipal airport a third and final time.

In his 1940 survey of airports around the world, architect John Walter Wood found insufficient planning to be the factor that most hindered commercial aviation and national security. He observed, "Airports are frequently thought of as a group of self-contained parts and units, instead of portions of a co-ordinated,

working whole—the complete airport operating like a well-oiled machine." Wood, along with many aviation experts of the period, criticized the piecemeal approach to airport construction. The solution he and others proposed was a coherent program of development: "To attain the unity necessary for present needs and an ordered expansion for potential future traffic the airport construction program should be based on a comprehensive, flexible, and well-conceived master plan, drawn up at the very outset."[181]

Formality of plan and arrangement is a recognizable trait of early architect-designed airports. Especially notable is the aerial view, a perspective emphasized in the BAID competition and by many architects of the period. Because pilots flew at low altitudes under visual conditions, the airport had to be marked in such a way that it could be clearly seen from above. Initially this meant simply a white chalk circle in the center of the landing field, which at this time could just be open turf. In addition to this standard identification circle, the name and location of the airport was chalked on the field or painted on the hangar roof, such as at Lindbergh Field, San Diego (fig. 4). But it was the introduction of paved runways and the new importance of the passenger terminal that gave the airport such an affinity with Beaux-Arts notions of abstract planning. The dominance of these two elements evolved into elaborate designs that could only be appreciated from the air.

The most outstanding example of this design focus is the Army Air Service airport of Randolph Field, near San Antonio, Texas, 1929-1932 (fig. 31). Pilot and

[181] Wood, *Airports,* 336, 3.

architect Lt. Harold L. Clark devised the initial concept for the post, while William Delano of Delano and Aldrich and the city planner George B. Ford, who the Army retained as architectural advisors, reviewed and revised the plans. Randolph Field is unique in that the aerial view was paramount. George B. Ford explained,

> Perhaps, after all, it is aviation that has at last made us conscious of how utterly formless most of our Army and civilian layouts have been. The new approach is from the air. Our new first view—our first and often lasting impression—of a city or an Army post or field is from the air . . . .
>
> As seen from the air, which after all is the usual way in which it will be seen, the post in its form and color will take on very much the appearance of some of the rose windows in the great cathedrals of Europe.[182]

Ford's description of the new-found awareness of the "formless" landscape and his desire to create an ordered space that would appear from above as stained glass windows in a church are explicitly religious evocations. The abstraction of the landscape that the aerial view provided is also one that is particularly modern, made possible only by the skyscraper and the airplane. This type of distanciation, as Michel de Certeau has determined, "transforms the bewitching world by which one was 'possessed' into a text that lies before one's eyes. It allows one to read it, to be a solar Eye, looking down like a god."[183] Popular postcard depictions of the aerial view during this period further confirm this new "exaltation of the scopic and gnostic drive."[184]

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[182] George B. Ford, "New Army Posts for Old," *Quartermaster Review* (November-December 1929): 19-21; quoted in Jody Cook, "Randolph Field Historic District," National Register of Historic Places Registration Form, United States Department of the Interior, National Park Service (26 February 2001), 55.

[183] Michel De Certeau, *The Practice of Everyday Life* (Berkeley, Calif.: University of California Press, 1984), 92.

[184] Ibid.

The decorative aerial pattern of Randolph Field is a feature of other American airports of this period, and it is particularly evident where the site itself was constructed specifically for the airport. At New Orleans, for example, land for Shushan Airport was reclaimed from Lake Pontchartrain (the subtitle of a 1934 article on the new airport noted: "Usually an airport must be fitted to the ground; here the ground was made to fit the airport.").[185] The ingenious use of crushed oyster shells and clay as filler allowed architects Weiss, Dreyfous & Seiferth—the same firm which had just completed the state capitol building in Baton Rouge—an unusual amount of freedom in planning the airport's buildings, layout and grounds, which in this case were laid out as wings symbolizing flight (fig. 32a).[186] Washington National Airport (now Ronald Reagan Washington National Airport), built under the direction of architect Howard Lovewell Cheney in 1938-41, is a similar case (fig. 35). The site, Gravelly Point, was constructed of hydraulic fill (dredged clay and sand) that extended an uneven bank of the Potomac River. The star-shaped plan of the runways and the landscaping of the triangular area between the field and the parkway integrated the airport into the larger context. The airport was made into another of the city's monuments, its plan linked it to

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[185] "Shushan Airport, New Orleans, La.," *Architectural Forum* 61 (October 1934): 237.

[186] Jessie Poesch and Barbara SoRelle Bacot, eds., *Louisiana Buildings 1720-1940. The Historic American Buildings Survey* (Baton Rouge: Louisiana State University Press, 1997), 144. A contemporary commentator pointed out a practical consideration: the swept back angles of the "wings" increased visibility of the runways from the central control tower. "Shushan Airport," 241. This same formulation was also used at Newark airport for its new terminal, which was constructed the same year as Shushan.

Mount Vernon to the south and the Jefferson, Washington, and Lincoln Memorials, which, from the vantage point of an airplane, were clearly visible to the north.

The penchant for an orderly and aesthetic organization of the airport's runways and structures is illustrated in John Wood's survey, which included diagrams of forty American and European airports.[187] The plans, all drawn to the same scale, contrast the order of Beaux-Arts designed American airports to the irregular layouts of European airports. In part an effect of the open fields—paved runways were still a rarity in Europe—the plans of European airports appear unstructured.

LEHIGH AIRPORTS COMPETITION

The widespread adoption of concrete runways in the United States may very well be one result of the Lehigh Portland Cement Company's 1929 American Airport Design competition.[188] The BAID competition for an air terminal had little impact on actual airport design, but the Lehigh competition proved to be influential even though none of the submitted airport designs were built. First, the

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[187] Wood, plates 52 and 53.

[188] Deborah Douglas makes the qualified statement that the Lehigh competition led to the construction of concrete runways in the United States, although there were other contributing factors. Douglas, "The Invention of Airports," note 106, 506.

competition was highly publicized: announcements of the contest appeared in general interest, aviation, and architectural periodicals. In addition, magazines that had an editor or publisher as a jury committee member—*Architectural Forum*, *Airports*, *Engineering News-Record*, and *American City*—ran several feature articles about the competition. Second, the competition offered generous prizes, with awards totaling an unprecedented $10,200. First Place alone was $5,000, an amount today worth more than $55,000.[189] The prize money ensured a healthy participation; there were 257 entries from 35 states. Last, the award-winning designs were given full-page reproductions, with commentary, in a catalogue published the following year. Entitled *American Airport Designs*, this catalogue was widely disseminated and can be found in many public libraries around the country. Its importance is such that the American Institute of Architects selected it for republication in 1990.

The goal of the Lehigh competition was two-fold: it hoped to raise awareness of airports as a unique design problem and to provide the remedy of well-designed airport plans. In particular, the competition outlined a program that was "to suggest practical airport designs of value to municipalities and other organizations which are today creating America's future airports."[190] The jury consisted of a committee of twenty-four experts in the fields of architecture, aeronautics, engineering, and city planning. The committee chairmen was none

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[189] Adjusting for inflation according to the Consumer Price Index.

[190] Lehigh Portland Cement Company, *American Airport Designs* (New York: Taylor, Rogers, & Bliss, 1930), 10.

other than Columbia University's School of Architecture dean William Boring, and on the architecture section sat Beaux-Arts Institute of Design judges Harvey Wiley Corbett and Raymond Hood, as well as Parker Morse Hooper, editor of *The Architectural Forum*, and Francis Keally, an architect who had written extensively on the architectural development of airports. The other jury sections likewise contained some of the most prominent people in their respective fields, including National Advisory Committee on Aeronautics director Dr. George W. Lewis, Curtiss-Wright Flying Service president Charles S. Jones, executive engineer for the New York region Harold M. Lewis, and George B. Ford, the Army's Airfield Advisor and a Beaux-Arts trained architect and engineer who became one of the country's first city planners. The jury evaluated the submissions in four areas: new ideas for airports, new architectural conceptions, engineering features, and influence on city planning. The winners were ranked from first to fourth place, and the committee also awarded twelve honorable mentions.

The competition called for entries of two drawings, one the *parti*, and the other a *projet rendu.* The program stipulated an airfield of 3,500 feet in all directions, with a minimum of four runways in each of the cardinal directions, and for a passenger terminal with "complete facilities for the public," including a means to shelter emplaning and deplaning passengers, as well as designated spaces for customs, immigration, airline companies, and air traffic control. The program also called for a small hotel and hangars, and "such essential structures as would normally be required for the maintenance and care of the airports,"

such as repair shops, pump station, and concessions. Finally, the designs had to allow for future expansion (exempting the airfield) in such a way that the original elements remained intact. The program concluded, “Nothing in these conditions shall be deemed to govern or limit the competitors in developing logical relationships between the units, the height of the structures, or their architectural character.”[191]

Although stressing the need for practical designs, these specifications were typical of the Beaux-Arts *concours*, which were characterized by their abstract programs. The site, for example, was ideal: a flat, sea level area of regular dimensions, with no surrounding obstructions. Unrealistic too was the prominence given to structures and amenities for passenger use and comfort. In actuality airports operate under severe site restrictions and it is the aircraft requirements for safe operation and maintenance that dictate airport design, not passenger comfort and convenience. Unsurprisingly, nearly all the designs reproduced in the catalogue adhere to Beaux-Arts planning conventions. An orderly symmetry prevails: the terminal is the monumental central structure approached by a grand boulevard and the airfield runways form decorative allées and parterres. In contrast to this uniformity, the structures display a wide range of stylistic diversity, such as Neoclassical, Spanish Colonial, Art Deco, Classic Moderne, Expressionist, with the Classic Moderne style the most prevalent.

The First Place entry went to the design submitted by A.C. Zimmerman and William H. Harrison, Associated Architects and Engineers of Los Angeles

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[191] Ibid.

(fig. 36). Zimmerman, the senior partner, was noted in the catalogue as a graduate of the Beaux Arts Institute of Design as well as the chief architect for the Western Air Express Terminal at Los Angeles. Their space-efficient "Quadrant Airport" permitted longer runways than the conventional rectangular field and it allowed for the preferred semi-circular arrangement of structures. The passenger station shows the usual tripartite massing, with a projecting central block. The rear of the building, however, has an unusual extension. This addition contains five corridors separating passengers on commercial and private planes as well as those arriving and departing. Each corridor becomes an underground tunnel that leads to a loading point, one of five points in a star-shaped structure. The control tower tops the loading points; its position provides excellent visibility of the field and hangars.

The jury praised this ingenious structure, a precursor of the satellite airports developed thirty years later, but equally commended the architectural treatment of the entire project as "combining beauty, stability, and a feeling of permanency."[192] Although the association is made with ancient Egyptian rather than Greco-Roman architecture—the hangars are designated as "pylons" and the massive masonry station is ornamented with shallow relief panels of outstretched wings in reference to the falcon god Horus—the style of the Quadrant Airport can be called Classic Moderne. This style was popularly introduced at the 1925 Exposition des Arts Décoratifs et Industriels Modernes in Paris. And, while it retained the elements and proportions of monumental classical architecture, they

[192] Ibid., 13, 22.

were in low relief or vestigial and the stylized ornament was restricted to pilaster capitals, frieze panels, and decorative grillwork.

Of forty-four winning drawings of the Lehigh contest, only two were nominally in the International Style. One of these designs, by New York architects Robert Doulton Stott, Howard R. Hutchinson, and Lansing C. Holden, Jr., of Holden, Stott & Hutchinson, is of special interest because this firm would build the first federally-funded airport in Washington, D.C. (fig. 37). The Lehigh entry depicts a passenger station that is thoroughly modern in its materials, lack of ornament, and horizontal strip windows; however, the tripartite, symmetrical structure and the airport's grand axial plan betray the architects' Beaux-Arts background. The principal architect, Lansing C. Holden, Jr., trained at Harvard as well as the École; interestingly, he was also a pilot. Holden apprenticed with another École-trained architect, Benjamin Wistar Morris. It was while he was with Morris's office that he submitted the first designs for the Washington Air Terminal, which were published *American Architect* in May 1929. Shortly thereafter, Holden set up his own office with Hutchinson and Stott, and it was his firm that received the final commission for the airport.[193]

This Modern structure served as the capital's airport from 1930 until Washington National Airport opened several miles away in 1941 (fig. 34).

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[193] During the Depression, Holden gave up his East Coast architectural practice to direct the dogfight scenes in a Hollywood war film. He was involved in a series of 1930s films and he became an early adapter of the "Technicolor" process. Richard and Clio Chafee, "The École des Beaux-Arts and Hollywood," paper presented at the 52nd Annual Meeting of the Society of Architectural Historians, Miami, Florida, 14-18 June 2000.

Although extremely simple in design, this terminal replaced the even more primitive privately owned facilities that had been in operation on the site (roughly the current location of the Pentagon) since 1927. Considered primarily a practical and functional building, the Washington Airport nonetheless had a stylistically advanced flat façade and windows that formed glass corners. The consequent play in the volumetric forms between positive and negative space and solidity and transparency is characteristic of the International Style even as its plan and disposition retained a Beaux-Arts symmetry. When the increase in air traffic required the building of a new airport on a different site, it was determined that the terminal had to be both technically and stylistically sophisticated. Robert H. Hinckley, the Secretary of Commerce and former Chairman of the Civil Aeronautics Authority stated that Washington National Airport "was conceived as a model for what other such terminals may be" and that special consideration was given to the airport's "aesthetic obligations" because of its relation to the Capitol City.[194] Yet the design of this later terminal—with its monumental colonnaded entrance—retreated from the innovations of its predecessor and reaffirmed the classical tenets of the Beaux-Arts style.

CLASSIC MODERNE STYLE: SHUSHAN AIRPORT

[194] Robert H. Hinckley in John Stuart, "The Washington National Airport," *Pencil Points*, 21, no. 10 (October 1940), 609.

The Classic Moderne style of Washington National Airport was the idiom of choice for American airports of the 1930s and 1940s. For the Beaux-Arts architect, Classic Moderne, a restrained Art Deco, was ideal for defining the airport's character. On one hand, familiar features and arrangements provided an architecture of reassurance; on the other hand, new materials (such as concrete and steel) and simplified detailing represented a step forward, as did aviation. Architectural historian Rosemarie Bletter describes Classic Moderne as a "stripped down classicism with little nods to modernity in the flat decorative panels or spandrels which contained touches of Cubist, Futurist, and Expressionist ornament. This was a sharply modified modernity that could be safely accommodated within the Beaux-Arts tradition."[195]

The conventional approach of the Classic Moderne belies the ideological war in American architectural circles that was just beginning with the incursion of European Modernism. BAID Architect and Lehigh jury member Harvey Wiley Corbett mused,

> And what do we mean when we say 'modern'? Is that merely the definition of some new forms of ornament and architectural dressing, some new uses of old materials, or fresh uses of new materials? Or have we as a professional group become modern in the sense of fitting ourselves — measuring up to the requirements of modern business, modern living, modern industrialism?[196]

American architectural institutions considered the middle path offered by the Classic Moderne style to successfully decide the issue of what constituted

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[195] Bletter, "Modernism Rears its Head," 109.

[196] Harvey Wiley Corbett, "Architecture Has Become a Business as Well as an Art," *American Architect* 137 (January 1930): 46.

modernism. The University of Pennsylvania, for example, in its 1934-35 *Bulletin* on the Department of Architecture in the School of Fine Arts, declared: “Modern problems to be successful must have modern solutions; the proper approach to modern solutions is through a study of the solutions of the past. Good design—good proportion and composition—are the growth of past ages of art.”[197]

The design of the administration building at the Shushan Airport at New Orleans illustrates this approach (fig. 32). It had been named after local businessman and president of the Orleans Levee Board, Abraham Lazar Shushan. He was an influential friend of Huey P. Long, then the Louisiana Governor and later a United States Senator and presidential hopeful. The governor viewed the airport as an opportunity to showcase the state and make it a gateway to the world; no expense was spared in its construction and decoration (although it was in fact a WPA project). The airport’s opening day souvenir pamphlet called Shushan “the nation’s most modern airport,” but the *Architectural Forum* critic more accurately described it as a “modified modern design.”[198] The architects applied modern materials, such as cement facing (in a

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[197] Quoted in Joseph Esherick, “Architectural Education in the Thirties and Seventies: A Personal View,” in *The Architect: Chapters in the History of the Profession*, ed. Spiro Kostoff (New York: Oxford University Press, 1977), 241.

[198] *The Story of a Great Enterprise, The Nation’s Most Modern Airport*, commemorating the formal opening of Shushan Airport, New Orleans, 1934; and “Shushan Airport, New Orleans, La.,” 237-242. The airport is still in operation as the New Orleans Lakefront Airport, although it suffered considerable hurricane damage in 2005. It underwent extensive renovations in 1964, which covered the façade—the sculptural reliefs were considered outdated and too expensive to maintain—but a number of the interior elements survive. Joan Maloney, *Art and Architecture at Lakefront Airport*, commemorating the fiftieth anniversary of Lakefront Airport, 9 February 1984.

"warm, light tan" finish) and aluminum trim, to a traditional tripartite form of a large central block flanked by two wings. A columnless portico marked the elaborate entrance, and pilasters, capped with low reliefs of whirling propellers, separated the mullioned windows. The sculpted relief panels, designed by Enrique Alferez under the direction of the architects, depicted abstracted mythological figures symbolizing the four winds and flight. The critic noted that the figure of *Man as a Flying Machine* that crowned the entrance looked like a crucifix. Although he found the allusion "unfortunate," it may have been intentional as religious associations with flight were frequently made throughout this period.[199]

The lobby combined luxurious materials and ornamented surfaces with informally arranged tubular steel furniture (fig. 33). The floors and walls were faced with terrazzo marble and the plaster coffered ceiling covered with glazed aluminum leaf. Aluminum was used again for the ornamental railings and chandeliers. As at the contemporary Pan Am terminal at Dinner Key, the aviation theme of Shushan's interior links technological and human progress. Instead of the globe, the floor pattern has aeronautical symbols and a large, central compass. Each of the eight compass points to the name of a major city and gives the distance from the airport in air miles. A frieze by Alferez tells the story of the airplane's development and depicts stages in its manufacture. Each ceiling coffer shows a tool or mechanical part, such as a cogwheel or drive train. The mezzanine level, clearly visible from the waiting room, featured eight mural-size

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[199] Joseph Corn explores this topic in *The Winged Gospel*.

paintings by Xavier Gonzalez with the theme of the aviation's conquest of distance. The paintings depict the arrival of the airplane to places modern, ancient, or exotic: New York, Paris, Egypt, the "Land of the Mayans," the South Pole, Mount Everest, and Bali (fig. 33b). In the lunch room adjoining the waiting room were landscape murals by Alexander J. Drysdale of Louisiana scenery. The entire interior program was Art Deco in style, with a sophisticated color scheme of red, off-white, and tan. Although the *Architectural Forum* reviewer found "a little too much Paris 1925" in the décor, he nonetheless praised the symbolic program as "both effective and appropriate."[200]

The organization of the public interior spaces at Shushan is reminiscent of the train station; indeed the reviewer described it as such. Although the Lehigh competition emphasized the creation of new architectural conceptions, the competition entries, such as the Quadrant Airport, relied on the precedent of the train station for the plan of the air terminal. One of the results of the competition was to establish the air terminal as an adaptation of the rail terminal.[201] The association of the air station with the rail station provided the new, and as was frequently remarked, unprecedented, building type with a history and a familiar

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[200] "Shushan Airport," 242. Another WPA project, Newark Airport administration building, was built in the same year of similar materials and design. The 1934 Newark terminal was listed on the National Register of Historic Places in 1979, and in 2004 Beyer Blinder Belle Architects restored the terminal to its original splendor. It is now used as office and exhibition space.

[201] Brodherson, "What Can't Go Up Can't Come Down," 408.

typology.[202] The shared features of both stations were a prominent public entrance to a large open reception room, bounded by ticket counters and baggage check. The second floor typically had a balcony that encircled the reception area while the wings contained offices and services as well as a restaurant with a view of the airfield. The station had a vehicle-accessible public or "land" side and off the rear, an operations or "field" side. The primary differences that distinguished the air from the train station were usually not visible from the façade: the observation or visitor's deck and the air traffic control tower that capped the airfield side of the building. This arrangement of the air terminal was still in effect at the end of this period, as evidenced by the CAA's recommended airport plan of 1940 (fig. 13).

In 1931 Harold Vandervoort Walsh admitted that the adoption of the train terminal to that of the air terminal would later be outmoded: "It is certain, though, in the light of the experience we have had with railroad stations, we can predict that every airport will be a brand new problem with new conditions to solve and new technical advances to be used."[203] By 1940, Walsh's colleague at Columbia University, Talbot F. Hamlin, addressed this issue in a *Pencil Points* article entitled, "Airports as Architecture." One problem he observed was that of scale. As commercial aircraft became larger they began to dwarf the terminal. The terminal was insignificant in size compared to the hangars and resisted the

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[202] Train stations were also historicist in style; the train shed was the only evidence of modernity as was the hangar at the airport.

[203] Walsh, "Architectural Principles," 128.

Beaux-Arts typology. Hamlin pointed out that, “Much of the difficulty with American airports has been the attempt to give these new and smaller buildings the monumentality people have come to associate with the railway station.”[204]

Also unlike the train terminal was the airport’s location on the outskirts of town. Hamlin noted that it was not truly a terminal but a transfer point. Consequently, the first design principle was to ensure the smooth flow from one form of transportation to another, both from without and within the passenger station.[205] A decade earlier, Richard Neutra had claimed that the monumental air terminal was a “romantic transposition of an old concept” that is “too much opposed to the necessary continuity of traffic flow.”[206] His proposed Rush City Air Transfer was a nexus of different forms of transportation: air, rail, vehicular and pedestrian (fig. 38). Neutra wanted to eliminate the representational aspects of the airport and make it purely functional. However the airlines, the architectural profession, and the public expected more; Neutra entered the Rush City Air Transfer to the Lehigh competition but the jury did not select his design either for an award or for publication.

To Talbot Hamlin and others at this time, the greatest difference between the air terminal and the rail station was that one represented a glorious future, the other the past: “The airplane station must be as modern as the transport it

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[204] Talbot F. Hamlin, “Airports as Architecture,” *Pencil Points* 21, no. 10 (October 1940): 645.

[205] Ibid., 644-645.

[206] Richard J. Neutra, “Terminals?—Transfer!” *Architectural Record* 68, no. 2 (August 1930): 99.

serves; and to give the passenger, as he enters the station, something of a foretaste of the beauty of this quality should be one of the great aims in airplane station design."[207] Thus in this early period of airport development, architects, with few exceptions, used the Classic Moderne or Art Deco style to signal both the new and modern while retaining the aesthetic language and spatial organization of the Beaux Arts tradition.

In 1938, Shushan Airport underwent a "beautification program" under the WPA: the grounds were landscaped and expanded to include a public swimming pool (which was also a reservoir for the fire department). The sculptor Enrique Alferez, who had settled in New Orleans in 1929 as a result of the airport commissions and whose sculptures could be found throughout the city, was commissioned to create a fountain for the airport's entrance. It consists of four allegorical figures representing the four winds around a partially submerged globe in the center of an elliptical basin. The basin has a low relief frieze of zodiac symbols and at night the pool was illuminated from below with colored lights (fig. 39). In a muscular and dynamic Art Deco style, the well-endowed male figure of the group was denounced as an affront to public morals.[208] At one point Alferez, armed with a rifle, protected the fountain from attack. The controversy over the fountain went all the way to the White House, where Eleanor Roosevelt

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[207] Hamlin, "Airports as Architecture," 645-646.

[208] Poesch and SoRelle Bacot, *Louisiana Buildings*, 144 and "The Airport," *Little Woods Neighborhood Snapshot*, available from http://www.gnocdc.org/orleans/9/49/snapshot.html&e=10053; Internet; accessed 1 April 2005.

settled the issue by ruling that the fountain should remain unaltered. Today, the fountain is considered to be Alferez's finest work.

The Four Winds fountain managed to survive but in most cases the WPA art that decorated many airport terminals from this period has been destroyed. Murals in particular fell victim to allegations of portraying figures too sexually, like the Alferez fountain, or being too modernistic for public taste.[209] However a primary reason seems to be that many WPA artists were suspected of communist leanings. In one case, August Henckel's paintings for the dome of Floyd Bennett Field terminal by were burned before their final installation for illustrating "red propaganda".[210] The imperialist theme of the Xavier Gonzalez wall paintings at Shushan airport raised no comment, but his murals for a subsequent WPA project at the San Antonio municipal auditorium were interpreted as "communistic" and were summarily removed.[211]

MODERNIZING THE ARCHITECTS

These incidents were not just skirmishes over stylistic appropriateness or ideological correctness. At issue was the modernization of artistic production,

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[209] Greta Berman, "Murals Under Wraps," *Arts Magazine* 54, no. 1 (September 1979): 168-171.

[210] Gerald M. Monroe, "Mural Burning by the New York City WPA," *Archives of American Art Journal* 16, no. 3 (1976): 8-11.

[211] "Denies He is Red [Xavier Gonzalez]," *The El Paso Times*, 27 August 1935, 1.

which was one of the most heated debated both outside and inside the fields of art and architecture. Although Albert Kahn was fond of saying, “Architecture is ninety percent business and ten percent art,” his colleagues were clearly discomfited by this philosophy. Thus Kahn’s firm dominated the area of American industrial architecture for thirty years.[212] In 1930, Frank Lloyd Wright pronounced that “Architecture as a profession is all wrong.”[213] With evident bitterness, Wright claimed that “The A.I.A. has allowed the engineer as a separate ‘institution’ to build its buildings and has become satisfied merely to put the architecture *on* the thing.”[214] However he had equal disdain the modern firms or “plan factories” that treated architecture as a service industry, much like making customized hats or shoes. Instead, Wright argued, the architect must understand modern building materials and methods in order to utilize their expressive as well as functional capabilities. In addition, the modern architect needs an astute business sense and strong management skills in order to direct and control the design and construction process.

The nearly opposite opinion was expressed two years later by William Delano, the designer of a good number of the first airports throughout the Americas. “I believe that Architecture is an Art and not a business,” he stated forcefully in the first lines of his published philosophy on architecture.[215] Yet when

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[212] Bergeron, *Industry, Architecture, and Engineering,* 107, 202.

[213] Wright, “Architecture as a Profession is All Wrong,” 22.

[214] Ibid., 86.

[215] Delano, “My Architectural Creed,” 145.

asked to speak about being a successful architect to the Junior League of the New York Society of Architects, he said somewhat peevishly that, "I wished the question had been framed to ask how a man may become an *ideal* architect rather than a successful one. . ."[216] His following discussion makes clear that the ideal architect is one who is fulfills his client's expectations, a piece of advice that certainly had some part in the success of his firm.

Well-known architects such as Wright and Delano completed projects across the country and internationally. In 1928 an editorial appeared in *American Architect* that noted that airmail had "proven highly useful" to the profession in meeting time constraints for putting out bids, shipping materials, getting approvals, submitting last-minute changes, and in coordinating multiple and distant projects.[217] As Wright early noted, however, "Modern industrial, and therefore economic affairs, are becoming daily more 'orchestrated,' meaning more dependent upon each other."[218] Thus airmail and commercial flight brought more than speed and convenience to architect; they also contributed to the growing demand for greater efficiency, specialization, and organization. In other words, the old atelier system was displaced by a corporate structure as architecture inevitably became more businesslike.

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[216] William Adams Delano, "To Be an Ideal Architect," *Pencil Points* 13 (February 1932): 105.

[217] "Editorial Comment: The Air Mail," *American Architect* 134 (5 December 1929): 759.

[218] Wright, "Architecture as a Profession is All Wrong," 23.

The flap over the Alferez fountain was only one of the controversies surrounding Shushan airport. Huey Long was assassinated in 1935 and Abe Shushan implicated in improper business practices with his administration in conjunction with the airport and levee construction. In 1939, Shushan was indicted again as one of the 150 people accused of defrauding the Federal government (mostly of WPA funds) during the Louisiana Scandals. Shortly thereafter, the airport's name was changed to New Orleans Municipal Airport. The Orleans Levee Board attempted to remove the disgraced politician's name from the airport, a near-impossible undertaking as Shushan's name or initials appeared throughout the airport and its grounds. Legend has it that even the screw heads had "S"-shaped slots.[219]

Perhaps wary after the scandal-plagued Shushan Airport, when New Orleans took over Moisant Field from the military following World War II, by then a much-needed larger airport outside the city, it did not immediately replace the Quonset huts that still served as passenger facilities (fig. 40). A new terminal, designed by the firm of Goldstein, Parham & Labouisse, finally opened in 1959 (fig. 41). The ultra modern concrete, steel, and glass structure is distinguished by the great parabola of its Main Lobby, which rises to a height of sixty-five feet. Its form is a fitting echo of airship and early hangar design (fig. 2), and its expansive interior is a successful evocation of outer space. The corbelled shell is left unpainted; the only décor is the abstract patterns formed by the zig-zag arrangement of the bright colored upholstered seats and the light flowing through

[219] Blake Pontchartrain, "New Orleans Know-It-All," *Gambit Weekly,* 12 December 2000.

the lattice of the great window. At the renamed New Orleans International Airport, the Winged Man of Shushan Airport was displaced by air itself.

FROM CITY AIRPORT TO TERMINAL CITY

CHAPTER THREE

> Today, with aviation heralding the arrival of the greatest change in the ways of man since the beginning of time, the experimenting, the discussion, the theorizing, are all about to cease. Man is to reorganize and reconstruct in accordance with the knowledge he has gained those chosen spots wherein he congregates, where business is transacted, leisure is spent, and sleep enjoyed; a change in the appearance of the whole of our self made surroundings is about to take place, inevitably.
>
> — Thomas Mitchell, 1929[220]

The architect Thomas Mitchell early grasped the symbiotic relationship of aviation and urbanism, for their development occurred interdependently. Historians call the period of the 1920s and 1930s in the United States—when the first airports were built—the Age of Metropolitanism. The federal census of 1920 revealed that, for the first time, the majority of Americans lived in metropolitan areas.[221] Sociologist Howard Chudacoff comments, “In 1890, the Census Bureau

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[220] Thomas Mitchell, “Building the City Around the Airport,” *Airports* 2, no. 2 (February 1929): 9.

[221] The Census Bureau defined a metropolitan district as an urban population of over 200,000. In 1910 there were twenty-five such districts, in 1920 the number of metropolitan and near-metropolitan districts reached fifty-eight, accounting for two-thirds of the population. Howard P. Chudacoff, *The Evolution of American*

had announced that the frontier no longer existed. Now, thirty years later, the figures confirmed that the nation had evolved into an urban society. The city, not the farm, had become the locus of national experience."[222]

"The city," observes Michel de Certeau, "is simultaneously the machinery and the hero of modernity."[223] Chudacoff cites a number of factors that contributed to the growth of cities. One was the economic recession of 1907 and later the Depression which caused many rural people to migrate to cities in search of employment. As agriculture declined, manufacturing capacity increased due to lower labor and production costs. Another cause was the rapid expansion of the service and retail sectors of the economy which created a new 'white collar' class. During the 1930s this new middle class began to exert considerable political and economic power. Period film, theatre, art, and literature also represented the shift from a rural to an urban society. The emergence of a popular culture that promoted mobility, leisure and consumption signified new cosmopolitan values and lifestyles. Manufacturing and industry, which in the nineteenth century typically created their own power and shipping networks, became in the twentieth century increasingly reliant on metropolitan public utilities and infrastructure, particularly those of electricity and transportation. The downtown railroad terminus marked the city center as the commercial core, and the subsequent rise of tall office towers reinforced this concentration of economic

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Urban Society, 5th ed. (Upper Saddle River, New Jersey: Prentice-Hall, Inc., 2000), 224.

[222] Chudacoff, *Evolution of American Urban Society*, 212.

[223] De Certeau, *The Practice of Everyday Life,* 95.

activity. A critical supporting role in urban development was also played by road construction, which occurred at a phenomenal rate during the interwar period. Increasing the number of roads was an attempt by state and federal governments both to ease inner city congestion and to link these centers through a national highway system.[224] Other factors were significant as well: road building was a means of providing employment, supporting the vital industry of automobile manufacturing, and stimulating the consumer market by encouraging the purchase of automobiles.[225]

At the same time, commercial aviation came to be considered an important component of the transportation system, which, furthermore, was itself viewed as characteristic of modern, urban life. In his 1929 series of articles entitled "Building the City Around the Airport," the architect Thomas Mitchell voiced accepted opinion with the statement: "It is an indisputable fact that no single factor has contributed more to the development of civilized life than has rapid transport."[226] The rush by burgeoning municipalities to build airports affirmed the widespread support for unimpeded speed, progress, and growth. In

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[224] Chudacoff, *Evolution of American Urban Society*, 212-262.

[225] Harvey, *The Condition of Postmodernism*, 126-129; and Peter J. Ling, *America and the Automobile: Technology, Reform and Social Change* (Manchester and New York: Manchester University Press, 1990), 117-123, 162.

[226] Mitchell, "Building the City Around the Airport," 9.

1927, Army Air Corps First Lieutenant Donald Duke, coiner of the term 'airport' and also the first general manager of Boston's airport,[227] claimed that,

> Air transportation, having taken its inevitable place as an integral part of the established transportation systems, is having an important bearing on our industrial and economic development. . . . An ever-increasing number of men and women, prominent in industrial, civic and social affairs, with demands for their time and presence assuming proportions impossible of fulfillment by railway or motor, are becoming air-minded, and, when possible, they are utilizing the wings of progress to enlarge a horizon of useful activity.[228]

Although an economic argument for a municipal airport would not be viable until much later, the consensus was that a city with no airport is no city at all. Indeed, the municipal airport grew hand-in-hand with urban America, and their fates were mutually dependent.

The Age of Metropolitanism marks not only the shift from a rural to an urban population but also the spread of suburban areas. In 1920, suburban growth had already overtaken that of city centers. By 1950, suburbs were expanding at ten times the rate of city centers, yet most municipal airports remained within ten miles of the central business district. City airports created traffic congestion, noise disturbance, and eventually restricted the commercial growth that they had initially enhanced. Consequently, inseparable from the role that airports would play in the economic development of metropolitan areas was

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[227] Massport, "About Logan: Logan International Airport: Then and Now," available from http://www.massport.com/logan/about_histo.html; Internet; accessed 21 February 2005.

[228] Duke, *Airports and Airways*, 5-6.

their impact on urban spatial development.[229] As the failure of New York's first municipal airport, Floyd Bennett Field, demonstrates, the commercial success of an airport is contingent on two factors: location and access. Specifically, an airport needed to be sited a convenient distance from the central business district with direct roads that connected it to the downtown. "The question of future airports accessible to our cities is one of the chief problems in aviation," noted R.E. Wilson in a 1928 article for *Airports* magazine; "Airports should be as accessible as a railroad station or terminal depot."[230] Many cities, such as New York, New Orleans, and Detroit, learned this lesson the hard way and had to relocate their airport closer to the central business district.[231]

Property adjacent to an airport, which became too expensive and over-developed because of its proximity, led to the greatest problem experienced by the metropolitan airport: that of limited land area. Thus by becoming a locus of economic activity that then competed with that of the downtown, the airport stunted its own long term viability and contributed to inner city stagnation. The same cities that had moved their airport to the city in the 1930s a decade later were compelled to relocate the municipal airport yet again to an area well outside

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[229] Fairbanks, "Airports," 20-21; and Chudacoff, *Evolution of American Urban Society*, 268.

[230] R. E. Wilson, "Airports to Serve the City" *Airports* 1 (September 1928): 16-18. He suggested locating airports on top of rail freight yards as a solution.

[231] This error of locating an airport too distant and without sufficient highway access to the city continued to be made; Dulles International Airport (1958-62) was built 26 miles from Washington, DC, but the most spectacular example is undoubtedly Mirabel International Airport (1975), sited forty miles distant from downtown Montreal, which closed in 2004.

the city center but where development could be tightly controlled. And so the airport served as a catalyst both for urban centralization and decentralization. Hobart McKinley Conway, editor of *Industrial Design* magazine, concluded: "development clusters quickly around big, busy airports even if they are built at some distance from the central business district in relatively undeveloped areas. In short, it is impossible for the big airport to escape from the city."[232]

The principal difficulty in siting an airport is its stringent functional requirements. It needs an extensive flat area and airspace that is clear, unobstructed, and positioned to take advantage of prevailing winds. Just as important, there needs to be easy access by roads and, in large metropolitan areas, by rail. Locating an airport where it could fulfill its commercial potential and meet its operational needs *and* which also anticipated the direction of expansion demanded unprecedented strategic planning. In other countries, the state orchestrates planning at this scale; however in the United States, the patchwork of jurisdictions, which includes private and local as well as regional and national interests, greatly complicates any kind of planning process. While railroads remain largely in private hands and airports are municipally owned, the enormous state and federal funding of roads has resulted in a disjointed transportation system, or more precisely, three separate systems that at times compete against each other.[233]

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[232] H. McKinley Conway, *The Airport and the Future Intermodal Transportation System* (Atlanta: Conway Publications, 1977), 160.

[233] James S. Russell, "Bullet Train Bailout," *Architectural Record* 190, no. 1 (January 2002): 113.

The architect Francis Keally, one of the first experts in airport design and juror for the Lehigh airport design competition, described the relationship between the city and the airport as a kind of chicken or egg phenomenon: “Here in the United States . . . population has always followed transportation. Each of the new methods of transportation brought in its wake new living and city problems. . . . Quite evidently aviation means new solutions of city planning problems. . .”[234] The profession of city planning, like that of the commercial aviation industry, was in its infancy at this time. The transportation explosion and urban expansion led to the recognition of the necessity for planning and galvanized the professionalization of the field. City and regional planners were critical to shaping metropolitan America through the proposals they produced and the dialogue they initiated about the nature of urban life.

URBAN PLANNING

Keally accurately predicted that the airport would become a magnet for business and residential development, and he presciently advised that areas around airports be zoned for the safety of nearby residents as well as for airplanes. But he also envisioned vast cities “spread out over great areas like

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[234] Francis Keally, “How Airports will Affect Zoning Laws: A Glimpse at Future Problems that Should be Solved Today,” *American Architect* 136 (December 1929): 20.

monstrous eagles," with low buildings whose flat roofs would double as landing pads for autogiros. These horizontal cities of the future would transform the country into an "enormous checkerboard" of landing fields. Keally found support for this vision of urban decentralization in the recently published proposal of the New York Regional Plan Association, which estimated that forty-six specialized landing fields would be necessary to serve the metropolitan area by 1965.[235]

Keally's conception of the city of tomorrow, with its combination of the practical and fantastical, was based on the most current analytical planning document available, one which is still considered one of the most significant examples of urban planning in the United States.[236] The landmark 1929 Regional Plan of New York and Environs forecast that aviation would follow the same pattern of use and development as the automobile. In the same way that the car had replaced the horse-drawn carriage, the airplane would supplement and eventually supplant the automobile. The Plan thus specified for numerous well-dispersed airports throughout the metropolitan area, as well as those serving specific functions, such as agricultural uses, freight, commuters, and tourists. To a certain extent, the use of specialized airports has proved true. But most of the many small airports established around major metropolitan areas (in 1929, for example, the New York City area had twenty-two airports) would not survive into the next decade as consolidation, rather than proliferation, of aviation activities occurred.

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[235] Ibid., 100.

[236] David A. Johnson, *Planning the Great Metropolis: The 1929 Regional Plan of New York and Its Environs* (London: E & FN Spon, 1996), 2.

This common miscalculation demonstrates how difficult it was to adequately prepare for and anticipate the effects of the airport. It also indicates how a particular conception of the future could profoundly influence present-day planning. And nowhere was this more evident than in the United States where there was as yet no national strategy but authority rested with local officials and communities. There evolved two competing visions of the modern city that were significant to airport development: the first was the Garden City and the second was the Rationalist City.

The Garden City was the dream of a nineteenth-century London stenographer, Ebenezer Howard. His book, published in 1898 as *To-morrow: A Peaceful Path to Real Reform* but better known under its republished title of 1902, *Garden Cities of To-morrow*, outlined a city plan that he hoped would transform urban life. [237] Cities were considered unhealthy both morally and physically, a condition many attributed to capitalism, overcrowding, and dissociation from nature. The contemporaneous City Beautiful movement in North America, which climaxed with the 1893 Columbian Exposition in Chicago, sought to ameliorate urban social problems through the implementation of centralized Beaux-Arts city schemes. The movement believed that the separation of functions, monumental public buildings, formal parks, and grand avenues could inspire civic pride as well as provide a measure of social control. In contrast, Howard determined that the only way to alleviate the situation of inner-

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[237] Ebenezer Howard, *Garden Cities of Tomorrow,* London: Swan Sonnenschein & Co., Ltd., 1902. The original edition, *To-morrow: A Peaceful Path to Real Reform*, is available in facsimile with new commentary by Peter Hall, Dennis Hardy and Colin Ward, London and New York: Routledge, 2003.

city populations was to create new highly organized, low-density environments of cooperative communities. Howard recognized that with the advent of rapid transport (railroads) and electrification, it would no longer be necessary to live in congested cities. Thus the decentralized, planned ‘town-country’ of the Garden City could provide the social and cultural benefits of the city with the healthy effects of clean air and green spaces of the countryside.

Howard proposed a circle as the ideal design for the Garden City (fig. 42). At the center of the plan was a park containing the hospital and civic and cultural buildings. Bounding the Central Park was the Crystal Palace, a large department store. From this point radiated boulevards through tiers of gardens and houses for 30,000 inhabitants. Avenues bisected the boulevards, and schools were interspersed within the largest Grand Avenue. The outermost tier was a commercial belt of factories, workshops, and markets that were served by a railway that formed the city’s circumference. The city, which was to cover 1,000 acres, was surrounded by 5,000 acres of farmland that was to supply it with food and agricultural products.

Howard acknowledged that this plan was a paradigm, and he directed that it be modified to accommodate existing site conditions. Of crucial importance to Howard was the significance of the form and structure of the concentric circle and its radii, which symbolized unity and cooperation and was intended to invoke an organic synthesis of home, work, and leisure by making the three areas well

separated yet interconnected.[238] Unity and cooperation were to be not only the result of this new manner of living but also the effect of community ownership. Initially the city would be built through the investment of private capital. But the goal was that tenants, by pooling together, would be able to buy out their leases and jointly own property.

Howard believed that the realization of the Garden City would spark a peaceful revolution in modern living. The landscape of the future would resemble a patchwork of Garden Cities linked by their radial boulevards and railroads—the "enormous checkerboard" described by Francis Keally. Although Howard's books predate the airplane, architects and city planners immediately associated the airport with the spatial plan of the Garden City. In his introduction to the 1945 republication of *Garden Cities of To-morrow,* Lewis Mumford considered that, "if the aeroplane, in its present or conceivable future forms, is to be anything but a menace to health and safety, and if it is to become as much a part of our daily life as the motor-car now is, it will be so only after the Garden City, with its wide belt of open land, has become the dominant urban form."[239]

Howard was an ardent promoter of his ideas and he lived to see two Garden Cities, Letchworth and Welwyn, built outside of London, although neither city followed his model nor became the site of social transformation. Letchworth came the closest through its thoughtful design by the socially progressive

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[238] Robert Fishman, *Urban Utopias in the Twentieth Century* (Cambridge, Mass.: The MIT Press, 1982), 41.

[239] Lewis Mumford, introductory essay, 1945, *Garden Cities of To-morrow*, ed., F. J. Osborn (Cambridge, Mass.: The MIT Press, 1965), 30.

architects Barry Parker and Raymond Unwin. Even so, the architects were unable to build low-cost housing for laborers and the investors were unwilling to relinquish property ownership. The Garden City devolved primarily into a concept for creating suburbs and satellite towns that were either subsidized by the welfare state or undertaken as profit-making ventures by real estate developers.[240]

Nevertheless, the Garden City had great impact in the United States. In 1945 Lewis Mumford declared, "*Garden Cities of To-morrow* had done more than any other single book to guide the modern town planning movement and to alter its objectives." He went on to claim, "At the beginning of the twentieth century two great new inventions took form before our eyes: the aeroplane and the Garden City, both harbingers of a new age."[241] One reason that the Garden City movement took off in America was no doubt due to its timing. It took over from the flagging City Beautiful movement, which was viewed as proposing grandiose solutions that were too expensive and impractical to implement.[242] The Garden City movement, while in many respects antithetical to the aesthetic and civic-minded ideals of the City Beautiful, can also be seen as its logical successor. Instead of reforming the city center, however, the Garden City movement abandoned it altogether in favor of a decentralized scheme that then depended

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[240] Daniel Schaffer, *Garden Cities for America: The Radburn Experience* (Philadelphia: Temple University Press, 1982), 20-22.

[241] Mumford, *Garden Cities of To-morrow*, 29.

[242] William H. Wilson, *The City Beautiful Movement* (Baltimore: The Johns Hopkins University Press, 1989), 281-298.

on rapid transit and supported private home ownership. In 1923, Mumford, Clarence Stein, Benton MacKaye, Henry Wright, and others founded the influential Regional Planning Association of America, which implemented the Garden City model in the United States by promoting small-scale and regional development.

The landmark 1929 Regional Plan of New York and Environs referenced by Keally is another example of the Garden City philosophy of land use and development. Directed by Thomas Adams, who had assisted in the planning of Letchworth and Welwyn, the Regional Plan Association included the leading planners of the day: John Nolen, Edward Bennett, Frederick Law Olmsted, Jr., and George B. Ford. The 1929 plan, the result of ten years of statistical studies, land surveys, and scientific analyses, was the first of three published by RPA. (The last plan was published in 1996, and the organization is still active today.) The original plan loosely followed the Garden City diagram of concentric traffic hubs, and, with the exception of one airport planned for Wall Street, relegated airports to the edges of the metropolitan region. The proposal wisely advised municipalities to purchase in advance the land that might be needed for airports later, and to integrate airports into the road and rail system. The RPA released a number of transit plans in the 1920s that were widely disseminated and caused considerable public discussion (fig. 43). A 1928 newspaper article related the hoped-for results of the Regional Plan:

> The New Yorker of 1965 will have plenty of room. . . He will not spend so much of his time sitting in stationary motor cars in congested traffic. . . He will be able to get around the 5,000 square miles of the region far more easily than now. But he will not have so much occasion to do so. His job,

> his recreations, his stores, his children's schools will be much more conveniently situated with respect to where he lives than they are now. . . . Easy transit in 1965 will really be easy, not the present struggle against crowds.[243]

Although intended to be a comprehensive growth strategies, the RPA's plans, like that of the Garden City, emphasized transportation systems as a means for directing land use, preserving distinctions between city and country, and optimizing natural resources. It was this aspect—the transportation network—that would remain the dominant model in the field of regional and city planning in the United States.[244]

However, the 1929 Regional Plan was not without its critics. Many planners, in particular the rival Regional Planning Association of America, attacked the plan for relinquishing the ideals of the Garden City. Mumford voiced his objection that the plan's disregard for reforming social institutions and its reliance on technology and engineering to instigate positive change was an instance of the tail wagging the dog. He also contended that the adoption of the plan would contribute to suburban sprawl rather than real decentralization. [245] Benton MacKaye, the RPAA planner responsible for the creation of the Appalachian Trail and other parkways, stated succinctly, "One way *not* to get [ten

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[243] "New York in 1965," *The Morning Bulletin* (Rockhampton, Queensland, Australia: 6 September 1928), as quoted in Johnson, *Planning the Great Metropolis,* xii.

[244] Larry Gerckens, "Regional Planning," *Planners Web*; available at http://www.plannersweb.com/planning-abcs/r.html; Internet; accessed 1 March 2005.

[245] Lewis Mumford, "The Intolerable City: Must It Keep On Growing?" *Harper's Magazine*, February 1926, 283-293.

million people in metropolitan New York] is *not* to make 'swifter and less painful' subways."[246]

In any case, the Depression restricted the full implementation of these large-scale schemes and only a few elements of the regional plans of the 1920s were ever realized. Regional planning was renewed after World War II but the emphasis changed to integrating local development with that of the bigger, national picture. In city planning, zoning triumphed as the main means for controlling land use. In fact, the primary contribution of early city and regional planning on later airport development is the use of zoning.[247] Yet it must be noted that as late as 1944 cities, operating through the United States Conference of Mayors, opposed ceding to the CAA the authority to implement zoning laws to regulate areas around airports. This only changed in 1952, after there were three airplanes crashes in Elizabeth, New Jersey, a residential area encroaching Newark Airport. These accidents, which resulted in a number of deaths and caused the temporary closing of Newark Airport, sparked a presidential commission to address the issue of the airport's metropolitan context. The commission's report, *The Airport and Its Neighbors*, recommended among other safety measures, that strict zoning needed to be imposed and furthermore, that "airports must be planned as part of the total system of metropolitan

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[246] Benton McKaye, "New York: A National Peril," *Saturday Review of Literature,* 23 August 1930, 68.

[247] Bednarek, *America's Airports*, 124-125.

transportation and land use."[248] The RPA was nevertheless instrumental in determining the location and operation of airports in the New York City area, and it was also involved in placing Newark, LaGuardia, and Idlewild (now John F. Kennedy) airports under the single administration of the Port Authority of New York and New Jersey.[249]

Of broader significance was the 1929 Plan's acknowledgement of the potential of commercial aviation and the recognition of airports as an important planning problem. For example, city planning was one of the four evaluation criteria in the Lehigh airport design competition, and two of the five jurists, George B. Ford and the engineer Ernest P. Goodrich, were RPA planners. Ford and Goodrich had founded the Technical Advisory Corporation fifteen years earlier in New York City. This firm was the first to specialize in city planning in America, and TAC consulted on hundreds of planning projects until Ford's death in 1930. The field became an academic discipline in 1929, when Harvard University offered the first graduate degree in city planning. The well-known city planner Henry Vincent Hubbard headed the program; in 1930 he initiated the groundbreaking Harvard City Planning Studies series, the first of which was on

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[248] United States President's Airport Commission, *The Airport*, 89; in Barrett, "Cities and Their Airports," 127-128.

[249] Regional Plan Association, "About RPA: History;" available at http://www.rpa.org/aboutrpa/history/history.html; Internet; accessed 1 March 2005.

airport planning.[250] Also in 1930, the American Academy of Political and Social Science published a study entitled, “Airport Problems of American Cities.” The study’s author, University of California Professor Austin F. Macdonald, noted that,

> In a way, airport planning is simpler than most phases of the planning movement, because it has no hoary traditions gathered about it and no century-old mistakes to be corrected. Airports, like every phase of aviation, are a product of the age of planning. The airport was invented in 1903; the first permanent, official, city planning commission in the United States was created in 1907 . . . Interest in aircraft and airport development has paralleled interest in city and regional planning. It is surprising that the planning movement has not influenced American cities to select and design their airports with greater care.[251]

Despite the evident shortcomings of early development proposals, the 1929 Regional Plan was visionary enough to appear a decade later as a large diorama that was displayed in the New York pavilion at the World’s Fair. There, it was compared to other conceptions of the city, such as the fifteen model homes in the Town of Tomorrow, which advertised advances in building materials, and the American Institute of Planners’ film, “The City”.[252] This provocative documentary eulogized agrarian life and contrasted it to the squalor and overcrowded conditions of city slums. “The age of rebuilding is here,” Mumford

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[250] Henry V. Hubbard, Miller McClintock, and Frank B. Williams. *Airports: Their Location, Administration and Legal Basis.* Vol. I, The Harvard City Planning Studies (Cambridge, Mass.: Harvard University Press, 1930).

[251] Austin F. Macdonald, “Airport Problems of American Cities,” publication no. 2415. Reprinted from *The Annals of the American Academy of Political and Social Science* 151 (September 1930): 49.

[252] “The City,” 1939. Directed by Ralph Steiner and Willard Van Dyke; script by Henwar Rodakiewicz, from an outline by Pare Lorentz. Commentary written by Lewis Mumford with music by Aaron Copland.

exhorted; “We must remold our old cities and build new communities, better suited to our needs.”[253] The audience is then taken on an airplane ride where the aerial view reveals the control, order and beauty of planned environments. Showcased are the newly built the Tennessee Valley Authority dam and the garden cities of Radburn, New Jersey, and Greenbelt, Maryland. Both Radburn and Greenbelt were designed by Clarence Stein and Henry Wright, Mumford’s colleagues at the RPAA. The film closes with an assertion and a challenge:

> This new age builds a better kind of city, close to the soil once more. As molded to human wants as planes are shaped for speed. . . . Have we vision, have we courage? Shall we build, and rebuild, our cities, clean again, close to the earth and open to the sky? . . . Order has come. Order and life together. We've got the skill—we've found the way. We built the cities. All that we know about machines and soils and raw materials and human ways of living is waiting. We can reproduce the pattern and better it a thousand times. It's here! The new city. Ready to serve a better age. You and your children, the choice is yours.[254]

While “The City” effectively propagandized the need for urban and regional planning, it is chiefly remembered for introducing American audiences to socio-political documentary film. In terms of impact, however, the RPA model’s closest comparison was to the Fair’s two most prominent attractions: Democracity, billed as “a perfectly integrated garden city” of 2039 and the Futurama for General Motors, which depicted an America of 1960.

Democracity occupied the place of honor inside the Fair’s gigantic Perisphere. This pure white sphere was, along with the obelisk of the Trylon, the symbol of the Fair whose theme was “Building the World of Tomorrow.” The exhibit, by industrial designer Henry Dreyfuss, was a large-scale model that

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[253] Ibid.

[254] Ibid.

visitors viewed from above by means of two rotating balconies. Democracity presented in essence the plan of the Fair grounds itself even as it projected how Americans would live in the next century. As in the Garden City, Democracity was organized into concentric recreational, residential, and industrial zones surrounded by a large greenbelt (fig. 44). No one lived in the city of Centerton itself; rather the population resided in five cities, called Pleasantville if exclusively residential or Millville if they included light industry. Parkways connected these suburban bedroom communities to the metropolis.

The *House for the Year 2039* illustrates the type of dwelling that may have been envisioned for these new communities (fig. 10). This demonstration house was an unrealized project produced for the Fair by the modernist architect William Lescaze, who also designed the Fair's futuristic Aviation Building. Lescaze's house is clearly indebted to Le Corbusier's ideal of the ocean liner, but its long, low streamlined profile also boasts both a two-car garage and a rooftop landing pad for the family aircraft, here a fantastic combination of autogiro and monoplane. The single-family house, separated from public, commercial and community spaces and dependent on individual transport, demonstrates the exhibit's promotion of the contradictory values of independence and cooperation.

These ideas were further supported by the culminating feature of the exhibit: a sight-sound presentation projected onto the Perisphere dome of a choir of workers, each in the dress and with the attributes of his or her occupation, singing the Democracity Hymn. The throng was meant to symbolize, in the words of the Fair's Theme Committee chairman Robert Kohn, "the interdependence of

all people, trades and classes in the modern world."[255] Democracity was the Fair's centerpiece, both literally and ideologically. Its unitary vision, which minimized differences by elevating the shared, communal, and sameness into a moral value, is characteristic of pre-war Modernism.

Nevertheless, what that most caught the public's imagination at the Fair was the GM Highways and Horizons pavilion with its Futurama exhibit. Surprisingly, it was Albert Kahn, the architect of rationally-planned industrial buildings and military airports, who designed the over-scaled neoexpressionist GM building (fig. 45a). The Futurama itself was the creation of theatre-set and industrial designer Norman Bel Geddes. Both Dreyfuss and Bel Geddes were involved in airliner projects, although their work was at this point mostly limited to selecting the colors and fabrics for airplane interiors.[256] As Dreyfuss became known for ergonomic design, Bel Geddes was at the forefront of aerodynamic design. His book *Horizons*, published in 1932, was a paean to speed. He projected that flying would soon become a main means of transportation, which would, by necessity, be located outside of the metropolitan area.[257] Included in *Horizons* were innovative concepts for airports and aircraft, such as a large V-wing airliner designed to hold just over 600 persons.

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[255] Robert Kohn quoted in "Theme Center of the Fair—Democracity," *New York Herald Tribune*, New York World's Fair section, 30 April 1939, 6; quoted in David Gelernter, *1939: The Lost World of the Fair* (New York: The Free Press, 1995), 66-67.

[256] Zukowsky, *Building for Air Travel,* 17.

[257] Norman Bel Geddes, *Horizons* (Boston: Little, Brown, and Company, 1932), 80-82.

The Futurama was set in this very near future anticipated by Bel Geddes." The elaborate diorama, which claimed to be "the largest and most life-like model ever constructed," was made up of more than a million natural features such as miniature trees, lakes, and mountains; over five hundred thousand buildings of all types, as well as approximately fifty thousand stationary and moving cars, operational bridges, and a rotating regional airport all interwoven by multiple-lane highways leading to a modern city of streamlined skyscrapers. Visitors, seated in upholstered chairs each outfitted with its own audio speaker, flew over a changing, but totally planned and gridded landscape in which the models varied in scale. The ride began with what Bel Geddes described in the pamphlet as an "airplane-eye" view and finished with a large-scale model of an urban traffic intersection (fig. 45b). Landing at this corner, the visitor then emerged into the "real" world of the Fair. This traffic intersection—surely a fitting metaphor for 1939—was in contrast to the profoundly anti-urban utopia of Democracity, where there were no street corners since none of the streets actually intersected.[258]

Futurama and Democracity presented opposing ideas of the perfectly-planned future city, but rapid transport, particularly the automobile, was a salient feature of both. Mobility was associated with modernity, a new way of living, and personal freedom. Their differences were in how each implemented rapid transport: as a means of escape from the city through green parkways and

[258] According to Robert Kohn, the intention of the design was to eliminate traffic accidents. Kohn in Gelernter, *1939,* 69.

private aircraft or as a way of easing access to the city via an elaborate network of freeways and an immense public airport.

Significantly, all three of the future urban environments presented at the Fair—"The City", Democracity, and the Futurama—relied on the aerial perspective from an airplane, either simulated or actual, to show the future. The audience/passengers thus shared the same godlike view that first fascinated George B. Ford and other planners. The single superior viewpoint was not only a modernist carryover of the Enlightenment panoptical rational ideal. It also held out the promise of directed progress in a time of rapid change, when social disintegration, urban decay, economic instability, and world war made for a chaotic present. [259] Indeed, upon exiting the GM pavilion, spectators received a pin that said, "I have seen the future."

URBAN VISIONS

Because the 1929 Regional Plan for New York and Environs was the first to address these issues, it no doubt inspired these plans; but the more recent urban visions of Frank Lloyd Wright's Broadacre City and Le Corbusier's Ville Radieuse (or as it was translated, the Radiant City) informed their divergent approaches. In 1935 both architects were in New York City; Wright for the

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[259]Adnan Morshed, "The Aesthetics of Ascension in Norman Bel Geddes's Futurama," *Journal of the Society of Architectural Historians* 63, no. 1 (March 2004): 78-82.

unveiling of a large model of Broadacre City at Rockefeller Center and Le Corbusier, on his first visit to the United States, ostensibly for the retrospective of his work at the Museum of Modern Art. Remarkably, although the two celebrity architects wrote and lectured extensively about their conception of the modern metropolis, they never met.[260] Even so, the display of their city plans coincided with the formation of the New York World's Fair Corporation, a group of prominent businessmen and politicians, which operated from an office in the Empire State Building.

Le Corbusier's earlier urban plans of the Ville Contemporaine and his Plan Voisin for central Paris were well known in the United States by the late 1920s. A model of the Ville Contemporaine was first shown at the Salon d'Automne in 1922, and it was exhibited again, along with a model of the Plan Voisin, as part of the Pavillon de l'Esprit Nouveau at the 1925 Exposition des Arts Décoratifs in Paris. In 1925 Le Corbusier followed his seminal theory on modern architecture, *Vers une architecture*, with the publication of *Urbanisme*. It was the translation of these books in English in 1927 and 1929, respectively, as *Towards a New Architecture* and *The City of To-morrow and Its Planning* that brought Corbusier's ideas to a larger American audience.

The translated title of *Urbanisme* is an obvious reference to Howard's *Garden Cities of To-morrow*, a model that Corbusier had studied with interest. The introduction to the English text, by British architect and Vorticist artist

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[260] Wright was in New York City in April and Le Corbusier some seven months later. William J.R. Curtis, *Le Corbusier: Ideas and Forms* (London: Phaidon Press Limited, 1986), 126.

Frederick Etchells, supports the Garden City dream of the single family dwelling but concludes that the inevitable adoption of “mechanical transport” will make this way of living outmoded.[261] The Ville Contemporaine does retain elements of the Garden City, particularly the geometric form of the plan, with its tiered zones radiating from a central point, and its integration of parkland (fig. 46). The city rests lightly on the ground: its immense skyscrapers and roads raised on slender supports results in a near uninterrupted pedestrian greensward. It is, in fact, a vertical garden city. Le Corbusier replaced the cooperative goal of Howard’s Garden City with a hierarchal authority, yet because all buildings are public rather than private property, interdependence, however unequal, is an essential feature of the Ville Contemporaine.

Yet the contemporary city is not an updated garden city despite these shared characteristics. For the core of the Ville Contemporaine is not a garden but a multilevel traffic interchange of railroad, highway, subway, and airport. In the manifesto that accompanied the Ville Contemporaine diorama, Le Corbusier stated categorically that the “Means of transport are the basis of all modern activity.”[262] Consequently, as Le Corbusier explained in a *New York Times* article,

> This new city will be the reverse of the garden city, fundamentally opposed to it in principle. Since the garden city is situated in the suburbs and so extends the area of the town, it creates a transport problem, but as the

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[261] Frederick Etchells, “Introduction,” Le Corbusier, *The City of To-morrow and Its Planning* (New York, Dover Publications, Inc., 1987 reprint of 1929 edition), v-xviii.

[262] Le Corbusier, *The City of To-morrow*, 84.

> green city will reduce the town area this problem will be done away with entirely. The time spent in traveling from home to factory will be saved, and spent in the recuperation of physical and nervous energy.[263]

Thus the monumental transportation nexus represents the city's *raison d'être*: a center for the rapid exchange of goods, ideas, information, and pleasures.[264]

The Ville Contemporaine was an ideal plan but the following Plan Voisin was developed for a specific site in Paris, that is adjacent to the Île de la Cité on the Right Bank (fig. 47). The Plan Voisin is a fragment rather than a complete city scheme; it is a design of the central business and administrative district, and its elements are consistent with the Ville Contemporaine. The Ville Radieuse, published in 1935, departed in form from these earlier plans (fig. 48). Le Corbusier replaced the concentric city with an expandable linear city. Here, the interchange serves as the single juncture or throat between the commercial brain of the city and its body of apartments and factories, which are arranged along a transportation "spine".[265] During the war, Le Corbusier organized a regional planning group named ASCORAL (L'Assemblée Constructeurs pour une Renovation architecturale). The group's global development plan was announced by Le Corbusier in 1942 as the fulfillment of his visionary declaration a dozen years earlier: "We have arrived at the approaches to a synthesis; the intense and

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[263] Le Corbusier, "A Noted Architect Dissects Our Cities," *New York Times*, 3 January 1932, SM11.

[264] Fishman, *Urban Utopias*, 191.

[265] This plan in its description, form, and details is clearly based on Arturo Soria y Mata's linear city plan of 1882; however, this source was never acknowledged. George R. Collins, "Linear Planning Throughout the World," *The Journal of Architectural Historians*, 18, no. 3 (October 1959): 92.

sparkling linear cities; vast tracts of land revitalized by new institutions and rescued from the disgrace and tedium of grime and crushing labor."[266]

Although the urbanism of Le Corbusier was certainly influenced by the ideas of Ebeneezer Howard, Arturo Soria y Mata, and others, it was also affected by his intense interest in aviation. For Le Corbusier, like other urban planners, the airplane provided a revelation: "The airplane, in the sky, carries our hearts above mediocre things. The airplane has given us the bird's-eye view."[267] However, instead of design, the aerial view unmasked the disorder of the manmade environment. He found in this new perspective an "indictment" of the city:

> By means of the airplane, we now have proof . . . of the rightness of our desire to alter methods of architecture and town-planning. . . . The airplane instills, above all, a new conscience, the modern conscience. Cities, with their misery, must be torn down. They must be largely destroyed and fresh cities built.[268]

The famous image of Le Corbusier's directing hand over the Ville Contemporaine (fig. 47b) supports the Modern ideal of a controlled and logical order. [269] It is the Hegelian theory of progress revealed: the dialectical process that leads to rational unity.

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[266] Le Corbusier, *The City of Tomorrow and its Planning,* 193.

[267] Le Corbusier, *Aircraft*, 13.

[268] Ibid., 11-12.

[269] Morshed, "The Aesthetics of Ascension," 92.

When Le Corbusier arrived in the United States in 1935, he made headlines by declaring that New York City's skyscrapers were too small.[270] He crusaded to reform the city through his books, the exhibition of his models, the endorsement of his ideas by the Museum of Modern Art, the many articles in both professional and general audience periodicals, and his leadership in the Congrès Internationaux d'Architecture Moderne. Founded in 1928, CIAM was dedicated to offering modern architectural solutions to urban problems. Even though Le Corbusier traveled the country promoting the tall crystalline prisms of the Ville Radieuse, his vision of the centralized vertical city was not in accord with the aspirations of the majority of Americans. Frank Lloyd Wright rightly saw that rapid transport, rather than bringing people together at a point of interchange, made it possible for them to disperse:

> It is in the nature of the automobile that the city spreads out . . . It is in the nature of flying that the city should disappear . . . . Centralization by way of the city has had a big long day, but. . . decentralization and reintegration are the need and purpose of the machine age.[271]

Wright called his plan for Broadacre a city but it was in fact an anti-urban, back-to-the-land model (fig. 49). The heart of Wright's proposal was the homestead; at Broadacre each person was allotted an acre of land. This system of property distribution ensured the autonomy of the individual and limited population density. The homesteads were part of larger units that formed the basis for a network of roads and highways. As in Le Corbusier's plans, the traffic

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[270] "Editorial: Cities of Light," *New York Times*, 23 October 1935, 20.

[271] Frank Lloyd Wright, "America Tomorrow," *American Architect* 141 (May 1932): 16.

intersection was symbolic as well as multi-functional. At Broadacre, however, there was not one intersection but many. Roadside markets and county fairs operated at the major intersections of Wright's radically decentralized society, making these junctions important loci of commercial exchange and community interaction.

Like Le Corbusier, Wright was strongly influenced by the concept of the Garden City, and aspects of Broadacre were clearly modeled after Howard's plan. For example, Howard had plotted his city for the pedestrian: any of its 30,000 inhabitants could walk the breadth of the city in fifteen minutes. Wright modernized this element by designing his city for the motorist: any of its 30,000 residents could, by driving sixty miles per hour, reach opposite side of the city in fifteen minutes. Even the airplane was not seen as a form of mass transit but rather as a type of flying automobile:

> In the affair of air transport Broadacre rejects the present airplane and substitutes the self-contained mechanical unit that is sure to come: an aerotor capable of rising straight up and by reversible rotors able to travel in any given direction under radio control at a maximum speed of, say, 200 miles an hour, and able to descend safely into the hexacomb from which it arose or anywhere else. By a doorstep if desired.[272]

Wright's fantastic-looking aerotor he later described as a helicopter in his 1958 manifesto on his utopian urban ideas, *The Living City* (fig. 49a). Helicopters were first used extensively by the United States military in the Korean War. Wright's change of reference shows that he was, like many people of his day, deeply interested in the current experiments in passenger aircraft.

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[272] Frank Lloyd Wright, "Broadacre City: A New Community Plan," *Architectural Record* 77 (April 1935): 249, 253.

Other aspects of Broadacre City react against the Garden City model. Most notably, he rejected Howard's unifying circle as too authoritarian or "monarchial". For Wright, it was the grid that provided the paradigm for his ideal community of independent freeholders. The Garden City's strict separation of live, work, and play also does not occur in Wright's plan. Instead, the units are infinitely replicable. The Main Arterial, a multi-level and lane thoroughfare of automobile, monorail, and truck traffic, which borders Broadacre City is its most distinguishing feature (fig. 49b). According to Wright, it is this road, with its complex structure, that represents the "great architecture" of the city. [273] The Main Arterial, like Le Corbusier's transportation spine of his Ville Radieuse and later regional plan, have more in common with Arturo Soria's linear city than with Howard's concentric Garden City.[274] In addition, Wright designated few parks; instead he eliminated or concealed power lines, utility poles, storage sheds and all the "utilitarian scaffolding" of modern life. His intention was not to bring nature into the city but to erase the distinction between rural and urban altogether. He explained that, "Broadacre City is everywhere or nowhere. It is the country itself come alive as a truly great city."[275]

The form of the modern city was fundamental to the theory and practice of both Le Corbusier and Wright. Although their plans were too extreme to be

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[273] Ibid., 246.

[274] Collins, "Linear Planning," 90.

[275] Frank Lloyd Wright in Baker Brownell and Frank Lloyd Wright, *Architecture and Modern Life* (New York: Harper, 1938), 309.

adopted, their ideas informed the field of urban planning. Wright's predictions characterizing the nature of urban development, for example, are now considered prophetic. His declaration that the city would be "everywhere or nowhere" has even been misquoted as "everywhere and nowhere," turning a prescriptive statement into a descriptive one: one that seems the definition of urban sprawl.[276] In any case, Wright's assertion, "America needs no help to Broadacre City. It will haphazard build itself. Why not plan it?" was certainly prescient.[277]

THE NATIONAL TRANSPORTATION SYSTEM

Rapid transport, primarily the automobile but also the commuter train and airplane, made possible the phenomenal growth of cities and the expansion of suburbs during the 1920s and 30s. A mechanistic version of the Garden City's concentric circle became the dominant urban model: the wheel. The Central Business District formed the axel and commercial roads the spokes that connected the city to the beltway that rimmed it and the suburbs beyond. Although pre-war suburbs offered a retreat from the city, their success depended on convenient access to the city, which provided jobs, education, services, culture, and commerce. Consequently, the construction of the United States

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[276] James Krohe, Jr., "Wright Had It Right," *Planning* 65 (December 1999): 17.

[277] Frank Lloyd Wright, *The Living City* (New York: Harper, 1958), 159.

Interstate highway system, intended to increase access to urban centers and whose routes were affected by the location of airports, was of major significance to the decentralization of cities and the spread of suburbs.

The Federal government's involvement in the development of a national transportation system, both highways and airports, began in the late 1930s as part of national defense. However, the most substantial changes followed World War II with the passage of the 1946 Federal Airport Aid Act and the 1956 Federal-Aid Highway Act. The 1956 legislation finally increased funding and established design standards for the building of the interstate, which had been initiated in 1944. At the same time, in order to relieve small and overburdened urban airports, cities applied Federal airport monies to the construction of large, new airports outside of metropolitan areas that would rely primarily on interstate roads to provide access. These two Acts worked hand-in-hand to stimulate suburban growth.

For example, the city of New Orleans built an artificial peninsula off Lake Pontchartrain in 1929 in order to situate New Orleans' Shushan Airport close to the Central Business District (fig. 32).[278] The airport's convenience and amenities made it a destination in its own right and boosted the nearby neighborhood, but the airport's restricted site left it with few options for growth. John Walter Wood, in his 1940 survey of airports, noted about Shushan that: "No provision has been made in the station for its future expansion, for a separation of incoming and outgoing passengers, or for sheltering passengers passing to and from stations

[278] "Shushan Airport," 237.

and planes."[279] The city was soon forced to consider building another airport; this time it did so in coordination with the CAA, which recommended a distance of greater than six miles from the central business district.

The site selected, swampland of the former Kenner family plantation and Moisant Stockyards, was on the opposite side of the city to the west and nearly twice the distance from the downtown as the municipal airport. The new airport, named Moisant Field, was quickly built by the Army Air Service to use as a base during the war (fig. 40).[280] It was turned over to the city in 1946, and already in the following year, it was the largest commercial airport in the country.

By 1949 Moisant Field trailed only New York and Miami in international travelers, and the airport supported a vibrant, if rampant, commercial corridor. Along Airline Highway, which connected the airport to the city, sprang up businesses, manufacturing, and residential subdivisions. Even as New Orleans politicians called for the replacement of the Quonset huts that still served as the airport's passenger facilities, the city council of Kenner called the airport a "growing cancer" and approved measures to stop its expansion. [281] New Orleans nevertheless had its way, and a new terminal opened in 1959 (fig. 41).

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[279] Wood, *Airports,* 110.

[280] It was named as a memorial after the barnstormer John B. Moisant, who had crashed on the Kenner family plantation in 1910. The airport's code letters of MSY stand for Moisant Stockyards.

[281] Encyclopedia Louisiana, "Louisiana Timeline Year 1949," 1998; available from http://www.enlou.com/time/year1949.htm; Internet; accessed 27 April 2005; and Karen Kingsley, *Buildings of Louisiana* (London: Oxford University Press, 2003), 160-161.

With the building of the new terminal came the building of Interstate 10. This expressway, which stretches coast-to-coast from Santa Monica, California, to Jacksonville, Florida, connects Louisiana's largest city of New Orleans to the state capitol of Baton Rouge, and it superseded the slower commercial roads to the airport. While the I-10 caused the decline of businesses such as motels and restaurants along the former route to the airport, it mitigated Moisant Field's greater distance from downtown. In 1960, the airport was renamed the New Orleans International Airport to strengthen its identification with that city despite its location in Kenner.[282]

Initially, interstate roads often went directly through the downtown area, creating fast and efficient access to the central business district. In New Orleans, however, the pull of the airport and its expressway shifted the development of the central business district further from its historic waterfront and former core and towards the suburban area of Metairie. The interstate and its bypass now enclose the central business district, whereas the former downtown is excluded entirely. The separation and circumvention of historic and commercial city centers by interstate roads occurred across the country. Although considered a way to improve circulation and decrease congestion, it was, paradoxically, a significant factor in their decline. The proximity of expressways and airports and the lure of inexpensive real estate attracted manufacturing, retail, and business

[282] Nutrias (New Orleans Public Library), "Images of the Month Gallery, August 2001," available from http://nutrias.org/~nopl/monthly/august2001.htm; Internet; accessed 11 May 2003. In 2001, the airport was renamed once again; it is now the Louis Armstrong New Orleans International Airport.

offices to the metropolitan fringe. From 1954 to 1963, for example, cities lost more than five hundred thousand jobs while suburban areas gained approximately 1.5 million. By 1970, more Americans lived in the suburbs than anywhere else; a decade later the majority of Americans not only lived in the suburbs but they worked there too.[283]

Joel Garreau documented the extent of this phenomenon in his groundbreaking 1991 study, *Edge City: Life on the New Frontier*. In his analysis of American metropolitan areas, Garreau found that the shift of offices and retailers to the suburbs had begun in the 1950s and had intensified in the 1980s to form new centers or "edge cities" around decaying downtowns. He recorded 171 edge cities, some as "strips" along stretches of interstate, such as the Technology Corridor that extends from Boston on Route 128; others as "nodes" or concentrated areas like Tysons Corners in Virginia, which is a satellite of Washington, DC; still others Garreau identified as "the pig in the python," a form that combines features of the strip and the node. These three types of exurban development exist in relationship to a major city and generally serve to create a super or multinucleated city. The edge cities of Boston, Chicago, Detroit, and many other American cities now comprise more commercial area than the central business district. Garreau also discussed an emerging fourth type of edge city; one that does not develop haphazardly but which is a planned community built *ex*

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[283] Jon C. Teaford, *The Rough Road to Renaissance* (Baltimore: The John Hopkins University Press, 1990), 93-105; Chudacoff, *Evolution of American Urban Society*, 269, 288; Robert Fishman, "The Post-War American Suburb: A New Form, A New City," *Two Centuries of American Planning*, Daniel Schaffer, ed. (London: Mansell Publishing Limited, 1988), 266.

novo in a rural area that he terms a "greenfield." Unlike earlier edge cities, a greenfield is not necessarily related to a large city but typically to other centers that are metropolitan in nature, such as large amusement parks or international airports.[284] The greenfield phenomenon, more than any other exurban type, confirms historian Robert Fishman's assertion, "Broadacre City already exists, and most Americans are already living in it."[285]

The advances in the areas of communications, computer technology, and transport are what make edge cities viable. The introduction of the jet in commercial aviation paralleled the suburbanization of the late 1950s. Jet aircraft necessitated the construction of new and larger airports, which were located well outside of metropolitan areas. The implementation of jet aviation technology, according to former head of the Federal Aviation Administration Najeeb Halaby, "induced elaborate and expensive facilities which in turn converted the airport into an industrial complex in order to provide the infrastructure on the land side of jet aviation. In turn, this produced communities clustered around airports—jet cities." [286] When the sprawling Dallas-Fort Worth airport was built in the 1970s (Halaby served as one of the project's consultants), for example, on what had been inaccessible prairie, it prompted the largest real estate speculation in north Texas history and accelerated the decentralization of both Dallas and Fort Worth

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[284] Joel Garreau, *Edge Cities: Life on the New Frontier* (New York: Doubleday, 1991), 103-138.

[285] Fishman, Post-War American Suburb," 266.

[286] Halaby, "The First Forty Years," 119.

to create a vast metropolitan region. The Dallas-Fort Worth airport authority anticipated that by 2001 it would be the largest airport in the world. It was built on an enormous area of more than twenty-seven square miles for future development. It was so large that the then three largest airports of JFK, O'Hare and LAX combined covered less area, and all of Manhattan can fit within its grounds.[287] The artist and critic Douglas Davis said that Dallas-Fort Worth airport was like imagining the entire island of Manhattan covered with same building repeated over and over.[288]

THE DECENTRALIZED AIRPORT: DALLAS-FORT WORTH

International airports are without question the largest urban projects ever undertaken (it was said that Dallas-Fort Worth was the largest public works project since the pyramids). It therefore follows that their designs represented the forefront of current ideas in city planning. In particular, the two strands of modern urbanism can be found in the terminal plans of the late 1950s-1970s: Le Corbusier's centralized nexus of interchange and Wright's decentralized nodal grid. Chicago's O'Hare International Airport, for example, which opened in 1949

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[287] Four terminals were built in the 1970s; the long-range plan was to construct thirteen terminals, making DFW the largest in the world not only in area but also in operations. Although DFW Airport is now even larger, at nearly thirty square miles, newer airports have surpassed it in size.

[288] Quoted by Molly Ivins, "A Texas-Scale Airport," *New York Times,* 16 September 1973, sec. SM, 16.

but was extensively rebuilt and expanded from 1959-63 to handle jet aircraft, had a centralized terminal plan (fig. 17). The “roundhouse”, a three-story circular structure, was the linchpin of the system; it connected the two long terminal buildings and contained the airport’s food and beverage facilities. Because of its location in the center of the continent, O’Hare became the leading airport for transfers, making it in 1962 the busiest airport in the world. So its plan represented both in a particular and in a general way the primary operation of the airport.

In contrast, Dallas-Fort Worth Airport, although it is called the “Metroplex,” is an example of a radically decentralized plan. Placed approximately midpoint between the rival cities of Dallas and Fort Worth, each of whom had fought to dominate the region’s commercial aviation market for more than forty years, the development of the airport was complicated and drawn out. The nine years of planning and construction, from 1965 to 1974, involved the large architectural firm of Tippetts-Abbett-McCarthy-Stratton (TAMS), who conducted the site studies and created the preliminary plan, of which the airfield portion was retained (fig. 50a). Later brought in were Welton Becket & Associates, who designed the control tower, and Giyo Obata of Hellmuth, Obata and Kassabaum (HOK) who with Richard Adler of Brodsky, Hopf and Adler collaborated on the design of the terminal area (fig. 50b). The artist Robert Smithson also served as a consultant for TAMS on the initial portion of the project.

Because it was thought that the primary use of DFW would be point-to-point travel, the goal was to minimize the space between automobile and aircraft.

Airport design manuals recommended that a passenger should not have to walk more than 600 feet between transportation. However, at O'Hare, because of the narrow finger extensions off already long terminals, the average distance was nearly 5,000 feet or five wide city blocks.[289] The architects' solution to this problem at DFW was a "drive-to-gate" concept. A linear plan developed that consisted of linked modular "mini-terminals" made of pre-cast concrete shells with "framing elements that fit together like the parts of a fine machine," which were part of larger crescent-shaped structures that formed replicable discs along a "spine" highway.[290] International Parkway, as the highway was named, was a divided, multi-lane high-speed road. From this road a vehicle could exit onto any half-loop to reach a terminal. Before the terminals the road split into two levels and separated arriving and departing passengers. Parking was also available in circular areas between the highway and megastructures, making the door-to-door distance as little as 120 feet.

In addition to the road system, DFW had the first computer-run, single-track electric train system that circulated between terminals and long-term parking.[291] Airtrans was developed by LTV Aerospace Corporation specifically for airport use and its operator had seventeen years experience overseeing similar transport systems at Disney World (fig. 51). However, Airtrans never

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[289] Von Eckardt, "Redesigning American Airports," 68.

[290] George McCue, "Airport Architecture: The Dallas-Fort Worth Solution," *Art in America* 62 (January/February 1974): 77.

[291] Thomas M. Sullivan, "Dallas/Fort Worth—A Giant among Airports," *Airport Forum* 2 (1973): 31-42.

operated correctly, it bankrupted LTV, and it was finally replaced in 2005 by the elevated Skylink train.[292] Contrary to expectations, DFW developed into a major hub airport and efficient transfer between terminals became more important than convenient parking.

As at Wright's Broadacre City, limitless expansion was part of DFW's elastic plan. Although early press about DFW claimed that the site the airport occupied was low-yield agricultural land of no significant recreational, natural, or environmental use,[293] it did impinge on the three small cities of Grapevine, Irving, and Euless (a fourth city, Coppell, now borders the airport). In 1992, these cities attempted unsuccessfully to halt the airport's expansion. At the same time, Joel Garreau characterized the new development adjacent to DWF, Las Colinas, as one of the nation's largest and fastest-growing edge cities. Las Colinas was so carefully planned and its development so controlled that it has been described as a "Disney World for the affluent." Garreau, however, found the inspiration for its "long-horizon" anti-urban vision at the airport: "Its vistas," he wrote, "resemble nothing so much as its neighbor, the Dallas-Fort Worth Regional Airport." [294]

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[292] The chief engineer for Airtrans, Dennis Elliott, now of Lea+Elliott, was nonetheless retained by DFW to design Skylink.

[293] Sullivan, "Dallas/Fort Worth," 31-42.

[294] Gary Cartwright, *Texas Monthly* in Garreau, *Edge Cities*, 231.

TERMINAL CITY: IDLEWILD

The airport and its exurban communities have a connection to Disney World that is more than incidental. Both are predicated on utopian concepts of city planning, particularly the garden city, which is organized for efficient circulation. Michael Sorkin, in his essay "See You in Disneyland," describes this incessant centrifugal movement as the circulation of capital, which is the basis not only for the economic system but also a mobile social order where one is "constantly poised in the condition of becoming."[295] Disney's theme, "It's a Small World After All," is duplicated a more abstract fashion at the international airport. Its merchandise of travel magazines, souvenirs, and duty free goods as well as its multilingual signs, mini-United Nations of airline ticket counters, and first-class lounges, creates an artificial environment for the commuter/consumer where all places are "vested with a kind of equivalence" and therefore essentially the same.[296] Yet the airport is separated from both Disneyland and residential development by its modernity. Disney and suburbia play into society's nostalgic longings while the airport taps into its imaginings of the future. The airport encouraged experimentation and novelty and was seen as the opportunity to create the ideal city of the future in microcosm.

The first truly modern expression of the international airport was New York's Idlewild airport (in 1963 its name was changed to John F. Kennedy

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[295] Sorkin, Michael. "See You in Disneyland," in *Variations on a Theme Park*. Michael Sorkin, ed. (New York: Hill and Wang, 1992), 212-216.

[296] Ibid., 215.

International Airport). Located in Jamaica Bay, a remote area of Queens, Idlewild took its name from the golf course it replaced—although the then executive director of the Port Authority, Austin J. Tobin, reportedly objected to the name, noting that the airport was "neither idle nor wild!"[297] When a rebuilt Idlewild approached completion in 1961, it was considered a masterpiece of urban architecture and planning. The *New York Times* called it "an authentic wonder of the world," even as it noted, correctly, that it might never be finished.[298] The critic Dudley Hunt, Jr., in an article for *Architectural Record* entitled, "How Idlewild was Planned for the Jet Age," described it in breathless terms:

> What is Idlewild? . . . It is major planning on a grand scale. It is an encyclopedia of engineering technology. It is a lexicon of contemporary architecture. Idlewild has robust vitality, the big jets, the flags, the fountains, the exotic public address announcements; all are part of it. People are part of it: school children and sightseers; ordinary travelers and world figures; cab drivers and customs inspectors. To these, Idlewild is a vigorous city carnival, a world fair, as well as an airport. Most important perhaps, Idlewild is a vast storehouse of information on the philosophy and practice of architecture of our time.[299]

In fact, Idlewild had not been planned for the jet and so it was outmoded from the beginning. The blame rests mainly on the airport's long gestation due to the unprecedented financial commitment such a large project involved. The land for Idlewild, the metropolitan region's third major airport, was purchased in 1941—only two years after the opening of LaGuardia airport, which was already

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[297] David W. Dunlap, "A 'New' Kennedy Airport Takes Wing," *New York Times*, 26 October 1997, 4.

[298] Gilbert Millstein, "Airport of the Jet Age," *New York Times*, 8 November 1959, SM9.

[299] Dudley Hunt, Jr., "How Idlewild was Planned for the Jet Age," *Architectural Record* 130 (September 1961): 152.

operating over capacity on a severely limited site. Nonetheless Delano & Aldrich, the same firm that had designed LaGuardia, was commissioned to design the new airport. William Delano proposed for Idlewild an enormous circular terminal in the neo-classical style with a runways spiraling from seven projecting loading docks. However, the city's poor financial situation prevented any real implementation of their design. The stop-gap measures and temporary terminal structures earned Idlewild the reputation among travelers as one of the world's worst airports.[300]

In 1947, the City dissolved the bankrupt Airport Authority and leased Idlewild to the Port Authority for management and redevelopment. Plans for the airport underwent several permutations over the next six years as the Port Authority vacillated between centralized and decentralized schemes. When it became apparent that a single terminal would not be sufficient to serve the projected number of passengers, and studies suggested that Idlewild was a destination rather than a transfer point, the Port Authority adopted the concept of a "Terminal City" proposed by Wallace K. Harrison, chief architect of the United Nations complex. Harrison's design combined elements of both centralized and decentralized schemes with a large, central terminal for foreign airlines and small multiple "unit terminals" for domestic carriers (fig. 52).

The site for Idlewild airport was more than five miles long—the size of Manhattan from 42nd Street to Battery Park—and the initial plans were to build fifty-six structures in five zones of activity. Occupying less than a quarter of the

[300] Dunlap, "A 'New' Kennedy Airport Takes Wing," 4.

airport's total area, the Terminal City, although a showcase for modern architecture, displayed classic Beaux-Arts planning. It was organized around a two-lane, one-way road that formed a large cloverleaf; along its perimeter were eight separate terminals for domestic airlines. Within the three loops were a 220-acre park and five parking lots, as well as some eighteen other buildings, such as an automobile service station, animal port, air cargo facilities, food production center, bank, bus garage, hotel, offices, and medical clinic.[301] The focus of the plan, however, was clear: approached by a grand boulevard and faced by a spectacular arrangement of rectangular reflecting pools and the large pond of Liberty Fountain, was the International Arrivals Building.

The International Arrivals Building, or IAB, was actually a cluster of connected steel-framed and glass-sheathed International Style structures: an eleven-story control tower, a parabolic steel-roofed passenger reception area, two low projecting Airline Wing Buildings, and a large "U"-shaped building containing customs, immigration, public health, the department of agriculture, and other passenger facilities (fig. 53). The arrivals hall was eleven blocks long and so immense that it was said it could contain the Wright Brother's field at Kitty Hawk. Appropriately, the IAB was designed by the first self-described full service architectural firms, Skidmore, Owings & Merrill (SOM), who as such were able to supply and coordinate in-house the diverse skills the project entailed.[302]

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[301] Today the CTA (Central Terminal Area) has nine terminals (the original terminals have been closed, replaced or heavily modified).

[302] Bernard Michael Boyle, "Architectural Practice in America, 1865-1965—Ideal and Reality," in *The Architect: Chapters in the History of the Profession*, 326.

Despite the colossal scale of the complex, the circulation of arriving and departing passengers was plotted to be controlled, efficient, and convenient, and commentators noted repeatedly with approval how the arrangement of customs inspection counters, with their electric conveyor belts, resembled the supermarket checkout system (fig. 53b). In contrast to the richly ornamented interiors of the terminals of the 1930s-40s, the IAB's processing spaces projected an austere modernism, with no decoration other than the modulated tones of orange and gold of the walls and seat cushions. These points of warm color relieved the surrounding white of the tiled floor and florescent lighting. A grid of metal strips that structured the balcony, wall and light panels unified the interiors and insisted on the institutional character of the spaces.

Countering this Spartan uniformity was the luxurious variety of the foreign airlines offices and lounges. Within the Airline Wing Buildings, airlines were responsible for the appearance of their own areas. These interiors showed the diversity of modern art and design as each tried to distinguish itself and give a national inflection to its space. (The exception was Air France, its Parisian Room showed traditional French taste in an updated Directoire style.) A *New York Times* reviewer found, for example, that the British airlines had made its area into a "little corner of Britain" with its "crisp" modernism, and the stark and sleek black and white interiors of the Swiss Air office reminded him of the precision

movement of a Swiss watch. The entire ensemble, he felt, was an exhilarating "United Nations of transportation."[303]

This vision of multinational cooperation was one of the intended messages of the IAB. At its dedication on 5 December 1957, Governor Harriman of New York declared, "Peace is our objective. Air travel is one of the reasons for our confidence that the peace of the world can be maintained."[304] The repeated emphasis by officials that the giant building was a symbol "peace, commerce, and friendship" suggests that they wanted to allay any unease it raised in foreign nations. This fear was not unreasonable since it was established practice for a government to requisition civil airports during wartime for military use.

The IAB was the first completed Terminal City project. SOM also designed the first domestic terminal building for United Airlines, as well as the central heating and refrigeration plant, and the First National City Bank at Idlewild. These last two structures were black-painted metal and glass-walled boxes that were clearly reminiscent of Ludwig Mies van der Rohe's recently completed Crown Hall at Illinois Institute of Technology.[305] One critic addressed the formal elegance of the heating and cooling building by describing it poetically as "an exhibition hall for the rows of huge white absorption chillers and darkly colored

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[303] Paul J.C. Friedlander, "Idlewild Transformed," *New York Times*, 8 December 1957, XX3.

[304] Quoted in Harrison E. Salisbury, "Idlewild Dedicates Central Unit of Mammoth Jet-Age Terminal City," *New York Times*, 6 December 1957, sec. 1, 18.

[305] Incidentally, SOM would undertake the first renovation of Crown Hall in 1975.

high temperature water boilers with their pastel forest of color-coded piping and clean tile surroundings."[306]

SOM's sophisticated buildings provided some stylistic consistency for Terminal City's architectural polyglot. As did the foreign carriers within the Airline Wing Buildings, the domestic airlines sought to differentiate themselves from their competitors through distinctive modern architecture and interior design. While architectural critic Ada Louise Huxtable decried the results as a "strange mixture of World's Fair flash and pedestrian bad taste," others delighted in their exuberant variety: "The eye receives but cannot entirely take in its vastness, shapes and colors, all dedicated to the practicalities and esthetics of flight . . . buildings—rhomboidal, curvilinear, parabolic, rectangular, shafted—of glass, steel and concrete."[307] The American Airlines terminal, designed by Kahn & Jacobs and opened in 1960, is an example of Terminal City architecture that elicited such sharply divergent views (fig. 54).

The American Airlines terminal was an attenuated and segmented rectangle with traditional tri-partite massing. The long central box projected over the two-level entrance and the two short wings had solid walls of rusticated granite. The building's outstanding feature was a stained glass facade by the artist Robert Sowers. At 317 by 22-1/2 feet, this work is longer than a football field, and it was, and possibly still is, the largest continuous stained glass window

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[306] Hunt, Jr., "How Idlewild was Planned for the Jet Age," 186.

[307] Ada Louise Huxtable, "Idlewild: Distressing Monument to Air Age," *New York Times*, 25 November 1962, 181; and Millstein, "Airport of the Jet Age," 8 November 1959, SM9.

ever made. Sowers, who was only 33 when he received this important commission, would become a major figure in reviving the art of stained glass as an architectural medium in the United States, which was in decline as ecclesiastical work fell while amateur craft production rose.[308] The window was fabricated with hand-blown glass, with individual panes equal to the dimensions of the granite blocks. Its brightly-colored flat forms—reminiscent of Sowers' teacher, the painter Stuart Davis[309]—suggested airplanes, skyscrapers, and bridges. This striking window was visible from the airport's entrance, and it confidently announced the terminal as a temple of travel.

The building's other notable aspect was its functionality. Outside, the split-level road separated arrivals and departures and eased the traffic congestion that resulted from the one-way road. Inside, a logical layout made circulation within the building equally efficient and it did not require passengers to change levels. The terminal also had four departure lounges, each with its own gate and Jetway. At the time, obvious way-finding, rational reservoir and flow areas, and direct terminal to aircraft access, marked American Airlines' "customer-oriented" approach.[310] The terminal's interiors were unremarkable although luxurious. Rosewood, travertine, and marble surfaces set off a pair of wall paintings by the

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[308] Erik Erikson, "In Memoriam: Robert Sowers, 1923-1990," *Neues Glas* 2 (1991): 31-37.

[309] Ibid., 32.

[310] Edward Hudson, "Idlewild to Open Newest Terminal," *New York Times*, 10 February 1960, 31.

Brazilian artist Carybé, entitled “Rejoicing and Feast of the Americas” and “Discovery of the West”, as well as ceramic tile wall pieces by Samuel Wiener.

However, ease of use and showy décor could not disguise the building’s uninspired form; Huxtable derided its award-winning architecture as banal, and the Sowers mural as “no more than a false front in dashingly conventional style.”[311] Her remarks were prescient; the travel writer Wayne Curtis recently called the American Airlines terminal the “Pavilion of Unappreciated Brazilian Art,” after encountering the Carybé murals in the building’s now dingy cafeteria.[312] The terminal is scheduled for demolition in 2007.

A structure that was more original was the Pan American World Airways terminal by Tippetts-Abbett-McCarthy-Stratton (fig. 55a). The Pan Am terminal was a two-story glass and steel oval with a cantilevered concrete roof held by steel girders and cables. The upward tilt of the roof effectively hid its supports and made it appear to hover. The terminal’s entrance was also innovative. Instead of doors, passengers passed through an “air curtain” that moderated the building’s 89-foot-wide second-floor opening. A large glass windshield fronted the vehicle ramp for outgoing passengers and displayed the airline’s name as well as bronze zodiac signs by the sculptor Milton Hebald. The building itself had a transparent core and the vibrant interior lighting enhanced the visual effects. One critic declared the terminal to be “a kind of mirage.” The design architect, Walter

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[311] Huxtable, “Idlewild: Distressing Monument to Air Age,” 181.

[312] Wayne Curtis, “Greetings from Airworld!” *Atlantic Monthly*, July/August 2006, 146.

Prokosch, explained that the building's immateriality was meant to make it "a backdrop for the excitement inherent in the interplay of passengers and airplanes."[313] The minimizing of visible and physical boundaries through the use of glass, lighting, and ventilation draws attention to the terminal as a liminal space. The transition from ground to air is architecturally dramatized and raised the act of taking a plane to a rite of passage.

Its flying saucer appearance was a spectacular and a fitting symbol of the Space Age, but in fact the building's form and features evolved from practical considerations. The elliptical shape allowed the greatest number of aircraft to dock, nose in, at the terminal, which also shortened the distance from curb to aircraft. Open-air bridges permitted direct boarding from terminal to plane, and the wide canopy and high windshield provided protection from inclement weather as well as an acoustic barrier. Even the theatrical lighting was purposeful, as it was programmed to dim at inactive gates and brighten at active gates.[314] Six months following its inauguration in May 1960, Pan Am claimed that the unusual building "had proved in use to fulfill its purpose—the smooth transition of passengers between threshold and airplane."[315]

The terminal in fact had been substantially modified late in the design process as the much larger aircraft of the Boeing 707 were introduced and

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[313] Quoted in George Horne, *"*Airlines' Modern Buildings Ease Tie-Ups and Attract Business," *New York Times*, 13 November 1960, S17.

[314] "Aviation: Umbrella for Airplanes," *Time*, 13 June 1960, 103.

[315] Ibid.

looked to become the industry standard.[316] The makeshift result had serious drawbacks: the terminal could not be expanded without compromising the design and the number of aircraft it could handle was fixed: six at once, eight in one hour. And, although planes could taxi to the terminal, they had to be towed from it. Less than a decade later the airline added the first of several "finger" extensions to the trademark terminal. The restrictive site required a highly space-efficient design. The additions, designed by TAMS and completed in 1973, formed an irregular wedge-shape that connected to the terminal at its smallest point (fig. 55b). This design left the original structure prominent from the landside while providing docking space for the new Jumbo Jets and rooftop parking for automobiles. The dense amalgamation of spaces was functional but unaesthetic and unwieldy. Renamed the Pan Am Worldport, the labyrinth—now the largest air terminal in the world—signaled the end of glamorous Jet Age that it had first so boldly exemplified.[317]

Another innovative building at Terminal City was the Trans World Airlines Flight Center designed by Eero Saarinen and Associates with Ammann & Whitney as the structural engineers (fig. 56). Unlike the Pan Am terminal, where the form was ostensibly the result of the functional program, Saarinen's intention was primarily expressive. He recounted, "The challenge of TWA was twofold. One, to create, within the complex of buildings that make up Idlewild, a building

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[316] Thomas Leslie, "The Pan Am Terminal at Idlewild/Kennedy Airport and the Transition from Jet Age to Space Age," *Design Issues* 21, no. 1 (Winter 2005): 67-68.

[317] Ibid., 63-80.

for TWA which would be distinctive and memorable. . . . Two, to design a building in which the architecture itself would express the excitement of travel."[318] The concrete terminal is composed of four barrel vaults supported by four "Y"-shaped columns. The flattened vaults were individually shaped to direct the eye upward in order to impart a sense of soaring. The building's abstract form was widely interpreted as a bird in flight; and its location, opposite the Terminal City's entrance and at a rising bend in the road, enhanced this impression.

The interior of the building is equally dramatic and dynamic, although the organization of the single-level reception area is quite conventional. It has a central information kiosk with stairways at either end that lead to the gallery level (fig. 56b). This legible plan is arguably necessary because of the interior's unusual appearance. The ceiling, walls, and built-in furnishings are poured concrete curvilinear forms. The asymmetrical curves create an integrated structure with a continuous flow of space that some found disorienting. The critic Alan Colquhoun excoriated the effects of the spatial ambiguity as "destroy[ing] any sense of scale, like the monster forests of a child's nightmare."[319] Narrow bands of skylights at the interstices of the vaults make lines of light and heighten the impression of airiness. A long arcing tube contains a moving sidewalk that connects the main terminal to a star-shaped "ramp house" of aircraft gates. The architect Paul Andreu, design director at Aéroports de Paris, finds that these

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[318] Eero Saarinen, "TWA Air Terminal, Idlewild, New York," *Architectural Design* 32 (October 1962): 466.

[319] Alan Colquhounm, "TWA Terminal Building, Idlewild, New York," *Architectural Design* 32 (October 1962): 465.

curving spaces are far from static but rather imply direction and motion: “When you go in, you cannot see the end of the tunnel. Instead of this horrible impression of a fixed perspective, you genuinely get the feeling that you are going somewhere.”[320]

The organic metaphor is carried through to the interior’s white surfaces, which are accented by bright red carpeting, upholstery, and sign lettering (red and white were TWA’s corporate colors). Saarinen wanted the building to have “one consistent character” to produce a “total environment where each part was the consequence of another and all belonged to the same form-world.”[321] Saarinen, however, was not able to realize some of his original intentions, such as air curtains instead of façades or a transparent connecting tube. Nonetheless the building was a remarkable technical and visual achievement. The space-bending poetry of the TWA terminal became symbolic not only of a bird in flight but also of the limitless future that the Jet Age seemed to herald.

The IAB, American, Pan American, and TWA airlines terminals represent very different ideas about modern architecture, from the prosaic and functional to the symbolic and sculptural. At their openings, the structures of Terminal City were repeatedly recognized for their practicality, beauty, relationship to site, incorporation of works of art, and advances in the use of steel, glass and concrete. A number of the architectural firms involved in Terminal City, based on

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[320] Paul Andreu, “The Airport Town: Interview with Paul Andreu,” 1991 by Patrick Javault in *Airport* (exh. cat., London: The Photographers’ Gallery, 1997), 76.

[321] Colquhoun, “TWA Terminal Building,” 465.

the experience gained there, would subsequently design other airports or airport buildings. For SOM and TAMS in particular, airport design would become a mainstay of their practice and they would design airports all over the world.[322]

The TWA Flight Center at Idlewild suffered the same fate as nearly all of the Idlewild terminals: it was too small to adequately serve jet aircraft. As architectural critic Reyner Banhan observed, Idlewild, "the perfect propeller-driven airport," was an example of the "inexorable law of design for transportation—that by the time you have finally found an architecturally acceptable format for any type of transport, it's obsolete."[323] Nonetheless Saarinen, who died before the TWA terminal was completed, had in 1958 begun the design of Washington Dulles International Airport, the nation's first purpose-built jetport (fig. 19). Unlike the TWA terminal, the monumental single terminal at Dulles was designed for expansion through the addition of bays, but Saarinen's intention was that the mobile lounge would limit the building's elongation.

The Terminal City had only one structure that was truly designed for the jet age: the National Airlines Sundrome (fig. 57). It was the last built, from 1962-1970. The terminal's design, by the firm of I.M. Pei and Associates, went through numerous alterations as the project's requirements changed from a multi-airline terminal to that of a single airline. National Airlines' flights to Florida originated there, hence the name of "Sundrome". Pei stated that he wanted bring "peace" to

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[322] In 1961 SOM received its first Firm Award, the greatest honor for design excellence for a collaborative practice, from the American Institute of Architects.

[323] Banham, "The Architecture of Wampanoag," 103.

the chaotic architecture of Terminal City.[324] His design was severe in its plainness and heaviness; massive concrete columns support a thick slab roof; but the expansive nineteen-foot high glass curtain walls lighten its monumental character. Pei did not like the visual interruption of metal mullions, so vertical glass strips were applied to reinforce the panes. The interior design is open and uncluttered and the smooth white surfaces augment the sense of spaciousness. To preserve the logical clarity of the design, the terminal was only one level. To separate arriving and departing passengers, the road was divided around the terminal so that people came and left from opposite sides of the building. The critic Alastair Gordon describes the Sundrome as "Jet-Doric" and it conveyed not the excitement of imminent motion but a calm limbo-like serenity.[325]

This eighth terminal finally completed the original Terminal City plan, which by this time had already been substantially altered and expanded. New roads, increased parking, and numerous other structures, additions, and on-going construction created Byzantine traffic circulation and visual incoherence in contrast to the Beaux-Arts simplicity and clarity of the initial layout. Within a week of the opening of the National Airlines terminal, on November 30, 1969, the first Boeing 747s landed at John F. Kennedy International Airport.[326] The Terminal City, as an encyclopedia of visionary architecture anticipated by Harrison's 1952

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[324] "Simplicity Picked for Air Terminal," *New York Times*, 19 August 1960, 47.

[325] Gordon, *Naked Airport,* 202-204.

[326] Farnsworth Fowle, "Superjet Terminal Will Open," *New York Times*, 29 November 1969, Business & Finance, 66.

master plan, became a thing of the past. Despite these drawbacks and the improvements in airport design that followed from the Terminal City project, JFK remained the iconic American airport. Its grand vision, however briefly and incompletely realized, was appropriate to its position as the United States' principal port of entry for immigrants, celebrities (the most famous being the arrival of the Beatles at the Pan Am terminal in 1964) as well as for foreign dignitaries.

Although a well-known symbol of New York City, John F. Kennedy International Airport—with more than thirty miles of roads, internal transportation systems, street signs and numbered addresses, residences, institutions and services, art, a prison (called a detention center), and industry—is itself a large city. It produces enough electricity to power the city of Hartford and employs as many people as the city of New Haven.[327] Kennedy airport has urban problems as well: homelessness (there are an estimated 150 people living at the airport), medical emergencies (coronary, at approximately one a day, is the leading cause of death), and crime. During the 1970s, for example, the mafia controlled cargo operations at JFK. In fact, the largest cash robbery in American history took place at Kennedy airport, with the heist of five million dollars and $850,000 in jewelry from the Lufthansa cargo terminal in 1978. Kennedy's art collection, established in 1969 and the country's first at an airport, numbers over 200 pieces

[327] Kaplan, *The Airport*, 25; "Can Airports Cope with the Jet Age?" 55.

and includes works by major modern masters such as Salvador Dalí, Joan Miró, and Pablo Picasso.[328]

At the very heart of the Terminal City were the Tri-Faith Chapels (fig. 58a). The three buildings were each designed by a different architect, but are linked by their location on a small plaza, the materials of white concrete and blue stained-glass, and their eccentric variation of a geometric shape: the Protestant chapel is almost an isosceles triangle, the Catholic chapel is a tall slightly fan-shaped structure, and the synagogue an upright rectangle.[329] All three buildings originally projected into a reflecting pool to convey the idea of an island or peaceful oasis.[330] Our Lady of the Skies, the Catholic chapel, was the first to be completed in 1954, with the Christ for the World Chapel and the International Synagogue following in 1966. Our Lady of the Skies features a large, and in the words of architectural critic Christopher Gray, "justifiably famous" statue of the Virgin Mary perched on a propeller. The inspiration for the chapel, as well as its décor, was the Catholic chapel at Boston's Logan Airport.[331] Our Lady of the

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[328] Suzanne Carmichael, "Stuck at the Airport? Then Look at the Art," *New York Times*, 15 December 1991, 1.

[329] The architects were Edgar J. Tafel for the Protestant chapel, George J. Sole for the Catholic chapel, and the firm of Bloch and Hesse for the synagogue.

[330] The reflecting pools and Liberty Fountain were some of the first casualties of airport expansion; they also attracted birds, which are hazardous to aircraft. In 1987, the chapels were closed for the construction of the new Terminal 1 that overlapped on their site. However in 2001, the chapels were reconstructed at a different location, and a fourth interfaith chapel was added.

[331] Deonnie Moodie, "Research Report: Airport Chapels: Shifting from Denominational to Interfaith," *The Pluralism Project,* 2005, available from

Airways, which was built in 1951 and dedicated the following year, is a sizeable room located off a walkway between Terminals B and C at Logan airport. The futuristic space has circular walls with a frieze of Christ carrying the cross; and in the center is a spectacular blue glass and aluminum light fixture that bears on its column a metal relief sculpture of an ascending Virgin Mary (fig. 58b). Following the example of the Boston chapel, all major airports established places for religious observance. Today there are some 140 airport chapels worldwide and approximately forty within the United States. Airport employees founded many of these chapels and all are independent of the airport authority. These places of worship reinforce aviation's early association with high ideals and the airport as a type of New Jerusalem.[332] Upon its completion in 1966, the Queens Chamber of Commerce awarded the Kennedy's Tri-Faith Chapel Plaza a special citation of merit. The chamber considered the chapels to be "enduring evidence that this nation's strength lies not so much in its natural resources, in munitions and arms and in economic structure but rather in spiritual vitality."[333]

John F. Kennedy International Airport was the first American airport to develop the scale of operation, economic importance, and cultural significance equivalent to a city. It was also an indication of the future. For in the late

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http://www.pluralism.org/research/profiles/display.php?profile=74144; Internet; accessed 9 September 2006.

[332] The Liverpool John Lennon Airport's motto, "Above Us Only Sky," is an unintended spoof on the religious sentiment engendered by flight.

[333] Quoted in "Airport Chapels are Among Award-Winning Queens Buildings," *New York Times,* 4 December 1966, Real Estate section, 1.

twentieth century the relationship between city and airport became inverted. Henri Lefebvre describes this new relationship in his discussion of the "space" of capitalism:

> This space is founded on the vast network of banks, business centres and major productive entities, as also on motorways, airports and information lattices. Within this space the town—once the forcinghouse of accumulation, fountainhead of wealth and centre of historical space—has disintegrated.[334]

Today the international airport is not an adjunct to any city or even a particular country; rather it has become a nearly autonomous constituent of global culture and commerce.

[334] Lefebvre, *The Production of Space*, 53.

FROM JET AGE TO JET LAG

CHAPTER FOUR

> Today my favorite kind of atmosphere is the airport atmosphere. If I didn't have to think about the idea that airplanes go up in the air and fly it would be my perfect atmosphere. Airplanes and airports have my favorite kind of food service, my favorite kind of bathrooms, my favorite peppermint Life Savers, my favorite kinds of entertainment, my favorite loudspeaker address systems, my favorite conveyor belts, my favorite graphics and colors, the best security checks, the best views, the best perfume shops, the best employees, and the best optimism. I love the way you don't have to think about where you're going, someone else is doing that, but I just can't get over the crazy feeling I get when I look out and see the clouds and know I'm really up-there. The atmosphere is great, it's the idea of flying that I question. I guess I'm not an air person, but I'm on an air schedule, so I have to live an air life. I'm embarrassed that I don't like to fly because I love to be modern, but I compensate by loving airports and airplanes so much.
>
> — Andy Warhol[335]

Andy Warhol's paean to the airport experience encapsulates the banal, paternalistic, and bureaucratic aspects of late modernity as well as an incipient unease with technology. Sputnik, the space race, the Jumbo Jet, and the air-borne atom bomb represented society's highest hopes and its worst fears. In this context, the commercial, civic, and functional elements of the airport receded in significance. The architects of Idlewild/Kennedy, for example, sought to

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[335] Andy Warhol, *The Philosophy of Andy Warhol (From A to B and Back Again)* (New York and London: Harcourt Brace Jovanovich, 1975), 160.

showcase the airport as a modern utopia. The idiosyncratic architecture of the Terminal City marks one of the first major attempts to distinguish the airport from its existing typological and vernacular contexts. Pre-war airports were designed to be strongly associated with public buildings, such as at Omaha, Nebraska (fig. 30); or with regional styles, such as at Burbank, California (fig. 12); or appear as a modified rail station, as at New Orleans' Shushan Airport (fig. 32). These three forms of tradition, having to do with type, locality, and function, directed the form, style, and plan of the American airport until the postwar period. Of these three, the dominant influence was the precedent of the train station.

THE TRAIN STATION PROTOTYPE

For the first half of the twentieth century, train depots operated as the city gates for both passengers and freight. They served as important access points to the metropolis and were located in or near the city center. Unlike airports, train stations were commercial projects and not funded by municipal or federal governments. Rail terminals were often representational buildings designed by prestigious architects. In New Orleans, for example, at the same time as the construction and expansion of the municipal airport in the 1930s, nine rail companies operated out of five major train terminals, with eight smaller "stations"

(some were merely platforms) providing additional service.[336] Two of the city's main depots were built by nationally-known Chicago architects: Illinois Central's Union Station by the firm of Adler & Sullivan (with some of the design work done by Frank Lloyd Wright) in 1891-92 and Southern Railway's Terminal Station by Daniel H. Burnham in 1908 (fig. 59).

In contrast, airports were located in the outskirts and were isolated from other structures. They therefore did not have the metropolitan presence or character of the train station. At this time—to use Henri Lefebvre's analytical framework of space—airports were simply a spatial practice. They functioned nearly unnoticed within the economic realm; unlike the airplane, the airport was not yet a space of representation or a representational space.[337] Thus early airports were not architect-designed, incorporated into city or regional development plans, or integrated into transportation systems. Neither were they considered symbolic structures or civic monuments. Boston's first airport, for example, is strictly utilitarian (fig. 1a), and Ford Airport of the same date (fig. 2a), was part of a factory complex. Boston airport, on one hand, evolved more or less organically; its makeshift buildings were for aircraft, not passengers, and the builder is unknown. Ford Airport, on the other hand, was architect-designed and purpose-built to promote civil aviation. Yet it was physically and symbolically separated from the leisure and cultural realms represented by the colonial-style Dearborn Inn on the opposite side of the street (fig. 25c).

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[336] Michael M. Palmieri, "Railroad Stations of New Orleans," 26 December 2004; available from http://lrs.railstuff.net/r-noupt.htm; Internet; accessed 16 July 2006.

[337] Lefebvre, *The Production of Space*, 33-39.

During the 1930s, however, airport passenger buildings, like train stations, began to receive the attention of politicians, city planners, and architects. The modification of state laws in the late 1920s, which declared airports a public utility and permitted municipalities to incur indebtedness in order to acquire and maintain airports, presaged social and economic practice by nearly a decade. Nonetheless, boulevards, landscaped grounds, fountains, fine restaurants and works of art soon graced the city airport. The second terminal structure built at Boston, with its entrance enhanced by a formal garden, illustrates these changes, albeit that the architect, if there was one, is unknown (fig. 1b). A more typical example is New Orleans' Shushan airport, which was named after a local politician and built by the same firm which designed the state capitol in Baton Rouge. Shushan airport also benefited from a WPA beautification program that added a fountain, park, and swimming pool. The controversy over whether or not the dynamic nudity of the fountain's figures (fig. 39) was appropriate for a public space signifies that the transition of the airport into a representational space was well underway.

Air terminal interiors of this period, although purportedly public spaces, consisted of a small reception area or waiting room with only a few informally placed chairs. There are no rows of benches or grand concourses as in a train station, but the location and identity of passenger services— ticketing, baggage, café, newsstand, etc.—were often identical to their rail counterparts. Furthermore, the murals and mosaics that decorated airports were the art forms of public buildings. With its wall paintings of Louisiana scenery and floor mosaics

that told the distance in air miles from New Orleans to other cities, Shushan Airport fit this mold (fig. 33).

In 1954, just as air transport was taking off, the city consolidated its numerous train depots at a single terminus, the New Orleans Union Passenger Terminal (NOUPT), which was at that time the country's only municipally-owned rail station (fig. 60). It was built adjacent to the former Union Station, which was demolished, as was the Terminal Station two years later. The interior, a single large concourse, featured a painted frieze by Conrad Albrizio, who also had painted the murals in the State Capitol at Baton Rouge. Continuous panels depict the "four ages" of Louisiana history: exploration, colonization, conflict, and modernization in an abstract figurative style. The structure was described as the latest in modern transportation facilities but it was the last major train station built in the United States. In 1960, train service to New Orleans had already begun to diminish and rail lines were reduced throughout the following decades. NOUPT survived as a combined bus and train station. And, although occupied by only one rail company for the past thirty years, the station, including its murals, was renovated and restored in the late 1990s.

A NEW PARADIGM: LAMBERT-ST. LOUIS

The suburban New Orleans International Airport was dedicated in 1959 (fig. 41). Commercial aviation was now the fastest growing area of the United

States economy, and the new airport's dramatic and distinctive concrete shell roof announced the arrival of the Jet Age. The inspiration for this departure in airport architecture was undoubtably the design of the Lambert-St. Louis International Airport by Minoru Yamasaki with George Hellmuth and Joseph Leinweber, 1953-1956 (fig. 61).

The architects' unique design was in fact inspired by the great vaulted interior space of New York City's Grand Central Station.[338] Their reinterpretation consisted of three concrete groin-vaulted sections with glass and aluminum curtains walls. Buford L. Pickens, Dean of the School of Architecture at Washington University, declared that the breakthrough form "conveyed no association with heavy locomotives or massive bus depots" but rather "seemed to float like bulbous clouds or to suggest symbolically the graceful cross section of an airplane wing from which the 'lift' is actually derived."[339] The structure was cellular; it was planned to expand up to six units but theoretically it could be replicated indefinitely. The spacious interior was without internal divisions; instead, component furniture allowed for maximum flexibility. The arrangement of the interior, with its abstract pattern of functional elements, repeated the rhythm of the structure itself.

Of special note is the terminal's metal-framed seating (fig. 62a). Designed by George Nelson and manufactured by the office furniture company of Herman

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[338] "Oscars for St. Louis and Los Angeles," *American City* 71 (June 1956): 142.

[339] Buford L. Pickens, "Proud Architecture and the Spirit of St. Louis," *Architectural Record* 119 (April 1956): 199.

Miller, the “Nelson Chair” featured canted backs and black vinyl upholstery in metal-framed units that were back-to-back and six seats across.[340] This stark and rectilinear seating enhanced the neutral and ordered environment meant to calm and control the terminal’s large numbers of travelers. The success of the Nelson Chair was followed by Charles and Ray Eames’ tandem sling seating, which was specifically designed for air terminals and first used at O’Hare and Washington Dulles airports in 1962 (fig. 62b). Also made by Herman Miller, the tandem sling seat has a minimal continuous die-cast aluminum frame and its comfort is not due to thick padding but because of its ergonomic curves. Lighter, stronger, airier, and available in more configurations than the Nelson Chair, tandem sling seating was adopted by airports throughout the world and is still in production.

The Lambert-St. Louis terminal was a building without façades or, depending on your point of view, it was all façade, with the thin shell roof forming the fifth façade. Its open, modular configuration and unified interior aesthetic conveyed the sense of a limitless future. In Pickens’ opinion, here was an example of an airport that “looks, feels, and even acts like it belongs amid aircraft—whether you view it from the inside, outside, or circling the field above.”[341] This terminal was the first American architectural form to successfully evoke flight and warrant critical attention since Delano & Aldrich’s 1928 Pan Am Airport in Miami (fig. 28); in 1956 it received an award of merit from American Institute of Architects. The concrete shell roof and transparent walls sufficiently

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[340] Brodherson, “The History of American Airport Design,” 85.

[341] Pickens, “Proud Architecture and the Spirit of St. Louis,” 197.

differentiated the air terminal from the rail station; yet it was still within the typology of transportation design. The curved concrete forms of Yamasaki's design would be echoed in subsequent American airports, such as at McCarran International Airport, Las Vegas, 1963, and Spokane International Airport, 1965; although often the reference was made just in the catenary curves of the *porte cochère*, such as at Hartsfield-Atlanta International Airport, 1961, and Oakland International Airport, 1962 (fig. 63).

The Lambert-St. Louis terminal reportedly influenced Eero Saarinen's design for the TWA Flight Center at Idlewild (fig. 56).[342] If true (the TWA design can also be seen as a natural development from his 1954 Kresge Auditorium), then Saarinen emulated the spectacular rather than the functional elements of Yamasaki's design. The image of a bird rising in flight was an expressive extreme that occurred even as the activity in the airfield became more distant.

In 1962, the same year the TWA Flight Center opened, the Federal Aviation Administration commissioned I.M. Pei Associates to design a standardized independent air traffic control tower. At Idlewild and earlier airports, air traffic control was a glass-enclosed area that projected from the top of the airside of the administration building. In the postwar era, the federal government began to include the airport's air traffic control room as part of its responsibility. As airports adopted separate terminals, however, and as field size expanded

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[342] Koos Bosma, "In Search of the Perfect Airport," Robyn de Jong, trans., in *Airworld*, Alexander von Vegesack and Jochen Eisenbrand, eds. (exh. cat., Weil am Rhein: Vitra Design Museum, 2004), 56; Hugh Pearman, *Airports: A Century of Architecture* (New York: Harry N. Abrams, 2004), 117.

while airport ground and airspace became busier, independent structures were needed to better direct field operations. By contracting a well-known architectural firm to develop three prototypes, it seems that the FAA recognized that the control tower was both an architectural and a symbolic form. The architects state the project's objective was to "create a uniform image of flight safety in America."[343] Their solution was a subtly flared pre-cast concrete shaft crowned by a black-painted aluminum and tinted glass control "cab" (fig. 72a). During the next decade, the FAA built some fifty control towers to their design.

Saarinen's final airport design was the monumental Washington Dulles Airport (fig. 19a). At Dulles's dedication in 1962, however, *New York Times* reviewer Paul J.C. Friedlander gave short shrift to the terminal's sculptural form in favor of detailing the benefits of the airport's mobile lounges (fig. 19b). He felt that the main advantage of the mobile lounge was that "the passenger never steps out into the weather once he has crossed the threshold into the terminal."[344]

An airport utility that came into more common use at this time was the Jetway (fig. 18). An adjustable tube that feeds passengers directly into an aircraft from the air terminal, the Jetway was first used at San Francisco International Airport in 1959, and became an indispensable feature of the Jet ports of the late

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[343] Pei Cobb Freed & Partners, "FAA Air Traffic Control Towers," 2006; available from http://www.pcfandp.com/a/p/6214/s.html; Internet; accessed 14 September 2006.

[344] Paul J. C. Friedlander, "Model for Future Airports," *The New York Times,* 11 November 1962, section TR, 23.

1960s. The designer George Nelson noted that airport architecture and systems tended towards what he termed “encapsulation;” he concluded that “the prime characteristic of modern travel is that it tends to isolate one from experience and there does not appear to be any exception to this rule.”[345] The displacement and effacement of thresholds, which so delighted earlier commentators, came to be perceived as one of the failures of air terminal design.

At Idlewild in the late 1940s, there were at one time so few flights and so many sightseers that the airlines would pull up airplanes to their terminals just to give spectators on the observation decks something to see. The showpiece architecture of the Terminal City held on to this spectacular notion of flight. Like the 1934 Shushan airport, Idlewild was conceived of as a representational space. It did not, however, represent the city as the destination; rather it symbolized the airport itself as the attraction. The former fair grounds and parklands on which many airports were built—LaGuardia was located on the site of an amusement park and Idlewild on a golf course—found an afterlife in airplane joy rides, swimming pools, landscaped settings, lighted fountains, and the terminal’s fine restaurants and observation decks. Idlewild, however, referred not to the here and now but to the future and the world beyond. Local resident Ann Marie Romano reminisced:

> As a girl growing up in Queens in the 1950s and 60s, I visited Kennedy Airport many times—with my mother on a Sunday afternoon and with nothing to do; as a college kid home for the weekend with a friend from up-state, to see the thrilling sight of the brand new Boeing 747s at the Pan

[345] George Nelson, “Architecture for the New Itinerants,” *Saturday Review,* 22 April 1967, 66.

> Am terminal; or bringing relatives from out of town to see what I thought of as the doorway to the world.
>
> Each airline had a flavor of its country, like the tapestries hanging near the Air France ticket counters. And one could go outside onto the observation deck and, after the deafening engine noise and the sickening fuel smells blasting at you, lean on the rail and pretend it was you flying off on one of those planes.[346]

At the airport's dedication on July 31, 1948, President Harry S. Truman tellingly called Idlewild the "front door to the United Nations," instead of to New York City or even to the United States.[347]

THE INTERNATIONAL AIRPORT AND NATIONAL IDENTITY

Aviation historian R.E.G. Davies notes that in order for a country to be recognized as an international power, two things are necessary: admission to the United Nations and a national airline.[348] National prestige and security, coupled with the standardization of safety procedures and economic considerations, are the primary reasons for government control of international civil aviation. Indeed, most commercial pilots are trained by the military; in the interest of defense, it serves the state to train its pilots. An international airport is itself a demonstration of a country's ability to participate in the global arena, for it is often the largest public works project ever undertaken by the state. Cultural theorist Paul Virilio

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[346] Ann Marie Romano, "Letters to the Editor: My Own Private J.F.K.," *New York Times,* 20 June 2004, sec. 2, 4.

[347] Dunlap, "A 'New' Kennedy Airport Takes Wing," 4.

[348] R.E.G. (Ronald Edward George) Davies, *A History of the World's Airlines* (New York: Oxford University Press, 1964), 398.

has called it "the last gateway to the State," [349] even though the international airport's physical location is typically nowhere near a geographical border.

Like an embassy, an international airport can function as a symbol of the state. Architect Brian Edwards claims that, "National image is reflected more directly in the design of airports than in any other building type, with the passenger terminal the key element in public perception."[350] As such it is frequently the first target in foreign military conflict as well as the initial locus of diplomatic ceremony. The tradition of the Pope kissing the ground when he deplanes, for example, acknowledges the airport as a point of entry to a new land. Today, even airspace is "under" state control and requires the adherence to national laws and mores.[351]

An international airport is always of strategic concern but the airport in the nation's capital has added symbolic significance. The design of Washington National Airport of 1938-41 acknowledges this special dimension in both its aspect and its prospect. The aerial view shows the airport as a nexus to places of memory and power (fig. 34a). The approach to the airport was via Mount Vernon Memorial Parkway, the terminal the centerpiece of a terraced public park. The terminal's portico entrance and control tower cupola were contemporary echoes

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[349] Paul Virilio, "The Overexposed City," 1986, reprinted in *ROAM: Reader on the Aesthetics of Mobility*, ed., Anthony Hoete (London and New York: Black Dog, 2003), 268.

[350] Brian Edwards, *The Modern Terminal: New Approaches to Airport Architecture* (London and New York: Routledge, 1998), ix.

[351] For example, it is forbidden to consume alcoholic beverages in Saudi Arabia's airspace.

of the city's Classical architecture (fig. 34b). The star-shaped airfield with its radial runways could be seen as a miniature version of the rational L'Enfant Plan of Washington. From within the airport, an airside concourse with a glass curtain wall displayed an unobstructed view of field operations (fig. 35), while the observation deck was said to "spread out before the eyes of observers" the stirring "panorama of Washington."[352]

Although the United States has a national airport, it does not have a national airline. This is even more surprising given its overwhelming domination of international civil aviation in the postwar period.[353] The ramifications of this omission were especially marked during the Jet Age, as the number of countries achieving international civil aviation capability began to increase rapidly. At Idlewild, for example, the foreign carriers, all national airlines, were located within the low wings of the International Arrivals Building, on either side of the monolithic control tower. When a *New York Times* reporter reviewed the IAB, he noted "these rooms could have been transplanted intact from some of the new Park Avenue and Madison Avenue office buildings."[354] It was the architectural one-upmanship of the terminals of the American carriers that projected the

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[352] John Stuart, "The Washington National Airport," 604.

[353] In 1961, the first year the International Civil Aviation Organization broke out its annual statistics by country, the United States ranked number one in terms of aircraft kilometers flown, passengers carried, and passengers per kilometers. The United States' figures in these three categories were more than seven times those of the United Kingdom, its closest competitor out of ninety member states. ICAO, "News Release," 12 March 1962.

[354] Friedlander, "Idlewild Transformed," XX3.

prevailing world's fair atmosphere that was repeatedly ascribed to them. Alastair Gordon, in his architectural history of the airport, recalled visiting the "topsy-turvy" TWA terminal at Idlewild after a day at the 1964 New York World's Fair: "I was only twelve and knew nothing about architecture, but the pavilions at the world's fair seemed stodgy in comparison. This wasn't pretending to be the future; this *was* the future."[355] These insistently avant garde buildings were all conceived, as architect and critic Michael Sorkin describes them, as "modernist shrines whose signifying tasks are engaged via abstraction rather than representation: expressions of grandeur and consequence rather than any particular evocation of regional particulars."[356]

CORPORATE IDENTITY

This new type of airport architecture was largely a response to economic factors. For it was during the 1950s that federal restrictions on air routes were relaxed, consequently a number of carriers expanded their routes nationally and internationally. Airlines that had established regional identities sought to recast themselves more broadly while at the same time maintain distinctions from their competition. These contradictory forces of standardization and differentiation were resolved in the airlines' aggressive pursuit of distinct corporate identities.

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[355] Alastair Gordon, *Naked Airport* (New York: Metropolitan Books, 2004), 2.

[356] Michael Sorkin, "See You in Disneyland," 219.

Commercial airlines were in fact among the first companies worldwide to develop comprehensive corporate identity programs.[357] These were consistent, across the board self-presentations; as such, the company's "image" was reflected in all aspects of design, from architecture and advertising to furnishings, fashions, and food.

The fine arts were also utilized in the service of airline branding. Until deregulation in 1978, the airlines had a great deal of control in determining the design of their terminal space.[358] They thus became the primary commissioners of art for airports, replacing the municipal and federal patronage of the inter-war period. Murals, mosaics, and stained glass, the mainstays of civic architecture interior decoration, continued, however, to be commissioned even as the airport became more and more representative of the corporate environment. Contemporary examples are a ceramic tile mosaic by Joyce Kozloff entitled *Bay Area Victorian, Bay Area Deco, Bay Area Funk*, 1983, which makes up a wall in the baggage claim area of the San Francisco airport; Jenkyn A. Powell's *You Are*

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[357] Jochen Eisenbrand, "'Airlines and Corporate Design," trans., Julia Thorson, *Airworld*, 145-174. Other companies, such as the F.W. Woolworth Company in the United States and AEG (Allgemeine Elektrizitäts-Gesellschaft) in Germany, had established comprehensive corporate identity programs earlier in the twentieth century but not on a worldwide basis.

[358] After deregulation, there was open competition for air routes and thus the presence of a particular airline at an airport was no longer assured. Therefore, it no longer made financial sense to invest in individual terminals or even custom-designed ticket counters and lounges. Stricter federal standards relating to airport interior construction also resulted in more uniform terminal spaces. In addition, cities often contracted out the management of major airports to a private business or a public agency (such as a port authority) that promoted its own company identity.

Here, a 1995 stained glass wall at the arrivals building of the Salt Lake City airport; and at Denver's new airport is an extensive collection of site-specific works, including the mural *Spirit of the People*, a grouping of photographs and paintings, and a pair of mixed-media wall maps called *America. . . Why I Love Her,* 1994, by Gary Sweeney. Even though large-scale wall pieces remain in evidence, it is another, newer medium that came to typify the airport environment: kinetic art.

A kinetic art work exhibits apparent or actual movement through manipulation, mechanical or natural means. As kinetic art began to capture attention in the early 1960s, the well-known kinetic artist George Rickey charted its history and catalogued its forms.[359] He designated six types of kinetic art: optical phenomena caused by either the viewer's or the object's movement; transformations, especially dematerialization through rapid movement; movable works, where the viewer can manipulate and rearrange elements; light play caused by the movement of light; machines, where the motion is mechanical; and "movement itself", in which motion is the subject. Rickey distinguishes between works where movement is secondary and incidental from those where it is central and integral. In the kinetic art work, he contends the movement should be "as intrinsic as that of a gramophone record or an airplane in flight; without it the object would be something else." Therefore it is the last category of

[359] George W. Rickey, "The Morphology of Movement: A Study of Kinetic Art," *Art Journal* 22, no. 4 (Summer 1963): 220-231.

"movement itself" that Rickey considers the most profound expression of the medium.[360]

It is likely that the first widely seen works of kinetic art in the United States were at airports. Kinetic art has particular resonance in the airport environment for a number of reasons (although not every kinetic work has all of these characteristics): one aspect is that kinetic art is technical-mechanical; another is the incorporation of time and movement, particularly in the suspension of moving objects; and a third factor is that kinetic works do not require specialist knowledge to understand and appreciate. Although today all types of kinetic art are found at airports (and not necessarily within a terminal), it is Rickey's last category of free movement, in the form of monumental mobiles, which initially predominated. In 1957 the New York Port Authority commissioned a mobile from Alexander Calder for Idlewild Airport. Entitled *.125* after the gauge of the aluminum elements used in the piece, this forty-foot long mobile is installed in the main arrival area of the International Arrivals Building (fig. 64a). The following year his mobile entitled *Pittsburgh* (Calder was a Pennsylvania native) was donated to the Greater Pittsburgh Airport (fig. 64b). Within a short period of time, the mobile was established as the focal point of a number of airport terminal interiors. Large-scale mobiles—by Calder as well as by other artists—could be found at Midway airport, Chicago; Hartsfield Atlanta airport; and Love Field in

[360] Ibid., 222-224.

Dallas.[361] Abstract and technical, modern kinetic works such as the mobile largely replaced the more literal and traditional globes, maps, and aviation-themed murals of earlier airports.

Calder did not invent the mobile, yet he is the artist most associated with this kind of kinetic art. “Mobile” was the term given by Marcel Duchamp to Calder’s sculpture of suspended moving elements in 1932, in response to Jean Arp’s earlier designation of “stabile” for Calder’s nonmoving freestanding sculpture. Calder had trained as a mechanical engineer and many of his early mobiles were motorized. Later, however, he rarely used mechanized movement in favor of the chance motion of air currents.

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[361] The Calder mobiles for airports have had a rather lamentable history. *Pittsburgh* and *.125* have both been restored and reinstalled at Pittsburgh and Kennedy airports, respectively. The Calder mobile, *Brass in the Sk*y, 1947, was commissioned for the Cloud Room at Midway by Marshall Field’s. When the restaurant closed, it was sold to French & Co., Chicago, a gallery that specializes in antique textiles. They had the mobile on view in their showroom for a long time. At some point, they sold or donated it to the Chicago Museum of Contemporary Art. The MCA sold *Brass in the Sky* in auction at Sotheby's in Chicago in November 2005.

American Airlines commissioned from Calder *Red, Black and Blue* for Love Field in 1968, but moved the mobile to Dallas-Fort Worth airport after it opened in 1972. *Red, Black and Blue* was sold in 1981 to Martin Margulies, who donated it to the Whitney Museum. The museum eventually returned the work; it was too large to put on view. Margulies sold the mobile to Republic (now Northwest) Airlines for installation in the atrium at Mitchell International Airport in Milwaukee. In 1986, *Red, Black and Blue* was again sold, this time to Jane and Lloyd Pettit, who donated the work to the city. In 1998 the mobile was moved to the entrance hall of the new Milwaukee Art Museum. It is the first work of art visitors will see at the museum, which was designed by Santiago Calatrava, who is a kinetic artist as well as architect. Art critic James Auer finds the mobile is still a symbol of modernity, and so more appropriate installed at the new museum than at Milwaukee’s aging airport. James Auer, “Calder’s *Red, Black and Blue,*” *Milwaukee Journal Sentinel*, 29 August 1997.

Because of the free movement of mobiles, their configuration has sometimes been mistaken as accidental rather than designed. Thus the contribution of Calder's engineering background has often been overlooked. Nevertheless, their complex balance and character of motion are the result of a thorough understanding of the laws of physics.[362] George Rickey points out that while a talented person may produce an expressive and original painting or sculpture without possessing any learned skill, just as "there is no primitive or untutored clockmaker" there can be "no archaic and naïve kinetic artist." Kinetic art, according to Rickey, requires "considerable technical know-how."[363] Calder himself resented the implication that his whimsical mobiles were simple to make. When journalists asked Calder how long it took to construct *Pittsburgh*, he replied with evident irritation, "It took me thirty years."[364]

Calder's mobiles are predominately non-objective and use industrial materials (metal sheet, rods, and wire); yet they refer more to nature than the machine. Jean-Paul Sartre described Calder's mobiles as "lyrical inventions" and "technical combinations." At the same time, he added, mobiles are symbolic of nature, specifically "of that profligate Nature which squanders pollen while unloosing a flight of a thousand butterflies; of that inscrutable Nature which

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[362] Mooson Kwauk, "Geometric Mobiles: From Conceptualization of Motion in Space to Rational Design," *Leonardo*, 32, no. 4 (1999): 294.

[363] Rickey, "Morphology of Movement," 229.

[364] Quoted in Robert Osborn, "Calder's International Monuments," *Art in America* 57, no. 2 (March-April, 1969): 32-49.

refuses to reveal to us whether it is a blind succession of causes and effects, or the timid, hesitant, groping development of an idea."[365]

Sartre's connection of nature to movement conveys an important aspect of kinetic art. Instead of representing nature in a static form in the manner of traditional art media, kinetic art acts as nature does. The discovery of the spinning structure of the atom by Ernest Rutherford and Niels Bohr in 1913 revealed that nature, even at its most elemental level, is in constant motion. Albert Einstein's concurrent theory of relativity further proposed the seamlessness of matter, movement, and time. The space-time continuum revolutionized physics by providing a coherent model of how the universe works at both the subatomic and galactic levels.[366] Around the same time, the Russian Constructivists began to consider actual movement as a fundamental component of art. They declared in their "Realist Manifesto" of 1920:

> For us, space and time are born today. Space and time: the only forms where life is built, the only forms, therefore, where art should be erected

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[365] Jean-Paul Sartre, "The Mobiles of Calder," *Alexander Calder* (exh. cat., New York: Buchholz Gallery/Curt Valentin, 1947), n.p. Essay translated reprint from *Alexander Calder: Mobiles, Stabiles, Constellations* (exh. cat., Paris: Galerie Louis Carré, 1946), 9-19. "Ils sont . . . des inventions lyriques, des combinaisons techniques . . . et, à la fois, le symbole sensible de la Nature, de cette grande Nature vague, qui gaspille le pollen et produit brusquement l'envol de mille papillons et dont on ne sait jamais si elle est l'enchaînement aveugle des causes et des effets ou le développement timide, sans cesse retardé, dérangé, traversé, d'une idée.

[366] In the field of quantum physics, Einstein's Theory is now being challenged by string theory.

> . . . . we are building our works as the universe builds. . . . We proclaim a new element in plastic arts: the kinetic rhythms, which are essential forms of our perception of real time.[367]

Calder then, when he claimed the "system of the Universe" as his model, was not being pretentious but simply acknowledging the basis of kinetic art.[368]

Kinetic art is time made visible through the sequencing of intervals and the duration of movements. The experience of time in kinetic art can supply the sense of scale lost in other modern art media. Because of the large size and abstraction of modern painting, for example, it is difficult for a viewer to gain access to the work. As Rickey noted, "Time in kinetic art is of equivalent relevance to the human image and human scale in figurative art; even the uninitiated can bring their measure and feel that the work has something recognizable for them."[369] Rickey viewed the accessibility of kinetic art as a two-edged sword. On the one hand, kinetic art is "barrier-free," since anyone can relate to it physiologically. On the other hand, this facile appreciation can lead to an absence or devaluing of the work as art.[370] Illustrating both aspects of this issue are the Calder mobiles, the majority of which are in corporate and public collections and are arguably the most popular works of modern art. Yet the

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[367] Naum Gabo and Anton Pevsner, "The Realist Manifesto," 1920; reprinted in Jean-Louis Ferrier and Yann le Pichon, *Art of Our Century, The Chronicle of Western Art, 1900 to the Present*. Trans. Walter D. Glanze (New York: Prentice-Hall Editions, 1988), 209.

[368] Alexander Calder, "What Abstract Art Means to Me," *Museum of Modern Art Bulletin* 18, no. 3 (Spring 1951): 8.

[369] Rickey, "Morphology of Movement," 224.

[370] Ibid., 224-225.

troubled story of the *Pittsburgh* mobile highlights how little user-friendliness is associated with art.

Pittsburgh is a black and white mobile made of iron and aluminum. It was awarded first prize for sculpture at the Carnegie Institute's *1958 Pittsburgh Bicentennial International Exhibition of Contemporary Paining and Sculpture*, whereupon it was purchased privately and donated to the county. When the Greater Pittsburgh Municipal Airport opened in 1952, it had the largest and most expensive terminal to date. At a cost of $33 million, disgruntled local taxpayers called it the "Taj Mahal", while city officials promoted the expansive granite and glass building as a "bold step into the World of Tomorrow."[371] The terminal's amenities—a 70-room hotel, three restaurants, a cocktail lounge, drug store, movie theatre, amusement arcade, upscale shops, and an observation deck—made it, according to a postcard text, "a city in itself" and the world's "most modern airport."

As part of its claim to modernity, the mobile *Pittsburgh* was put on display in the terminal's rotunda. At its installation the mobile was painted green and gold, the official colors of Allegheny County, making *Pittsburgh,* as one journalist put it, "one of the few works of cutting edge art that perfectly matched the paint scheme on a municipal dump truck." [372] Furthermore, it was felt that a part of the

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[371] The "architecturally officious" terminal by architect Joseph Hoover was $9.5 million. "New Thinking in Airport Terminals," *Architectural Forum* 97 (November 1952): 138.

[372] Chris Potter, "You Had to Ask: Calder's *Pittsburgh* Mobile," *Pittsburgh City Paper,* 23 October 2003.

mobile hung too low and counterweights were attached. The weights immobilized the work and so it was motorized. Calder was outraged at these alterations but the airport refused to return the piece to its original state. Eventually a compromise was negotiated in which the mobile was repainted bright “Calder” red. However, due to problems with the paint application, the repainted mobile was a diluted, dull red (fig. 64b). Twenty years elapsed before it was restored and hung in the Carnegie Museum stairwell. In 1992, following the opening of the new Pittsburgh International Airport (designed by the Pittsburgh-trained architect Tasso Katselas), *Pittsburgh* was finally returned to the airport terminal where it is on display.

A Calder “mobile” was also literally one of the largest public relations promotions. In 1972 Braniff International Airways commissioned Alexander Calder to paint one of its DC-8 jets destined to be the flagship of its South American fleet. The project was meant to rekindle Braniff’s successful “end of the plain plane” campaign of the 1960s in which the designer Alexander Girard created vibrant paint schemes for the Braniff fleet (Girard also designed Braniff’s terminal interiors and Emilio Pucci the coordinating psychedelic fashions). Calder was reportedly delighted with the opportunity to make what he called “a flying mobile.”[373] The result was *Flying Colors*, a 157-foot painting—Calder’s signature alone was fourteen feet long (fig. 65a). In November of 1973 it made its highly touted debut tour of America, starting from Braniff’s new headquarters at the

[373] Quoted in Joe Mitchell, “The Lost Calder Files,” *The Braniff Pages*; available at http://www.braniffpages.com/calder/calder.html; Internet; accessed 24 July 2006.

recently opened Dallas-Fort Worth airport. Although Braniff's logo was not visible on *Flying Colors*, the airline advertised its patronage in the production of "a true work" from Calder, the "old master of modern painting and the father of kinetic art." The company noted portentously that, "certainly it will be seen by more people than have looked at any other work of art in the history of man. For many, the sight of [*Flying Colors*] will be their first and only view of an original work by an internationally famous artist."[374]

The popular acclaim of *Flying Colors* led to a subsequent commission for Calder from Braniff for the paint scheme for a 727 jet in honor of the bicentennial of the United States. Calder produced four models and a committee that included the directors of the Chicago Museum of Contemporary Art, the Detroit Institute of Art, the National Gallery of Art, and the Whitney Museum of American Art selected the final design, which resembled a rippling American flag (fig. 65b). In late 1975, First Lady Betty Ford dedicated *Flying Colors of the United States* at Washington Dulles International Airport.

Despite Braniff's proclaimed art patronage, when the airline began to experience financial difficulties—in part from the expenses incurred in relocating to Dallas Fort-Worth airport—the American fashion designer Halston (Roy Halston Frowick) was hired in 1977 to revamp the company's image. Halston's comprehensive redesign featured a neutral palette and his signature fabric, Ultra

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[374] Undated advertisement from the Braniff Collection, History of Aviation Collection, McDermott Library, The University of Texas at Dallas.

suede. The “Ultra” scheme was also applied to Braniff aircraft, which included repainting the *Flying Colors*.[375]

JET SET

When Braniff advertising executive George Gordon approached Calder about the *Flying Colors* project, Calder initially thought he was being asked to paint a model airplane and he responded disdainfully: “I don’t paint toys!”[376] His reaction is ironic since his best known early work is his *Cirque Calder*, an assemblage of miniature sculptures made of cork, wire, yarn, wood, and other common materials, which, when manipulated by the artist, performed a series of movements or acts.[377] In fact the articulated toys and pull-toys that Calder had designed for manufacture were the inspiration for his development of *Cirque Calder*.[378] Although the playfulness of his art has led some critics to dismiss his work as unserious, others have identified this quality as characteristic of kinetic

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[375] Calder was working on a third Braniff commission, the *Flying Colors of Mexico*, when he died in 1976; this design was never realized. Ibid., and Braniff International, “Alexander Calder’s *Flying Colors*;” available from http://www.braniffinternational.org/image/flyingcolors.htm; Internet; accessed 8 May 2006.

[376] Joe Mitchell, “The Lost Calder Files.”

[377] *Cirque Calder*, 1926-30, is permanently on view at the Whitney Museum of American Art.

[378] The Gould Manufacturing Company in Wisconsin produced a number of these toys during the late 1920s.

art in general and of modernism in particular. Art historian Francisco Calvo Serraller, in an essay about Calder's work, discusses its ludic nature:

> Play, irony, and humor, even though they are not inventions of the contemporary era, are perhaps the most determining modern traits of its literature and its art because all three are substantially related to freedom and to the corresponding erosion of all established, fixed norms. They are devices for setting in motion things that stagnate and don't change, that have remained too fixed, regulated, immobilized, that resist the flow of time through their inertia, which is the true position of the modern—a term that means 'made in today's style,' contemporary, susceptible to modification, change, fashion. Temporal modern art is, therefore very dynamic and uses as its most powerful agents these vertiginous points of flight, which are play, irony, and humor, its 'mobiles.'[379]

Temporality, fashion, and freedom were especially associated with jet travel. The North American edition of *Vogue* magazine, in its October 1, 1960 issue, focused on the Jet Set lifestyle. Advertisements by the upscale department store of Saks Fifth Avenue, Rolls Royce, and Beechcraft (Rolls Royce manufactured jet engines and Beechcraft private planes) featured well dressed couples en route to important events—a christening, a première, an embassy dinner, a golden anniversary, etc.—around the world. The image of an elegant, blond woman rushing to board a waiting aircraft is captioned:

> Commuting in a ball gown is routine for her. Faraway social events are important to her career. Warm and understanding in her social world, she's also a calm and cool administrator, with far-flung business interests . . . If you're one whose accomplishments keep you constantly on the move, why not let the incomparable Beechcraft be your magic carpet, too?[380]

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[379] Francisco Calvo Serraller, "Calder: Gravity and Grace," *Calder*, 16.

[380] Beechcraft advertisement, *Vogue*, 1 October 1960, 42.

The Pan American terminal was used as the location for a fashion spread and featured in the accompanying article on Idlewild's Terminal City. Described as a "pale, floaty, umbrella of a building" (the model is shown facing into the breeze and holding onto her fur-trimmed hat), the writer stressed the spectacular "absolutely wrap-around" view from the terminal of arriving and departing jets. The airport's International Hotel similarly conveyed a glitzy excitement. Its double-glazed windows and air-conditioned rooms offered guests a heretofore-unknown degree of control—or freedom—over their environment. It was these technologies that made the International, according to the reviewer, "full of the peculiarly urgent glamour that characterizes absolute transience."[381]

Evident in the magazine's images and texts is a new attitude towards time: the leisured class was no longer distinguished by spending time but by saving it. Therefore it is not coincidental that the kinetic art movement acquired momentum at the beginning of the Jet Age, for time consciousness is a condition of modernity.[382] Even the traditional medium of stained glass was reconceived in terms of movement: Robert Sowers calculated the effects of the changing light on his gigantic abstract glass façade of the American Airlines terminal at Idlewild to suggest "the ever-shifting sensations of space and movement through

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[381] "New York's Idlewild—The New Look," *Vogue*, 1 October 1960, 194, 217.

[382] The organization of labor around clock time rather than the seasonal rhythms of agricultural life is a result of industrial capitalist production. Harvey, *The Condition of Postmodernity*, 201-289.

space."[383] Furthermore, as Jean Baudrillard has observed, the perception of time as a divisible substance makes it into a commodity.[384] The identification of time, travel, and consumption is confirmed by British writer John B. Priestley's well-known quip: "A good holiday is one spent among people whose notions of time are vaguer than yours." The air passenger, for example, "buys" time by choosing to fly over other forms of transportation. Since air travel is much faster and more expensive than other forms of transportation, it can be inferred that frequent flyers represent the most wealthy and important members of their societies.[385] Physical and social mobility are thus indelibly linked; the attraction of air travel is enhanced by the fact that, unlike inherited property, its upward mobility can be acquired no matter what one's actual social status. The air terminal environment reiterates this modern concept of time as a high-value commodity through intermittent announcements, constantly updated computer displays of flight arrivals and departures, and advertising about the time-saving benefits of air

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[383] Quoted in "Glass Mural Set for Air Terminal," *New York Times,* 28 January 1959, Business and Financial section, 62.

[384] Jean Baudrillard, *The System of Objects*. James Benedict, trans. (London: Verso, 2005. Original publication Paris: Editions Gallimard, 1968), 101.

[385] Thomas Hylland Eriksen and Runar Døving, "In Limbo: Notes on the Culture of Airports," paper presented at the Second European Association of Social Anthropologists Conference, Prague, 30 August-3 September 1992. However, now this is not necessarily so. Martha Rosler observed that today the airport represents "everybody", and it is those that use slower and cheaper methods of travel who are no longer part of mainstream culture. "Long-distance bus travel," she notes, "like poverty, is not respectable in the United States." Rosler, "In the Place of the Public," 62.

travel.[386] Ironically, although a place of transience, the primary activity at the airport is in fact waiting or downtime.

Mid-century airport interiors, such as O'Hare's hall of glass and Lambert-St. Louis's seamless "Great Room", denote something of this new space-time relationship (17b and 62a). Their shiny and frictionless glass, metal, and linoleum surfaces are like the internal workings of a machine. The smooth efficiency of the technological systems and the hygienic and institutional environment reinforced the impersonal cosmopolitanism of High Modern style.

Jacques Tati's 1967 film *Playtime* pokes fun at the functional architecture of the modern city of which the airport is such a significant constituent. Its cold rationality serves as a foil for its anti-hero, the good natured and bumbling Monsieur Hulot, and an attractive American woman who is part of a tour group. The film opens in an expansive sterile corridor bounded by cubicle partitions and strip seating. A bright light from the glass curtain wall at the corridor's end bounces off the hard, immaculate surfaces of tile, plastic, and metal. The setting is nondescript; it may be a hospital waiting room, a government building, an office lobby or the reception area of a conference center. The blank window merely indicates that the space is off the ground. Various people pass by—a pair of nuns, a worker with a cart of metal instruments, a businessman, a military officer, etc.—each identified by uniform and all with a uniform cadence to their

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[386] The selling of duty-free goods at the airport and on the aircraft further associates flight with other luxury commodities, such as cognac, French perfume, and Rolex watches. Eriksen and Døving, "In Limbo: Notes on the Culture of Airports."

stride (fig. 66a). Only when flight numbers are announced and the tailfin of an airplane circles into view does the viewer understand that the location is an airport. Tati described the plot:

> A group of foreign tourists arrive to visit Paris. On landing at Orly they find themselves more or less at the same airport they left in Munich, London, or Chicago. They get into the same bus they'd used in Rome or Hamburg and drive on a road bordered with street lamps and buildings identical to those in their own capital. They find once again the style of architecture that makes living a matter of being constantly on your guard.[387]

A leitmotif of the film is the reflection in the modern glass walls of traditional Paris tourist sites, such as the Eiffel Tower, Sacre Coeur, and the Arc de Triomphe, of which the characters are oblivious. One hilarious scene takes place in a travel agency. The walls display posters of resorts in exotic places, each destination illustrated by an identical cloudless blue sky and International Style skyscraper.

THE DEMATERIALIZED AIRPORT: TULSA

Tati's ultra-modern Paris is just as much a mirage as the vision of an unchanging historic city. As film reviewer Vincent Canby noted, the movie was "about a Paris so modern it does not yet exist;"[388] it was Le Corbusier's Ville Contemporaine come to life. The set for *Playtime* was in fact an elaborate faux

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[387] Quoted in James Harding, *Jacques Tati: Frame by Frame* (London: Secker and Warburg, 1984), 122-123.

[388] Vincent Canby, "'Playtime' a Funny Film, And Tati's Most Brilliant," *New York Times*, 28 June 1973, 1.

metropolis that Tati had constructed outside of Paris, which included two skyscrapers, one complete with a working elevator, apartment buildings, a parking lot, and an air terminal. Tati was compelled to reproduce key elements of the city because his subject, modern life, would not pause for his film production. In 1964, when he attempted to shoot the opening sequence at the airport, Tati discovered that "It was difficult to stop traffic at Orly, it was like the cashier of a drugstore or supermarket, full of activity. So we found it necessary to make this nonexistent décor. I had to invent it." [389] In reality Orly was a modern wonder: over half of the steel structure, which covered an area of twelve square miles, is encased in glass. It has been described as a gigantic display case (fig. 66b).[390] Industrial designer George Nelson described it as "the category of modern design known as 'endless,' which means that the façades do not have a beginning, middle, or end but consist of repetitive elements which could be continued to infinity without any fundamental design change."[391] Opened in 1961, in 1964 Orly received three million visitors—more than the Chateau of Versailles—making it the most popular tourist destination in France.

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[389] Author's translation. "Il était difficile d'arrêter le trafic à Orly, tout comme la recette d'un drugstore ou d'un supermarché en pleine activité. Nous avons alors été dans l'obligation de faire ce décor qui n'existait pas. Je l'ai inventé." *Playtime* press release, 1967; reprinted in "Playtime," *TV5 Télédoc dossiers*; available from http://www.cndp.fr/Tice/Teledoc/dossiers/dossier_playtime.htm; Internet; accessed 17 July 2006. "Tativille" became a tourist destination in its own right, but ironically it was demolished during the 1970s to make way for a highway.

[390] Pascoe, *Airspace*, 54; Bosma, "In Search of the Perfect Airport," 50.

[391] Nelson, "Architecture for New Itinerants," 65.

During the early 1960s there were a number of air terminals that were built as International Style vitrines across the United States, including Theodore Francis Green State Airport in Warwick, Rhode Island; Greenville-Spartanburg Airport, South Carolina; Robert Mueller Airport of Austin, Texas; Will Rogers World Airport Terminal in Oklahoma City; and Tulsa International Airport, Oklahoma (fig. 67). These terminals, located in small to mid-sized metropolitan areas, were celebrated in the postcard descriptions for their "gleaming array of lights" (Austin) that "captur[ed] the modern beauty of the new" (Green State); and where "the newest concept of runway lighting is provided" (Greenville-Spartanburg) as well as "the latest known methods and devices for expediting the movement of passengers and cargo" (Tulsa) to best "serv[e] the supersonic age" (Will Rogers). Like Orly, these airports were significant as sites as much as for the sights they offered.

Nevertheless, the only extant terminal is at Tulsa (fig. 68a). It is an outstanding survivor in terms of airport architecture—more than forty years without significant modification—because of its anticipatory design. Meant to meet Tulsa's aviation needs of 1970, the airport was designed by Robert Lawton Jones, the principal architect of the firm Murray-Jones-Murray in Tulsa. His design for the airport addressed three issues: noise, expansion, and access. To deaden the sound of jet engines—not yet in use at Tulsa—the windows were double paned and a half-inch thick and the roof was a substantially deep pad of concrete. In order for the airport to grow without stretching the terminal unduly, the structure had footings and columns that could bear additional levels. And,

although passengers then boarded aircraft by walking out onto the tarmac, Jones considered the possibility that the increasing size of aircraft might make it necessary for above ground boarding directly from the building in the future.[392]

The Tulsa terminal complex is arranged like Charles Fourier's *phalanstère*, a giant U-shaped sequence of linked boxes, the central arm punctuated by a larger and higher rectangular structure placed at a ninety-degree angle to its adjacent wings, which are connected to narrow L-shaped concourses. However, the materials, forms, and expression of Tulsa airport are clearly based on the landmark Farnsworth House, 1946-51, by Ludwig Mies van der Rohe (fig. 68b). Jones studied under Mies at the Illinois Institute of Technology and subsequently worked in the International Style; in fact the Robert Lawton Jones house of 1959 is designated as the first example of Miesian International Style architecture in the state of Oklahoma.[393]

The Farnsworth House is an interesting choice of model for an airport. It is a dwelling, typologically distant from an airport, although the Farnsworth House is far from homey. Because his client Edith Farnsworth was single, Mies felt the house did not have to function in the context of family life; he evidently viewed the commission of this small country house as an opportunity to create "pure" architecture, free from programmatic requirements, which expressed universal

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[392] "Sky's No Limit for Tulsa, Okla., Airport," *Tulsa World*, 10 February 2002.

[393] National Register of Historic Places, listing 01001355; available from http://www.cr.nps.gov/nr/listings/20011221.htm; Internet; accessed 17 August 2006.

and spiritual values.[394] A masterpiece of Platonic forms, the Farnsworth House was also impractical, inflexible, and expensive. Yet there are some unlikely correspondences between this most famous of modern houses and Tulsa airport.

One shared aspect is its horizontality. The emphatic parallel planes of the floor and roof of the Farnsworth House are matched by the central structure of the Tulsa terminal complex, albeit its inflated proportions are like the Farnsworth House on steroids. The terminal's emphatic flatness is directional in nature; one passes through rather than dwells. Mies's radical disjunction between built and natural environments also has a somewhat different effect in the airport environment. Here, the terminal forms a barrier between the greenery of the landside and the airside tarmac and planes; it acts as a space of transmutation: the individual enters earthbound and departs airborne.

Another characteristic of both structures is that of transparency. Mies created an architecture of immersion through broad glass curtain walls and slender white-painted steel columns. At the airport, providing panoramic views for spectators was an important revenue source. Many postcards document not the view but the view from within the terminal, and also those appreciating, that is, consuming the sight (fig. 69). In addition, the dematerialization of the structure underlined the activity of flight as opposed to the grounded position of the airport.

The interior of the Farnsworth House was likewise spare or "free" space, with few internal divisions. Mies wanted an ordered, neutral space that would not

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[394] Alice T. Friedman, "People Who Live in Glass Houses: Edith Farnsworth, Ludwig Mies van der Rohe, and Philip Johnson," *Women and the Making of the Modern House* (New York: Harry N. Abrams, 1998), 127-159.

impinge on the spectacle of ever-changing natural light. Pop artist Andy Warhol once described the ideal space for living as “One suitcase and one empty room. Terrific. Perfect.”[395] However far from creating an atmosphere of calm and contemplation, the space caused Edith Farnsworth to feel caged, monitored, and controlled.[396] As in the Farnsworth House, emptiness of open space strips away privacy: at the airport, the fact that there is no place to hide restrains behavior and reminds the travelers that even as they survey the airfield, they are subject to surveillance. The open interior of the air terminal, such as at Tulsa, ensures its non-specificity; it is flexible, open to adaptation, even as the rigid geometry of the fixed rows of side-by-side seats in the sidelined “reservoir” areas prevents conviviality. It instills the message that the airport is a place of passage, of movement: there is no place to stay, hang up your coat, put down your bags, or pull up a seat.

NON-PLACES AND NON-SITES

International Style international airports signaled the transition from goods to services that was taking place throughout the developed world. When

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[395] Warhol, *The Philosophy of Andy Warhol*, 143,144, quote 155.

[396] However, she noted the negative effect of the space only after her relationship with Mies had deteriorated. Edith Farnsworth to Joseph A. Barry, “Report on the American Battle Between Good and Bad Modern Houses,” *House Beautiful* 95 (May 1953), 270, quoted in Friedman, *Women,* 141.

Saturday Review ran an issue in 1967 devoted to twenty years of travel, the editors focused on a handful of influential figures: the advertising executive David Ogilvy; the head of Pan American World Airways Juan T. Trippe; the president of Boeing Aircraft Company William M. Allen; Donald W. Douglas, Sr. and Jr. of Douglas Aircraft Company; Walt Disney; and the inventor of the Polaroid camera Dr. Edwin H. Land. The editors noted that all of these things—advertising, commercial aircraft, instant photography, resorts and hotel chains—followed from the advent of low-cost air travel.[397] Already recognized was the homogenizing effect of mass travel on the built environment. George Nelson stated,

> The words for what has been happening to travel architecture since the war are 'everywhere,' 'mass,' 'sameness,' 'big,' 'modern.' . . . The universal architectural response to mass travel is mass modern. One could do an article about a quick trip around the globe and use only two photos, one showing a glass air terminal and the other a glass and concrete hotel stuffed with cells.[398]

The cityscape was itself redrawn into special tourist areas. The "tourist bubble," an artificial enclave of festival mall, theme restaurants, restored historic buildings, convention center, stadium, aquarium, and museums that defines the tourist space, has remade many formerly decaying downtowns. Political scientist Dennis R. Judd notes that "Ironically, as the tourist spaces become more and more alike from city to city, it becomes easier for cities that otherwise have no outstanding tourist attractions to remake themselves into tourism sites. This happens when the tourist space, not the historic city, becomes the principal signifier of a

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[397] "1947-1967: Twenty Years of Travel," *Saturday Review,* 22 April 1967, 59-64.

[398] Nelson, "Architecture for the New Itinerants," 30.

locality."[399] The airport is not only a means of access but also an active participant in this process. The airport is filled with souvenir shops, welcome signs, and local arts, crafts, and industry displays to constantly remind travelers of where they are, although usually in all other ways the airport, like the tourist bubble, is disconnected from its locale.

In contrast to the tourist bubble, the airport is not a fake or artificially reconstructed place. Rather, it is an example of a non-place. According to anthropologist Marc Augé, a *non-lieu* or non-place is a transitional "installation" which exists "in opposition to the sociological notion of place. . . with the idea of a culture localized in time and space."[400] Thus a non-place is one which is also "deterritorialized;" that is, it has become disconnected from culture and separated from its particular place in space and time.[401] The commonplace criticism that all airports are the same is evidence that it is a symbol of the deterritorialization of contemporary culture in general, since the same complaint is not leveled at banks, courthouses, cathedrals, or other ubiquitous public or commercial buildings that display a high degree of uniformity. Photographs taken by the *New York Times* of American forces occupying Baghdad International Airport on 5

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[399] Dennis R. Judd, "Constructing the Tourist Bubble," *The Tourist City*, eds., Dennis R. Judd and Susan S. Fainstein (New Haven and London: Yale University Press, 1999), 39.

[400] Marc Augé, *Non-Places: Introduction to an Anthropology of Supermodernity,* trans. John Howe (London and New York: Verso, 1995), 34.

[401] Gilles Delueze and Félix Guattari, "City/State," trans. Brian Massumi, *Zone 1/2* (New York: Zone Books, 1986), 195-199. Reprinted in *Rethinking Architecture,* ed., Neil Leach (London and New York: Routledge, 1997), 313-316.

April 2003 initiated the long-running thread entitled “Airport World” on the libertarian weblog Electrolite. Moderator Teresa Nielsen Hayden asserted that the photographs proved that “all airports are the same place.” A blogger followed with a faux news posting: “The soldiers blasted through the wall of the VIP terminal, stepped through the hole and found themselves in the departures lounge of Bradley International Airport in Windsor Locks, Connecticut, surrounded by confused business travelers and New Englanders.” Other commentators pointed out that in actuality the architecture of Baghdad airport does express “Arabic” qualities not found in American airports.[402] In other words, the jarring effect of the photographs of combat at the airport was due more to a widely-held *idea* of the airport—it represents the global and not the local—than the reality of a particular airport.

The process of deterritorialization is akin to what philosopher and sociologist Anthony Giddens has termed “disembedding.”[403] A defining characteristic of modernity, disembedding occurs when social relations and information exchanges are “lifted out” from their local context and reconstituted in situations that are international and a-historical. Disembedding operates through two instruments: “symbolic tokens” and “expert systems”. Symbolic tokens are “media of interchange”, such as shared language, currency, standardized time,

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[402] “Airport World,” *Electrolite*, moderator Teresa Nielsen Hayden, 5 April 2003 and following; available from http://nielsenhayden.com/electrolite/archives/002540.html; Internet; accessed 6 August 2006.

[403] Anthony Giddens, *The Consequences of Modernity* (Stanford, California: Stanford University Press, 1990), 21-36.

and power. Expert systems are depersonalized, or abstract, international networks, services, and procedures that routinize or standardize transference. Examples of symbolic tokens are the widespread use of English, the Euro, and the economic dominance of multinational corporations. Examples of expert systems are international sea and air routes, credit cards, wireless Internet connections, and even guidebooks. [404] The experience of international air travel involves a high concentration of disembedding mechanisms; indeed, many of modernism's expert systems were the result of tourism's evolution into a global industry. To illustrate the concept of non-places, Augé recounts a trip to the airport of a fictional Pierre Dupont, who stops at an automatic teller machine to withdraw cash, hops into his car and takes a highway, parks at the airport garage, checks his bags onto a conveyor belt and reserves a seat at the ticket counter, buys a paperback at the terminal's chain bookstore on the way to his gate, boards his airplane through the Jetway, finds his seat, fastens his seatbelt, and settles down by flipping through the in-flight magazine of duty-free offerings.[405] M. Dupont's journey is replete with interconnected expert systems that are, however, largely independent from local culture and place—and he has not even *left* yet. The non-place is a state of constant mobility because, as Gertrude Stein put it, "there's no there there."

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[404] Ibid., and Jens K.S. Jacobsen, "The Tourist Bubble and the Europeanisation of Holiday Travel," *Tourism and Cultural Change*, 1, no. 1 (2003): 79.

[405] Augé, *Non-Places,* 1-6.

The 1960s saw the establishment of hotel and restaurant chains, universal credit card use, and the development of tourist districts, bureaus, and agencies. The glass, cement, and steel architecture of the International Style resort, office building, apartment building, and airport were generally perceived of as positive symbols of globalization and progress. As late as 1978, Karl Nyren wrote: "There is a new kind of reality found only in airports. They relate to broad regions of the land and to people. They are not creatures of the static cities they serve but rather unique places created by the intersections of our travels through the air."[406] Even George Nelson, who early derided the sameness of modern architecture, thought that the only thing wrong with the long gleaming corridor of O'Hare was that "it isn't *enough* like a factory."[407] Thus the idea of the airport as pure architectural Fordism—a place for the efficient processing of people as well as luggage—began to predominate airport architecture.

The design of the Dallas-Fort Worth airport is an example of this new architectural ideal; it was purely functional, highly organized, infinitely replicable, and without regard for historical precedent or local context (fig. 50). Douglas Davis called the miles of concrete doughnuts as "an unending repetition of bland geometry" with "no concessions to illogic or sheer delight." He objected, "Where does this leave the imagination, the morale and the inner life of the people who must inhabit it, as well as those who pass through?"[408] Thomas M. Sullivan, the

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[406] Karl Nyren, "Airport As Mirror," *New York Times,* 30 March 1978, C5.

[407] Nelson, "Architecture for the New Itinerants," 31.

[408] Quoted in Ivins, "A Texas-Scale Airport," sec. SM, 16.

executive director of DFW dismissed Davis's criticism by declaring that the airport is a tool, not a monument.[409] Sullivan was the former head of Idlewild airport during the construction of the Terminal City; and in 1957, he had received the Port Authority's highest award for his direction of that project. The engineering and architectural firm responsible for Dallas-Fort Worth's site planning, Tippetts-Abbett-McCarthy-Stratton, had also gotten its experience at Idlewild as the designers of the remarkable Pan Am terminal. Like Sullivan, it now espoused a completely different perspective on the airport's architectural character. The terminal, TAMS claimed, is nothing more than a transition between automobile and airplane.[410] Airport architecture, then, was identified not with the excitement and extraordinary character of flight but with its increasingly bureaucratic and generic dimensions.

Yet in the planning stage, TAMS contracted the avant-garde artist Robert Smithson to consult with them on the airport's design. Although the one-year collaboration (July 1966-1967) had no tangible impact on TAMS' plan for DFW, the experience was the critical impetus to Smithson's idea of the non-site and the development of earthworks. The initial work of TAMS was to conduct intensive land surveys and air-space simulation studies. Their concept was to design an airport from the air down. It was the resulting reams of abstract materials of aerial photographs, topographical maps, and computer data that interested Smithson:

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[409] Ibid., 59.

[410] Ibid., 16.

> I was drawn to the fringes of its development, to the low level landscape that surrounded the central building. The technological intensities were transformed in my mind into something else; a metamorphosis took place. The terminal itself ceased being an end in itself, and generated a condition of timelessness. All the tiers and platforms became the potential center of a kind of busy tedium full of vaults and waiting rooms, the empty stillness of 'clear zones' near the runways began to exude the obvious public function of the terminal. Those nondescript regions at the circumference of the project led me to the earth itself. What was to be 'the biggest airport in the world' became a speck in the Texas prairie. The architecture could have been any architecture—a building in the distant past or distant future; it became what I am tempted to call the 'entropic scale' of time and space.[411]

For Smithson, the aerial view did not provide a scenario for domination as it did for Le Corbusier and other early urban planners. Instead it suggested the temporary and inconsequential nature of human activity. By making visible the non-visual and the infinite finite, the aerial view reversed the usual dialectic of both space and time.[412] The aerial art of the earthwork drew attention to these oppositional breakdowns.

Smithson's concept of the non-site was closely related. Non-sites are peripheral, unnoticeable and trackless areas, which he first identified with the airfield's clear zones. By exhibiting a non-site in a gallery through maps, earth samples, photographs, and other documentary materials, Smithson was able to perform the same kind of reversal provided by the aerial view. He explained,

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[411] Robert Smithson, letter of 31 July 1970 to Rolf-Dieter Herrmann. Reprinted in Rolf-Dieter Herrmann, "In Search of a Cosmological Dimension: Robert Smithson's Dallas-Fort Worth Airport Project," *Arts Magazine* III, no. 9 (May 1978): 111.

[412] Smithson, "Aerial Art," 1969, reprinted in *Robert Smithson: The Collected Writings,* ed. Jack Flam (Berkeley: University of California Press, 1996), 116-117.

> There's a central focus point which is the non-site; the site is the unfocused fringe where your mind loses its boundaries and a sense of the oceanic pervades, as it were. . . . The interesting thing about the site is that, unlike the non-site, it throws you out to the fringes. In other words, there's nothing to grasp onto except the cinders and there's no way of focusing on a particular place. On might even say that the place has been absconded or lost. This is a map that will take you somewhere, but when you get there you really won't know where you are. In a sense the non-site is the center of the system, and the site itself is the fringe or edge.[413]

The loss of the usual distinctions of "aerial art" and the non-site—close/far, here/there, focus/field, significance/insignificance—also represents the displacements of the airport itself. As David Pascoe notes,

> In such a space, time zones and time lags begin to assume concrete reality; the idea of 'border' loses its physicality and reveals itself to be a theoretical construction with can materialize anywhere. The airport functions as a national frontier on the outskirts of a major city in the middle of a country; that in itself should suggest the beginning of a different spatial dimension.[414]

A sketch from 1967, *Wandering Earth Mounds and Gravel Paths,* is an example of a proposal for the non-sites of Dallas-Fort Worth (fig. 70). By placing paths between runways where no one can go and arranging patterns that are apparent only aerially, Smithson could create an abstraction of the concrete while making a place out of nowhere. Although this project was unrealized, an interesting corollary is George McCue's 1974 review of Dallas-Fort Worth airport for *Art in America*. Its strong impression, he wrote, "is not from any imagistic terminal buildings, but in its character as an immense totemic imprint on the

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[413] Smithson quoted in "Discussions with Heizer, Oppenheim, Smithson," *Avalanche I* (Fall 1970): 63.

[414] Pasco, *Airspace*, 34.

reddish flatland, an earth sculpture," which, he noted, "is evident only from the air."[415]

COUNTER-SITES

Smithson's concept of the non-site was contemporaneous with Michel Foucault's articulation of the counter-site or heterotopia.[416] Foucault adapted the medical condition of heterotopia to describe places that in a society "suspend, neutralize, or invert the set of relationships designed, reflected, or mirrored by themselves." Because heterotopias are spaces of "otherness", they are non-places even though they actually exist.[417] Foucault documents two types of heterotopia: those of crisis and those of deviancy.

In the 1970s, the airport became a kind of heterotopia; its architecture converted to spaces of alternate ordering.[418] There were three primary causes for these changes: smuggling, hijacking, and high passenger volume. In 1970,

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[415] George McCue, "Airport Architecture: The Dallas-Fort Worth Solution," 77.

[416] Suzaan Boettger, *Earthworks: Art and the Landscape of the Sixties* (Berkeley: University of California Press, 2002), 45-47.

[417] Michel Foucault, "Of Other Spaces: Utopias and Heterotopias," 1967; reprinted in *Rethinking Architecture,* ed. Neil Leach (London and New York: Routledge, 1997), 352.

[418] This idea of the heterotopia as a site of alternate social ordering is developed in Kevin Hetherington, *The Badlands of Modernity* (London and New York: Routledge, 1997).

United States Attorney for New Jersey, Frederick B. Lacey, called Kennedy Airport an “open city” of crime. He claimed that airport employees were working in tandem with organized crime to steal some seven million dollars worth of cargo a year.[419] Two years later, Kennedy’s famous “fishbowl”, the Spectator’s Lounge of the Customs Hall of the IAB (fig. 53b), was walled over to prevent the exchange of signals between drug smugglers and their contacts and the targeting of wealthy travelers by thieves.[420] Of greater concern to passenger safety was aircraft hijacking, for a hijacking was almost always accompanied by violence on the ground. The hijacking of aircraft had occurred intermittently since the beginning of commercial air travel. Public opinion was often favorable to hijackings because they were nearly always by political dissidents from Communist countries escaping to the West. Later the direction began to flow the other way, principally going to Cuba, with more than two hundred hijacking attempts worldwide from 1969 to the end of 1971. An agreement with Cuba in 1973 to apprehend and prosecute hijackers reduced the problem, but political hijackings increased by other terrorists groups, namely the Palestinian Liberation Organization. American airlines, because of their predominance, were most often the victims of these attacks. Public outcry, and the airlines’ inability to effectively screen passengers without the cooperation of airport management and the assistance of federal authorities, resulted in the implementation of standard

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[419] “Lacey Call Airport Crime’s ‘Open City’,” *New York Times*, 1 October 1970, 8.

[420] “Customs Area at Airport Screened to Foil Smuggling,” *New York Times,* 26 April 1972, 3.

security measures at all American airports. These security measures basically consisted of armed personnel, mandatory screening of passengers and carry-on baggage, and the creation of “sterile” and “non-sterile” zones to isolate passengers from terrorist “contamination.”[421] The air terminal now had to block views, control movement, maintain surveillance, and limit entrances and exits to single points. Paul Virilio noted,

> The architecture that resulted from this had little to do with the architect’s personality. It emerged instead from perceived public security requirements. . . . Practically, this meant examining clothing and baggage, which explains the sudden proliferation of cameras, radars and detectors in all restricted passageways. When the French built ‘maximum security cell-blocks’, they used the magnetized doorways that airports had had for years. Paradoxically, the equipment that ensured maximal freedom in travel formed part of the core of penitentiary incarceration.[422]

The Airlines Deregulation Act of 1978 eliminated fare restrictions and opened up competition for air routes among the airlines. Lower fares and more flights on popular routes brought a dramatic increase in the number of passengers even as it destabilized the commercial aviation industry worldwide. Most airports had to deal with unprecedented congestion, while some experienced a sudden drop in use as air service dwindled on less profitable routes. Even the newly-built Dallas-Fort Worth was not designed to meet the new security requirements or the waves of connecting passengers. The architects’ conception for the terminals was as little interface as possible (fig. 71a). Consequently, formerly open space had to be partitioned (one frequent flyer described the subdivided terminal as “jam-packed cattle pens”) and choke points

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[421] Virilio, “The Over-Exposed City,” 267-268.

[422] Ibid., 268.

introduced, as it was not feasible to install security equipment and personnel at each of the sixty-eight gates.

Airport terminals were reconfigured into labyrinths of low-ceilinged corridors, Tensa barriers, and security cameras (fig. 71b). They became stressful, dreary, and oneiric, but they were also great democratizers: even movie stars and sports heroes had to obey, submit, and wait, the airlines' ineffectual attempts at emulating the class divisions of rail and ocean liner travel notwithstanding. The writer Pico Iyer observed that airports "are among the only sites in public life where immortals rub shoulders with the rest of us, and everyone is subject to the same rules (even Michael Jordan has to go through customs and even Queen Elizabeth has to deplane)." Whether one found the experience authoritarian or egalitarian, Iyer noted that the airports can also be "vertiginous places because we have nothing to hold our identities in place there; the most fundamental things are up for grabs."[423]

The airport displaces markers of identity and location: social, cultural, spatial, and chronological. The effect on the individual, as Robert Smithson noted in his confrontation with the non-site, is to feel adrift.[424] Foucault gives the experience of chronological discontinuities (heterochronism) as a defining feature of heterotopias. He states, "The heterotopia enters fully into function when men

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[423] Pico Iyer, *The Global Soul* (New York: Random House, Inc., 2000), 54, 62. However, passengers on private planes are largely exempt from security requirements and waiting in line.

[424] "A sense of the oceanic pervades." Smithson quoted in "Discussions with Heizer, Oppenheim, Smithson," *Avalanche I* (Fall 1970): 63.

find themselves in a sort of breach of their traditional time."[425] The phenomenon of jetlag, which occurs when biological time is out of synch with clock time because of the time discrepancy between departure and arrival, is one such discontinuity. After the introduction of supersonic flight, Baudrillard commented that a passenger on the Concorde could actually arrive in New York before leaving Paris. The compressed, undifferentiated, and darkened terminal spaces of the airports in the era of mass travel created a kind of visual jetlag and exacerbated its disorienting effects. Indeed, the disruption of circadian rhythms, suspension of reality-testing capabilities, and culture shock that occur at the airport can induce psychic disturbances in a large number of individuals.[426] The airport became, like Van Gogh's night café, a place where one can go mad.

[425] Foucault, "Of Other Spaces," 354.

[426] Stanley Shapiro, "A Study of Psychiatric Syndromes Manifested at an International Airport," *Comprehensive Psychiatry* 17, no. 3 (May/June 1976): 453.

THE SPACE OF FLOWS

CHAPTER FIVE

> Mass transportation has introduced radically new spaces to the world—not just the coach or the cabin of the vehicle, but that less definable place in between, the space of the rapidly passing view, of suspension and uncertainty.
>
> — Michael Sorkin[427]

The hub-and-spoke networks established in the 1970s resulted in an architectural shift from the lobby to the concourse. The airport was no longer a place of arrival or departure but of passage. Sociologist Mark Gottdiener proposes in his book, *Life in the Air: Surviving the New Culture of Air Travel*, that out of this space a new type of society is developing, one that is not based on place but on condition. He states:

> Complex, multidemensional contemporary life is increasingly knit together by plane trips. . . . Air space is a space of flows inhabited temporarily by single individuals but on an aggregate scale by a mass of humanity. . . . Airports like O'Hare and Dallas/Fort Worth, the first and second busiest airfields in the world, act as other human vortex points.[428]

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[427] Michael Sorkin, "The Architecture of Air Travel," *New York Times,* 14 April 2002, 6.

[428] Mark Gottdiener, *Life in the Air: Surviving the New Culture of Air Travel* (Lanham, MD: Rowman & Littlefield Publishers, Inc., 2001), 2.

The journalist Pico Iyer concurs, stating that there exist today a growing number of people who are not defined by land, race or nation. Instead these "Global Souls" inhabit international air space or "its metaphorical equivalent," use air miles for currency, and speak a language of three-letter codes; their memories take place in airports that appear "more and more like transnational cities."[429] While frequent flyer Sean Denny admits "You could live in an airport" because of all of the consumer goods and services available, he counters the idea that an airport is any kind of community: "You're not there to meet people. You're there to get on a plane;" or that airport amenities make it a destination. He notes that shopping or viewing art while at the airport is simply "something to kill time, but it's never a reason why you're there." Echoing Warhol's sentiments, Denny emphasizes that the best thing about airports, particularly "good" ones, is their sameness: "It's like the invasion of the Gap and Starbucks in neighborhoods that once had a lot of character and no longer do. [Airports] are not designed to be different."[430] Airports, in other words, are not like cities. It is cities that have become more like airports.

At the airport, Iyer observes, "everyone's a stranger, so it seems, on his way to somewhere else," but at the same time its "look-alike settings are the scenes for the most emotional moments in our public lives."[431] The airport

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[429] Ibid., 19.

[430] Sean Denny quoted by Geoffrey Gibson, "Citizen Airport: An Interview," *On Site Review* 5 (2001): 8-9.

[431] Iyer, *The Global Soul*, 44-45.

provides the heretofore distinctly urban extremes of social isolation and alienation from one's surroundings with celebrity sightings and intimate dramas played out in public. A study conducted on patients given emergency psychiatric care while at Kennedy airport found that most (82%) were not in transit but that the airport itself was their destination. From patient interviews the study concluded that the airport symbolized not flight but a place where "time and space could somehow be bridged and the safety, security, and reassurance of reattachment to loved ones might be established."[432] Standardization makes airports all the same place, and flights are calculated in terms of hours, not miles. As Guy Debord has observed: "The same modernization that has deprived travel of its temporal aspect has likewise deprived it of the reality of space."[433] The psychogeography of the airport is due to the dissolution of the fixed space of place and its replacement with transitional spaces of circulation and exchange.

Manuel Castells, in *The Rise of the Network Society*, argues that this continuous movement (of people, capital, information, technology, images, sounds, symbols, etc.) permeates postmodern society and structures all of its material forms into a space of flows. According to Castells, a key characteristic of the space of flows is its architectural uniformity. He writes,

> Thus, the space of flows includes the symbolic connection of homogeneous architecture in the places that constitute the nodes of each network across the world, so that architecture escapes from the history and culture of each society and becomes captured into the new imaginary,

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[432] Shapiro, "A Study of Psychiatric Syndromes Manifested at an International Airport," 455.

[433] Guy Debord, *The Society of the Spectacle,* trans. Donald Nicholson-Smith (New York: 1994; original publication Paris: Buchet-Chastel, 1967), 120.

> wonderland world of unlimited possibilities that underlies the logic transmitted by multimedia: the culture of electronic surfing, as if we could reinvent all forms in any place, on the sole condition of leaping into the cultural indefinition of the flows of power.[434]

THE POSTMODERN AIRPORT: TAMPA AND ORLANDO

The architectural organization of airports of the 1970s, with their emphasis on seamless transfer, exemplified this new spatial paradigm. Richard Neutra's model of the Rush City Air Transfer, proposed in 1930, saw its first manifestation more than forty years later in the Dallas-Fort Worth Metroplex.[435] Its "drive-to-gate" concept combined both linear and garden city plans in a radically dispersed series of identical terminals. Another model is the concentrated transportation nexus of Tampa International Airport. Despite DFW's greater critical attention, it would be the design of Tampa airport, the construction of which was initiated in the same year as DFW but completed earlier in 1971, that was to have greater influence and become more widely adapted by subsequent airports.

Tampa Bay has a history favorable to aviation; it prides itself as the birthplace of commercial flight: in 1914, a short-lived operation called the St. Petersburg Tampa Airboat Line ran between the two coastal cities. The municipal airport of Drew Field was constructed in 1928 and the new Tampa International

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[434] Manuel Castells, *The Rise of the Network Society,* vol. I (Oxford: Blackwell Publishers, 1996), 411-412, 417-418.

[435] Neutra, "Terminals?—Transfer!" 99-104.

Airport was to replace a 1952 terminal on this same site. After more than a dozen years of stop-gap airport expansion of the old terminal, and the contemporaneous development of the nearby Walt Disney World Resort (it opened six months after Tampa's new airport), the local aviation authority hired the consulting firm of Leigh Fisher Associates to submit proposals of airport plans for community evaluation. The plan divided the landside functions of parking, ticketing, baggage, and concessions from airside operations of security and emplaning and deplaning into separate structures: a central landside terminal surrounded by four airside terminals (fig. 72).

This design was innovative not so much for its rationalization of the process of arriving and departing but because it conceptualized it into a continuous flow. In this plan, which was further refined and implemented by the design firm of Reynolds, Smith and Hills, airport access roads led directly into the top level of the six-story landside terminal (fig. 72b). The three floors of parking were integral to the structure; passengers transferred to the lower decks that contained baggage check, ticketing, and concessions by means of elevators and escalators. Visible on the exterior as well as throughout the interior is a simple color-coding system (blue for south and red for north), which assists travelers in using the most direct route to their airside terminal. The airside terminals were initially planned to be uniform structures, but in the end each airline dictated the design of its terminal. Passengers are conveyed between the landside terminal and the airside terminal by Automated People Movers, computer-operated electric shuttle cars, each with its own dedicated track (fig. 73a).

The design of the airport is highly functional but it was equally concerned with passenger comfort. There is wall-to-wall carpeting and ambient lighting to soften aural and visual noise. Large windows and Tampa-themed works by area artists provide waiting passengers with something to look at. The standard Tandem Sling seating was modified so that a more relaxed, legless hovering chair is tethered to either side of a small table (fig. 73b). Furthermore, the seating was arranged in conversational groupings in central areas. A shopping arcade connects the transfer level of the landside terminal to an adjacent Marriott Marquis hotel with a revolving restaurant and cocktail lounge. The airport stores, such as Jon's Surf Shop, offer local flavor as well as the usual travel items.

The automated people mover or APM was the feature that garnered the most attention. Its speed, efficiency, and economy were uniformly praised as functional modernism at its best. Tampa is a tourist destination, it receives mainly two types of visitors: families with young children en route to Disney World and sun-seeking retirees (international service began with the first of Trans Canada Airlines' "snowbird" flights in 1950). Thus the fact that the airport's design minimized human locomotion and substituted it with the orderly and mechanized movement of vertical and horizontal elevators (as the shuttles were likened to) was well regarded as a consideration to its passengers.[436]

Since its inauguration in 1971, Tampa International has consistently maintained a top ranking in air passenger surveys. It is the only airport to have its

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[436] Warren H. Goodman, "Tampa Airport—It Works," *Airport Forum* 5, no. 3 (1975): 17.

own fan website: “Juan’s Tampa International Airport: ‘America’s Favorite Airport’ Fan-Page,” which opens with the statement that Tampa’s airport “is known around the world for its magnificent Landside/Airside Terminal. Since its debut in 1971 air travelers and the media have praised this beautiful jetport.” [437] While it is true that newspapers and magazines such as *Condé Nast Traveller* have written about Tampa airport, the architectural press has ignored it.

The silence over Tampa’s airport is somewhat unusual: it was the first major airport completed in the United States in nearly a decade, its design was unprecedented, and the development of its contemporary, the Dallas Fort-Worth Airport, was written about extensively. There are likely three reasons for this oversight: the design process was unusual in that it was done by committee and without the input of an architect, the terminals’ lack of traditional architectural qualities such as a façade or aesthetic detailing, and the bourgeois character of its interiors, which are neither high style nor institutional. These same qualities also adhere to the characteristics of Postmodernism that Frederic Jameson laid out in his famous 1984 essay, “Postmodernism, or the Cultural Logic of Late Capitalism.”[438]

The first factor is Tampa airport’s aesthetic populism. The novelty of the revolving restaurant, the views from the terminal windows, the shopping and

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[437] “Juan’s Tampa International Airport: ‘America’s Favorite Airport’ Fan-Page;” available at http://www.geocities.com/anastasia757/; Internet; accessed 2 June 2006.

[438] Frederic Jameson, “Postmodernism, or the Cultural Logic of Late Capitalism,” *New Left Review* 146 (July-August 1984): 53-92.

tourist art, and the entertainment aspect of the forty-second-long APM ride, create an environment that draws attention away from where one is to what one sees.

Second, the architecture is dematerialized. The buildings do not appear solid but as interlacing thoroughfares connecting highway to contrail. Michael Sorkin poetically describes the runway as globalization's gateway, contradictorily symbolic of both freedom and constraint: "Like an automatic teller machine, the runway is the point at which a vast, controlling, and invisible skein is made manifest. As each jumbo sets down, tarring its tread-trace in a puff of burnt rubber, the runway becomes the rune-way, marker of that inescapable web."[439] Tampa International's overwhelming emphasis on movement corresponds to this much larger unseen network of transactions, "the impossible totality of the contemporary world system" or hyperspace, as Jameson terms it, that now forms our socio-economic space.[440]

Several other airports of the 1970s emulated Tampa's design and people-pleasing features. Two examples are the Richardson Associates' additions that enveloped the historical 1949 terminal of Seattle-Tacoma Airport, begun in 1968 and completed in 1973, and Orlando International Airport's north terminal complex by KBJ Architects, 1978-81. At Orlando, the city sought to regain the air traffic it was losing to Tampa's larger and better-equipped jetport after the opening of Disney World in 1971.

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[439] Sorkin, "See You in Disneyland," 220.

[440] Jameson, "Postmodernism," 80.

In 1974 Orlando expanded and renovated the former McCoy Air Force Base into the Orlando International Airport, and city officials initially adopted a plan to construct two semi-circular drive-to terminals like those at Dallas-Fort Worth. Deregulation in 1978 caused the number of flights and air travelers to Orlando to increase exponentially; it soon became the busiest airport in the state of Florida. Like Tampa, Orlando was a destination airport, not a hub, requiring acres of land for rental car parking and bus company facilities. As the primary transportation link to the squeaky-clean utopia of Disney World, there was also pressure to raise the standards of the airport's amenities, appearance, and services. In the end, the newly-formed Greater Orlando Airport Authority (GOAA) opted for the simplicity of the Tampa airport model of a single centralized landside terminal with separate airside buildings connected by Westinghouse Automatic People Movers.

Design improvements to the electric shuttle car system allowed for curved and gradient tracks not possible at Tampa. The longer, bowed trackways permitted changes in level that reduced the vertical movement of people within the landside terminal while the ride was extended to more distant airside "pods". The visual emphasis thus shifted from the landside terminal, which resembled a colossal adapter plug, to the journey (fig. 74a). The architects described the concept as "an expandable airport set in a garden, with majestic lakes, extensive natural lawns and groves of tropical plantings."[441] In 1992, GOAA again

[441] KBJ Architects, "Orlando International Airport, North Terminal Complex, Orlando, Florida," *KBJ Architects, Inc.*; available from http://www.kbj.com/

contracted KBJ to expand the airport. Two more airside pods were built and the landside terminal was lengthened to increase the facilities for ticketing, baggage, and people mover stations. Atop the terminal was added a ziggurat-shaped Hyatt Regency Hotel. Instead of the now passé revolving restaurant, the hotel features an eight-story atrium that contains a simulated city park with benches, full-grown trees, and a fountain. The GOAA trumpets that the airport's panoply of Floridian landscapes offer travelers "a unique visual experience" that makes Orlando airport "practically an attraction in itself!"[442] In providing a "preview" of a theme park, the airport is an apt illustration of the simulacrum: a copy for which no original has ever existed. Michael Sorkin describes Disneyland itself as a place where "one is constantly poised in the condition of becoming, always someplace that is 'like' someplace else;" he concludes that this displacement makes it "the utopia of transience, a place where everyone is just passing through."[443] Orlando airport's simulation of the tourist sites that people are flying to Florida to see has been a successful strategy. It has often competed with Tampa for the title of "best-liked airport", and Orlando has won it in recent years as Tampa airport has become architecturally dated.

Architecture/aviation/oia_north_terminal.htm; Internet; accessed 25 September 2006.

[442] Greater Orlando Aviation Authority, "Orlando International Airport," *Orlando Airports;* available from http://www.myflorida.com/goaa; Internet; accessed 25 September 2006.

[443] Sorkin, "See You in Disneyland," 216, 231.

HUBS: SEATTLE, ATLANTA, AND O'HARE

As in the case of Orlando, it was a spectacle that put Seattle on the map. The city achieved world-class status when it hosted "Century 21", the 1962 World's Fair. Seattle's iconic Space Needle was built for the fair; it boasted one of the first revolving restaurants, which was designed by the local architect John Graham, Jr., who also was an originator of the shopping mall.[444] In addition to the Space Needle, an elevated monorail operated from the fairgrounds to the downtown. The monorail and the Space Needle were the fair's most successful features, symbolizing an optimistic future based on technological progress.

With the World's Fair and the contemporaneous inauguration of service to Honolulu, Seattle's airport traffic grew dramatically. But it was Scandinavian Airways' introduction of its "over the pole" route from Sea-Tac to Copenhagen in 1966 that caused the Port Authority to consider capitalizing on Seattle's position as the only American airport midway between Europe and Asia.[445] Thus it embarked upon its ambitious airport expansion in preparation for the latest advancements in commercial aviation: the 747 and the SST. The gamble on these two aircraft, however, caused the collapse of the regional economy. The

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[444] Tom Vanderbilt, "Talking About a Revolution," *Metropolis* (August/September 1998).

[445] HistoryLink.org, "Seattle-Tacoma International Airport, Part 2: From Props to Jets (1950-1970)," HistoryLink.org Essay 4232; available from http://www.historylink.org/essays/output.cfm?file_id=4232; Internet; accessed 24 September 2006.

Boeing company, whose research center and aircraft factories are located in the Seattle area, had invested its net worth on the success of the 747, which made its maiden voyage on 9 February 1969. Due to the numerous airplane hijackings, high fares, and national recession set off by the Vietnam War, the expected orders for the new Jumbo Jet failed to materialize. The government's cancellation in early 1971 of the supersonic transport project it had funded since 1966 exacerbated Boeing's dire situation. During the Boeing Bust of 1971-73, the company laid off more than sixty thousand employees and went a billion dollars into debt. As a black joke, a sign was posted on the airport access road that read, "Will the last person leaving Seattle turn out the lights."[446] The spell of the technological imperative was broken.

The Seattle Port Authority nevertheless managed to proceed with its airport expansion. The architect's additions to Sea-Tac encased the old terminal by extending its wings and concealing its landside façade with a large garage-terminal, the operations of which were organized identically to Tampa's landside building (fig. 74b). Satellite terminals were added at either end, and travelers accessed them using a Westinghouse Automated People Mover system. The spiraling ramps of the garage-terminal give the otherwise strongly horizontal design a dynamic element. The postcard illustration indicates the travelers' similarly arcing trajectory from elevated highway to Jumbo Jet; on the reverse,

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[446] HistoryLink.org, "Seattle-Tacoma International Airport, Part 3: Boeing Bust to Deregulation (1970s)," HistoryLink.org Essay 4233; available from http://www.historylink.org/essays/output.cfm?file_id=4233; Internet; accessed 24 September 2006.

the text states, “Seattle-Tacoma International Airport, one of the world’s most modern airports. . . The Terminal provides a complete and unique shopping area for visitors and tourists alike.”

Unlike Tampa and Orlando airports, Sea-Tac was primarily a hub, a stop-over to someplace else. Airlines develop hubs or “wayports” to cut costs, increase flight offerings, and create regional market dominance through visible presence at an airport.[447] At a hub airport, most travelers never leave the terminal. Plans to extend Seattle’s monorail service to the airport, for example, were never realized, due in part to a lack of demand.[448] Thus a hub airport is where the sense of dislocation is most intense, for it is neither the place of origin nor of arrival: you go *through* a place rather than to it. Author and frequent flyer Douglas Coupland describes hubs as “where we experience the horrific torpor of Extreme Progress, where Modernism is fully integrated into a universe of Smarte Kartes, nubbly maroon fabric chairs, non-specific accents squawking across grand halls that flights with numbers four digits long are currently boarding.”[449]

As the Sea-Tac postcard indicates, shopping is one of the primary activities at the hub airport. “Dwell time” is a term that migrated from the military,

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[447] John H. Huston and Richard V. Butler, “The Location of Airline Hubs,” *Southern Economic Journal*, 57, no. 4 (April 1991): 975-981.

[448] Although the monorail remained a popular presence in Seattle until just recently, it was never widely adopted by other cities as predicted. One problem, according to Kim Pedersen, president of the Monorail Society, is that the monorail was perceived as a tourist attraction: “It just got typecast as a ride, not as a serious transit option.” Quoted in William Yardley, “In Seattle, a Dream From the Past Has a Hazy Future,” *New York Times*, 25 September 2006, A16.

[449] Douglas Coupland, “Hubs,” 1995, reprinted in *Airport*, 73.

where it is used to describe the tracking capability of sensors, to Internet advertising, where it describes how much time a viewer lingers at a website. In travel parlance, dwell time is the time spent in the airport. With the development of the hub, airport managers quickly realized that there was money to be made from a captive audience. Typically placed after the security checkpoint, airport malls cater specifically to connecting passengers. In 1974, at the beginning of this trend, the psychologist Robert Sommer wrote an irate article to the *New York Times* in which he suggested that the "antiseptic and sociofugal" appearance of airport terminals was deliberate, since dispiriting and uncomfortable waiting areas drove travelers to go shopping. "The income of these commercial interests is reflected in the design of the terminal" he claimed; and "Any effort to humanize or provide comfort in the waiting area is a threat to the restaurant, cocktail lounge, news store and gift shop."[450] The inclusion at the airport of what formerly had been the separate modernist tourist institutions of the conference center, international hotel, museum, theme restaurant, shopping mall, and the like, was evidence not only of a Postmodern populism of distraction and entertainment, but also of mass culture's tendency towards homogenization and the effacement of differences: it *is* a small world after all.[451]

The Hartsfield-Jackson Atlanta International Airport, today the world's busiest, is a hub airport *par excellence*, with more than seventy percent of

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[450] Robert Sommer, "Our Airports are Sociofugal, Not Sociopetal, and it's an Outrage!" *New York Times,* 3 March 1974, TR533.

[451] A.S. Travis, "Museums, Theme-parks and Developments in Tourism," *Loisir et Société* 10, no. 1 (1987): 13-21.

arrivals transferring. Its 1961 terminal was the largest passenger building in the world, capable of handling six million passengers a year (fig. 63b). However, that first year it received well over nine million people—more than twice the population of Georgia.[452] The airport is the city's largest public employer and Delta the largest private employer. Atlanta is the fastest-growing metropolitan area in the United States. During the stagflation of the early 1970s, it was estimated that more than half of Atlanta's new jobs were directly due to the convenience of the airport's many flight connections as well as its location close to downtown and at the convergence of three interstate highways. Roy Cooper, head of the Chamber of Commerce, stated unequivocally: "There is no question that the movement of goods and people is Atlanta's life-blood."[453] Under mounting pressure from area businesses and airlines—Atlanta was the main East Coast hub for Delta and Eastern—the city commenced developing a master plan with specialists in the areas of urban, regional, and transportation planning.

As at Orlando, the choice came down to a decentralized plan of multiple terminals at a new location or the on-site construction of a "superterminal"; and like Orlando, the airlines and city initially favored the former design. The building of a second airport was eventually dropped because a suitable site with development costs agreeable to both the city and airlines could not be found. The architectural team of Robert and Company, the builders of the 1961 terminal,

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[452] Braden and Hagen, *A Dream Takes Flight,* 137.

[453] Wendell Rawls, Jr., "Atlanta Pins Wings on Its $500 Million Airport Terminals," *New York Times*, 19 September 1980, 3.

and the firm of Howard Needles Tammen & Bergendoff (HNTB), the designers of the Kansas City jetport, consequently devised a midfield plan of sixteen mini-terminals based on the Dallas-Fort Worth model that was approved in 1968.[454]

A long period of wrangling over funding for the new airport ensued between the airlines and the city. By 1975, when this issue was resolved, Tampa International Airport had been operating successfully for several years. Its design offered a less land-intensive solution than the sprawling Dallas-Fort Worth model, which was experiencing significant problems with its above-ground shuttle car system. The separation of landside/airside facilities was adopted at Atlanta, along with the Westinghouse APM. The architects placed the people mover system underground to free up space and protect tracks from freezing weather. This modification allowed for the inclusion of a "transportation mall" of shops, services, and restaurants, as well as moving sidewalks in the passageway. Atlanta airport's APM system is the largest in the world and it carries more passengers per year than the city's subway.

In recognition that the airport is primarily a transfer point, airside buildings were designed not as pods but as three parallel linear concourses (a fourth concourse was added in 1984) (fig. 75). For passenger convenience, the airlines wanted the landside terminal to have all of its functions on a single level, requiring an enormous structure. The chief design architect of the mid-field complex, Tom Ramsey of Stevens & Wilkinson, recalled that, "While we wanted to respect the terminal's horizontality, we also wanted it to be visible. Otherwise

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[454] Braden and Hagen, *A Dream Takes Flight*, 157.

the eye would just skip over it the way one ignores factory buildings."[455] The solution was a duplex structure joined by a single security center.

While functional, the building is not inspirational. When the rebuilt airport finally opened in 1980, the *New York Times* reporter Wendell Rawls commented, "the new terminal complex will be more notable for its function, form and flow than for its color and beauty. For the most part it has a sterile quality."[456] Architectural critic Paul Goldberger concurred when he complained, "There is almost no color in the terminal or concourses . . . It is hard to get over the sense that one is caught in a huge machine, something like a great Xerox machine."[457] In 1990, after spending so much time flying, the internationally renowned artist Martha Rosler decided to document the experience of air travel. Rosler described her project in these terms:

> In a time in which production in advanced industrial societies is characterized by metaphors of transmission and flow, I am interested in the movement of bodies through darkened corridors and across great distances but also in the effacement of the experience of such travel by constructs designed to empty the actual experience of its content and make it the carrier of another sort of experience entirely. This totalized representation of air travel and its associated spaces as a 'world apart' differs wholly from that of any other form of mass transport.[458]

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[455] Ibid., 187.

[456] Wendell Rawls, Jr., "Atlanta Opening New Terminal," *New York Times*, 14 September 1980, 14.

[457] Paul Goldberger, "New Atlanta Terminal is Orderly, but Will It Fly," *New York Times*, 24 September 1980, 8.

[458] Rosler, "In the Place of the Public," 62.

The resulting photographs of airports depict nondescript environments, such as at Atlanta's airport, of dreary tunnels, bland repetitive concourses, and forlorn stanchions.

In Atlanta's case, however, the airport is not a world apart, but a world in microcosm. The Atlanta airport is like the *Bonaventura* hotel that Jameson described as aspiring "to being a total space, a complete world, a kind of miniature city;" yet he noted, "it does not wish to be a part of the city, but rather its equivalent and its replacement or substitute."[459] The airport's bigness, busyness, and commercialism do signify Atlanta in a meaningful way. There is a saying in the South that while you may not know where you are going when you die, to get there you will have to go through Atlanta. When the ad agency of TBWA developed its "Absolut Cities" series as part of its Absolut Vodka campaign, it chose an aerial photograph of the airport to represent Atlanta (fig. 75). The Absolut advertising campaign has created a strong product identity not only by its longevity—it has been running for more than twenty years—but also by its creativity within a limited format: the image always refers to the vodka bottle.[460] Of all the ads, the Absolut Cities series has been the most popular, giving a twist to Guy Debord's well-known dictum, "the image has become the final form of commodity reification."[461]

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[459] Debord, *The Society of the Spectacle,* 24.

[460] Lisa Hickey, *Design Secrets: Advertising* (Gloucester, Mass.: Rockport Publishers, 2002), 11-15.

[461] Quoted in Jameson, "Postmodernism," 66.

Atlanta only recently surpassed O'Hare International Airport for the title of the nation's busiest airport and largest hub. O'Hare, dating back to the late 1950s, had long walking distances and few amenities: one luxury restaurant on the second level in the circular (but non-revolving) building linking the two linear terminals (fig. 17). According to writer Douglas Coupland, O'Hare was the "purgatory" of hubs, "transit distilled—like crack—pure neutrality made concrete."[462] It was especially criticized, as one critic put it, for its "naked" look—no plants, no textures, no color—the now rejected look of the International Style.[463] Around the airport the surreal "O'Hare City" sprang up composed of hotels, rental agencies of various sorts, and strip malls. The twenty O'Hare City hotels, however, had a seventy-two percent occupancy rate, which was higher than that of downtown hotels. At the airport restaurant, the manager observed,

> The thing about running these places is getting used to a different type of life. We're exceptionally busy when your average restaurant is very quiet. Saturday evenings are always the busiest part of the week for your average restaurant. It's like a funeral parlor for us. You also have to get used to an airline calling over to say that a flight has been delayed and they've issued food vouchers to 400 hungry people. That happens every day at O'Hare.[464]

O'Hare was indeed a world apart, a full dose of what Giddens' describes as "time-space distanciation."[465] On the O'Hare Hilton televisions, for example, there

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[462] Coupland, "Hubs," 73.

[463] N.R. Kleinfield, "O'Hare Airport: Bustling Hub," *New York Times,* 19 August 1980, D1.

[464] Bill Quirk quoted in Kleinfield, "O'Hare Airport: Bustling Hub," D16.

[465] Giddens, *Consequences of Modernity,* 16-17.

were dedicated channels that broadcast the United and American Airlines flights taking off right outside. The increasingly networked air system meant that travelers had more choice in routing their connections. Thus, as Atlanta was opening its new airport to much acclaim (at least for size and efficiency), O'Hare initiated its own makeover. The design by the well-known architect Helmut Jahn for United Airlines' Terminal 1 at O'Hare revolutionized airport building. It was the first expression of "romantic high-tech" —the architect's term—and it revived interest in the airport as architecture.

Jahn spurned the categories of Late Modernism, which he claimed was dull Corporate Modernism, and Postmodernism, which he viewed as lacking in cultural consensus. His practice sought what he called a "New Synthesis" style of aesthetic or cultural functionalism.[466] He announced, "Our work is based on the belief that the modern movement is not dead, and its principles can be extended and continued. We look to the immediate past—which has now become a tradition—and also to the remote past for inspiration."[467]

His inspiration for O'Hare's Terminal 1 was the great cast iron and glass interiors of the nineteenth-century train station. Whereas Yamasaki's source for the St. Louis airport was the cavernous lobby or "great room" of New York's Grand Central Station, Jahn's was the train shed itself (fig. 76). Terminal 1 consists of two parallel steel and glass double-height barrel-vaulted concourses

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[466] Quoted in Mark Michael Leonhart, "Helmut Jahn: The Building of a Legend," *New Art Examiner* (November 1987): 28.

[467] Helmut Jahn quoted in Andreas Joedicke, *Helmut Jahn: Design of a New Architecture* (New York: Nichols Publishing Company, 1986), 10.

linked by an underground passage with a moving walkway. At ground level, there is sufficient space between the concourses for two Jumbo Jets to taxi simultaneously. The concourses are each the length of three city blocks, making them as long as the Sears Tower is tall. The exposed white-painted steel skeleton of the concourses and the acid-etched glass windows (to eliminate glare) furnishes the concourse interiors with a diffuse light and a weightless quality. The extensive use of skylights is also a return to the shopping arcades of the previous century. Skylights do not provide the dematerialization of the International Style glass box terminals of the early 1960s. Yet the reach of natural light into public spaces acknowledges the recent attention given in airport design publications to the important physiological and psychological effects of daylight on the jetlagged traveler.[468]

Terminal 1 was not only a nostalgic reference to a bygone era of travel, it also gave a taste of the future through its advanced technology. It was the first airport to be fully automated, incorporating mechanical baggage handling, an electronic ticketing system, and moving sidewalks and Automatic People Movers. United Airlines called the complex the "Terminal for Tomorrow" as if it was a Disneyland exhibit.[469]

The terminal's *pièce de résistance* is Michael Hayden's kaleidoscopic sculpture, *Sky's the Limit* (fig. 77). This work runs the length of the ceiling of the

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[468] Dieter Wegler, "Glass Airports," *Airport Forum* (April 1978): 13-24.

[469] Paul Goldberger, "An Air Terminal Inspired by the Train Station," *New York Times,* 23 August 1987, A16.

underground corridor that connects the two concourses. Totaling nearly eight hundred feet and consisting of 466 colored neon tubes, *Sky's the Limit* is the largest light sculpture in the world. Prismatic colors pulsate along the three sections of the work in synchronization to original synthesized music by the composer William Kraft. Although the piece appears to respond to the movement of passengers through the tunnel, in fact it is a computer program that generates its random and non-repeating patterns. *New York Times* architecture critic Paul Goldberger admiringly described it "an almost Disneyesque experience in sensory inventiveness."[470]

The Hayden sound and light tunnel and the immense telescoping spaces of the concourses were intended to evoke wonder and exhilaration. Yet to Rosler the kinetic passage is a bizarre "fairyland" and the concourses authoritarian, "a mausoleumlike reminder of individual insignificance."[471] Her particular criticism is that Jahn is attempting to simulate a type of spatial experience that no longer exists: that of public space. She observes, "The airport is not organized as a signifying space that creates a public—unless we accept their message equally to be docility, homogeneity, replaceability, and transitoriness. This is a 'public' constituted only as a regulated flow."[472]

Rosler's resistance to the dynamism of Terminal 1 and intimations of it as a sinister form of social control can be related to Jameson's general dislike of

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[470] Ibid.

[471] Rosler, "In the Place of the Public," 70.

[472] Ibid.

Postmodern space (for despite Jahn's rejection of this label, his architecture is surely Postmodern). Jameson attributed his aversion to the fact that "we do not yet possess the perceptual equipment to match this new hyperspace, as I will call it, in part because our perceptual habits were formed in that older kind of space I have called the space of high modernism."[473] Like Alex Haley's irate air traveler in his 1968 novel *Airport*, Rosler and Jameson seem to be saying, 'You've the effrontery to tell me I must go to Kansas City to get to New Orleans. You people are rewriting geography! You're mad with power!'[474]

THE RETERRITORIALIZED AIRPORT

Ian Buchanan, in an essay entitled, "Space in the Age of Non-Place," dismisses this complaint as the equivalent of "flies complaining that the fly-paper doesn't have the same hold it used to." He writes, "Frictionless space designed to accelerate throughout will obviously not have the same effect as a more consciously arresting space, but that doesn't warrant the conclusion that it is either affectless or ineffable."[475] According to Giddens, the abstract systems of modernity at the heart of the space of flows cause the individual to oscillate

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[473] Jameson, "Postmodernism," 80.

[474] Arthur Hailey, *Airport* (New York, Berkley Books, 1968), 22.

[475] Ian Buchanan, "Space in the Age of Non-Place," *Deleuze and Space,* eds. Ian Buchanan and Gregg Lambert (Toronto: University of Toronto Press, 2005), 21, 22.

between four “dilemmas”: the forces of unification and fragmentation, powerlessness and appropriation, authority and uncertainty, and the personalized and the commodified experience. However, the effects of this unstable situation, which he calls the “juggernaut” of modernity, are not inherently negative. Rather in response to these ongoing tensions a reflexive self develops.[476] Another reading of the Postmodern space is to interpret its references and associations not only as pastiches or visual smorgasbords but also as an effort to mediate the space of flows through reterritorialization. “Reterritorialization” is Gilles Deleuze’s term for the process by which “home value” is ascribed to something that then makes it a “token” for home; that is, a habitable place.[477]

The trends in terminal design illustrate this process. As SOM’s Marilyn Taylor remarked, “Airports are competing for international and long-distance trips. They want to be remembered.”[478] Some airports, such as Burbank (now Bob Hope Airport), returned to a regional style. Most pre-war airports built in a historicist or vernacular style were modernized in the 1950s. The Spanish Mission detailing of Burbank’s 1930 terminal was effaced in renovations of the mid-1950s in an effort to modernize the airport, although structurally the building remained the same. Recently the airport initiated a plan to replace this outmoded

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[476] Anthony Giddens, *Modernity and Self-Identity: Self and Society in the Late Modern Age* (Cambridge: Polity Press, 1991), 187-217.

[477] Buchanan, “Space in the Age of Non-Place,” 30-31.

[478] Quoted in “Planes, Trains, and Automobiles,” *Architecture* 82 (August 1993): 44.

terminal with a new one which, according to the airport's website, "evokes the architecture of the California Missions, reminiscent of the original 1930 terminal building."[479] The reinstatement a sense of (historical) place at the airport is part of a larger trend by cities to "re-image" their territorial identities and is matched by a reinvention of local traditions in the form of cuisine, pastimes, music, and so forth.[480] Often this is done in recognition that a city's economic success in a globalized consumer society depends upon conveying its unique characteristics as a marketplace.[481]

When Sea-Tac was redeveloped in the 1990s and again from 2000 to 2005, for example, the firm of Fentress Bradburn Architects designed a "Pacific Marketplace" described by the Port Authority as a "city streetscape, a scene of the Northwest community complete with shops, restaurants, landscaping, a view of the airfield, and public art," which is intended to showcase the region for travelers who will not get the opportunity to experience the real thing.[482] Indeed,

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[479] Burbank Glendale Pasadena Airport, "The New Terminal;" available at http://www.bur.com/next/newterminal-main.htm; Internet; accessed 2 September 2001. In 2002, however, the new terminal plan was scrapped due to community opposition of airport expansion.

[480] Jacobsen, "The Tourist Bubble and the Europeanisation of Holiday Travel," 81.

[481] M. Mark Amen and M. Martin Bosman, "Place-Imagining Tampa in the Age of Globalization," *Relocating Global Cities, from the Center to the Margins,* eds. M. Mark Amen, Kevin Archer, and M. Martin Bosman (New York: Rowman & Littllefield, Publishers, 2006), 117-137.

[482] Port of Seattle, "Sea-Tac Airport: Central Terminal;" available at http://www.portseattle.org/seatac/art/centralterminal.shtml; Internet; accessed 24 September 2006; and Daryl Strickland, "Sea-Tac Concourses Reflect Regional Image," *Seattle Times*, 24 February 1993.

Curtis Fentress borrowed from Seattle's commercial neighborhoods of Pike Place and Pioneer Square for his reconstituted a version of a local market at the airport.[483] Sea-Tac's new additions are not in a historicist style, however; they are an example of romantic high-tech. Rick Zieve of the firm NBBJ, the architect in charge of the expansion and renovations at Sea-Tac, used abstract features to suggest the natural environment, such as a bronze perforated ceiling to suggest the dappled golden light of a forest canopy and water fountains equipped with speakers to amplify the sound of water gurgling, as if from a nearby stream. Zieve's goal was not only regional "self-definition" but also to express through the "universal language" of modern materials and forms the separate events of arrival, by referring to the land, and departure, through associations with the sky.[484]

The architectural firms of Fentress Bradburn (architects in charge) and NBBJ (as well as other firms) also worked together on the largest airport project in the United States since Dallas-Fort Worth: Denver International Airport (fig. 22). Like Dallas-Fort Worth, the airport was built on undeveloped land distant from downtown in order to accommodate the enormous scale of the project. The 53-square-mile airport contains 23,000 parking spaces and 50 restaurants and 120 stores in the terminal's so-called "airport village". As the major hub airport of

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[483] Lawrence W. Cheek, "On Architecture: Sea-Tac's Elegant Central Terminal will Send Travelers' Spirits Soaring," *Seattle Post-Intelligencer*, 31 May 2005.

[484] J. Lee Glenn, "Travelers can take Comfort in New Concourse," *Seattle Daily Journal of Commerce,* 10 June 2004; available from http://www.djc.com/news/co/11157863.html; Internet; accessed 24 September 2006.

the West, more than 200,000 people pass through the terminal every day; a population large enough to rank it as the third largest city in the state, after Denver and Colorado Springs.[485] The terminal's spectacular big-top roof and unique interiors—from its site-specific art, to its fountains and indoor landscaping—combined the local and global in a way that has served as a model for subsequent airport design.

Nevertheless, the airport's materials and forms also indicate the somewhat fluid nature of the abstract symbolism. The distinctive fiberglass and Teflon-coated peaked roof that represents the Rocky mountains as well as the historical teepees of local Native American tribes, for example, was taken from Gordon Bunshaft's design for the Haj terminal of King Abdul Aziz International Airport in Saudi Arabia (1975-82). Bunshaft has described the design as a practical solution to spanning a large area (the "tents" cover one hundred acres) to temporarily house the one to two million pilgrims that come through the airport annually, which was only accidentally symbolic, in this case of the tents of Arab nomads.[486] Another example is Denver airport's patterned granite floors. The stone, intended to represent that region's mineral wealth, was actually imported from Italy, much to the outrage of local masons and quarries.

Manuel Castells argues that the "glocalization" of architecture such as at Denver International Airport is most successful when it is not "over significant" or

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[485] Brooke, "Now Denver's Airport is Toasted, Not Roasted," B1.

[486] Gordon Bunshaft, "Oral History of Gordon Bunshaft," interviewer, Betty J. Blum for the Chicago Architects Oral History Project, 1990 (Chicago: The Art Institute of Chicago, 2000), 201.

charged with specific cultural meanings. Castells calls the kind of architecture that the contemporary airport exemplifies “the architecture of nudity.” This architecture is not one of comfort because it does not gloss over the “emptiness of transition” but puts one into confrontation with the trust in abstract systems that makes up the Postmodern condition.[487] It is, he concludes, “an architecture whose forms are so neutral, so pure, so diaphanous, that they do not pretend to say anything. And by not saying anything they confront the experience with the solitude of the space of flows. Its message is the silence.”[488] A virtual airport for a virtual society.

[487] Castells, *The Rise of the Network Society,* 421.

[488] Ibid., 420.

CONCLUSION

> Speed, it seems to me, provides the one genuinely modern pleasure.
> — Aldous Huxley

Historian David Nye has noted that new technologies are "contested terrains," which are not accepted *de facto* but are shaped by the current worldview: "machines are social constructions which Americans long have built into both their narratives and their sense of place. . . People use technologies to reshape and reimagine their material context, and their experience of any space is a complex, mediated encounter."[489] Aviation, and its land-based representation of the airport, charts the course of modernism in America: from initial disinterest, to wild enthusiasm, deep disillusionment, and resigned acceptance.

Although aviation was considered a technology external to social forces, the nature of its development was entirely due to social attitudes and beliefs.[490]

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[489] David E. Nye, *Narratives and Spaces: Technology and the Construction of American Culture* (Exeter: University of Exeter Press, 1997), 2.

[490] The belief in a technological imperative is still strong, however; in 2001 Secretary of State Colin Powell insisted that the United States was going to pursue missile defense technology despite international opposition. Powell stated, "we are not going to be knocked off the track of moving in this direction as long as the technology points us in that direction." Quoted in "U.S. to Ease Missile Defense Fears," CNN, 10 February 2001, available from

During the 1930s, for example, many American architects rejected International Style modernism; in Talbot Hamlin's words, it was the style of "economy, efficiency, and bareness" that indicated "a complete surrender to the industrial machine."[491] In contrast, William Lescaze argued that Modernism was "not just another style" but the physical representation of a "common approach" to contemporary life that was "a grand and fascinating thing."[492] This ongoing dialectic shaped aviation's architectural expression in the form, materials, and design of the airport.

Commercial aviation established itself as a technology that held enormous potential for social good: Harry Guggenheim called the airplane "not only a lessener of the distances between the habitations of men, but between the minds of men as well."[493] It was through the concerted efforts of public officials, like Postmaster General Walter Folger Brown and Aeronautics Director Eugene Vidal; the achievements of private individuals, such as the Guggenheims, Charles Lindbergh, and Henry Ford; and the effect of events, such as record-breaking flights and World's Fairs; that aviation was conceived of as a vehicle not only of commerce but also of peace and prosperity.

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http://archhives.cnn.com/2001/US/02/10/powell.missile/index.html; Internet; accessed 26 September 2006.

[491] Talbot Faulkner Hamlin, "The International Style Lacks the Essence of Great Architecture," *American Architect*, 143 (January 1933): 14.

[492] William Lescaze, "The Classic of Tomorrow," *American Architect,* 147 (December 1935): 11.

[493] Guggenheim, *The Seven Skies,* 68-69.

At the same time, the architectural profession in the United States was also undergoing the process of modernization, moving away from historical models and traditional practices. The struggle to find an appropriate expression for aviation in the materials, form, and plan of the airport reflects this process. In addition, the complexity of the airport's functional requirements, the scale of airport projects, and the necessity for long-term planning not only for the future expansion of the airport itself but to anticipate its impact on its environs, had a role in changing the organization and scope of architectural practice. Ateliers became firms, and a number that developed expertise in airport design, such as SOM, TAMS, and HOK, became international businesses.

The devolution of commercial aviation from utopian symbol to consumer service can be seen as the failure of modernism. Furthermore, the association of mobility with autonomy epitomized by, as Harry Guggenheim rhapsodized, "the fulfillment of man's age-old dream of the conquest of the air," has resulted less in a "mastery of the elements" than in environmental degradation.[494] Yet with the revival of awe-inspiring and sustainable airport projects, aviation's early promise is reevaluated and renewed. Paul Andreu claims that,

> Terminals have become more important these days than cultural places such as museums or theatres where societies used to assemble. This is because their space . . . is the locus of meeting between what is most universal, mobile and modern—the aeroplane, that dangerous marvel—and what is most primitive—the sense of belonging to a place and the very deep-seated desire to fly, to be somewhere else at once.[495]

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[494] Guggenheim, *The Seven Skies,* 12.

[495] Paul Andreu, "Preface," in *The Airport Builders,* 7.

Whether the airport can continue to hold out that promise of connection and freedom, as aviation becomes a mature technology, is the challenge of the twenty-first century.

a.

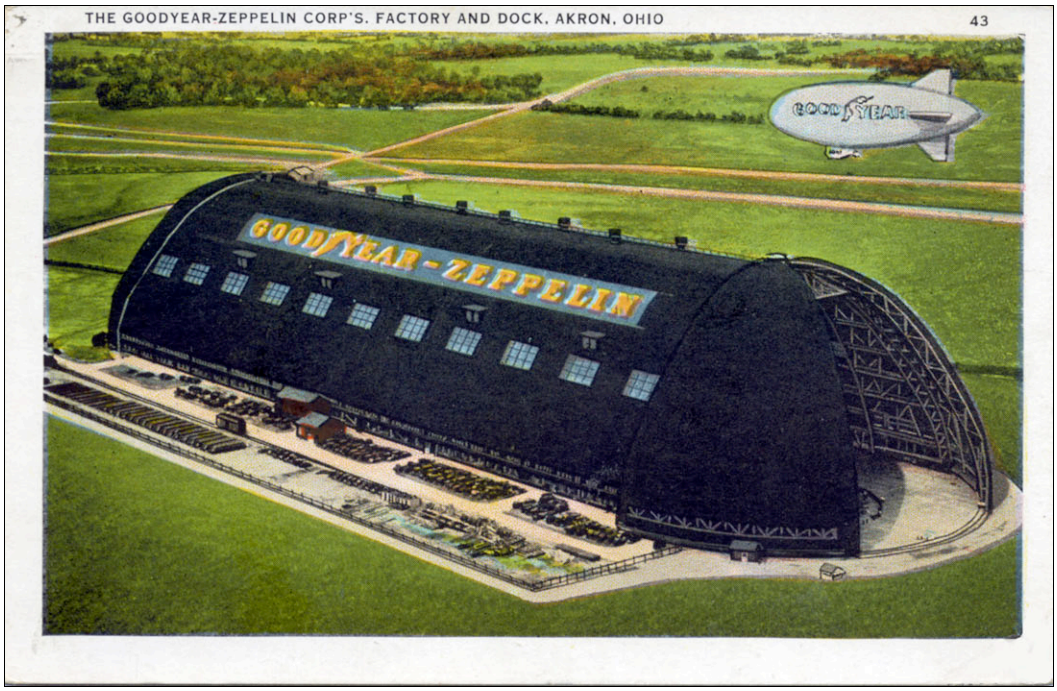
b.

c.

d.

Figure 1. Logan International Airport, Boston, Massachusetts: *a,* Boston Airport Corporation, 1927; *b,* Boston Municipal Airport, 1929; *c,* Boutwell terminal, c. 1952; *d,* control tower, Boutwell terminal, c. 1965.

a.



b.

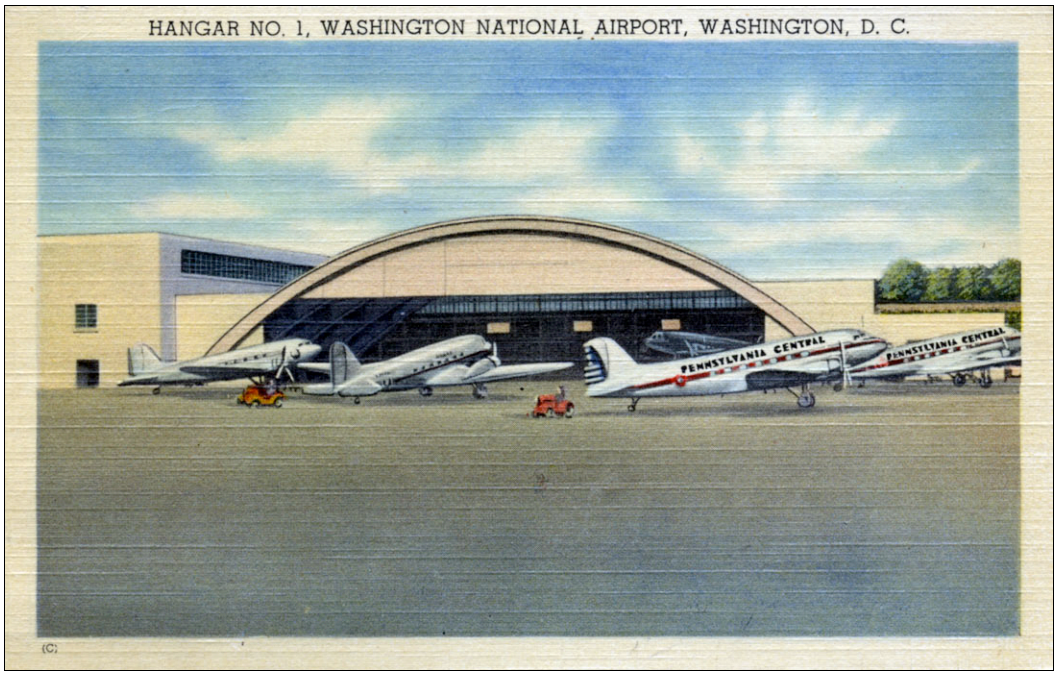


Figure 2. Hangars: *a,* Goodyear Zeppelin airdock, 1929, Akron, Ohio; Wilbur J. Watson, engineer; *b,* Hangar No. 1, one of six concrete hangars at Washington National Airport (now Ronald Reagan Washington National Airport), 1941, Washington, DC; Howard Lovewell Cheney, architect.

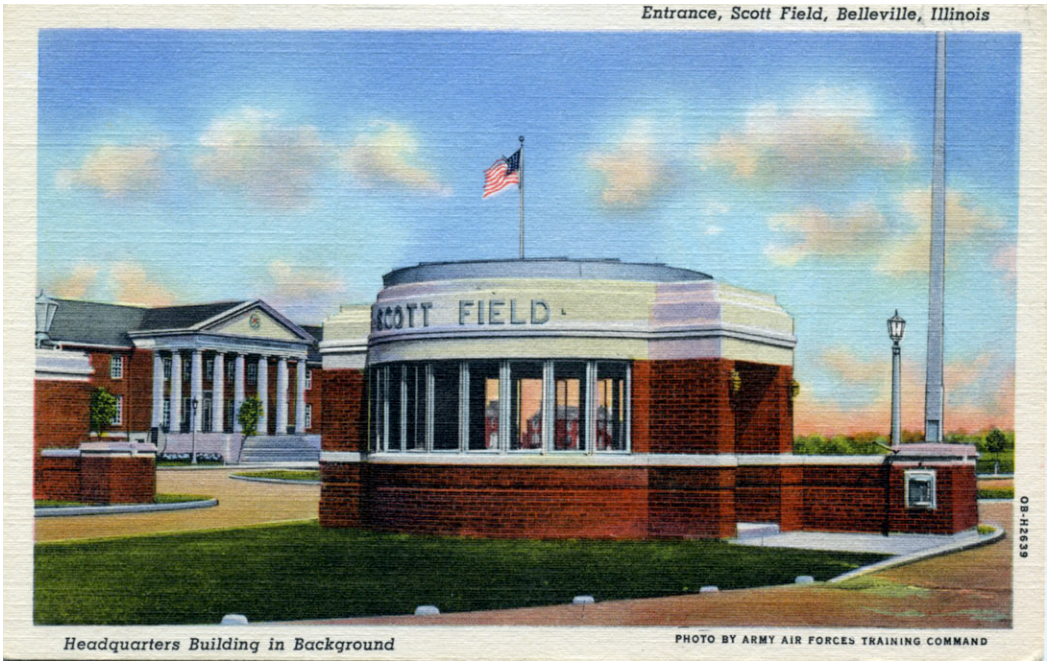


Figure 3. Entrance to Scott Field, 1917 (shown 1940), Belleville, Illinois. Albert Kahn, architect.

Figure 4. Aerial view of Lindbergh Field, San Diego, California, c. 1928

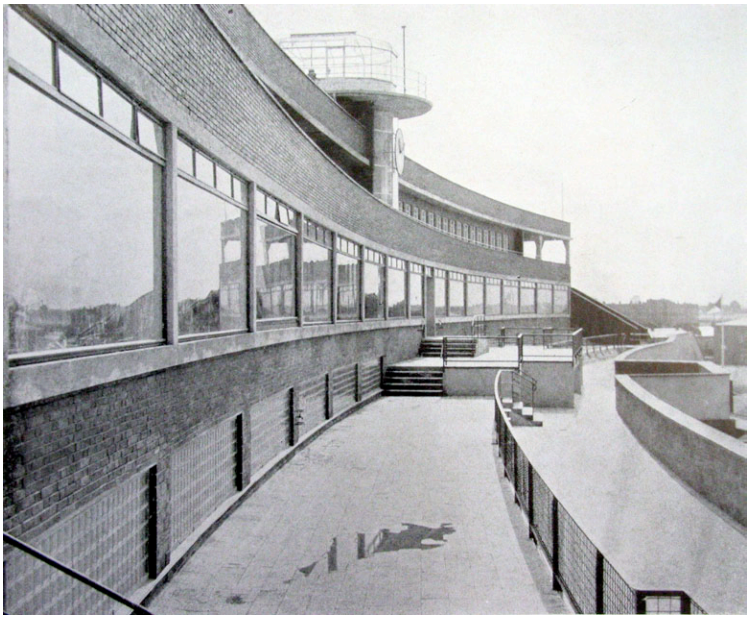


Figure 5. Fuhlsbüttel Airport Terminal, 1928-29, Hamburg, Germany; Friedrich Dyrssen and Peter Averhoff, architects; *a,* observation deck; *b,* terminal interior. Reprinted from *Architectural Record* 68, no. 2 (August 1930): 105-106.

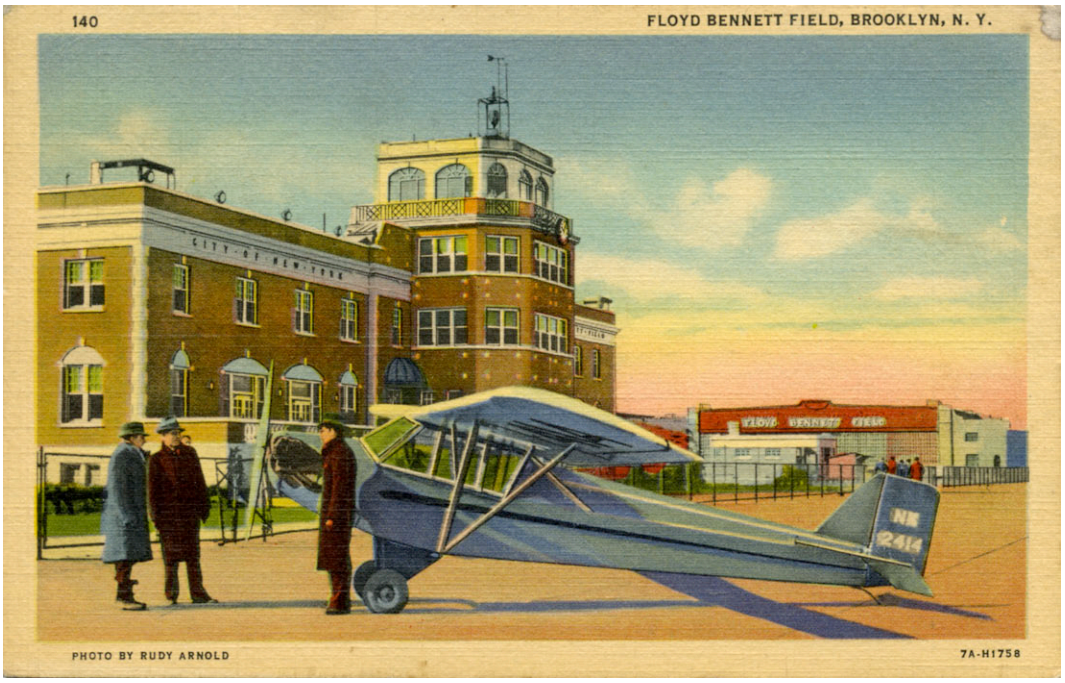


Figure 6. Airside view Floyd Bennett Field administration building, 1928-31, New York, New York. New York City Department of Docks, architects.

a.

b.

Figure 7. LaGuardia Airport, 1939, New York, New York; Delano & Aldrich, architects: *a,* land plane terminal; *b,* land plane terminal interior with zodiac signs by Arthur Covey, 1939; reprinted from *Pencil Points*, 21, no. 10 (October 1940): 625.

a.

b.

Figure 8. LaGuardia Airport, 1939, New York, New York; Delano & Aldrich, architects: *a,* aerial view showing marine air terminal (center left) and hangar (center); *b,* marine air terminal interior with *Flight* mural by James Brooks, 1939; reprinted from Arend, *Air World's Great Airports: La Guardia 1939-1979*, 80.

Figure 9. Autogiro from Pitcairn-Larsen Company, Inc., Willow Grove, Pennsylvania, *Fortune* magazine advertisement, 1941.

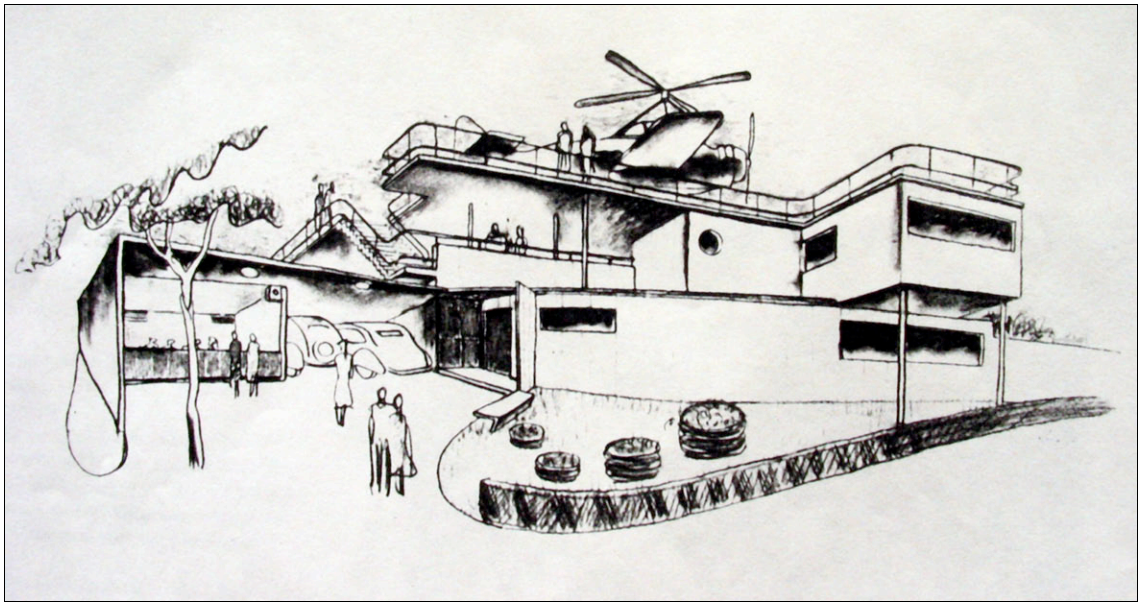


Figure 10. William Lescaze, House for the Year 2039 Project, 1938. Courtesy of Avery Fine Arts and Architectural Library, Columbia University.

a.

b.

Figure 11. Pan American Airways Miami Airport, 1934, Dinner Key, Florida; Delano & Aldrich, architects: *a,* landside view of terminal; *b,* terminal interior.

a.

b.

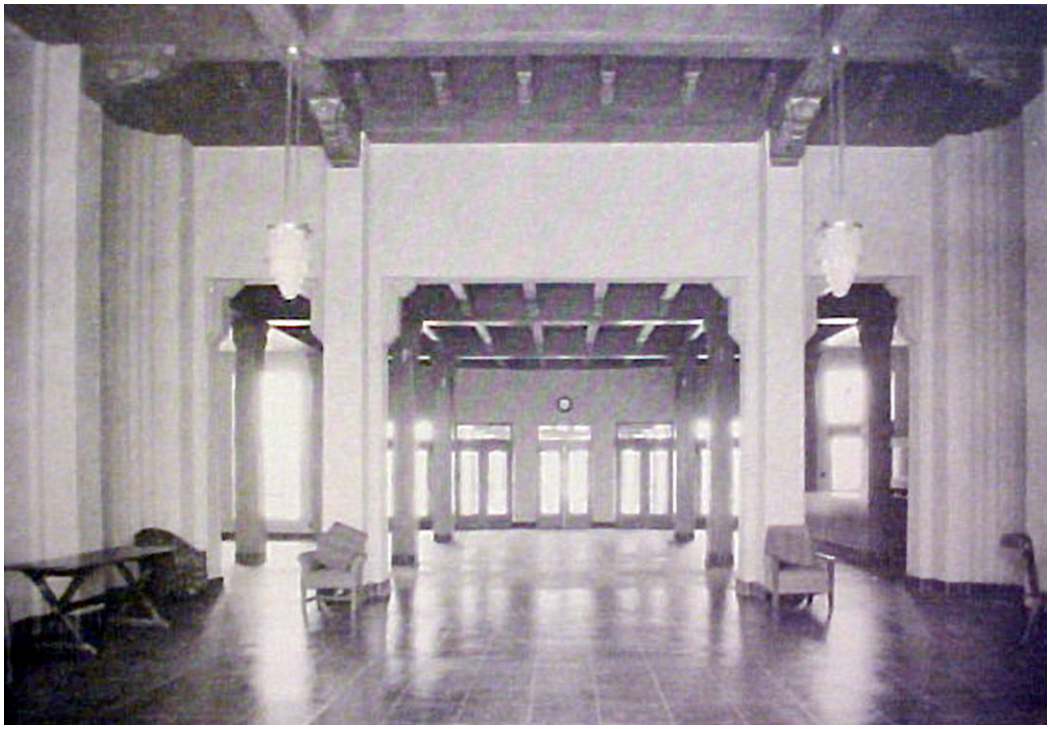


Figure 12. Union Air Terminal, 1930, Burbank, California (now Bob Hope Airport); The Austin Company, engineers and architects: *a,* aerial view; *b,* terminal interior; reprinted from *Airports* 4 (July 1930): 29.

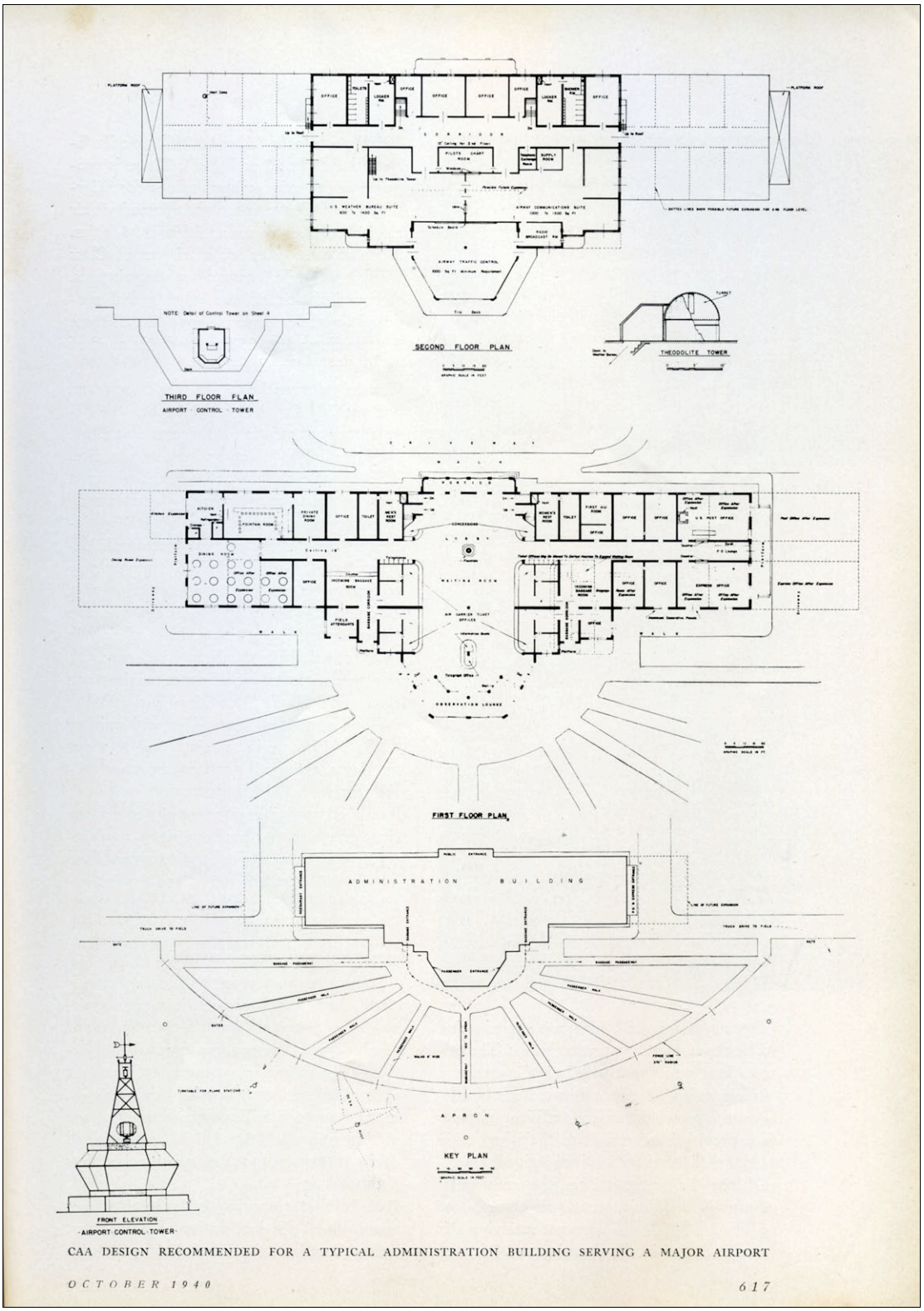
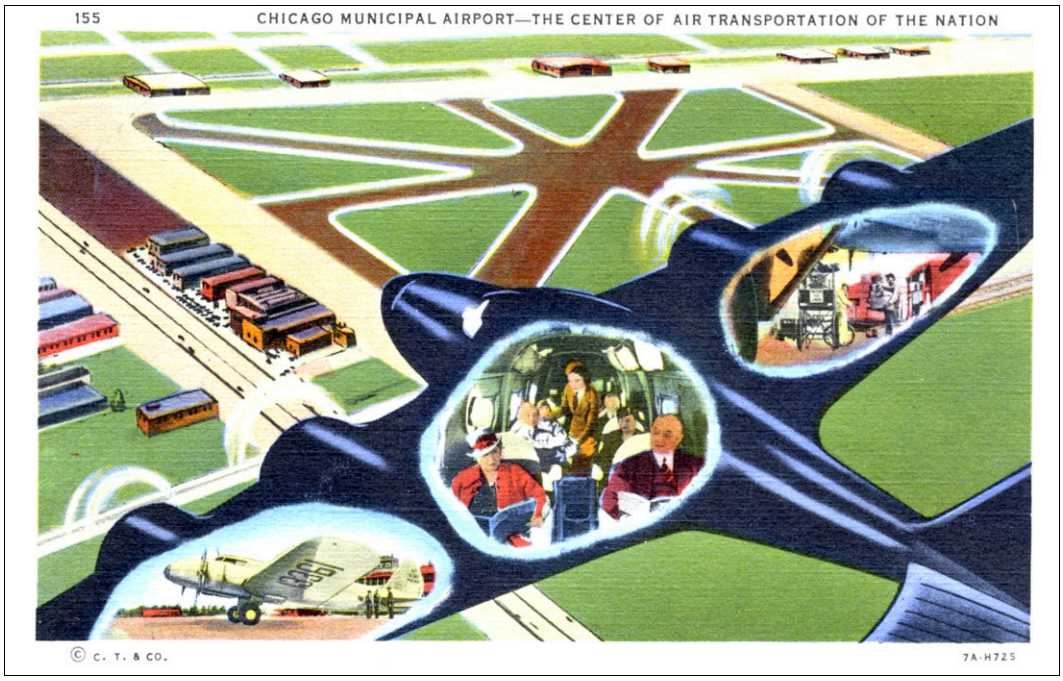


Figure 13. CAA design recommended for a typical administration building serving a major airport. Reprinted from *Pencil Points* 21:10 (October 1940): 617.

Figure 14. Boeing 377 Stratocruiser, 1946-49; interior design by Walter Dorwin Teague. Advertisement from *The Saturday Evening Post*, 12 July 1946.

a.



b.

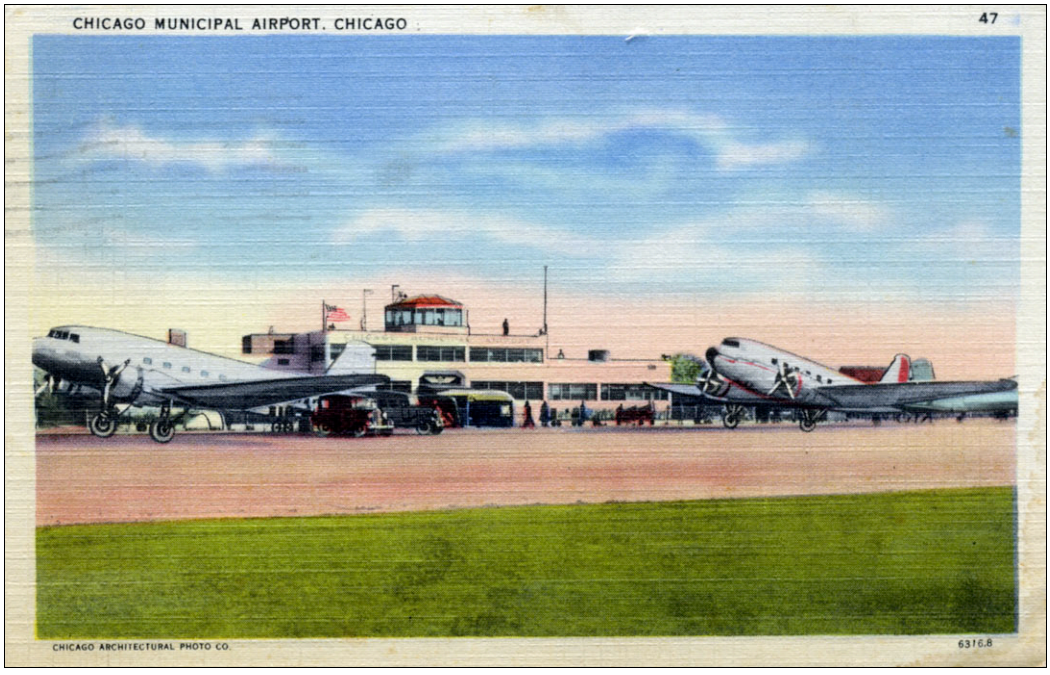


Figure 15. Chicago Municipal Airport, 1931-32, Chicago, Illinois; Paul Gerhardt, Jr., architect: *a,* aerial view of airfield with the Nathan Hale Elementary School in the top left corner, c. 1937; *b,* airside view of 1932 terminal, postmarked 1939.

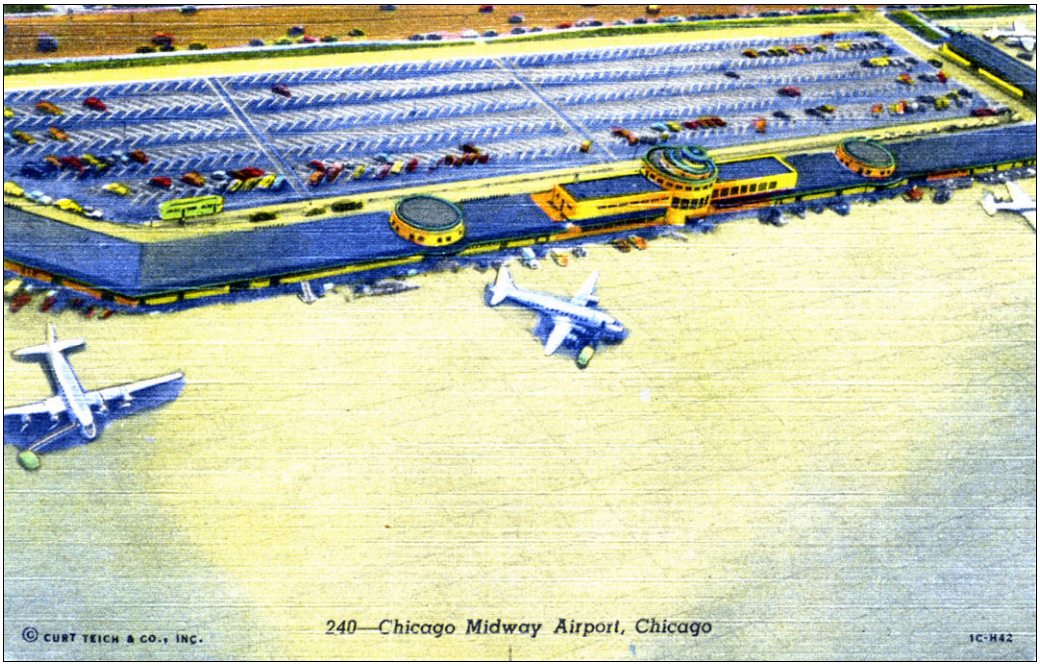


Figure 16. Chicago Municipal Airport (now Midway International Airport), 1945-47, Chicago, Illinois. Paul Gerhardt, Jr., architect.

a.

b.

Figure 17. O'Hare International Airport, 1957-63, Chicago, Illinois; C.F. Murphy Associates, architects: *a,* aerial view of terminals; *b,* interior.

Figure 18. Jetway at O'Hare International Airport, c. 1960s

a.

b.

Figure 19. Washington Dulles International Airport terminal, 1958-62, Dulles, Virginia; Eero Saarinen and Associates, architects: *a,* terminal; *b,* mobile lounge.

Figure 20. British Airways Concorde supersonic transport

Figure 21. One of two extensively modified Boeing 747-200B aircraft designated “Air Force One” when the United States President is on board. Boeing 747s have been used for Air Force One since 1990, replacing two Boeing 707-320B aircraft from 1962.

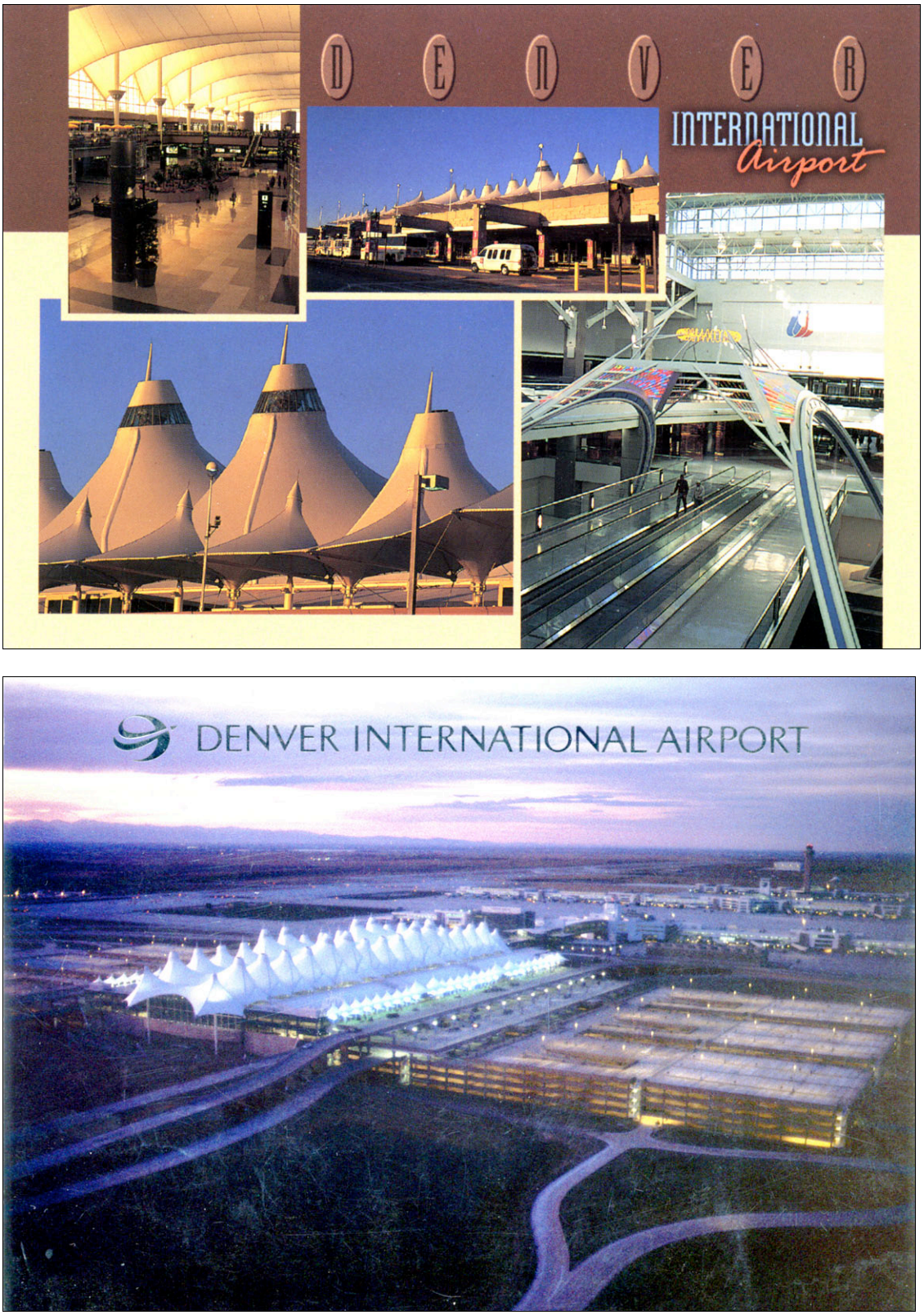
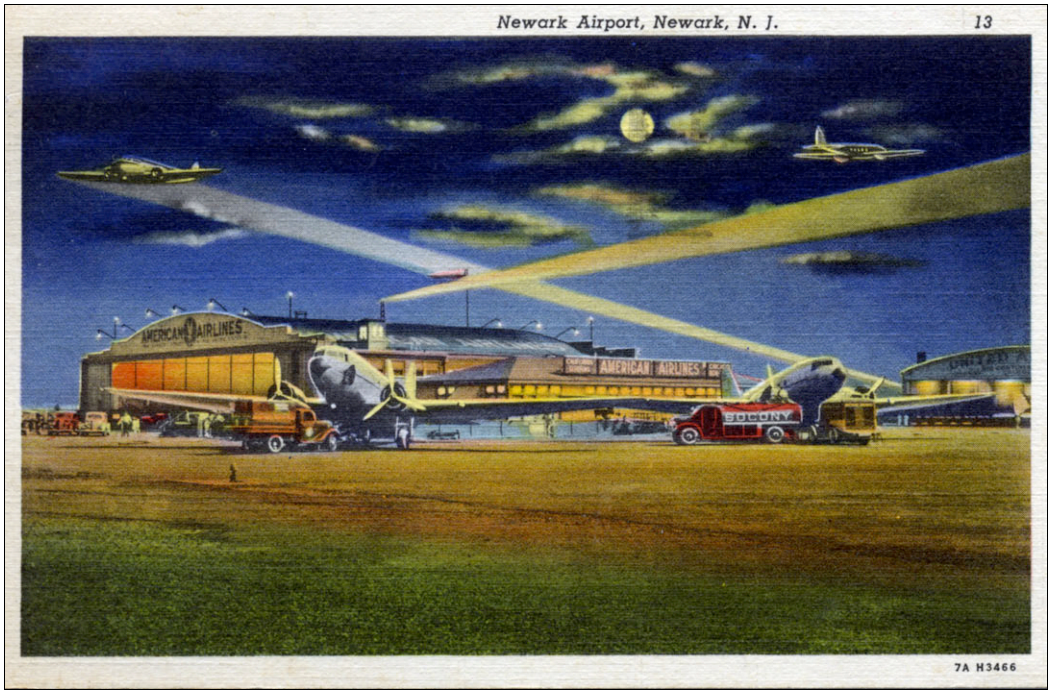


Figure 22. Jeppesen Terminal, 1995, Denver International Airport, Denver, Colorado. C.W. Fentress, J.H. Bradburn and Associates, architects.

a.



b.

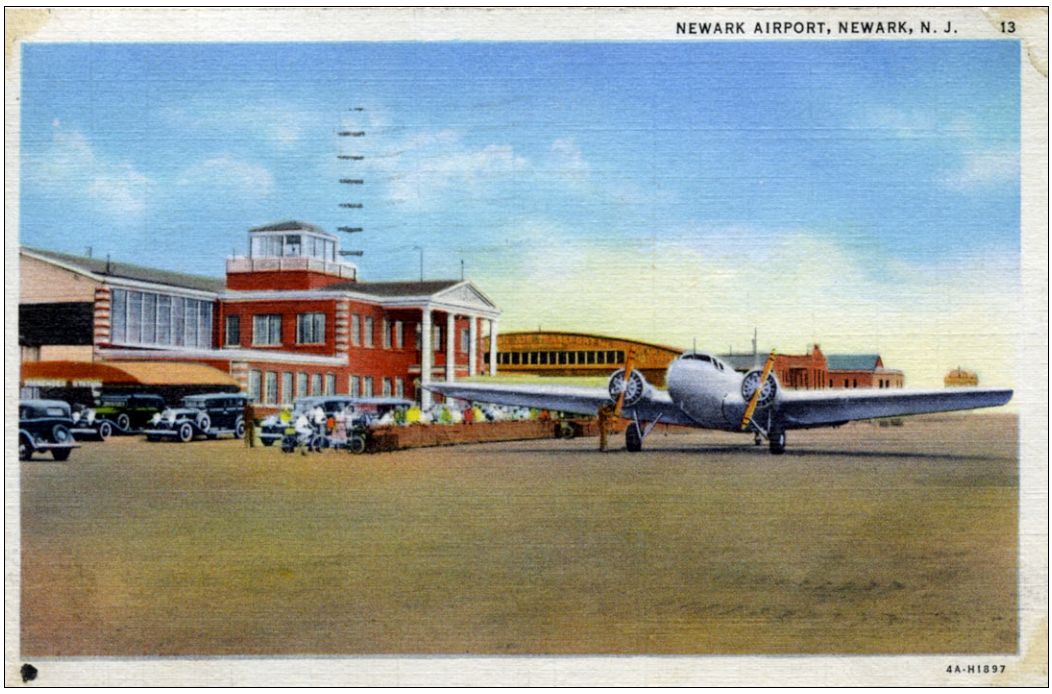


Figure 23. Newark Airport, Newark, New Jersey, 1930s: *a,* American Airlines depot hangar postmarked 1938; *b,* United Airlines depot hangar, postmarked 1937.

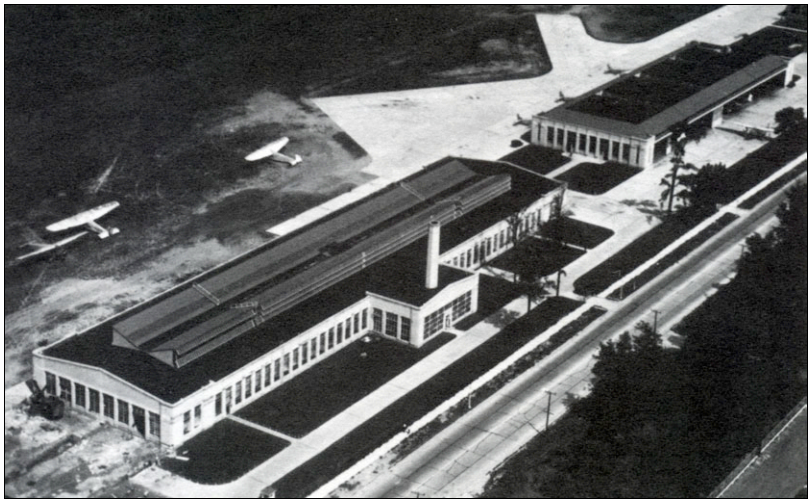
a.

b.

Figure 24. Influential European airports: *a,* airside view of Schipol Airport, 1926, Amsterdam; Dirk Roosenburg, architect; *b,* view of the airside steel canopy of Tempelhof Airport from the airport restaurant, 1936-39, Berlin; Ernst Sagebiel, architect.

a.

b.



c.

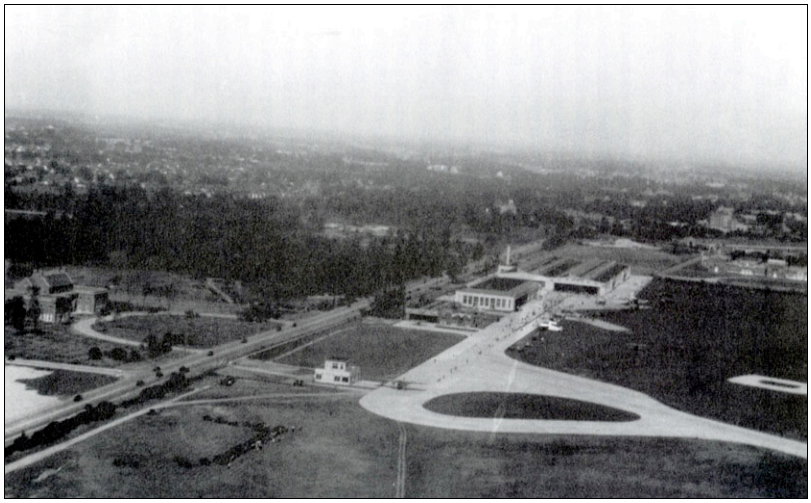


Figure 25. Ford Airport and Airplane Factory, 1926-27, Dearborn, Michigan; Albert Kahn, architect: *a,* air terminal; *b,* airplane factory and hangars; *c,* terminal is in center foreground, on the left is Dearborn Inn, on the right is the hangar and factory. Reprinted from O'Callaghan, *Henry Ford's Airport,* 11, 54, 57.

a.

b.

Figure 26. Dearborn Inn, 1931, Dearborn, Michigan; Albert Kahn, architect; *a,* rear of inn, 1962; *b,* lounge, postmarked 1938.

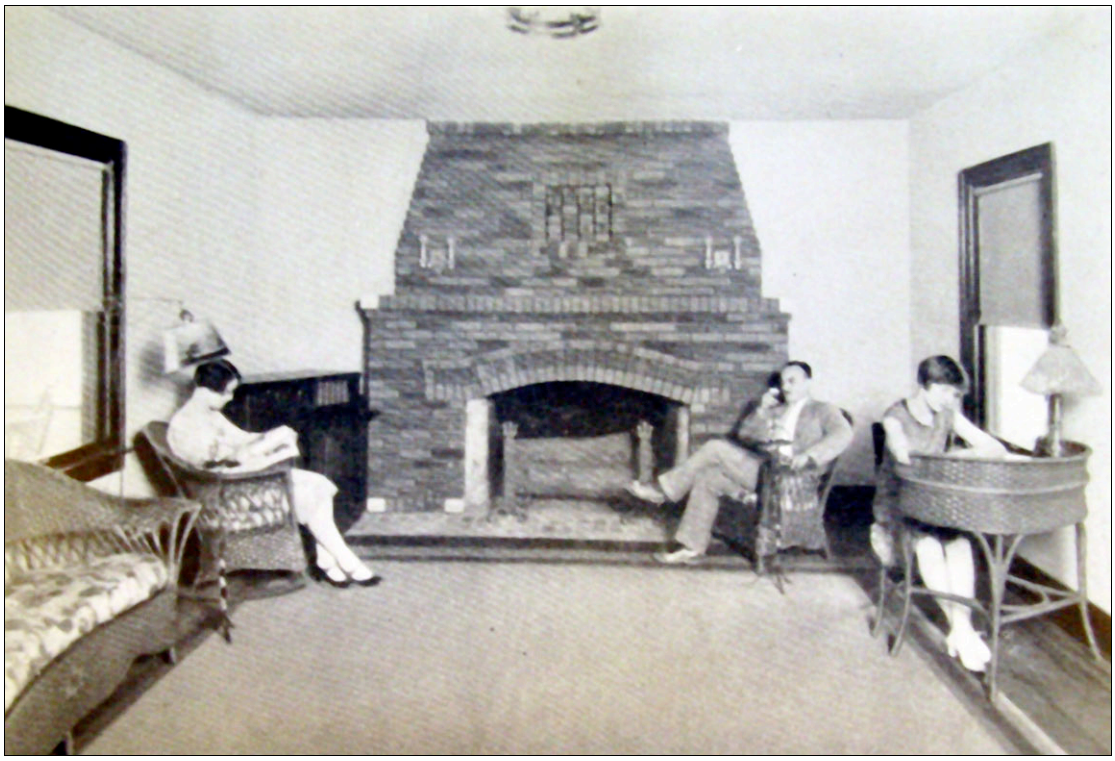


Figure 27. Grand Rapids Municipal Airport lounge, c. 1927. Reprinted from Duke, *Airports and Airways*, Plate IX.

a.

b.

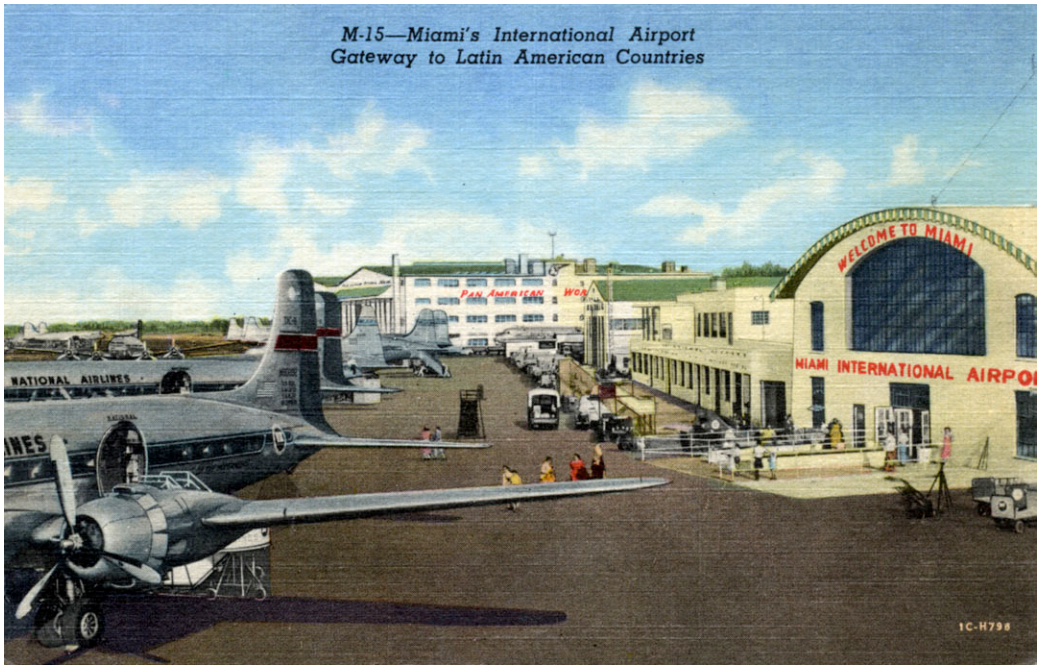
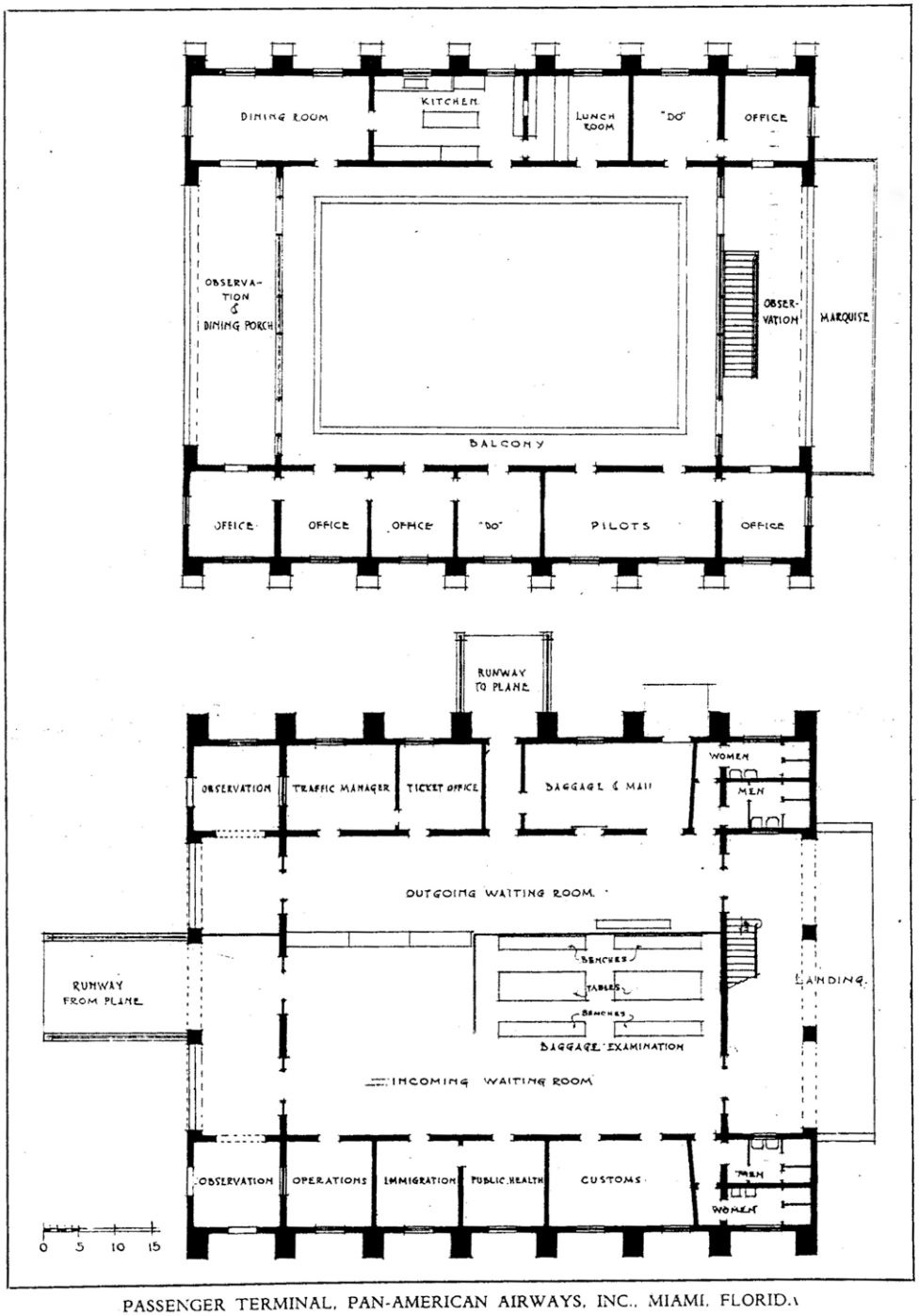


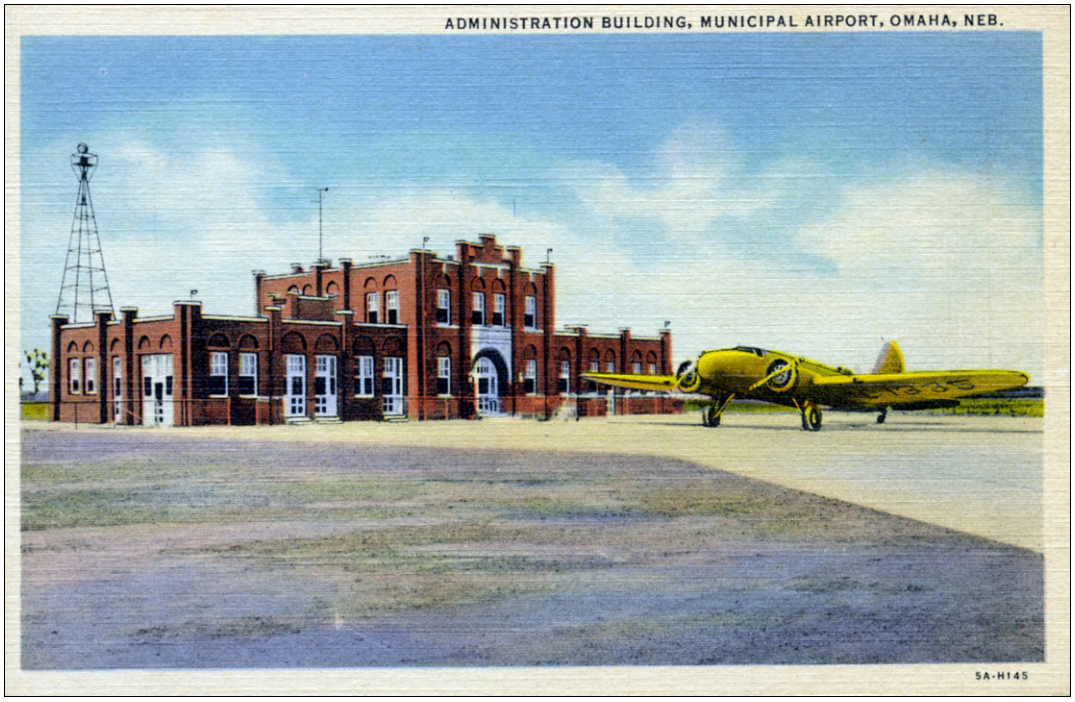
Figure 28. Pan American Airways, Miami Air Passenger Terminal, 1927-29, Miami, Florida; Delano & Aldrich, architects: *a,* terminal with Ford Tri-Motor in foreground (commemorative postcard, c. 1996); *b,* airport, 1951, showing additions to original terminal.



PASSENGER TERMINAL, PAN-AMERICAN AIRWAYS, INC., MIAMI, FLORIDA
DELANO & ALDRICH, ARCHITECTS

Figure 29. Plan of Pan American Airways, Miami Air Passenger Terminal, 1927-29, Miami, Florida; Delano & Aldrich, architects, Reprinted from *The American Architect* 13 (July 20, 1929): 76.

a.

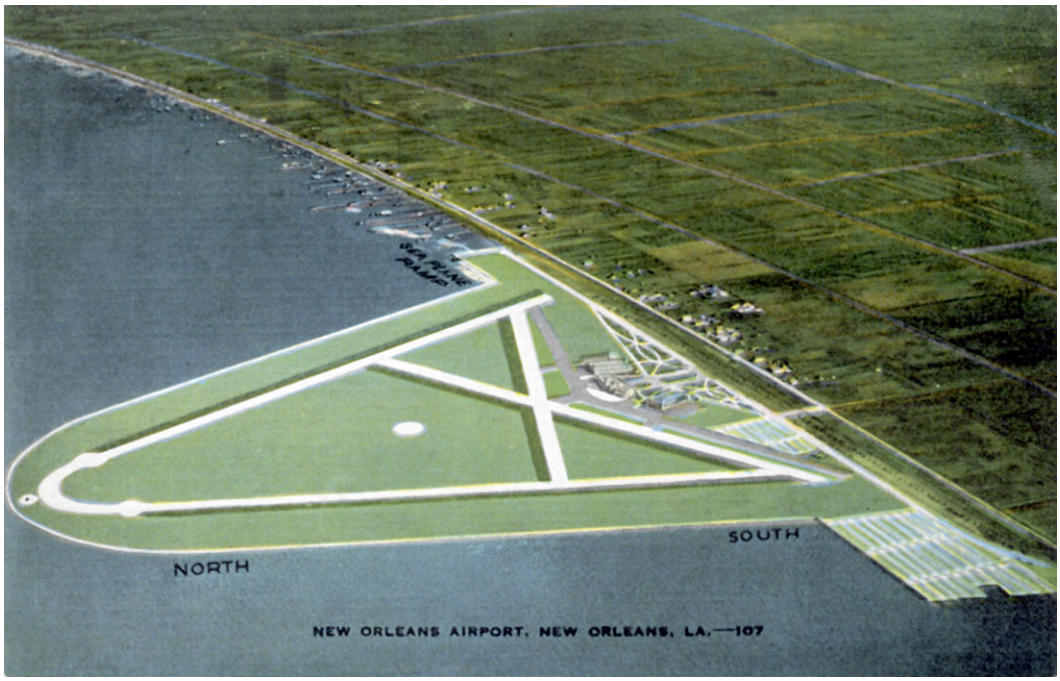


b.

Figure 30. Omaha, Nebraska: *a,* airside view of Administration Building, Omaha Municipal Airport, 1935; *b,* Omaha public schools, 1937.

Figure 31. Aerial view of Randolph Field, 1930-31, San Antonio, Texas. Ayers & Ayers, architects.

a.



b.

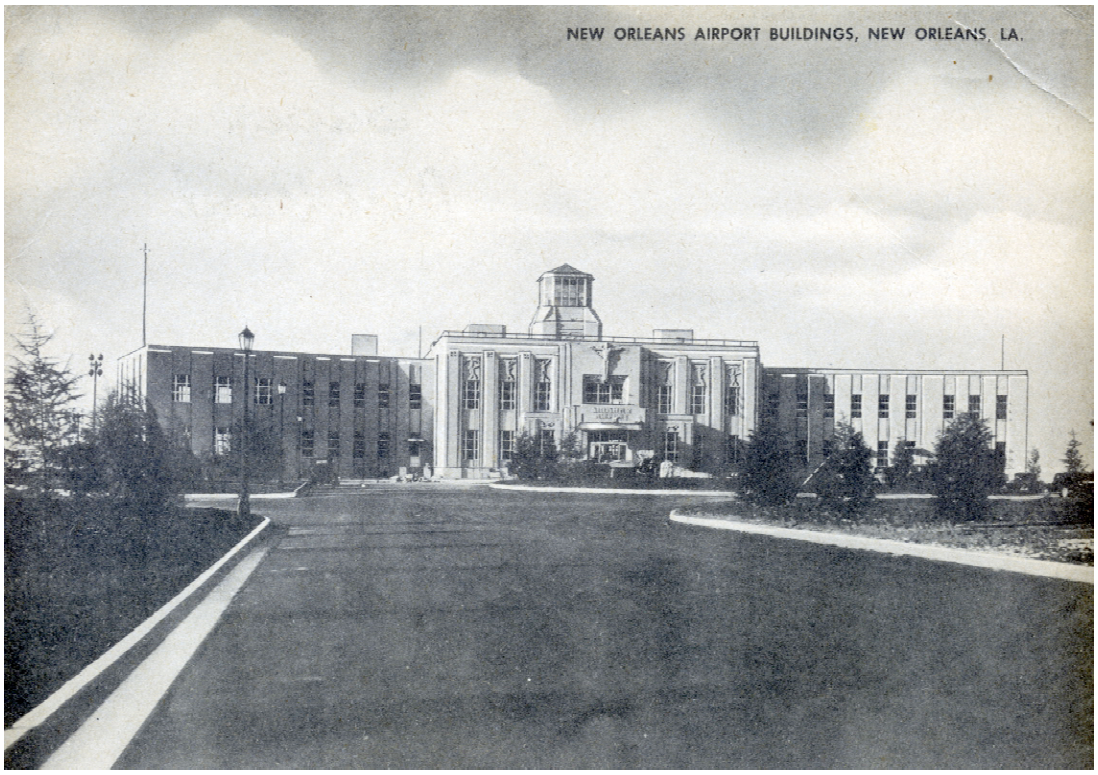


Figure 32. Shushan Airport, 1933, New Orleans, Louisiana; Weiss, Dreyfous & Seiferth, architects: *a,* aerial view, postmarked 1943; *b,* administration building, c. 1940.

a.

MAIN LOBBY, ADMINISTRATION BUILDING, SHUSHAN AIRPORT, NEW ORLEANS, LA.

b.

Figure 33. Shushan Airport, 1933, New Orleans, Louisiana; Weiss, Dreyfous & Seiferth, architects: *a,* main lobby of administration buildings; *b,* Xavier Gonzalez, *Bali,* 1933, oil on canvas; one of eight paintings originally installed in the mezzanine level of the administration building, Shushan Airport; reprinted from “Art and Architecture at Lakefront Airport,” commemorative brochure, 1984, n.p.

a.

b.

Figure 34. Washington National Airport (now Ronald Reagan Washington National Airport), Washington, DC; 1941, Howard Lovewell Cheney, architect: *a,* aerial view of Washington National Airport; *b,* airside (top) and landside views of terminal.

Figure 35. Terminal interior, postmarked 1944, Washington National Airport, 1941, Washington, DC. Howard Lovewell Cheney, architect.

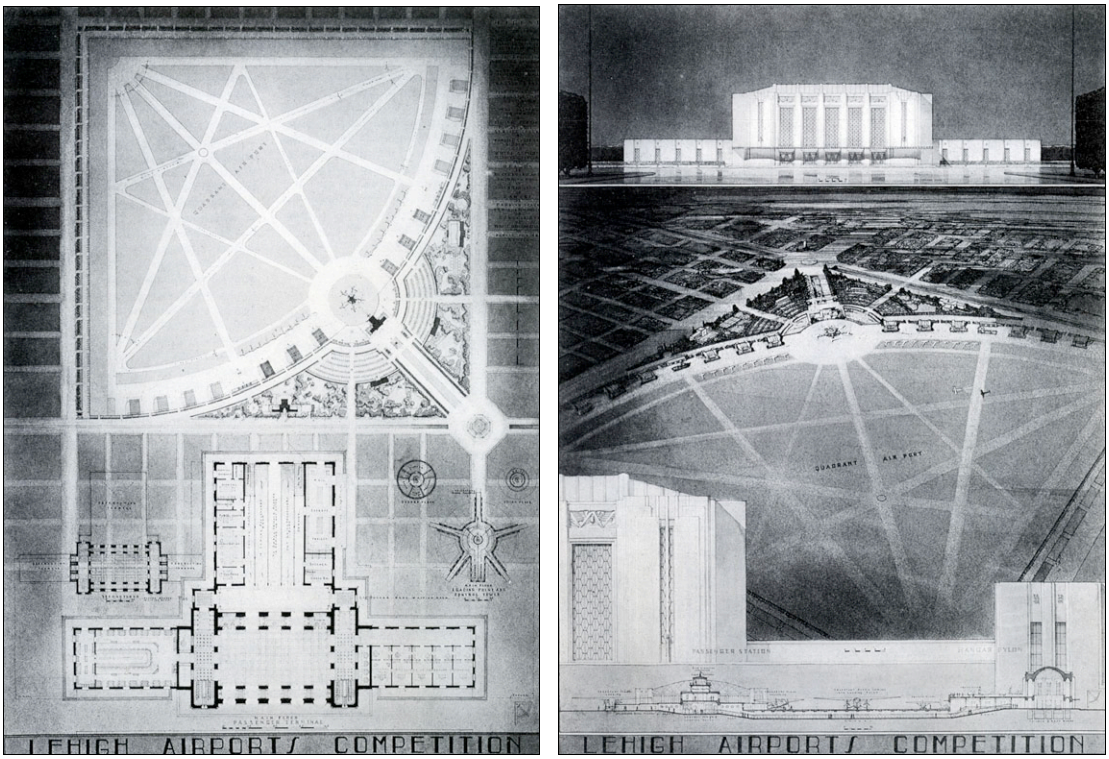
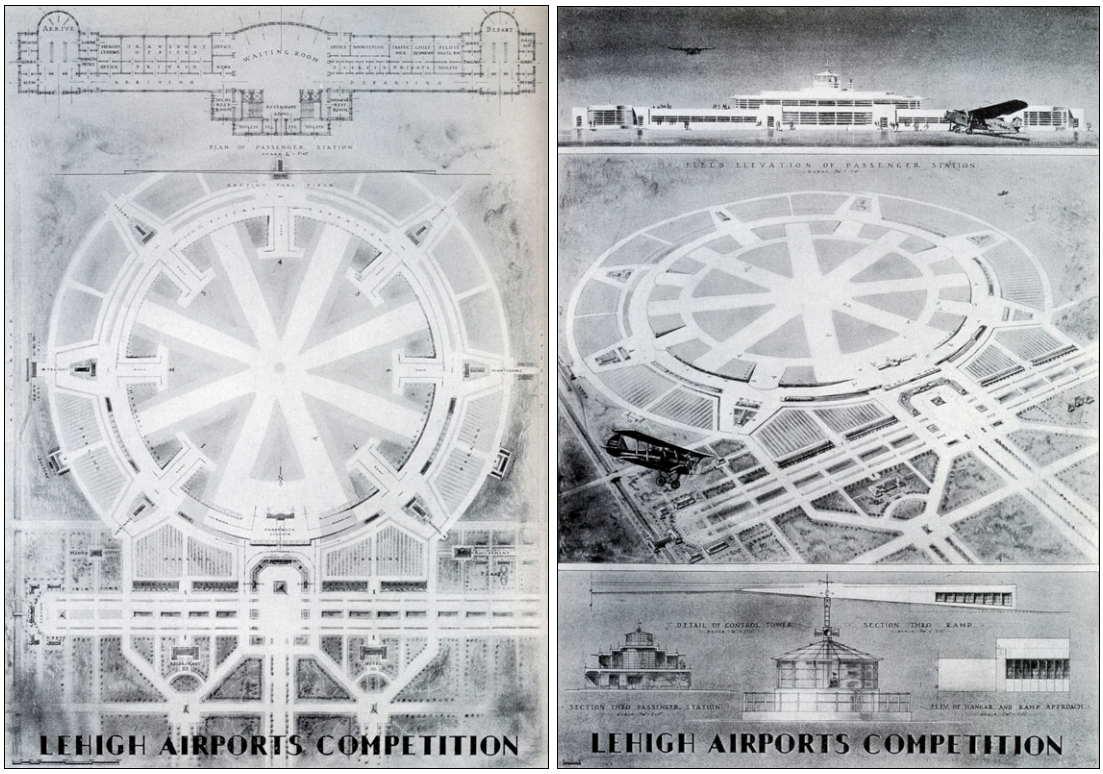


Figure 36. Lehigh Airports Competition 1st Prize: designed by A.C. Zimmerman and William H. Harrison. Reprinted from Lehigh Portland Cement Company, *American Airport Designs,* 14-15.

a.



b.

Figure 37. Holden, Stott & Hutchinson: *a,* Lehigh Airports Competition Honorable Mention; reprinted from Lehigh Portland Cement Company, *American Airport Designs*, 44-45; *b,* Washington Airport (now demolished), 1930; courtesy Library of Congress.

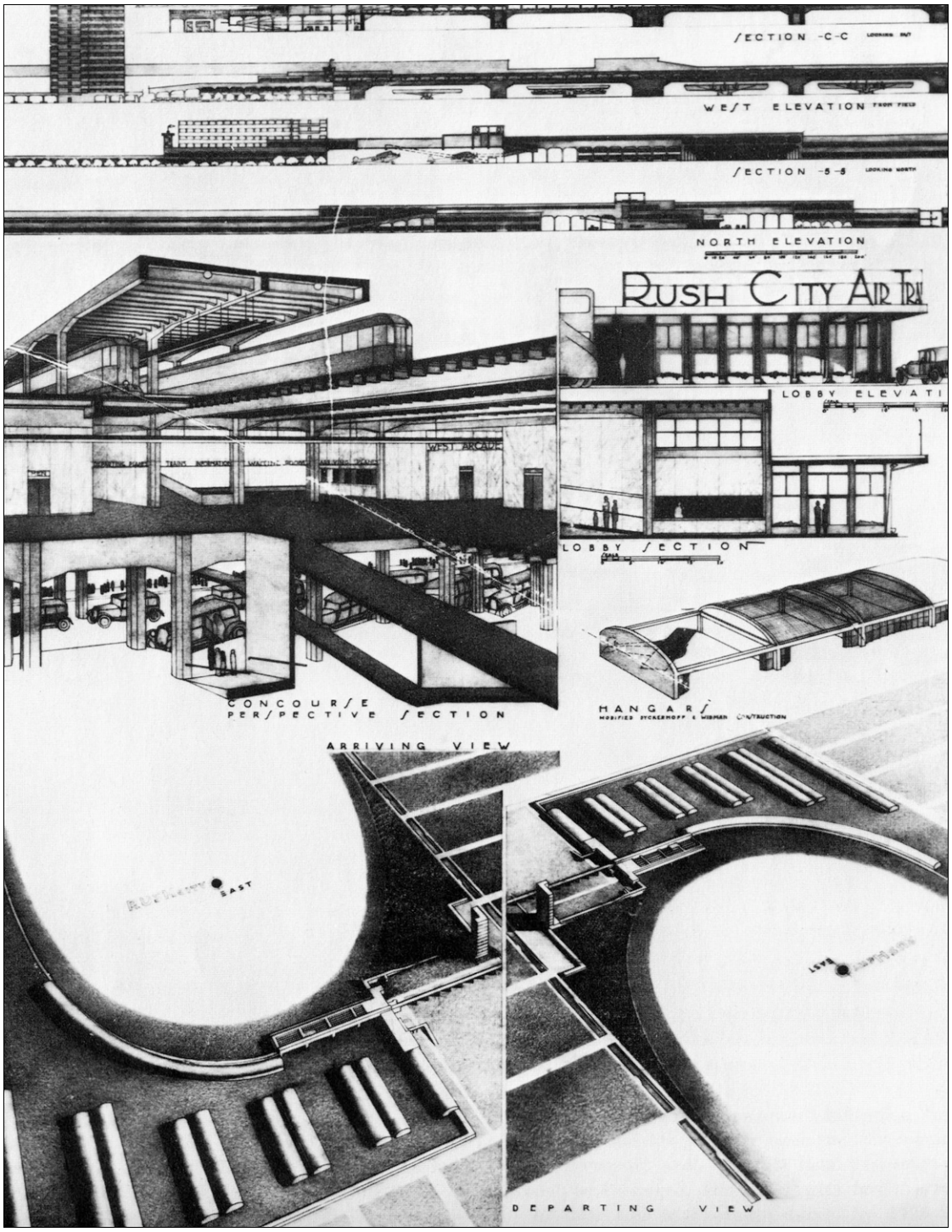


Figure 38. “Rush City Air Transfer,” Lehigh Airports Competition entry of Richard Neutra, 1929. Reprinted from Hines, *Richard Neutra and the Search for Modern Architecture,* 67.

Figure 39. Enrique Alferez, *Fountain of the Four Winds,* 1938; installed at Shushan Airport, New Orleans; WPA photographs, 1938. Courtesy of New Orleans Public Library.

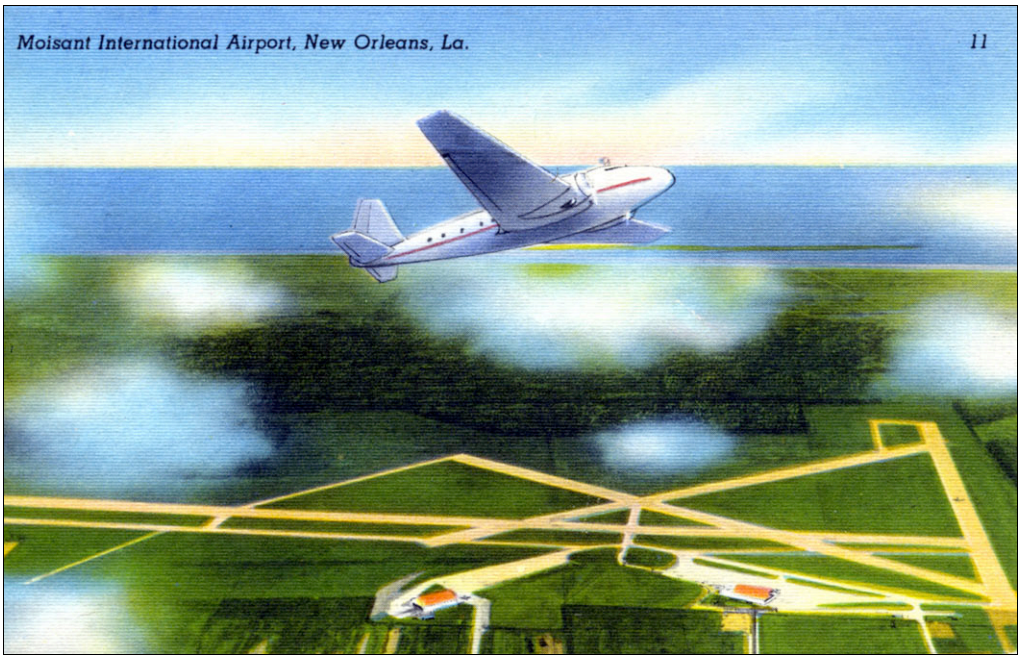


Figure 40. Moisant International Airport, c. 1950, New Orleans, Louisiana.

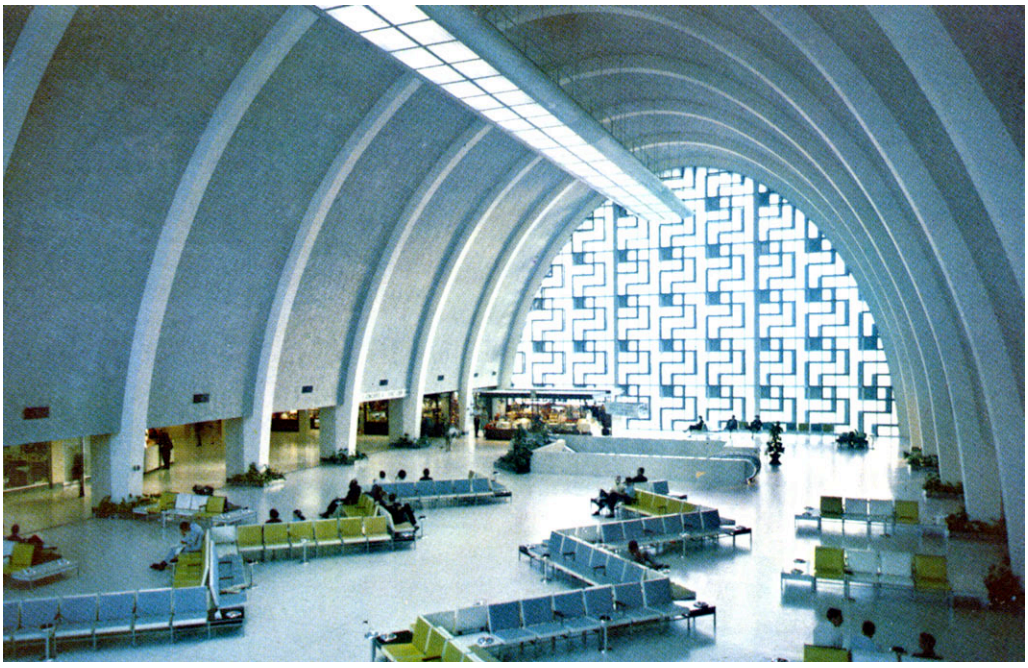
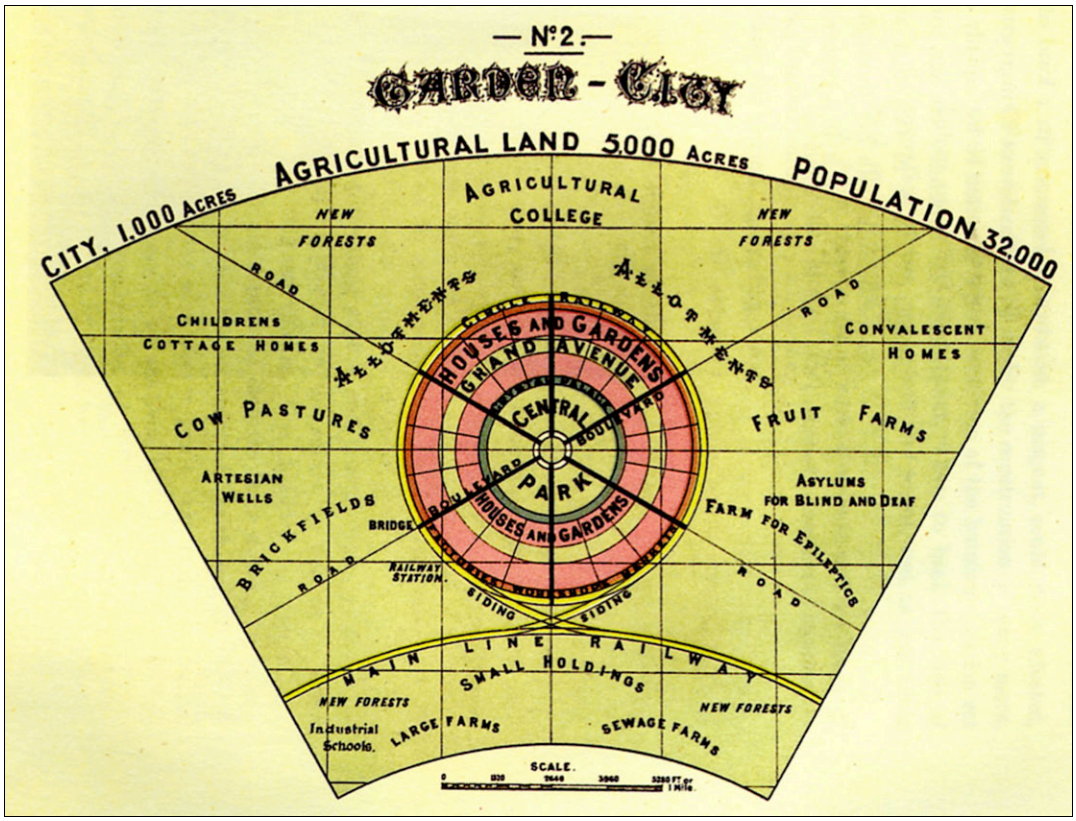


Figure 41. New Orleans International Airport (now Louis Armstrong New Orleans International Airport), 1959, New Orleans, Louisiana; Goldstein, Parham & Labouisse, architects.

a.



b.

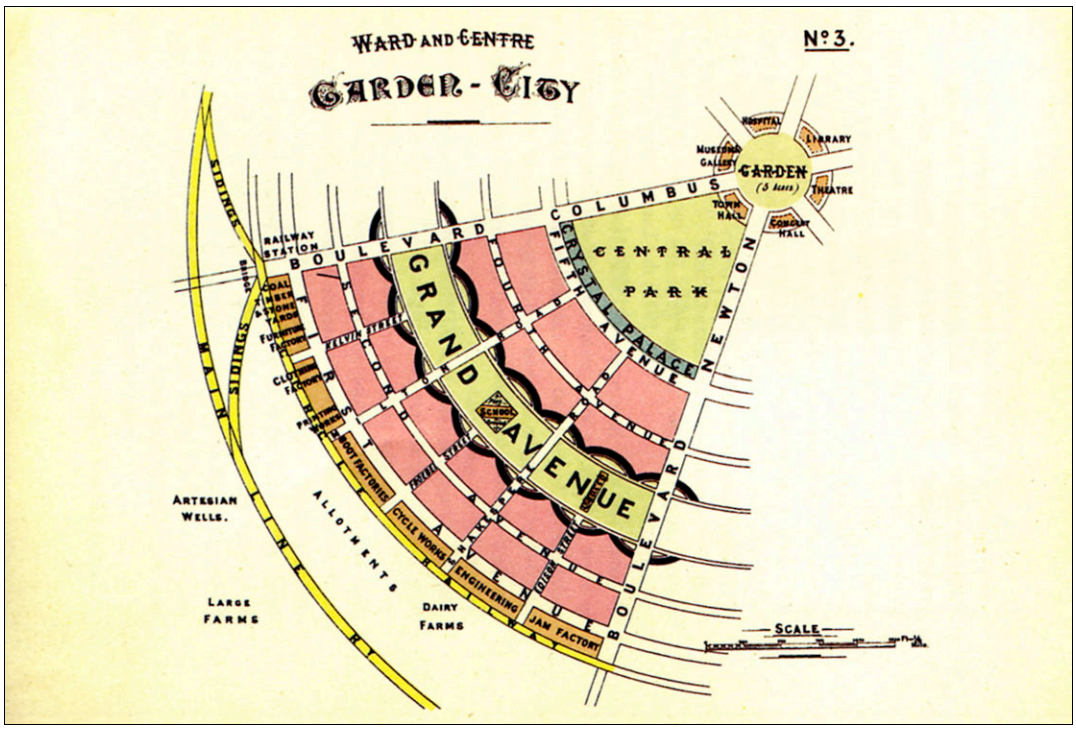


Figure 42. Ebenezer Howard, the Garden City, 1898: a, Garden City diagram; b, “Ward and Centre” section of the Garden City. Reprinted from Howard, *To-morrow: A Peaceful Path to Real Reform,* 13, 15.

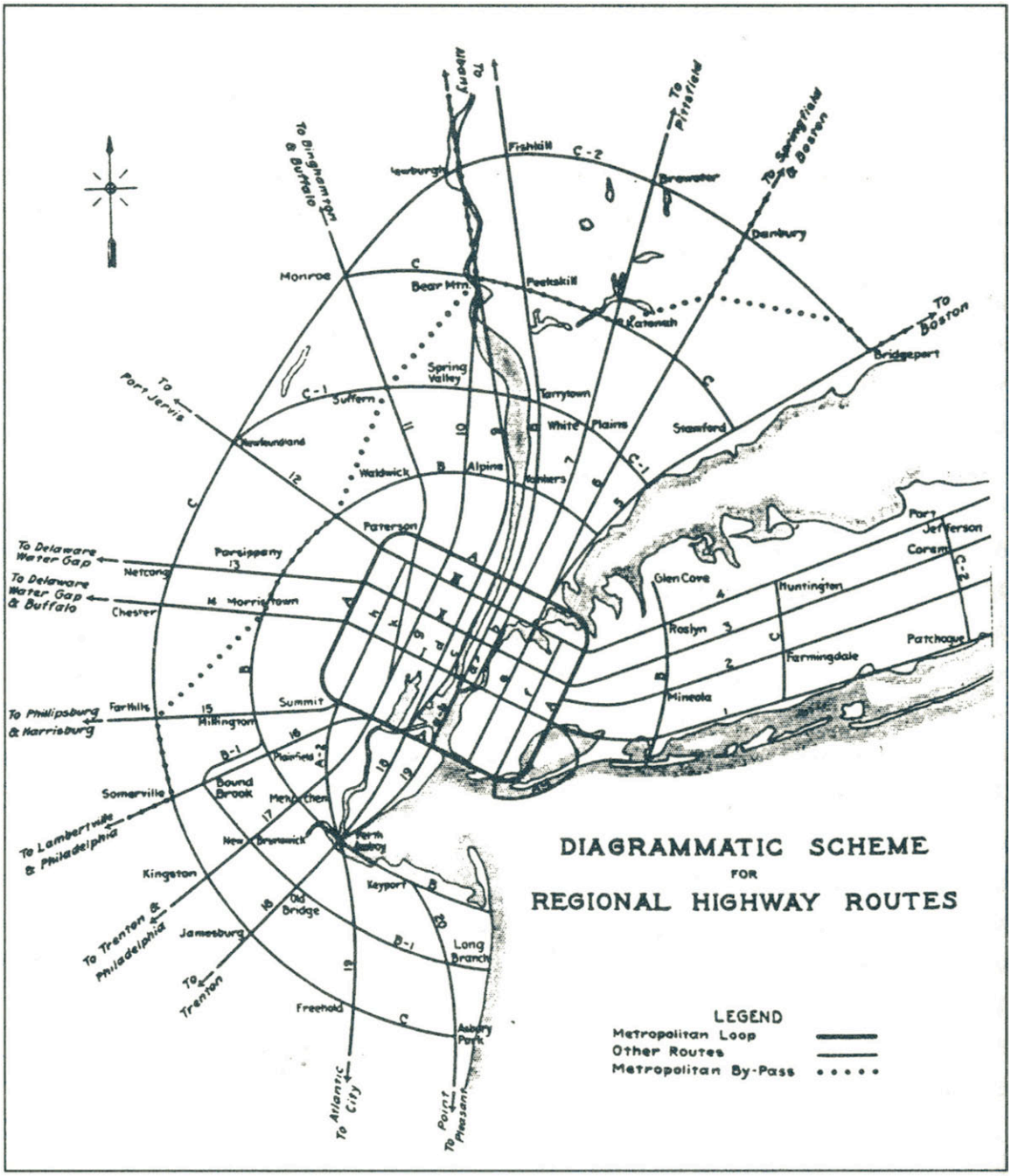


Figure 43. Diagrammatic scheme for regional highway routes, 1929 Regional Plan of New York and Its Environs. Reprinted from Johnson, *Planning the Great Metropolis,* 164.

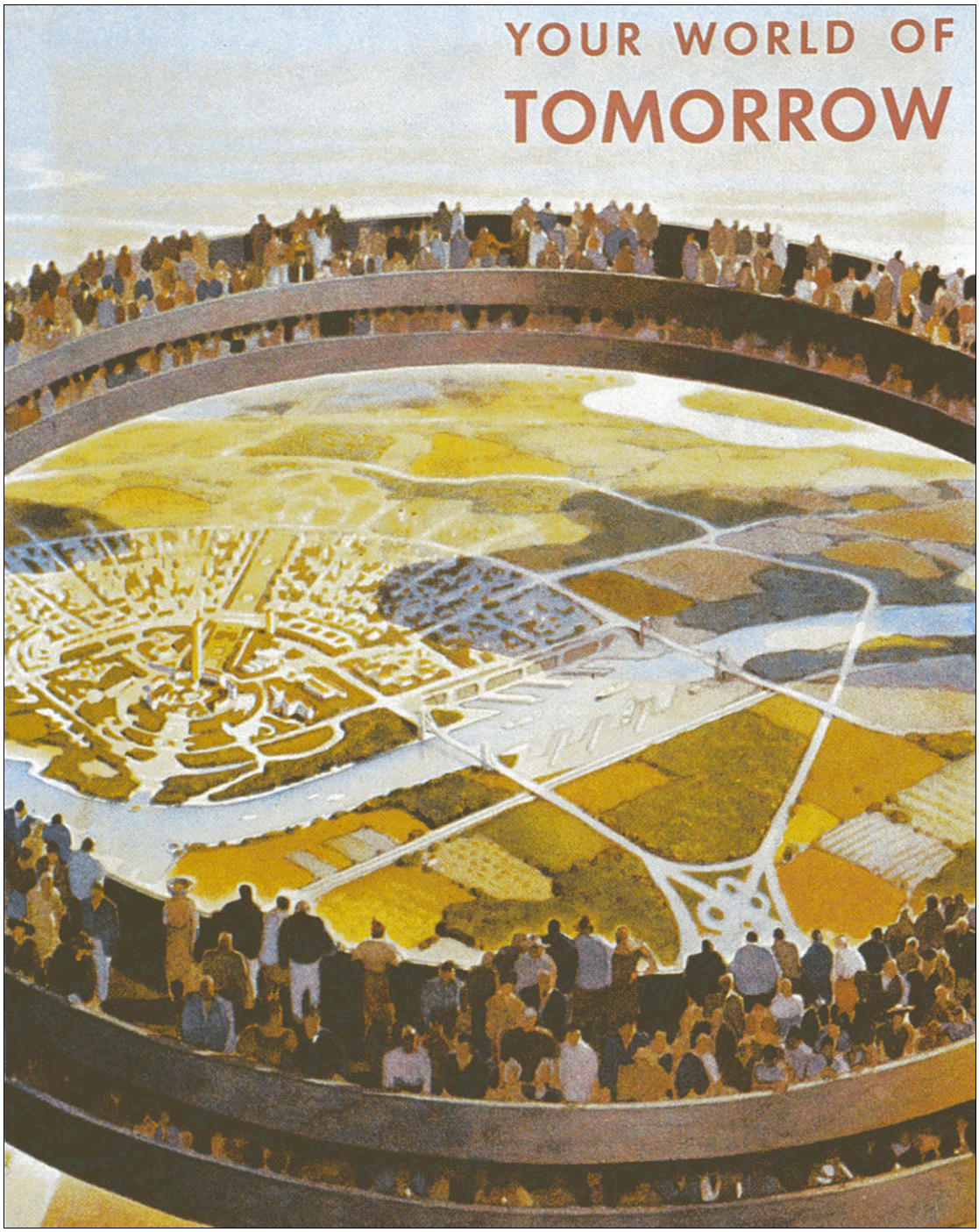
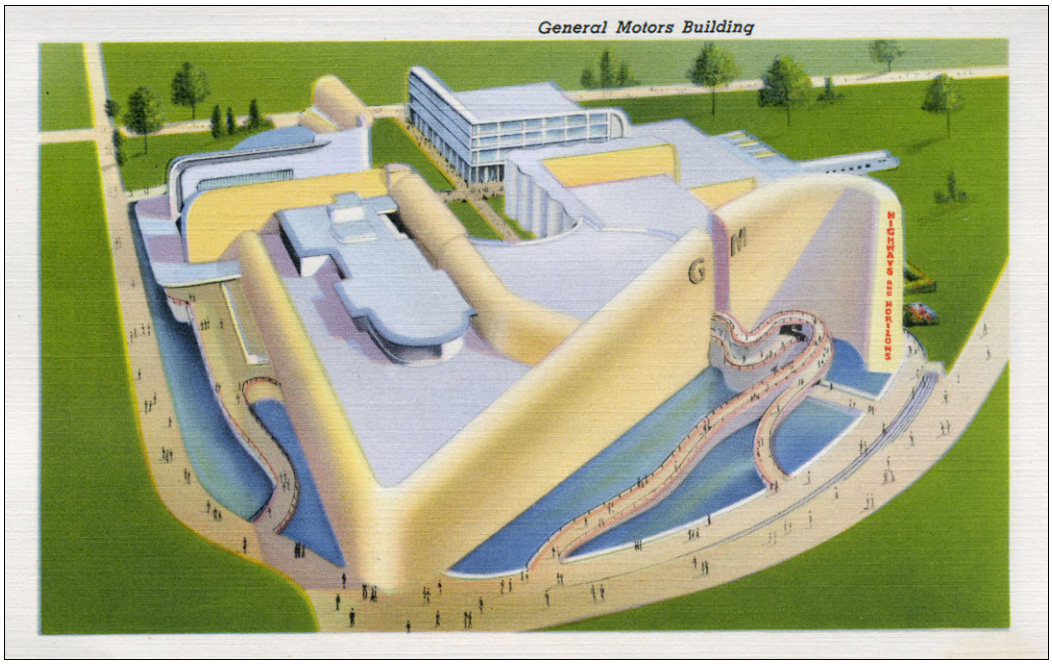


Figure 44. Democracity, Henry Dreyfuss, designer. Pamphlet, “Your World of Tomorrow” from the Democracity exhibit, 1939 New York World’s Fair.

a.



b.

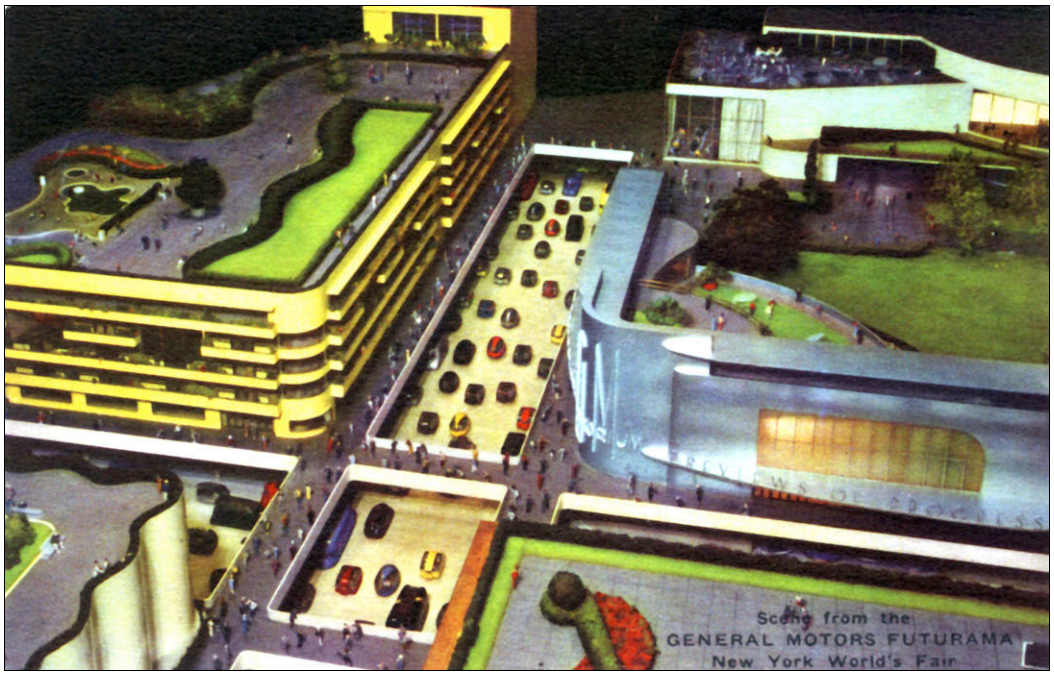


Figure 45. Futurama exhibit, General Motors Building, 1939 New York World's Fair: *a,* General Motors Building, Albert Kahn, architect; *b,* Futurama intersection, Norman Bel Geddes, designer.

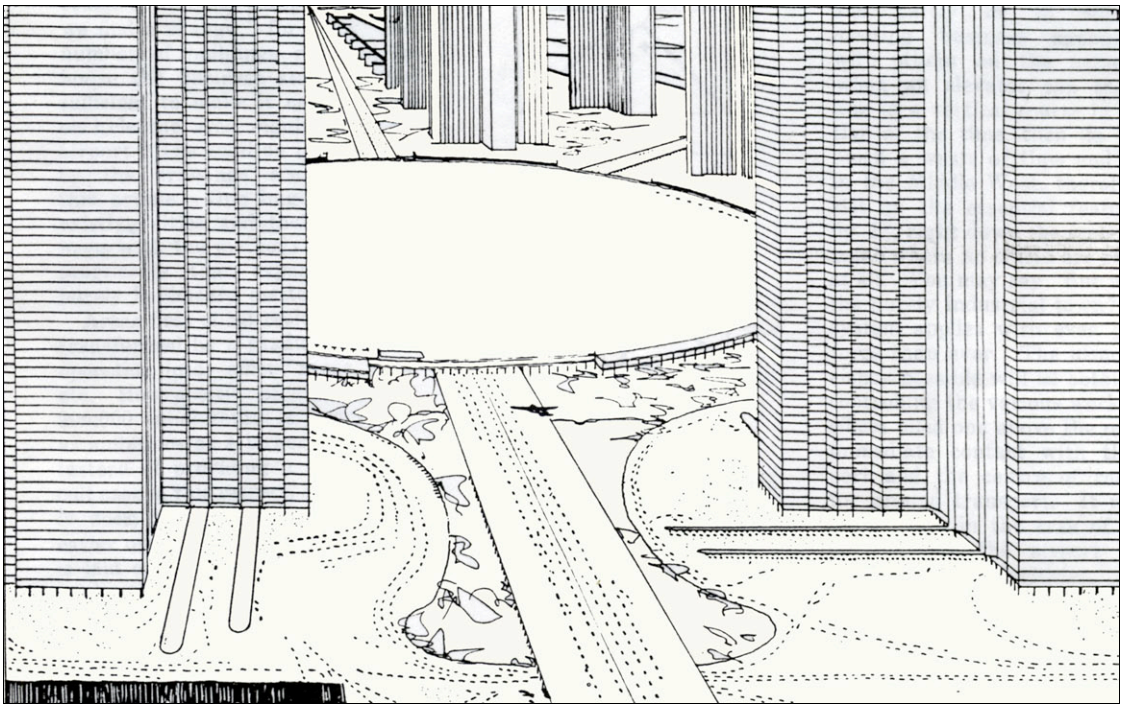
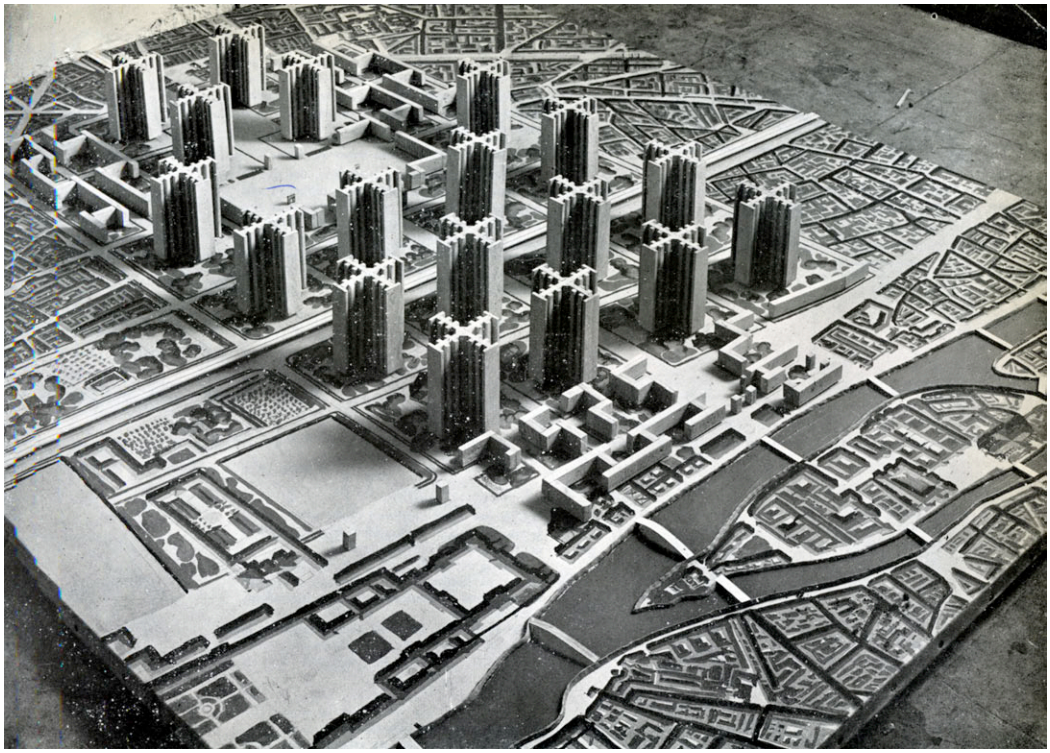


Figure 46. Le Corbusier, Ville Contemporaine, 1922; reprinted from *Airports,* 2, no. 3 (March 1929), 21.

a.



b.

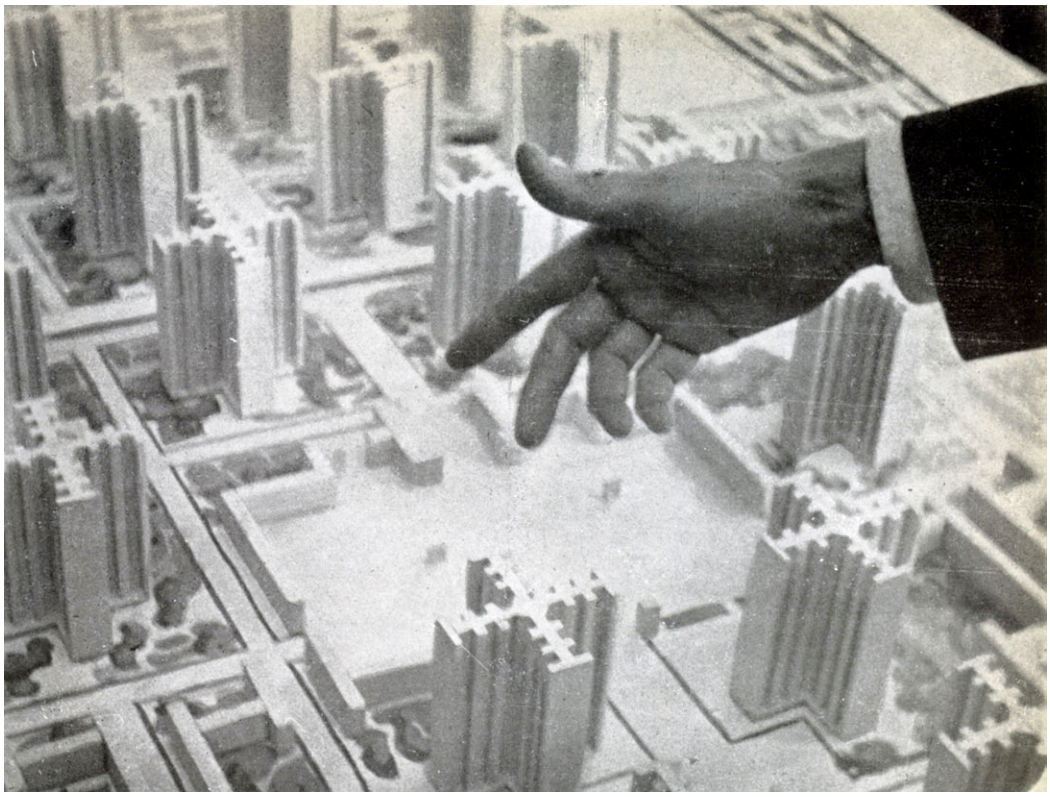


Figure 47. Le Corbusier, Plan Voisin, 1925; *a,* model; *b,* Le Corbusier's hand over the Plan Voisin model. Reprinted from Le Corbusier, *La Ville Radieuse*, 207, 135.

Figure 48. Le Corbusier, Ville Radieuse, 1930. Reprinted from Le Corbusier, *La Ville Radieuse*, 170.

a.

b.

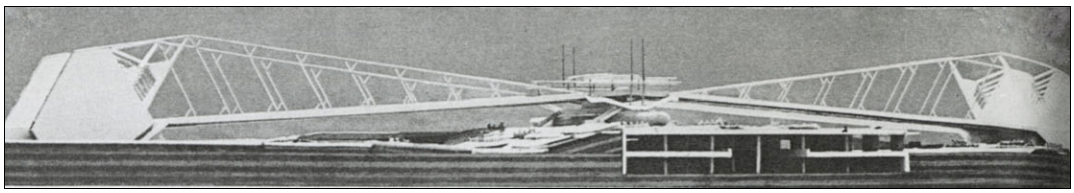
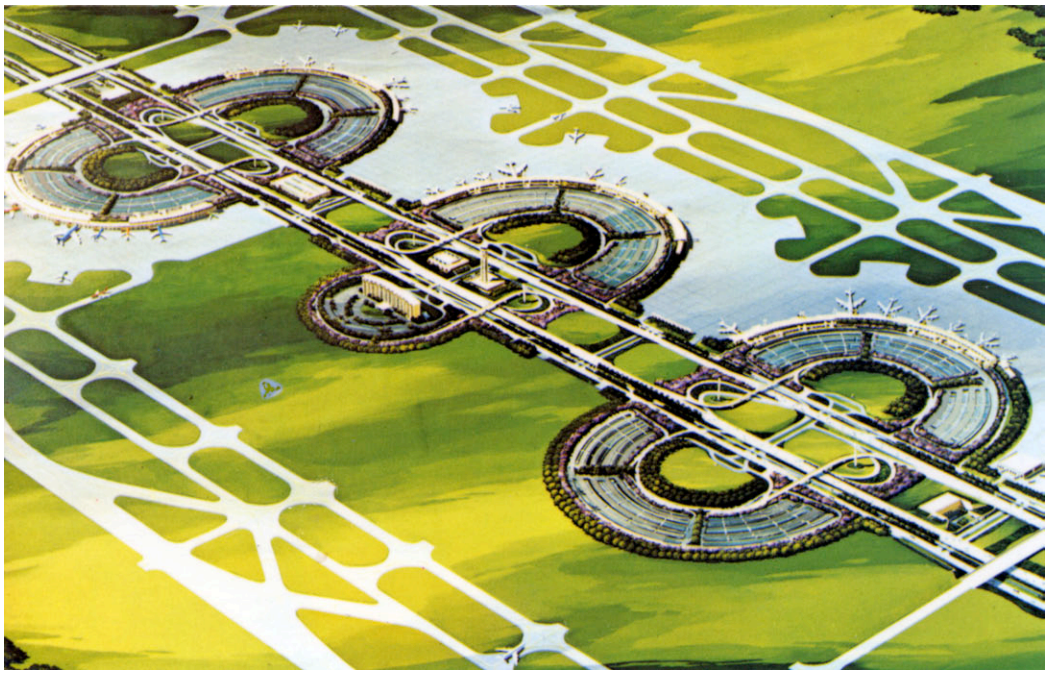


Figure 49. Frank Lloyd Wright, Broadacre City, 1934-35: *a,* drawing showing aerotors; reprinted from Wright, *The Living* City, 181; *b,* bridge pass over Broadacre City's main arterial. Reprinted from *The Architectural Record* 77 (April 1935), 246.

a.



b.

Figure 50. Dallas-Fort Worth International Airport, 1965-73, Dallas, Texas: *a,* site design by Tippetts-Abbett-McCarthy-Stratton, architects; *b,* terminal design by Helmuth, Obata, Kassabaum, with Brodsky, Hopf and Adler, architects.

Figure 51. Airtrans, the automatic intra-airport transit system at Dallas-Fort Worth International Airport. LTV Aerospace Corporation, manufacturer.

Figure 52. Terminal City plan, Idlewild, New York International Airport (now John F. Kennedy International Airport), c. 1957. Wallace K. Harrison, architect.

a.

b.

Figure 53. International Arrivals Building, 1957, Idlewild, New York International Airport; Skidmore, Owings, and Merrill, architects: *a,* landside view showing central control tower and administrative offices, arched arrivals hall, and foreign airlines wings; *b,* Customs Hall and second floor Spectators' Lounge.

Figure 54. American Airlines Terminal, 1960, Idlewild, New York International Airport. Kahn & Jacobs, architects.

a.

b.

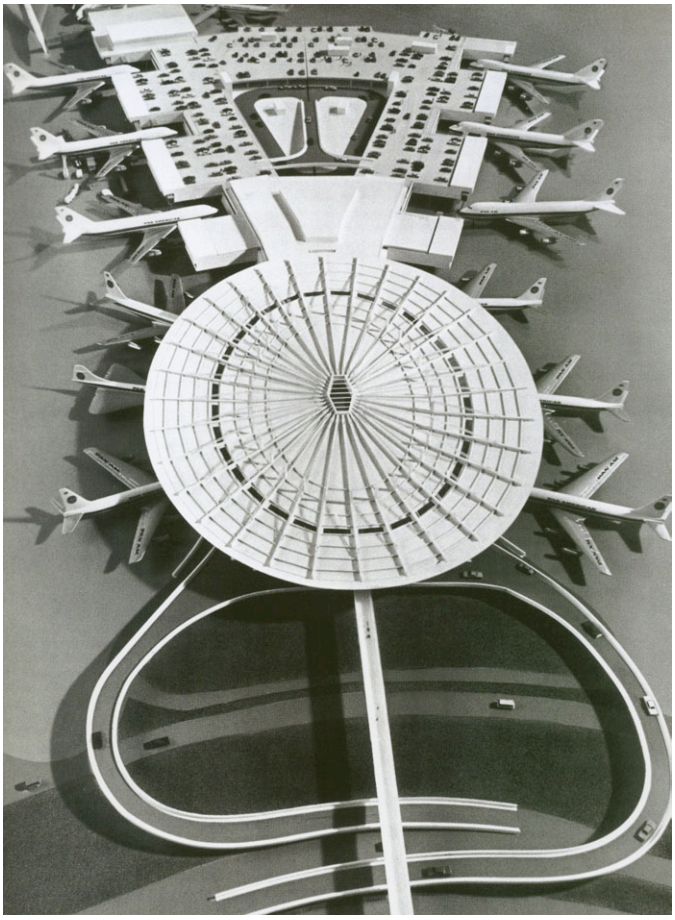


Figure 55. Pan American Airways Terminal, Idlewild, New York International Airport; Tippetts-Abbett-McCarthy-Stratton, architects: *a,* 1960 terminal; *b,* 1973 Worldport; courtesy of Aviation Picture Library.

a.

b.

Figure 56. Trans World Airlines Flight Center, 1962, Idlewild, New York International Airport; Eero Saarinen and Associates, architects, with Ammann & Whitney, structural engineers: *a,* landside view; *b,* information desk in main lobby from a TWA advertisement, *Time*, 15 February 1963, inside cover.

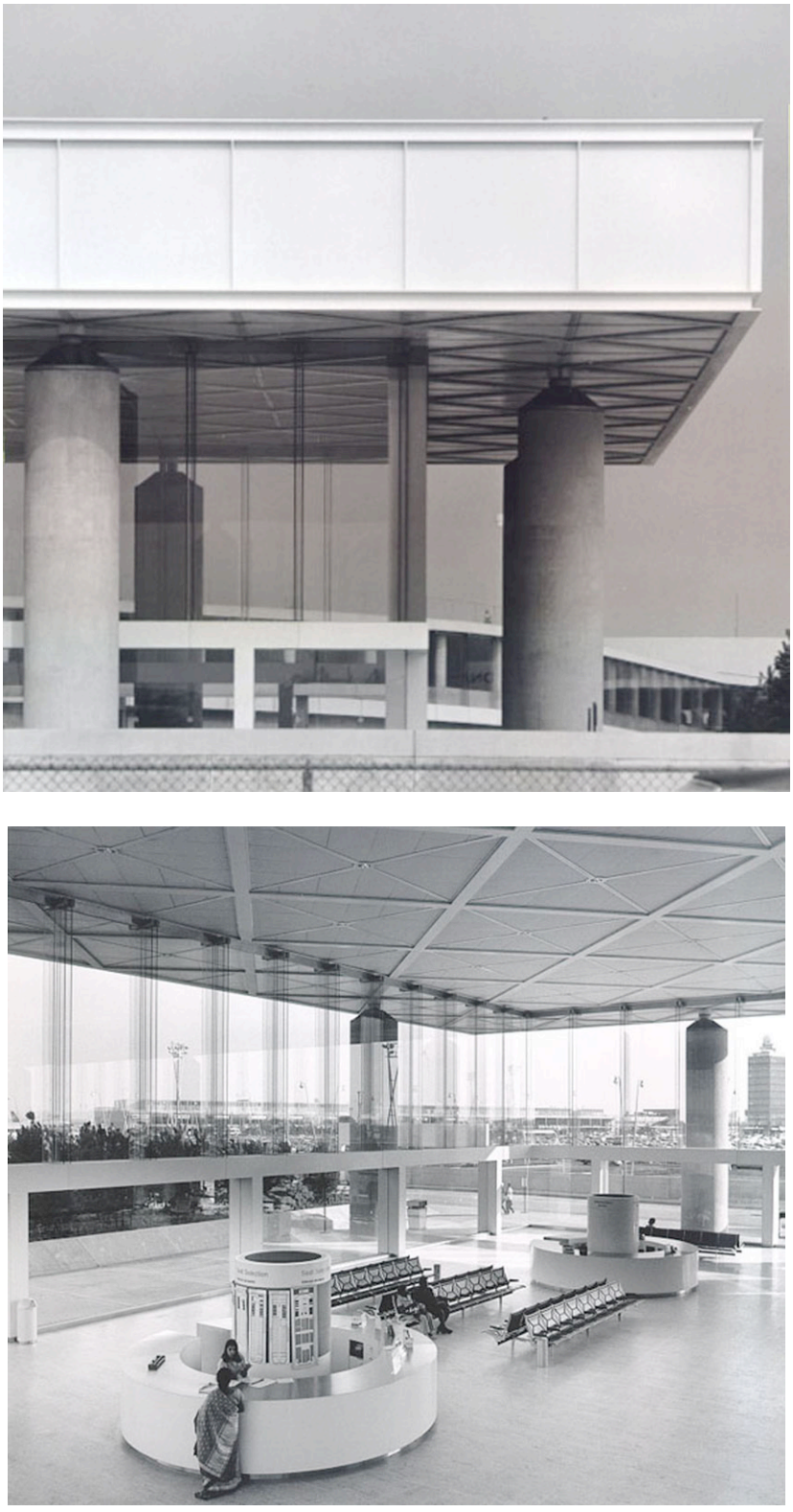
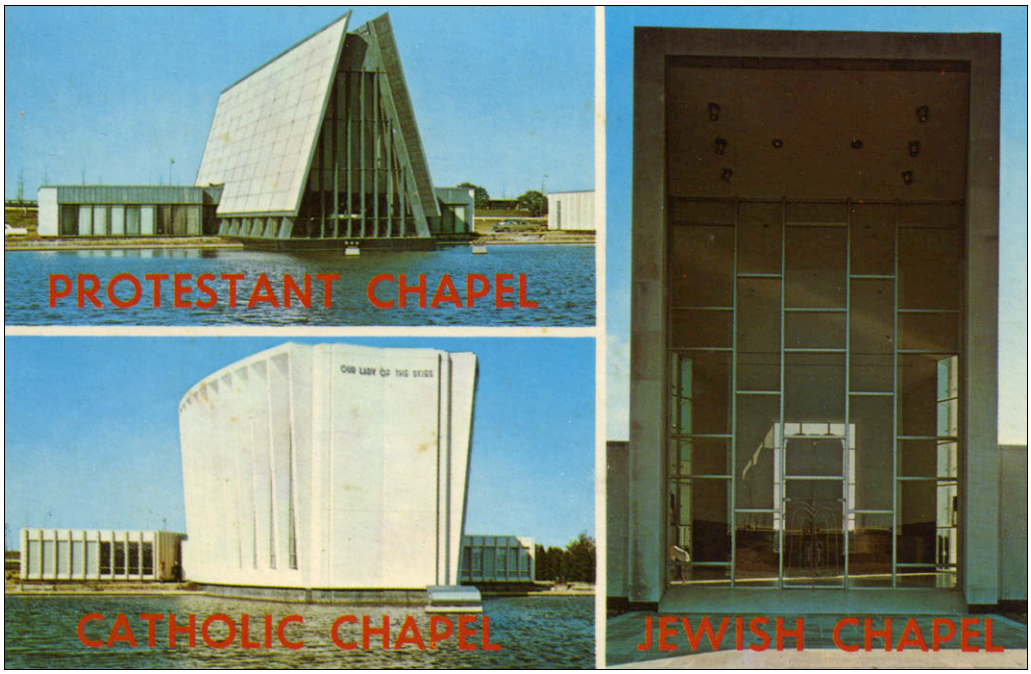


Figure 57. National Airlines Sundrome, completed 1970, John F. Kennedy International Airport, New York. I.M. Pei, architect. Images from Pei Cobb Freed & Partners, available from http://www.pcf-p.com/a/p/6223/s.html; Internet; accessed 28 August 2006.

a.



b.

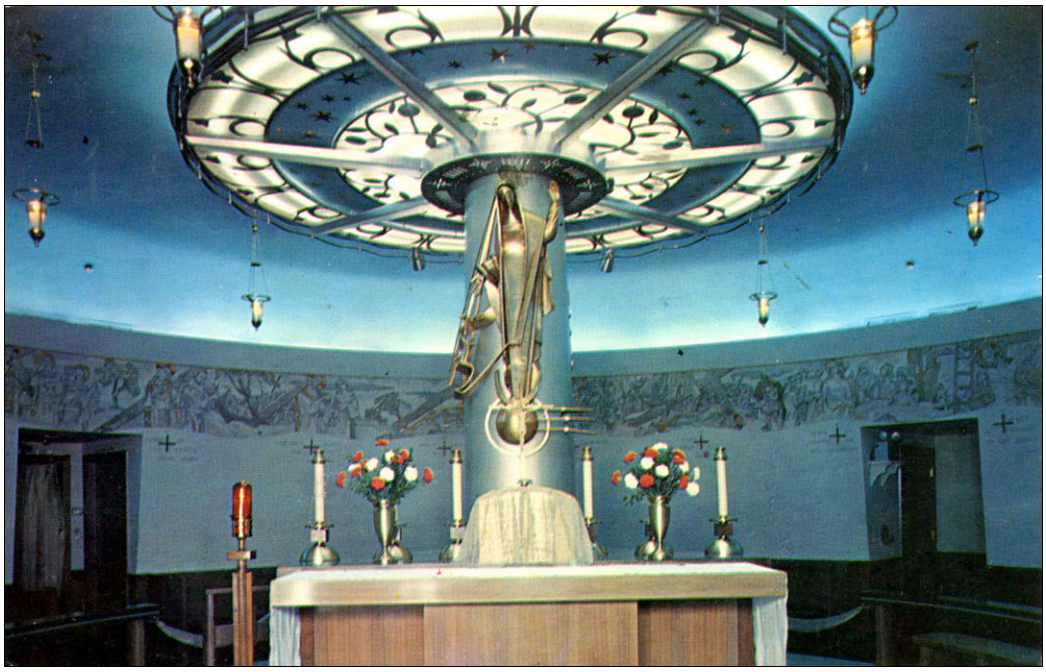
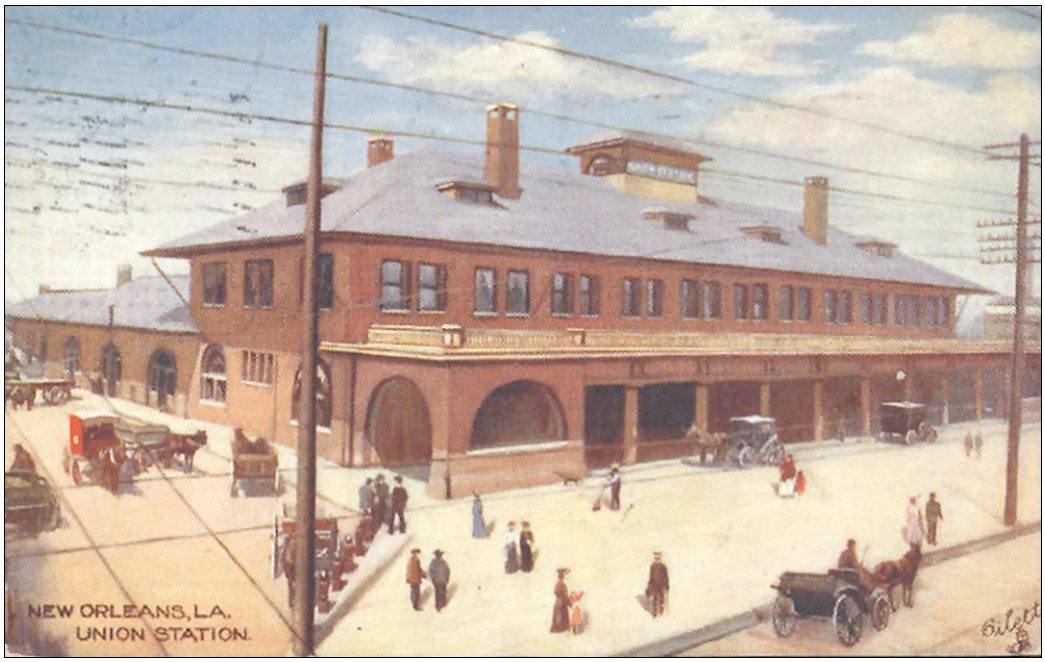


Figure 58. Airport chapels: *a,* Tri-Faith Chapels, completed 1966, John F. Kennedy International Airport, New York; Bloch and Hesse, architects; *b,* Chapel of Our Lady of the Airways, Logan International Airport, Boston, Massachusetts, dedicated 1952, postmarked 1953.

a.



b.

Figure 59. The main passenger rail stations in New Orleans until 1954: *a,* Illinois Central Union Station, 1891-92; Alder & Sullivan, architects (postmarked 1909); *b,* Southern Railway Terminal Station, 1908, (postmarked 1909); Daniel H. Burnham, architect.

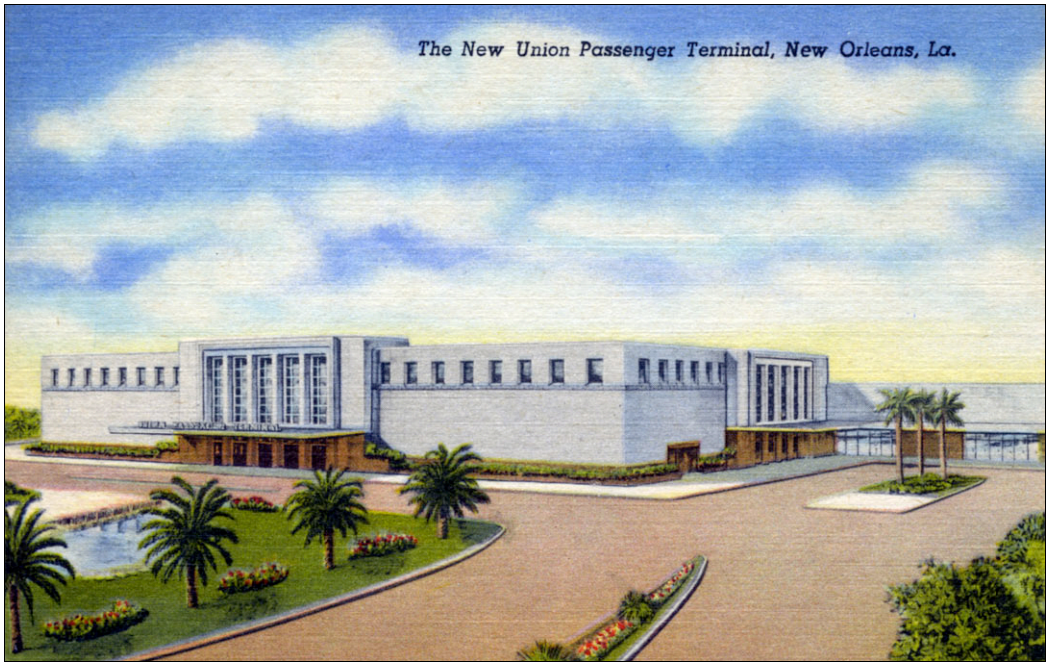


Figure 60. New Orleans Union Passenger Terminal (NOUPT), 1954.

a.

b.

Figure 61. Lambert-St. Louis International Airport, 1951-56, St. Louis, Missouri; Hellmuth, Yamasaki and Leinweber, architects: *a,* landside view of terminal; *b,* main concourse.

a.

b.

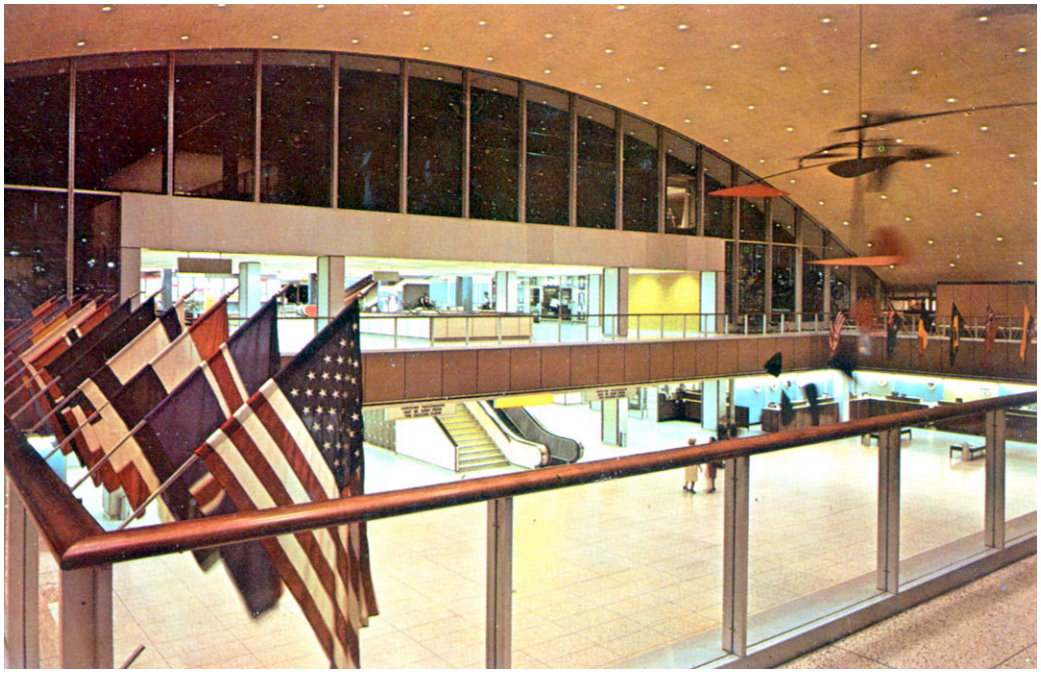
Figure 62. Airport seating: *a,* Nelson Chair in Lambert-St. Louis International Airport, c. 1956; George Nelson, designer; Herman Miller Company, manufacturer; reprinted from *Architectural Record* 119 (April 1956), 199; *b,* Tandem Sling seating in Washington Dulles International Airport, 1962; Charles and Ray Eames, designers; Herman Miller Company, manufacturer; photograph by Ezra Stoller.

a.

b.

Figure 63. American Airports showing the use of concrete shell roofs: *a,* Spokane International Airport, 1965, Spokane, Washington; Warren C. Heylman, architect; *b,* Atlanta International Airport (now Hartsfield-Jackson Atlanta International Airport), 1961, Atlanta, Georgia; Ed Moulthrop of Robert and Company, architect.

a.



b.

Figure 64. Mobiles in airport terminals: *a,* Alexander Calder, *.125,* 1957, Gateway Area of International Arrivals Building, Idlewild, New York International Airport (now John F. Kennedy International Airport); *b,* Alexander Calder, *Pittsburgh,* 1958 (repainted), Greater Pittsburgh Airport (now Pittsburgh International Airport).

a.

b.

Figure 65. Braniff International Airways *Flying Colors* fleet; Alexander Calder, artist: *a, Flying Colors,* c. 1973; courtesy of Aviation Picture Library; *b, Flying Colors of the United States* in foreground, c. 1976.

a.

b.

Figure 66. Tati's Paris: *a,* Still from *Playtime,* 1967, Jacques Tati, director; *b,* Orly Airport, 1963, Paris, France; Henry Vicariot, architect.

a.

b.

Figure 67. Examples of International Style air terminals in the United States: *a,* Theodore Francis Green Airport, 1961, Warwick, Rhode Island; *b,* Greenville-Spartanburg Airport, 1962, Greer, South Carolina; Skidmore, Owings and Merrill, architects.

Figure 68. Tulsa International Airport, 1961, Tulsa, Oklahoma; Murray-Jones-Murray, architects; and the Farnsworth House, 1946-51, Plano, Illinois; Ludwig Mies van der Rohe, architect (photograph by Peter G. Palumbo).

a.

b.

Figure 69. Postcards showing view from air terminal interior: *a,* Monroe County Airport, c. 1953, Rochester, New York; *b,* Newark International Airport, c. 1965, Newark, New Jersey.

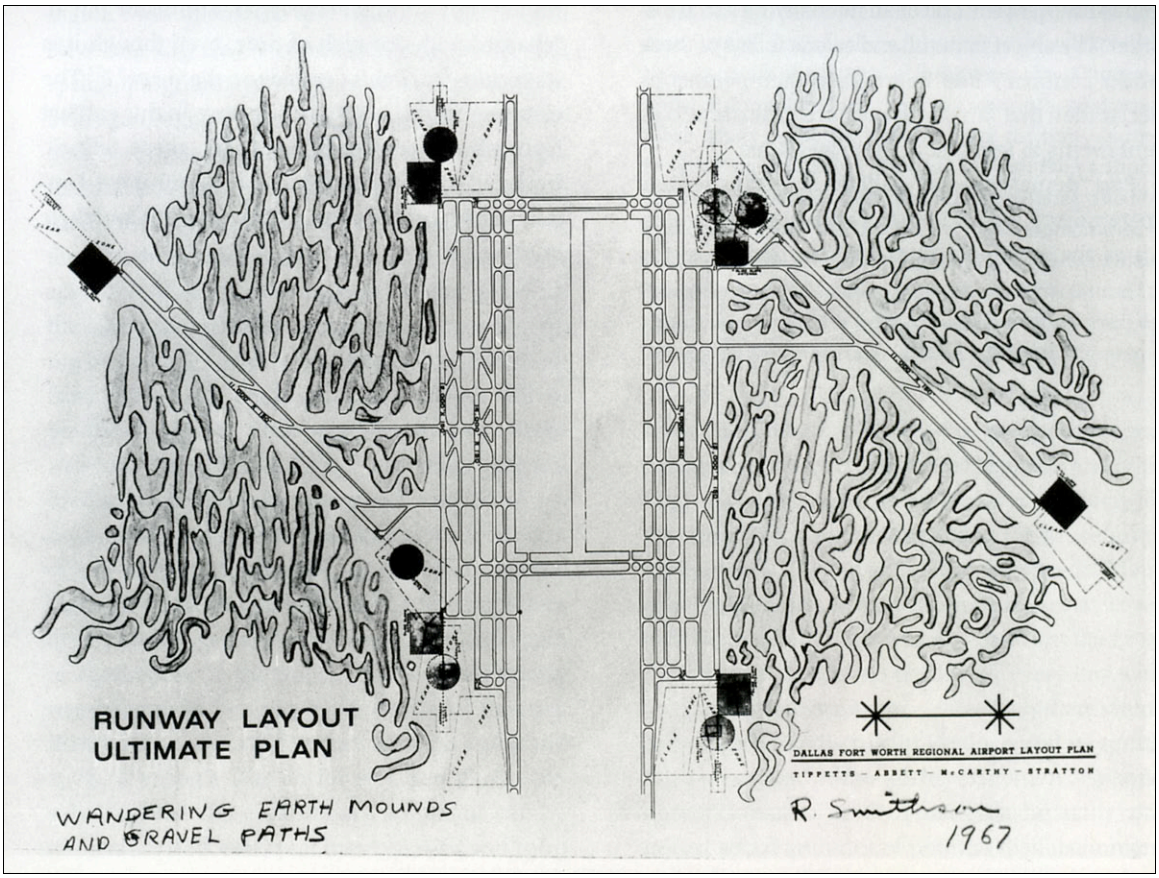
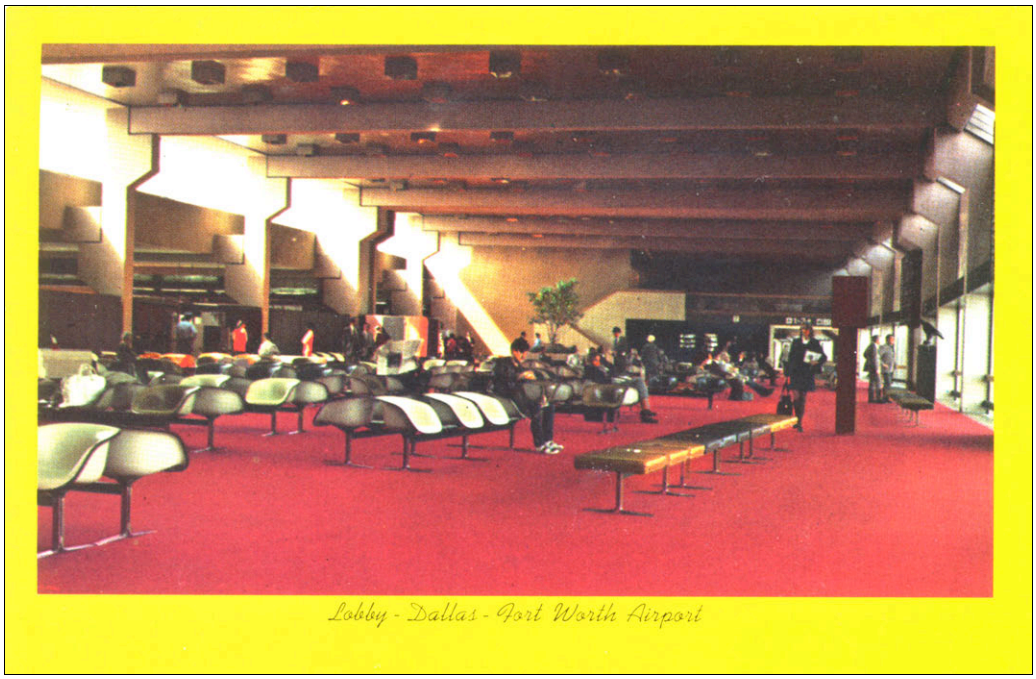


Figure 70. Robert Smithson, *Wandering Earth Mounds and Gravel Paths,* 1967. Blueprint with collage and pencil, 15 1/2 x 11 in. Reprinted from Boettger, *Earthworks*, 44.

a.



b.

Figure 71. Airport interiors: *a,* Dallas-Fort Worth International Airport, terminal design by Helmuth, Obata, Kassabaum, with Brodsky, Hopf and Adler, architects, c. 1974; *b,* Hopkins Airport, Cleveland, Ohio, 1970s.

a.

b.

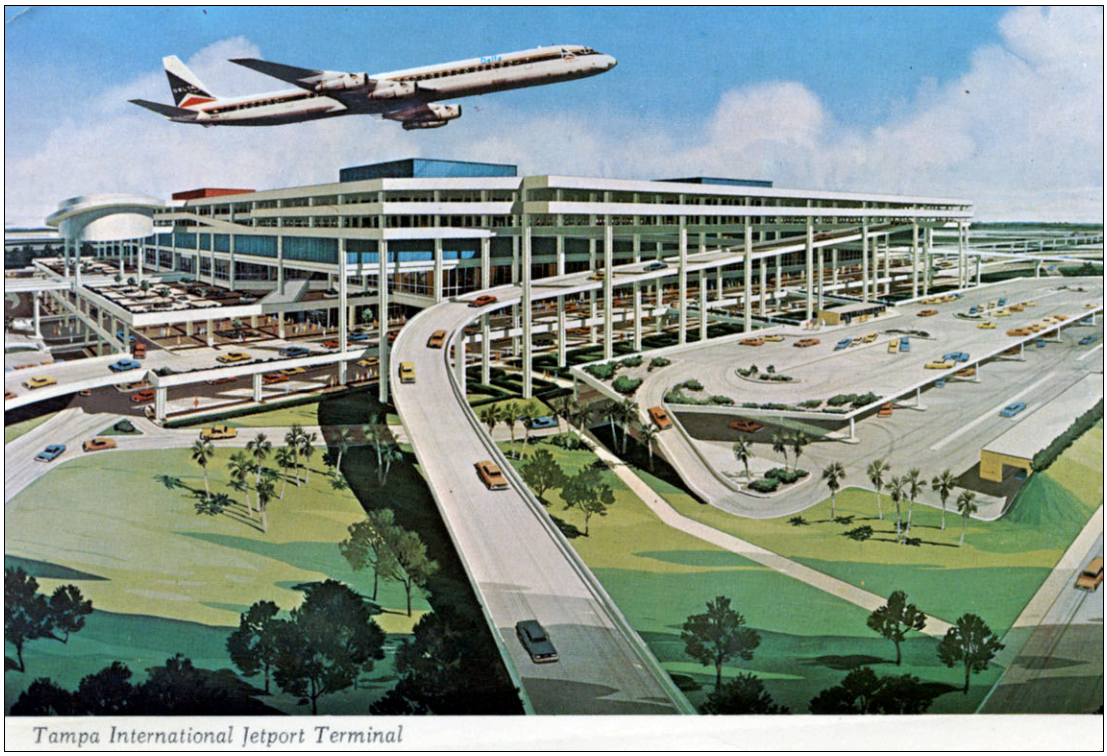


Figure 72. Tampa International Airport, 1971, Tampa, Florida; Reynolds, Smith and Hills, architects: *a,* aerial view with FAA Air Traffic Control Tower in center designed by James Ingo Freed of I.M. Pei Associates; *b,* landside terminal.

a.

b.

Figure 73. Tampa International Airport: *a*, Automated People Mover car entering landside terminal; Westinghouse Electric Corporation, manufacturer; *b,* interior of landside terminal.

a.

b.

Figure 74. Airports following the example of Tampa International: *a,* Orlando International Airport, Florida, north terminal complex, 1978-81; KBJ Architects; postmarked 1983; *b,* Seattle-Tacoma International Airport, Washington, 1968-73; The Richardson Associates, architects.

Figure 75. “Absolut Atlanta” advertisement, 1992. TBWA Advertising, New York.

Figure 76. United Airlines Terminal 1 at O'Hare International Airport, 1983-88, Chicago, Illinois. Helmut Jahn of Murphy/Jahn, architect. Courtesy of Architectural Press archive.

Figure 77. Michael Hayden, *Sky's the Limit,* 1987, 744' long neon light sculpture in underground walkway between Concourses B and C of Terminal 1, O'Hare International Airport, Chicago, Illinois. Courtesy of Architectural Press archive.

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