INTRODUCTION

The shapes and fates of cities have always been defined by transportation. Today, this means air travel.

Stan Gale was exultant. The chairman of Gale International yanked off his tie, hitched up his pants, and mopped the sweat and floppy hair from his brow. He beamed like a proud new papa, sprung from the waiting room and handing out cigars to whoever happens by. Beckoning me to follow, he sauntered across eight lanes of traffic toward his baby, New Songdo City, delivered prematurely days before.

Ten years ago, Gale was a builder and flipper of New Jersey office parks. But his fate began to change in 2001 with a phone call from South Korea. The Korean government had found his firm on the Internet and made an offer everyone else had refused. The brief: Gale would borrow $35 billion from Korea's banks, partner with its biggest steel company, and use the money to build from scratch a city the size of downtown Boston, only taller and denser, on a muddy man-made island in the Yellow Sea. When Gale arrived to see the site, it was miles of open water. He signed anyway.

New Songdo won't be finished until 2015 at least, but in August 2009, Gale cut the ribbon on its hundred-acre Central Park modeled, like so much of the city, on Manhattan's. Climbing on all sides is a mix of low-rises and sleek spires—condos, offices, even South Korea's tallest building, the 1,001-foot Northeast Asia Trade Tower. Strolling along the

park's canal, we heard cicadas buzzing, saws whining, and pile drivers pounding down to bedrock. I asked whether he'd stocked the canal with fish yet. "It's four days old!" he spluttered, forgetting he wasn't supposed to rest until the seventh.

As far as playing God (or SimCity) goes, New Songdo is the most ambitious instant city since Brasília appeared fifty years ago. Brasília, of course, was an instant disaster: grandiose, monstrously overscale, and immediately encircled by slums. New Songdo has to be much better, because there's a lot more riding on it than whether Gale can repay his loans. It has been hailed since conception as the experimental prototype community of tomorrow. A green city, it was LEED certified from the get-go, designed to emit a third of the greenhouse gases of a typical metropolis its size. It's supposed to be a "smart city" studded with chips talking to one another, running the place by remote control. Its architects borrowed blueprints from Paris, Sydney, Venice, and London, sketching what might become the prettiest square mile in Korea. (Nearby Seoul is a forest of colossally ugly apartment blocks.)

New Songdo isn't so much a Korean city as a Western one floating offshore. Smart, green credentials aside, it was chartered as an "international business district"—a hub for companies working in China. Worried about being squeezed by its neighbors, New Songdo is Korea's earnest attempt to build an answer to Hong Kong. To make expatriates feel at home, its malls are modeled on Beverly Hills', and Jack Nicklaus designed the golf course. But its most salient feature is shrouded in perpetual haze opposite a twelve-mile-long bridge that is one of the world's longest. On the far side is Incheon International Airport, which opened in 2001 on another man-made island and instantly became one of the world's busiest hubs.

"They tracked us down, wanted us to build a city in the ocean, and no one else was interested? *What was going on here?*" Gale told me, still dazed. "Their vision scared everyone else away. It wasn't until I saw the airport that I understood where they wanted to go with this." China. His sales pitch to prospective tenants is simple: move here, and you're only a two-hour flight away from Shanghai or Beijing, and four hours away at most from cities you've never heard of, like Changsha. Chairman Mao's hometown happens to be larger than Atlanta or Singapore. Nearly a billion people are a day trip away. When Stan Gale looks at a departure

board, he sees a treasure map. And when he gazes upon his creation, he sees potentially dozens of new cities, each next to a dot on that map.

"There's a pattern here, repeatable," he said that summer, stunning his partners with plans to roll out cities across China, using New Songdo as his template. Each will be built faster, better, and more cheaply than the ones that came before. "It's going to be a cool city, a smart city!" he promised. "We start from here and then we are going to build twenty new cities like this one, using this blueprint. Green! Growth! Export!" Their jaws dropped. "China alone needs five hundred cities the size of New Songdo," Gale told me, and he is planning to break ground on the next two. How many will be umbilically connected to the nearest airport? "All of them."

To the jaundiced American eye, New Songdo and its clones might appear to be fantasies left over from the Bubble. But dismissing them as the product of Asia's infatuation with all things mega misses the carefully calibrated machinery underneath. It's a machine the rest of us ignore at our peril as we enter the next phase of globalization—one marked by the shift from West to East and the trade routes up for grabs in between. It even has a name, which Stan Gale pronounced for me with a flourish: "It's an *aerotropolis*."

It isn't his word. The man who taught it to him is John Kasarda, a professor at the University of North Carolina who has made a name for himself with his radical (and some might say bone-chilling) vision of the future: rather than banish airports to the edge of town and then do our best to avoid them, we will build this century's cities around them. Why? Because people once chose to live in cities for the wealth of connections they offered socially, financially, intellectually, and so forth. But in the era of globalization, we choose cities drawing closer together themselves, linked by fiber-optic cables and jet aircraft. Stan Gale is simply taking this idea to its conclusion, building a network of instant ones joined by their airports.

Many aerotropoli will evolve out of the cities we already call home— only their highways and byways will lead us to terminals instead of downtown. For instant ones like New Songdo, Kasarda has drafted a set of blueprints replete with air trains and "aerolanes" connecting prefab neighborhoods and business districts. They range in size from a few thousand residents to a few million. Aerotropoli designed according to his

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principles are under way across China, India, the Middle East, and Africa, and on the fringes of cities as desperate as Detroit and as old as Amsterdam. In Kasarda's opinion, any city can be one. And every city should be.

The aerotropolis represents the logic of globalization made flesh in the form of cities. Whether we consider it to be good or simply inevitable, the global village holds these truths to be self-evident: that customers on the far side of the world may matter more than those next door; that costs must continually be wrung from every piece of every business in a market-share war of all against all; that the pace of business, and of life, will always move faster and cover more ground; and that we must pledge our allegiance if we want our iPhones, Amazon orders, fatty tuna, Lipitor, and Valentine's Day roses at our doors tomorrow morning. If the airport is the mechanism making all of these things possible, Kasarda reasons, then everything else—our factories, offices, homes, schools—will be built accordingly. The aerotropolis, he promises, will be a new kind of city, one native to our era of instant gratification—call it the Instant Age.

The Man with the Plan

If, thirty years ago, John Kasarda had tried telling a mayor to build his city around the nearest airport, the mayor would have told Kasarda he was crazy, and he would have been right, judging by the available evidence. Looking back now, however, the aerotropolis seems inevitable, at least when we stop to consider what a city is, what we want from it, and what we gain from living in one.

I first met him in his office, surrounded by model planes received as gifts from one foreign delegation or another. The only other place I've ever seen him is in an airport. You have too, I bet, floating in your peripheral vision: delayed in Hong Kong's, laying over in London's, or maybe wending his way through customs at New York's JFK, back from Bangkok or one of his conferences in Beijing. He's the one in the noniron shirt and wrinkle-free suit, jet lag stamped on his face. He's flown more than three million miles in the last quarter century—farther than any of the men who set foot on the moon. He's up in the air two months a year, flying far enough to circle the globe a half-dozen times. But his numbers are

barely half of his peers'. He blends in with all the middle-aged men in first class whom you pass on your way to coach, because he's one of them—the traveling salesmen recognize him, academic posting or no, as one of their own. They're his tribe.

Kasarda's mother tongue is academic jargon leavened by the argot of business bestsellers. Chat him up at the gate and he'll spit out long strings of professorial verbiage about "spatial friction," "sustainable competitiveness," and "the physical Internet." Listen closely enough, however, and the technobabble crystallizes into themes that have obsessed him since his teens: our lot in life is shaped by circumstance; our fates are not necessarily ours to choose.

He knew this instinctively growing up in Wilkes-Barre, Pennsylvania, near the end of King Coal's reign in the 1950s. He was thirteen when the miners dug upward into the Susquehanna's riverbed, which then collapsed. A dozen died, sixty-nine others escaped, and he watched the survivors fail to plug the ensuing whirlpool. "We knew this was the end," Kasarda recalled. "They couldn't change that, no matter what they did." Their fate was sealed long before the flood.

At Cornell, where he studied economics as an undergraduate and simultaneously earned an M.B.A., he clashed with professors more interested in defining deviancy than in divining the order of things. One instructor sneered at his apostasy, comparing him to Amos Hawley, the dissident who developed the field of "human ecology" to ask the big-picture questions his colleagues wouldn't touch. How do we adapt to our environments? How does this shape the way we start families, build cities, launch companies, found institutions? And how do these, in turn, determine how we see the world? So Kasarda followed Hawley to the University of North Carolina and set to work disassembling the machinery of everyday life. He became a professor himself at the University of Chicago in 1971.

He hadn't seen any hints of the aerotropolis yet. It would be another two years before Frederick W. Smith moved home to Memphis with his start-up Federal Express in tow. Its airport was typical of the time, with two stubby runways too short for the new 747s, and its most frequent fliers belonging to the Tennessee Air National Guard. If an airline wanted to fly to Chicago, it needed permission from the government; if you wanted to, you called your travel agent, because the Internet was then still just a science experiment.

Twenty years later, by now a professor at North Carolina's Kenan-Flagler Business School, Kasarda had seen enough of NAFTA to know that factories were headed overseas, and call centers, branch offices, and that factories were headed overseas, and call centers, branch offices, and even headquarters would soon follow. They would all need to link up again somehow, and faster than before. "The Global Air Cargo–Industrial Complexes" was his first stab at explaining it in 1991, imagining factories lining the runways someday. FedEx saw these schematics and called seeking his help—it was grappling with something called e-commerce. Amazon.com and its ilk didn't exist at the start of the nineties, but by the end they had transformed both FedEx and Memphis. New business models begat new companies, new jobs, and a new way of life for the quarter of the city's one million residents now in orbit around the airport.

Plans for the aerotropolis sprang from Kasarda's head fully formed at the millennium as a way to explain this, control it, plan for it . . . and maximize it. Suddenly, he held the plans to build an airport that was more than just an airport, and the world beat a path to his door. Memphis called, wanting to double down and remake itself as "America's Aerotropolis." Detroit, searching for life after the Big Three, wondered if its airport held the answer. Kasarda's brainchild first made him a regular on the Chamber of Commerce luncheon circuit, then attracted offers to chair conferences, and then meetings with foreign ministers. Soon, he was being summoned to China, India, Taiwan, and Thailand, where he emerged from closed-door meetings with "aerotropolis" dripping from bureaucrats' lips. He is the rare scholar whose ideas have consequences, for whose ideas governments have staked billions of dollars on his instant cities and strategy. His vision draws on decades' worth of data showing the trend lines creeping steadily upward.

There is still a bull market for business gurus, and Kasarda's stock has steadily climbed as "competitiveness" became the idée fixe of not just CEOs but also mayors and presidents. The Econ 101 approach of "I'm a Mac" vs. "I'm a PC" doesn't hold water anymore. Half the battle in any market is now fought by invisible armies of suppliers, any of which might be arming both sides. "Individual companies don't compete," Kasarda told me. "Supply chains compete. Networks and systems compete." And so, it follows, do the cities and countries they call (for the moment) home.

Kasarda is probably shuttling between Taipei and Bangalore right now, following the herd whose paths he's already traced. Not that he's enjoying

it. The man hailed by trade ministers as the prophet of living our lives aloft is disinclined to fly, if only because he does so much of it. There's no irony in this. His finding isn't that we *should* take to the skies in a perverse reprise of the Jet Age, but that we must, or else this flat world we've gotten used to will remember its former shape.

You don't need to see New Songdo for a vision of this future. Visit Kasarda at home in Chapel Hill, which forms one side of the urban triangle that lends its name to Research Triangle Park. The park opened in 1959 as a magnet for high-tech talent, which was then in short supply. A few years later, IBM arrived with the first group of some eleven thousand employees. Monsanto, GlaxoSmithKline, and dozens of other companies followed, sloughing off pieces of themselves to Tobacco Road, a five-hour drive from Washington, six hours from Atlanta, but only an hour's flight from Manhattan. When Lenovo bought IBM's ThinkPad line six years ago, it moved its headquarters there from China. The CEO's office is exactly three minutes from the airport (I've timed it), and needs to be, considering how often he flies to Singapore and Beijing.

"Despite all the talk of the service economy, of health care and software as our national industries, ours is still a goods economy," Kasarda once explained to me. "Even most services are concerned with paying for goods. And the people performing those services need iPods and computers, which create manufacturing jobs somewhere—today, in China. Aside from education, entertainment, and health care, we consume very little in the way of pure services. And health care is increasingly about the goods given to the patients.

"A large and growing proportion of these goods moves internationally, as a consequence of trade and modern supply chains. Components are made in a dozen different countries and assembled in a thirteenth. They move by air either because there's an emergency, because it's too valuable to sit in a warehouse, or because it's perishable, like flowers, fish, and pharmaceuticals. All of this passes through a physical Internet, the network of hubs and planes for trading and transporting goods—and people—almost as quickly as the Internet itself. And it's arguably more important—the Web can't move your box from Amazon.

"The aerotropolis is the urban incarnation of this physical Internet; the primacy of air transport makes airports and their hinterlands the places to see how it functions—and to observe the consequences. The

three rules of real estate have changed from location, location, location, to *accessibility, accessibility, accessibility.* There's a new metric. It's no longer space; it's time and cost. And if you look closely at the aerotropolis, what appears to be sprawl is slowly evolving into a system reducing both. It's here where we can see how globalization will reshape our cities, lives, and culture."

Cities and Speed

"Don't tell anyone," the bomb-throwing architect Rem Koolhaas once said, "but the 20th-century city is over. It has nothing new to teach us anymore. Our job is simply to maintain it." He's right, but his secret didn't get out in time. New cities began climbing fast and furiously in Shanghai, Mumbai, and Dubai at precisely the moment we in the developed West lost faith in our ability to build one.

Humanity is officially an urban species—at this moment, more than half of us live in cities. The percentage is even higher in the developed world, but Africa and Asia are catching up. The number of city dwellers is expected to double by 2050 to more than six billion people—the number alive on earth right now. The number of megacities (those with a population of ten million or more) will increase from three in 1950 to twenty-seven by 2025, housing 450 million people among them. Stan Gale wasn't exaggerating: China really does need five hundred new cities the size of New Songdo, and another hundred cities of a million residents or more.

Who will pay for all this? The world's governments are poised to spend a staggering $35 *trillion* on infrastructure in the next two decades, the majority on transport and urbanism. The biggest build-out in human history will reset the global pecking order, as new flows of people and goods displace financial churn. Before the rise of the rest resumes in earnest, we must find cities' new form before their skylines are locked in place for another hundred years . . . or subsumed by slums.

We have always chosen to live in cities for the wealth of networks they create—the elaborate webs of kinship and commerce delivering sustenance and security. That promise hasn't changed since the agora and acropolis, but the size and scope of cities have. Cities grew by shrink-

ing the distances within and between them, using technology to expand their grids and cover more ground.

Lewis Mumford, cities' foremost historian, recognized them by their elements, many of which were in place by the time of the ancient Greeks and are still in use today: "the walled enclosure, the street, the house-block, the market," even the office. But Mumford confused the lobster with its shell. Cities molt and outgrow their shapes, regularly exploding into new ones when the opportunity arises, typically when a new form of transport arrives on the scene.

There will never be enough time in the day, but space is fungible; it can be overcome with speed. Karl Marx called it the "annihilation of space by time." Distance is less of an obstacle to daily life than it is a persistent friction on our ability to get things done, which we can measure by the time and effort involved in commuting from Point A to Point B. The sociologist Melvin Webber dubbed this idea "the elastic mile," because our perception of just how far a mile is shrinks as we move faster, leading Amos Hawley to note that we tend to live our lives within a sixty-minute radius from home. While that once meant a life maybe six miles wide, today it means a commute between Barcelona and London. And e-mail bound for customer service or colleagues in India is returned instantly.

Edge City author Joel Garreau declared, "Cities are always created around whatever the state-of-the-art transportation device is at the time." When the state of the art is shoe leather and donkeys, the result is the hilly paths of Jerusalem. When it's men on horseback and sailing ships, it's the ports of Lisbon, Hong Kong, or Boston, and the canals of Venice and Amsterdam. The birth of the railroad produced Kansas City, Omaha, and the stockyards of Chicago. And the mass production of the Model T led first to Los Angeles and later to Levittown. Today, the modern combination on the ground is the automobile and Internet, yielding Garreau's exurban "edge cities," which are everywhere and nowhere within America, and have since cropped up in Bangalore and beyond. Soaring above them all are jet aircraft—first put into service sixty years ago, at the onset of the Jet Age—collapsing the distance between Dallas and Dubai as effortlessly as the Internet nodes connecting them. "Because of the airport," Garreau says, "it's possible to imagine a world capital in a place that was once an absolute backwater—a Los Angeles or a Dallas appearing in an utterly improbable location, [like] Bangkok."

The capitals of each era were cities native to them. Venetian ships ruled the Mediterranean and Dutch ships the oceans, briefly, from their home harbors, making their docks the centers of Western civilization. Chicago broke all records for urbanization during the back half of the nineteenth century, absorbing two million residents drawn to the factories surrounding its railroad stations, the de facto gateways to the American West. Los Angeles and its highways became the template for the suburban good life, while Silicon Valley's bandwidth enabled the Internet boom and the largest legal accumulation of wealth in history. Each one was a function of the fuel that fed it, whether wind or peat or coal or oil. *Especially* oil. The gravest threat to cities is the prospect of their pipelines of cheap oil running dry. Without oil, or a substitute that burns cleaner and just as brightly, the next form of cities may depend on the oxcart.

In every case, as the friction posed by space has decreased, cities have become less dense and contiguous and grown more dispersed, networked, and fluid. In the Net Age, this fluidity promised (or threatened) to become extreme—in theory, those of us who make our living with computers could live anywhere. No one has preached this vision more fervently than the technologist George Gilder, whose utopia of the "telecosm" and infinite bandwidth has us scattering back into the countryside to live like Jeffersonian gentlemen-farmers, with Facebook serving as the village green.

But total dispersion hasn't come to pass, and it won't, no matter how much bandwidth we're able to route through our iPhones. In fact, the same technologies that were supposed to disaggregate us have only made concentration more useful. We're becoming more urban at precisely the moment our outlook is growing more global. We keep an eye on the street and a cell phone to our ears, somehow managing to be in both places at once. The same thing is happening at a macro level too. The hinterlands of Los Angeles, for example, aren't California's Central Valley or the high Mojave Desert but the outlands of Seoul, Hong Kong, and Mexico City. Webber's elastic mile has stretched so far we're now turning ourselves inside out, crowding closer together so we can scatter across continents on a moment's notice. The product of the Jet Age and the Net Age is our current Instant one, simultaneously favoring aggregation *and* dispersal.

This is where John Kasarda comes in. With the aerotropolis, he at-

tempts to answer the question of what the cities of this age should look like. What will their shape and purpose be when the state of the art at the time of their birth is ubiquitous WiFi and jumbo jets shuttling from New York and London to them? Implicit in his thinking is a coming world of exponential population increase and cutthroat competition for resources and profits. His vision may evoke everything Americans find terrifying about globalization—a civilization cast in quick-drying cement, packed with worker drones—but even if you accept Kasarda's seemingly implacable logic, you have to ask: Who are these cities for? The companies that profit from marginally leaner operations? The leaders, each one a little more ruthless than the last, jockeying to land them? Or the planners, architects, and sages given carte blanche to raise islands from oceans and plant tarmac in desert—all in the name, when pressed, of "competitiveness"?

Cities have always sprouted at the junctions of commerce and industry, coalescing over time as we followed our callings to them. No one has ever succeeded in building one from scratch out of pure anticipation, following a logic that makes perfect sense on paper but falls apart in practice. What makes Kasarda and his fellow travelers think the aerotropolis will be any different, and will we—its potential residents—fare the worse for it if they fail—or if they succeed?

This book aims to answer such questions and to ask whether we will consciously choose to live in cities built in globalization's image—machines for living linked in great chains and tasked with specific functions: factories, farms, headquarters, hospitals, and hubs. Kasarda believes that we will, that we should, and that we'll suffer the consequences if we don't, because these debates have already been settled (one way or another) in places like China and Dubai, which have staked everything on the global triumphing over the local. The rest of us are not so sure.

The Heathrow Hassle: "Our Prosperity Depends on It"

There's a video on YouTube of London Heathrow titled *The World's Unofficial Longest Line.* Set to the Proclaimers song "500 Miles," the clip starts at the head of a line waiting to enter a security checkpoint and

pans back, *waaaaay* back, for several minutes—through the concourse, down a flight of stairs, along twisting corridors, up another flight of stairs, and emerging in an entirely different terminal before stopping at the end of the line. This bravura sequence, worthy of Orson Welles, is just one entry in an entire genre online. Each snippet bears the same warning: Abandon all hope, ye who enter here . . .

Heathrow was voted the worst airport in the world by passengers in 1982, and still was in 2009. In the meantime, the ground beneath the pair of runways became the world's most valuable piece of real estate. Owning rights to land there is worth incalculable billions to the airlines, which horse-trade a hard and fast number of slots among themselves for millions of pounds each. They have no choice but to pay up—Heathrow is the closest thing we have to a truly global hub. And it's falling apart.

Like most cities, London has an airport problem—it's a victim of its own success. Heathrow's terminals aren't crumbling from neglect but buckling under once unimaginable growth. Almost seventy million passengers endure its lines annually, twenty-five million more than the airport was made for. The sparkling Terminal 5 has since relieved some of the stress, twenty years after it was first suggested.

The "Heathrow hassle" has long been a painful fact of life for Britons, but in 2007 the most damning criticism of all came from an unlikely quarter: Kitty Ussher, a member of Parliament and City minister, London's equivalent to the mayor of Wall Street. In her first day on the job, Ussher warned that the Heathrow hassle was not only intolerable; *it was also a threat to the entire U.K. economy.* The bankers who had made London a world financial capital would rather pack up and leave, she intimated, than suffer a horrid airport. And after the bust, they quit flying—and started leaving—in droves.

"Heathrow does shame London," scolded Ken Livingstone, then the city's mayor. "It's typical of the English disease of short-termism with a lack of planning and lack of investment." Livingstone dreamed of London as a multicultural capital of the world, a virtual city-state within Britain. "A Singapore of the West," he called it. Ironic, considering the former British colony—the air hub of Southeast Asia—is poised to supplant it as a financial center.

He should have directed some of his scorn beyond the terminals, to the clogged motorways and suburban sprawl hemming Heathrow in. The

real threat to London's competitiveness wasn't the world's unofficial longest line at security but irreparable harm to the "Heathrow phenomenon" that has made west London and the Thames River Valley an economic engine in their own right comparable in output to Sydney. "A landscape which most people affect to loathe but which I regard as the most advanced and admirable in the British Isles, and a paradigm of the best that the future offers us," wrote the science-fiction author J. G. Ballard, a resident of the valley for forty-nine years. "I welcome its transience, alienation and discontinuities, and its unashamed response to the pressures of speed, disposability and the instant impulse."

The growth of that engine has created problems of its own. The airport's slow suffocation is visible—the number of destinations served has fallen by 20 percent over the last two decades, and no European airport hemorrhaged more routes during the recession. The multinationals based there have hinted they are looking to leave. In 2008, the British government announced plans to build a third runway, evoking screams of protest. Prime Minister Gordon Brown was unmoved. "We have to respond to a clear business imperative and increase capacity at our airports," he said. "Our prosperity depends on it: Britain as a world financial centre must be readily accessible from around the world." The idea that its preeminent international gateway could muddle through with just two runways was as absurd as digging the Chunnel wide enough for only one set of tracks.

In January 2009, Brown's transport secretary gave his final approval. The entire neighboring village of Sipson would vanish beneath a mile of tarmac, joining its twin hamlet Heath's Row, which was entombed in 1944. "I got married in the local church. My children were born here. Our family home is here," one resident lamented. "All of my family history will be buried under concrete."

Vowing no surrender, Greenpeace bought a patch of land in the middle of the proposed runway. "I don't understand how any government remotely serious about committing to reversing climate change can even consider these ridiculous plans," sniped the actress Emma Thompson, one of several celebrities who supplied the money. Brown's supporters wondered the same thing; a sizable fraction of his party opposed expansion on environmental grounds. The day of the announcement, the MP representing Sipson was dragged out of Parliament shouting, "It's a disgrace to the democracy of this country!"

Sipson received a stay of execution a year later, when Britain's High Court declared the plan "untenable" in light of climate change. The town's final deliverance came in the May 2010 general elections, which deposed Gordon Brown's Labour Party in favor of a coalition of Conservatives and Liberal Democrats. The new prime minister, David Cameron, scrapped the third runway within days, while ruling out expansion at London's other airports, Gatwick and Stansted. His government vowed to curb "binge flying" with new taxes, promising to build a new high-speed rail network across Britain instead. Meanwhile, London mayor Boris Johnson, the disheveled Tory toff who ousted the Socialist Livingstone, has talked up plans for an $80 billion replacement on a man-made island in the Thames estuary—unlikely considering the new government's intransigence.

The nonpartisan Town and Country Planning Association pleaded with Tony Blair's government to "retire" the airport altogether and plan a successor somewhere far beyond the suburbs. "Heathrow's history is a series of minor planning disasters that together make up one of the country's truly great planning catastrophes," the group declared. It had been a victim of the law of unintended consequences from the moment it opened out of an army surplus tent in 1946.

That was all in hindsight. Decades passed with Heathrow up and running before anyone—airline, architect, mayor, or prime minister—realized that while cities grow organically, airports cannot. They would learn their lesson through trial and error. The airports we have learned to live with (and despise) are stuck serving 747s that weren't even on the drawing board when their runways were laid. Imagine trying to run our wireless world through Ma Bell's original copper wires, and you'll get a sense as to the degree of difficulty.

Heathrow's intractability is one of the reasons British Airways agreed to merge with Spain's national carrier, Iberia—because although Heathrow has only two runways, Iberia's home in Madrid has four. If BA can't connect passengers through its London hub, it will reroute them through its partner's hub instead. Blocking expansion wouldn't put a stop to growth or cut carbon emissions, argued Willie Walsh, the airline's chief executive, but simply divert flights and opportunities to the Continent's competing hubs. "We shouldn't take Heathrow for granted," he pleaded, but his opponents were unimpressed.

The day after Heathrow's third runway was tentatively approved, Frankfurt's airport announced plans for a fourth, to little fanfare or protest. "The expansion keeps Fraport on course for staying competitive in the future," its chairman explained. "Globalization will not only continue but will gather momentum as soon as the crisis has bottomed out." And then we will be forced to choose: Do we retrofit our cities to become aerotropoli in the future, or save people's homes? The consequences of each choice are equally stark: either we risk weaving a competitive disadvantage into the very fabric of our cities, or we begin unwinding the fabric itself.

The Shape of Things to Come

There is no question that the fruits of globalization—literally, the mangosteens, lychees, and passion fruit on your grocer's shelves that weren't there a decade ago—are delivered through the air. In the thirty years between 1975 and 2005, global GDP rose 154 percent, while world trade grew 355 percent. Meanwhile, the value of air cargo climbed an astonishing 1,395 percent. More than a third of all the goods traded in the world, some $3 trillion worth—but barely 1 percent of its weight!—travels via air freight. Air passengers and cargo had recovered their recessionary losses by the summer of 2010 and were accelerating ahead of the global economy. More and more pieces of the latter are living aloft and landing in some pretty strange places. Planes carry the products of the Instant Age—what we want, right now, and typically our most ingenious creations. Wanting the world right this instant has created incalculable wealth, completely reconfigured how many companies and even industries operate, and is now willing entire cities into being. It's just that we tend to notice only when our choices are taken away from us.

When the Icelandic volcano Eyjafjallajökull erupted violently in April 2010, ash carried into the upper atmosphere drifted southward, forcing a shutdown of European airspace. For more than a week, tens of thousands of flights were canceled daily. Six million travelers were trapped, and millions of others were grounded at home. Everyone seemed to have a friend on Facebook who was stuck. Thousands rediscovered trains. Professional wrestlers, opera singers, and musicians missed performances;

long-distance runners missed marathons. The actor John Cleese hired a taxi to drive him from Oslo to Brussels—the fare came to $5,000. President Obama, Gordon Brown, Nicolas Sarkozy, and Angela Merkel all missed the funeral of Polish president Lech Kaczynski, who had died the weekend before in a plane crash.

As the week dragged on, fresh produce disappeared from super-market shelves—pineapple from Ghana, basil from Cyprus, beans and chilies from Egypt, asparagus from California—but was not replenished. In Britain, Tesco ran low on Thai orchids and Kenyan roses. In Kenya, three thousand tons of roses rotted after being picked. Thousands of farmers were sent home without wages. They lost $2 million a day; the world's airlines collectively lost $450 million daily.

No one knew how long the eruption would last—days, weeks, months? As the crisis dragged on, the scope of what we'd come to take for granted kept expanding. Even the notion of European integration turned out to be one of air travel's inventions. As the *Washington Post* columnist Anne Applebaum noted, "Over the last two decades—almost without anyone really noticing it—Europeans have begun, in at least this narrow sense, to live like Americans: They move abroad for work, live for a while in one country, and then move to another, eventually going home or maybe not. They do business in countries where they don't know the language, go on vacation in the Mediterranean and in the Baltic, visit their mothers on the weekends. Skeptics who thought the European single market would never function because there would be no labor mobility in Europe have been proved wrong."

But is the opposite also true? Do we really need to rearrange our lives to better serve these slices of our self-interest? John Kasarda's answer is an emphatic yes. "I see organized competition, strategy, and structure as the major forces shaping human life, not individual actions," he professed. "I don't believe in 'agency,'" sociology-speak for free will. "Agency is inevitably trumped by structure." Most of us are shaped by the family and community we are born into. Taken on its face, it's a reductionist worldview, but his underlying point is that our slightest whims, multiplied several billion times and duly noted by the marketplace, have already had the effect of conjuring aerotropoli where you'd least expect them, transforming everything and everyone they touch.

It's no wonder, then, that developing nations such as China and

India have been the aerotropolis's most eager adopters. They see it as an indispensable weapon for hijacking the world's trade routes. China's grand plans are perhaps more ambitious than anyone realizes—it intends to keep adding factories, corner the market on green energy technologies, double down on its export-driven growth strategy, and chart a New Silk Road to markets in Africa and the Middle East. The goal is to keep a lid on dissent by lifting another six hundred million citizens out of absolute poverty. The plan is to pack up the factory towns along the coast and move them inland. And the key is a network of a hundred new airports under construction in the hinterlands, which will connect these provincial cities to each other and to customers overseas. Twenty thousand factories have already closed, while a city eight hundred miles west of Shanghai named Chongqing has been chosen as China's answer to Chicago. Chongqing is currently growing at eight times the speed of the Windy City during the Gilded Age, adding three hundred thousand new residents a year. But it has never had a window on the world until now.

More than cheap laptops are at stake. The United Nations expects 115 million tourists a year to leave the Middle Kingdom by 2020. The most closed society in history is poised to make its presence felt outside its factories—in our cities, on our beaches, and waiting in line at the Magic Kingdom. They're signing up for "foreclosure tours" to buy the homes we can no longer afford.

The pace and scale of such urbanization threaten to overrun every model for building cities we've ever had. Architects and urban planners are in crisis about what to do with cities like Chongqing—or just about any city in China, India, and even established but sprawling capitals like Bangkok and Seoul. Rem Koolhaas coined the phrase "generic city" to describe megalopolises that throw tentacles in all directions, following neither form nor function. Kasarda believes the aerotropolis offers an antidote, imposing a hierarchy of needs on cities so that they openly and honestly express their true purpose: creating work for their inhabitants and competitiveness for their nations.

For Bangkok, he drafted plans to transform the swampy sprawl east of the city into an ideal aerotropolis surrounding its new airport, Suvarnabhumi. In his sketches, the outermost rings extend nearly twenty miles into the countryside from the runways. There, giant clusters of apartment towers and bungalows would take shape, the former for housing

Thais working the assembly lines and cargo hubs in the inner rings, the latter for the expatriate armies imported by the various multinationals expected to set up shop around the airport. (Golf courses would keep the expats happy, as would shopping malls, movie theaters, and schools that seem airlifted straight from Southern California.)

Moving in from the residential rings, the next layer was slated for the manicured campuses of those same multinationals—the back offices, R & D labs, and regional headquarters of the Toyotas and Nokias persuaded to relocate. Here, one would also find hotels, shopping malls, convention centers—anything and everything to sustain the knowledge workers laboring in the shadow of the airport. In the innermost rings, essentially abutting the runway fences, were the free-trade zones, factories, warehouses, and logistics hubs designed for the FedEx/UPS/DHL combine—the just-in-time manufacturers and suppliers for whom time and distance from the belly of a 747 equals, quite literally, cost. New six-lane highways would link the inner and outer rings, with semitrailers barreling down dedicated aerolanes while residents stroll along boulevards lining canals.

It didn't happen. A high-speed rail link costing more than a half a billion dollars connects Suvarnabhumi to Bangkok, but the rest of Kasarda's plans were scuttled by not one, but two coups deposing supportive prime ministers, dropping his project into limbo. The riotous sprawl of Bangkok, meanwhile, keeps creeping toward the site like kudzu.

In Amsterdam, home to the world's first aerotropolis-by-design, Dutch planners have a saying:

> The airport leaves the city.
> The city follows the airport.
> The airport becomes a city.

Although Kasarda's models are more elaborate, the fact remains: the aerotropolis is a city with a center. As such, it represents a return to the way our cities were built and how they produced some of our greatest monuments. We have not built high-rise cities in Manhattan's mold since the turn of the previous century, when the owners of the New York Central railroad oversaw the construction of a shining "Terminal City" above Grand Central's tracks buried beneath Park Avenue—thirty square blocks of midtown Manhattan and some of the most prestigious real estate in the

world. Cities since then have followed the galactic model of greater Los Angeles and its sclerotic freeways. The aerotropolis offers a new transportation paradigm powerful and compelling enough to assert itself as the bustling center of commerce within a city whose hinterlands lie a continent away. "Look for yesterday's busiest train terminals and you will find today's great urban centers. Look for today's busiest airports and you will find the great urban centers of tomorrow. This is the union of urban planning, airport planning, and business strategy," Kasarda told me. "And the whole will be something altogether different than the sum of its parts."

But what if the center cannot hold? What if globalism falls apart? There is a growing Greek chorus warning us the age of air travel is over, undone by the twin calamities of peak oil and climate change. They point to oil prices tripling over the last decade, while noting that a flight from New York to London releases more greenhouse gases into the upper reaches of the stratosphere than the thirstiest Hummer when driven for a year. They find it impossible to reconcile our urgent wish to go green with jaunts across the country or continent—the reason why Britain has elected to rein in airport expansion. Fortunately, their thinking goes, the imminent exhaustion of cheap oil will take care of the problem for us.

Then again, Judgment Day has been repeatedly postponed. For one thing, airliners are more virtuous and resilient than you might expect. China's airports aren't the source of its noxious air; its coal-burning power plants are. (China burns more coal than the United States, Europe, and Japan combined.) In the United States, as many as half of our own emissions emanate from "the built environment," the energy consumed to build and service sprawl. We emit more carbon living in McMansions.

For another, air travel's actual share of our carbon footprints is currently 3 percent and *falling* (at least in the United States), thanks to a bounty of incremental and potentially revolutionary advances meant to slow and hopefully end its carbon contributions. The next generation of airliners, headlined by Boeing's 787 Dreamliner, is lighter and more fuel efficient than last century's models, complemented by new engines that burn quietly and clean. Airlines thirsty for fuel that's both sustainably cheap *and* green are looking to high-octane biofuels refined from algae. Virgin Atlantic's grandstanding chairman Sir Richard Branson has pledged all of his airline's profits through 2016 (an estimated $3 billion) on R & D toward this end. Green crude might reliably cost $80 a barrel, enough to save the industry as we know it, and not a moment too soon. "Drastically curtailing flights or

even closing airports outright for the sake of climate change—the prescription of the most fervent environmentalists—is social and economic suicide," Kasarda argues. "It's a cure for cancer that cleaves healthy muscle, flesh, bone, and arteries in its desperation to kill the disease."

Despite a decade's worth of high oil prices, terrorism fears, and the airlines' endless nickel-and-diming, we have never flown as far or in greater numbers than we do right now. As recently as 1999 (when gas still cost a dollar a gallon), JetBlue had yet to start flying, Ryanair had no website, and starting your own airline was illegal in both China and India. No one west of Jerusalem had even heard of Dubai, and it was impossible to take a non-stop flight from New York to New Delhi or Beijing. The world may or may not have flattened since then, but there's a lot less changing planes.

In the end, we won't stop flying for the simple reason that quitting now would run counter to our human impulse to roam. Will you be the one to tell a hundred million Chinese tourists (and another hundred million Indians) they'll have to stay home?

I live in one of the oldest sections of Brooklyn, blocks of leafy streets and brownstones I like to think Jane Jacobs would have recognized as her own. The park where I read the newspaper most mornings is a small one—a few tables and benches, a patch of grass, a playground—but it sits on the site of a fort defended by George Washington's troops, one that gave the neighborhood its name: Cobble Hill.

Most mornings, the only patrons at 7:30 a.m. are a few bleary-eyed dog owners or the parents of overeager toddlers. But already I can hear the planes. They wheel overhead on final approach to LaGuardia, five miles distant, with a dull roar that is distinct but not distressing—certainly not loud enough to wake the children, of which there are many. But it's too much for my neighbors in Park Slope, another patch of brownstones down the hill to the east, where the typical approaching plane swoops so low you can clearly read the "Delta" painted on its sides. The brownstoners have lobbied unsuccessfully to have the flight paths moved over some less fortunate neighborhood. They're much like my neighbors here—lawyers, writers, and financiers. "Knowledge workers" is what they would call them in New Songdo, where the item at the top of Stan Gale's to-do list is to woo more of them there.

A few blocks west are the docks of Red Hook, where a faint few ships unload containers by day and blow foghorns by night. It's a rumble as startling as jet wash, though several degrees more romantic because their era seems farther removed. Walt Whitman lived here, hopping ferries to the city and back in the mornings and evenings, confronted each time with the simple, joyous fact that the city's lifeblood was commerce. He wrote:

> Look'd toward the lower bay to notice the vessels arriving,
> Saw their approach, saw aboard those that were near me,
> Saw the white sails of schooners and sloops, saw the ships at anchor,
> The sailors at work in the rigging or out astride the spars,
> The round masts, the swinging motion of the hulls, the slender
>   serpentine pennants,
> The large and small steamers in motion, the pilots in their
>   pilot-houses,

. . . the jetliners and captains of a distant epoch. That was 150 years ago, but longshoremen walked these streets from dawn to dusk for another hundred years, before the first Wall Street families arrived and gentrification followed. This was a neighborhood created by commerce, for commerce—as joined to those docks as surely as the fate of New Songdo and its offspring are tied to runways.

One morning, while a Delta Shuttle spluttered across the sky, I thought of the newborn city and its twelve-mile bridge across the Yellow Sea. New Songdo is farther from its airport than I am from LaGuardia. Perhaps the biggest difference, then, between my idyllic nabe and the aerotropolis of Kasarda's dreams is philosophical rather than material. What does it mean to live everyday life in relation to the airport? And are we mentally prepared to do it?

These are urgent questions for all of us. The age of suburbia is passing, just as the economy that drove it—cheap cars, cheaper gas, still-cheaper mortgages, and free highways—is passing with it. What's replaced it is the Instant Age, with its global economy of ideas—of people, really—and the lightweight, infinitely configurable expressions of those ideas: iPhones, solar panels, and the human capital in the Shanghai office. These are the things that can't wait, the things we pay dear prices for and

need right this second—even though they're being minted on the far side of the world.

John Kasarda sees the history of cities as a rising tide of breaking waves. Ocean harbors were swept away by river ports, which yielded to railroad terminals that were in turn exploded by highways and suburbia. Transportation is destiny. The fifth wave is here, and while we won't commute to work George Jetson–style anytime soon (though rest assured there are dreamers working on this), how we measure and meter our personal velocity has already begun this shift.

On a bench in Brooklyn, I can feel the tug of LaGuardia whenever a FedEx truck rumbles by, or when I spy a neighbor—suited up, wheelie suitcase in tow—emerging from a brownstone, obviously setting out on a business trip. I spent the better part of a year living out of a suitcase myself, following such tugs back to their sources in the warehouses of Memphis, the greenhouses of Amsterdam, and the factory towns outside Hong Kong. I even slept on terrazzo floors for weeks to meet the "road warriors" who congregate there—and it was there that I found John Kasarda, whose grand unified theory of their existence produced the aerotropolis. By then, I implicitly knew what he was saying to be true, even if we as Americans refuse to acknowledge the consequences. After profiling him for *Fast Company*, I agreed to partner with him on this book. The words are mine—I'm Greg Lindsay—but it's Kasarda who provides the framework for the apparently unrelated phenomena commonly lumped under the term "globalization."

As I shuttled between terminals, it struck me that they offer a map of the last half century, from the dawning of the Jet Age through the Net Age to our Instant one born in Asia. I traced a path from Sun Belt cities such as Los Angeles and Dallas (where the layover was invented) through Louisville and Memphis—decaying river towns reinvigorated by e-commerce—and onward to meet Kasarda in North Carolina. By then, he'd convinced Detroit's leaders that an aerotropolis was their city's best chance at a future. In Amsterdam, I learned how flowers portended the airborne future of food, and while connecting through India, China, and Dubai, I met the traders who traverse the New Silk Road. The aim of this book is to tell the story of how these things went from being impossible to inevitable.

1

A TALE OF THREE CITIES

Los Angeles, Washington, and Chicago are the sum of their airports. Without room to expand them, they face limits to growth.

Los Angeles: Neighbors, Noise, and NIMBY

In 1926, a year before Charles Lindbergh flew solo across the Atlantic and two years before the first Academy Awards, the burghers of Los Angeles were worried they didn't have an airport. In fact, they had too many. There were fifty-two landing strips in LA County that year—mostly dirt, with a windsock and maybe a barn doubling as a hangar. But forty-seven were in private hands, and there was no municipal field open to all comers. The Chamber of Commerce began lobbying the city to build one, and to speed things along, it hired the meteorologist Ford A. Carpenter to examine twenty-six sites of varying potential.

One of them was a one-mile-square patch of land known as Mines Field. In his report, Carpenter described what he dubbed the "Inglewood Site" as "an ideal location as far as level unobstructed space is concerned . . . No hangars, markings, phone, oil, or other supplies." In the photograph accompanying his summary judgment, a Model T has come to rest in the middle of a wide, muddy road with empty bean fields on either side. This was the future site of LAX.

There were other practical considerations. In deference to the urgency of airmail, Carpenter observed that Mines Field was fourteen miles from the Los Angeles central post office. Evangelizing a bit, he also included a map of the country, comparing the relative speeds and distances