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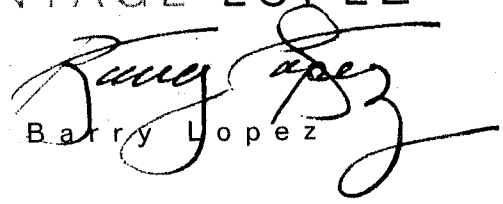

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FLIGHT

One foggy January morning in 1977, a few hours before dawn, a DC-8 freighter crashed on takeoff at Anchorage International Airport, killing all five people aboard and fifty-six head of cattle bound for Tokyo. Rescuers found the white-faced Herefords flung in heaps through the thick, snowy woods, their bone-punctured bodies, dimly lit by kerosene fires, steaming in the chill air.

A few days after the accident I happened to land in Anchorage on a flight from Seattle, en route to Fairbanks. The grisly sight of the wreck and the long scar ripped through birch trees off the end of the runway made me philosophical about flying. Beyond the violent loss of human life, it was some element of innocence in the cattle I kept coming back to. Were they just standing there calmly in large metal pens when the plane crashed? And why were they needed in Tokyo? At 35,000 feet over the winter Pacific, cruising that frigid altitude at 400 knots, did their lowing and jostle seem as bucolic?

Like many people who fly often, I have watched dozens of windowless air freighters lumbering by on taxiways and wondered at their cargos. In the years after that accident I puzzled over them everywhere—in Quito, in Beijing, in Nairobi, in Frankfurt, in Edmonton. What could warrant a fleet of machines so sophisticated and expensive to operate? It must be more than plasma and vaccines they haul, materials desperately needed; more than cut flowers, gold, and fruit, things highly valued or perishable. Would it be simply the objects people most desire? A fresh strawberry on a winter morning in Toronto?

Watching pallets go aboard on monotonously similar tarmacs around the world, I became more and more curious. I wanted to know what the world craved. I wanted a clarifying annotation for the rag-doll scatter of cattle.

At two a.m. one December night I climbed aboard a 747 freighter in Chicago to begin a series of flights around the world with freight.* I would fly in and out of cities like Taipei, Rotterdam, and Los Angeles with drill pipe, pistol targets, frozen ostrich meat, lace teddies, dog food, digital tape machines, pythons, and ball caps; with tangerines from Johannesburg, gold bullion from Argentina, and orchid clusters from Bangkok. During the hourless penetration of space between continents, I would sidle among the eighty or more tons of airborne freight on the main deck, examining disparate labels like an inquiring bird.

*The forty flights, covering about 110,000 nautical miles, were made aboard 747 freighters and on 747 passenger planes hauling substantial amounts of cargo in their lower-deck compartments or, with some aircraft configurations, on the aft portion of the main deck, separated from the passengers by a bulkhead.

Out cockpit windows on the flight deck, I would become absorbed in the strange untapering stillness of the Earth seen from that altitude.

Before I boarded the first flight, however, I wanted to learn about the plane.

II

The assembly building at Boeing's aircraft plant at Everett, Washington, is so large—ninety-eight acres under a single roof more than a hundred feet off the ground—that it has its own weather. Sometimes low clouds form in steelwork near the ceiling, where gantry cranes carrying subassembled sections of 747s, 767s, and 777s maneuver toward sites of final assembly. Over a single November night I watched swing-shift and third-shift crews at the plant complete the assembly of a 747-400 freighter, nearly the largest plane ever to fly. I studied it, and listened and touched, as its 68,000-pound wings were joined to a fuselage section, the six fuselage sections slid together and landing gear attached beneath, leaving it to tower above workers, empty as a cathedral, aloof as the moon.

As a boy I raised tumbler pigeons, a breed that at some height above the ground will destroy its aerodynamic lift and come plummeting down like a feathered stone, only to pull out at the very last moment, a terrifying demonstration of power and grace. Model airplanes—P-47, P-38, F-86, B-29—hung from the ceiling of my bedroom on black thread; I was mesmerized by the wind seething in eucalyptus trees around the house. Once I leaped hopefully from our roof with an open umbrella.

At seventeen I entered college as an aeronautical engineer, only to discover it was the metaphors of flight, not its mechanics, that moved me. I was less interested in engineering than in the imagination of an Antoine de Saint-Exupéry, who wrote of the "tender muslin of the meadows, the rich tweed of the woods," who climbed into the open cockpit of his Sahara-bound mail plane with heavy clothes and a tool bag, like a deep-sea diver, and who died in a crash in the Mediterranean in a P-38, a plane my mother's first husband helped design.

I switched to liberal arts, but the marvel of airborne flight never diminished for me. And the exotic allure of the Earth continued to tug. I saw the sky as an airscape of winds—West Africa's *harmattan,* Greece's damp *Apeloites,* California's Santa Ana, Japan's *daiboufu* ("the wind that knocks horses down").

I admired what I saw come tangibly together that night in the Boeing assembly building: a staggering achievement in engineering, in metallurgy, in economy of design. The assembly of a 747-400 freighter—232 feet long, 165 tons poised over eighteen tires like a barefoot gymnast on a balance beam, a six-story drop from the apex of its tail to the ground—suggests the assembly of a chronometer by tweezer, a sculptor's meaning with a jeweler's fastidiousness. Standing on a scaffold inside a wheel well, I marveled at a set of brass-colored steel screws securing six hydraulic lines in a pattern neat as a musical staff. Not a tool mark, not a misstep was to be seen. (Elsewhere, workers were

buffing the airplane's aluminum skin to remove scratches I couldn't find with the pads of my fingers.) Fuselage sections came together smooth as a cap sliding onto a French fountain pen.

For twelve or thirteen hours that night I watched, wandering off to sift through a box of button-head rivets (three million of the plane's six million parts were rivets); or to observe agile men disappearing into the labyrinthine recesses of another 747's unfinished wing; or to heft "nuclear hardened" cable—flexible, shielded conduit that carries thick bundles of color-coded wire from controls on the flight deck to each engine. Then I circled back to the freighter—this particular one being built for Singapore Airlines—with another bit of understanding, a new appreciation of its elegance. People who saw the 747's first flight, in 1969, were impressed that something so huge could fly. What surprised the pilots was its nimbleness, its fluid response to their foot and hand pressures, the easy way the aircraft absorbed turbulence. Designing a plane to fly this well is exceedingly difficult. The engineering task, the working out of that single genetic code, proves to be beyond the reach of formulas. It's as intuitive and mysterious a process—and as prone to catastrophe—as developing and holding on to the financial market for such things.

The Boeing 747 is the one airplane every national airline strives to include in its fleet, to confirm its place in modern commerce, and it's tempting to see it as the ultimate embodiment of what our age stands for. Superficially, it represents an apotheosis in structural engineering and in the applied use of exotic metals and plastics. Its avionics and electronics systems incorporate all the speed and design

efficiency of modern communications, and in terms both of manufacturing and of large-scale corporate organization, the swift assembly of its millions of parts is a model of streamlining and integration. In the air, the object itself is a virtuoso solution to flight, to Icarus's dream of escape and freedom. It operates with as little regard for geography, weather, political boundaries, intimidating physical distance, and time as anything humans have ever devised.

If subtleties in the plane's engineering were beyond my understanding, the spare grace of its long lines was not, nor its utilitarian perfection. The only thing that disturbed it, I was told, were rogue winds, the inevitable riptides and flash floods of the troposphere.

When I measured off the freighter's nearly completed main deck that night—sixty-eight paces down the bare interior—I was thinking of the quintessential symbol of another era, the Gothic cathedral of twelfth-century Europe, and of its emptiness, which we once filled with religious belief. Standing on the main deck, above the boxlike stub that joins the wing roots, standing where "nave" meets "transept" and looking up toward the pilots' "chancel," I recalled the intention behind Lúcio Costa's Brasília, a fresh city, aligned east and west like a cathedral but laid out in the shape of an airplane. But there on the assembly line the issue of spirituality, as serious a consideration as blood in the veins of a people, remained vague. The machine was magnificent, beautiful as staggered light on water, complex as an insoluble murmur of quadratic equations. But what placed within it could compare with religious faith?

In the assembly building that night, the 747 came together so quickly that to be away even for half an hour

meant missing lines in a sketch that soon became a painting. I would stand in one place, then another amid the cocoon of jigs, cradles, floor jacks, elevated walkways, and web slings surrounding the plane, watching while teams of men, some in sleeveless shirts with ponytails and tattoos, polished off a task neat as a snap of dry fingers in slow motion. They were glad for the work. They knew it could disappear in a trice, depending on the banks, the market, a securities trader in Singapore.*

An aircraft will give away some of its character to a slow walk-around. If you stare nose-on at a 747, you can tell whether the plane is fueled or not by the angle at which the wings sag. Empty, they assume an upward dihedral, making the plane appear to rest even more lightly on its wheel trucks. This vertical flexibility in the wings partly explains the sensation of unperturbed agility one feels as a passenger. If you let your eye run to the tip of either wing, you can see another key: a slight horizontal twist apparent in the last thirty feet or so, an engineer's quick, intuitive solution to damping a troublesome oscillation. A similar intuition once compelled Wilbur Wright to warp the leading edge of the wings of an experimental glider, lending it

*As a singular icon the 747 also symbolizes huge economic risk, brutal financial efficiency, and despotic corporate ego. Boeing president William Allen and Pan American's Juan Trippe dared each other to take the then mind-boggling steps of building and contracting for the 747. Who would go first? In 1969, when Boeing's total debt after developing the plane was thought to be larger than its net worth, it eliminated sixty thousand jobs to save the company, pushing Seattle's unemployment to 17 percent.

critical lateral stability. The glider metamorphosed into *Flyer,* in which, on December 17, 1903, at Kill Devil Hills on the North Carolina coast, Orville Wright achieved powered, sustained, controllable flight for the first time.

During the evening that I studied the buildup of the Singapore Airlines freighter, I was prompted, often, to reflect on early aviation. The vast interior of the Boeing plant and the peculiar absence of industrial noise combined to make the distant movement of messengers riding vintage bicycles seem almost timeless. The sight of these parts couriers gliding across the smooth concrete floors on fifties-era Schwinns triggered thoughts about the bicycle-building Wright brothers. The written history of all that led up to that December morning in 1903 reveals two young men who, beyond anything else, wanted to fly, at a time when most others were keen simply on winning the prize that feat would earn. While other people threw contraptions at the air, the Wright brothers worked out in painstaking detail the first practicable formulas for flight, challenging the previously revered mathematics of a German glider pilot named Otto Lilienthal, the author of *Birdflight as the Basis of Aviation* (1889). When *Flyer* flew, with its cambered wing and controllable elevator, its rudder and the world's first rudimentary ailerons, the Wright brothers knew exactly what they were doing. The achievement at Kill Devil Hills was not the fact that the plane sustained itself at about seven miles per hour over 120 feet, or the addition of a motor and props to a glider, but that Orville controlled it. He *flew* the plane.

The Wrights' entrepreneurial success embodies for many a vanquished innocence in America: this was an unprece-

dented thing, done for love, with little thought of personal gain, and financed largely out-of-pocket.

Orville's initial flight carried him about half the length of a 747 freighter's main deck. He was airborne for twelve seconds in a craft stripped of every bit of excess weight. The plane I was standing beside that night can carry 122 tons 5,000 nautical miles in about ten hours. The Wright brothers had little inkling of commercial advantage; without the support of government subsidies and the promise of private profit, without corporations competing fiercely for shares in a marketplace, without continuous turnover in what's considered fashionable in consumer goods, the 747 freighter might easily have gotten no further than a draftsman's table.

My last impression of the plane, the rainy morning I drove away, was of accomplishment. Whatever people might do with it, however they might fill this empty vessel, it gleamed to my way of thinking like an ideal. It was an exquisite reification of the desire for beauty.

Sometime later, I returned to Everett to inspect the finished cockpit. I wanted to crawl into every space that would admit me: low, tight bays on either side of the nosewheel doghouse that hold tiers of maintenance computers; the transverse avionics bay aft of them, where the plane's triple-redundant inertial navigation system and flight deck computers are located (and from where, via hatches above and below, one can either drop to the tarmac or emerge on the main deck). I wanted to orient myself among banks of Halon bottles (the fire-fighting system) and emergency oxygen tanks on the lower cargo deck. I wanted to enter the compartment aft of the rear pressure bulkhead and see

the massive jackscrew that tilts the horizontal stabilizer (the fins that protrude like a rear wing from the plane's tail).

Once the plane was fitted with four Pratt & Whitney engines—each developing up to 56,000 pounds of thrust (about 21,000 horsepower)—Singapore Airlines would take it away. At something like $155 million, it was an enormous capital investment; but with an international airfreight market currently expanding at about three times the rate of the passenger market, Boeing's plane number RR835 would soon pay for itself. After that, grossing upward of $750,000 per load against an operating cost of roughly $15,000 per hour, it would begin to earn its owners a substantial and unencumbered profit.

III

After Frankfurt's Rheim/Main Airport and London's Heathrow, Amsterdam's Schiphol International Airport is Europe's largest airfreight depot site. KLM's operation here is efficient and organized—dangerous goods here, live animals there, valuables (jewelry, currency, silver bars, uncut gemstones) over here, drugs in yet another place. In this world "perishable," I learned right away, refers to more than flowers, food, and newspapers; it includes everything in tenuous fashion: watches, video games, shades of lipstick, a cut of trouser—objects for which a few days' head start on store shelves is crucial.

On an upper half-floor of the cavernous outbound-freight building—the main floor includes an open space perhaps 600 by 200 feet, and 40 feet high—there is no one, only

automated equipment, enslaved by a computerized sorting program that is updated continually in response to aircraft schedule changes and new delivery priorities. The loaders, moving on floor tracks, pull standard-size pallets and cargo containers from steel shelves at just the right moment to launch them on a path terminating promptly at the cargo doors of their intended airplane. It is stark, bloodless work. On the main floor the mechanical tedium is relieved in three ways: in the buildup of single pallets, with workers arranging dozens of small packages trimly in an eight-by-ten-foot-square load, at heights to fit either the upper or lower deck of a particular aircraft, and with one top edge rounded slightly to conform to the curve of the plane's sidewall; by the loading of oddly shaped or remarkable objects—a matched set of four, dark blue Porsche 911s, a complete prefabricated California ranch-style house; and by the sheer variety of goods—bins of chilled horsemeat, Persian carpets, diplomatic mail bound in sisal twine and sealed with red wax, bear testicles, museum art exhibits, cases of explosives.

The impression one gets amid tiers of briefly stored cargo and whizzing forklifts is of mirthless haste. A polite but impatient rectitude about the importance of commerce prevails, and it forestalls simple questions: Have they run out of mechanical pencils in Houston? Is the need for eelpout in Osaka now excruciating? Are there no more shirtmakers in Rangoon?

The following day I departed the freezing rain and spitting snow of Amsterdam for Cape Town, six thousand miles

and an opposing season to the south, where one of KLM's smallest facilities operates on a decidedly different scale. We came in by way of Johannesburg and brought, among other things, two Goeldi's marmosets and eight white ear-tufted marmosets, both endangered, inbound from South America for a local attraction called Monkey Den.

When my escort completed our tour—a semienclosed metal shed, no automation—he very kindly suggested we go for a drive. He felt harried by shippers' phone calls, cajoling for more space than he could provide on the outbound flight. I, too, wanted to get away from the clamor.

For the past six days I had been flying a heavy schedule, mostly in and out of the Far East. I was bewildered by the speed with which everything moved, by how quickly I came and went through the countries. In a few hours I would turn around and fly back to Johannesburg, there to pick up fresh flowers, hunting trophies, and raw diamonds before returning to wintry Amsterdam.

We drove east through windblown sand scrub on the Cape Flats, rather quickly through Cape Town itself, and around to Clifton Bay on the west side of Table Mountain. The weather had been hot, but it was cooler now, seventy-two, with a brisk southeast wind, the one they call the Doctor.

For a long while I stood there on the bluff in the summer sunshine, staring into the transparent blue water of the Atlantic. I was acutely aware of history here at Bartolemeu Dias's Cabo Tormentoso (the Portuguese navigator's Cape of Storms, a foreboding appellation his king would later change to Cabo da Bõa Esperança, Cape of Good Hope). Cook and Darwin anchored here as did, in 1522, a rem-

nant of that part of Magellan's crew under Sebastián del Cano. In those days it had taken as many months as it now takes hours to come this far south from Europe, and an indifferent sea swamped and crushed the Dutch *jachts* and Iberian caravels like a child's paper sailers. Robben Island, where Nelson Mandela spent so many years, was just to the north. A few miles to the southeast was Skildergat Cave, a 35,000-year-old early human site. All this was once the landscape of the Khoikhoi people, now long since gone to Namibia and Botswana, where they are called San people and among whom are the much studied !Kung.

My companion was speaking English with a friend. When he lapsed into Afrikaans I recalled how, over the past few days, I had been scrambling to get the simplest grasp of Malay, Thai, then Hindi. I was moving carelessly around the planet. Beneath the familiar jet lag I began to sense something else: physical geography was not only spatial, it was temporal. I looked up past my shoulder at the serene oak and pine forests of Table Mountain, da Gama's defining pivot. It had a peculiar time to it, as indigenous as its rock. I could not take that time with me, nor bring my own time here and drape it possessively over the mountain. In that moment I glimpsed the impunity with which I was traveling, as well as the inseparability of time and space in geography. The dispensation I enjoyed from the historical restraints of immense distance had created an illusion about time: the Earth's spaces might vary terrifically—the moonlight reflecting for me last night on Shatt Al-Meghir, a saline lake in barren eastern Algeria, was not the same moonlight shining back from the icy reaches of Cook Inlet

in Anchorage—but time, until this moment, had seemed a seamless thing, never qualitatively different. Everywhere I went time continued the same, an imperial present. At most, in these new depots and their environs, I was resetting my watch.

As I stood there gazing at Table Mountain, then back at the transparent Atlantic, I knew the mountain's time was not my time. And that I would not, now, give in to its time. I was on this other, no-Sunday, no-night, on-time, international commercial time. I sought out my friend and asked, "Shouldn't we be getting back?" I was starting to behave as if the present were only a preparation for the future. When I phoned my wife from some point along the way to confide that I was deeply bewildered, that it was as though all the rests in a symphony score had become threats, she said, "It's because you're not going anywhere, you're just going."

Two changes in the late eighties boosted the growth of international airfreight. Up until then shipping by air meant being assured your goods would arrive at such-and-such an airport within forty-eight hours of a promised time. Today, for an average of one to four dollars a pound, a customer expects guaranteed, on-time delivery; and increasingly that service is door-to-door, not airport-to-airport. The largest airfreight operation in the world (though the bulk of what they haul is small packets) is Federal Express. Next, in descending order of tonnage carried, are Lufthansa, UPS, and Air France, then Korean Air and Singapore. (At pres-

ent, profitability in the industry remains marginal while airlines continue to maneuver for market share.)

Most air cargo, according to an industry forecaster, now consists of "high-value, time-perishable, consumer items." The business is driven by three things: the growing expectation, worldwide, of having whatever one wants tomorrow, not next week or next month; by frequent changes in fashion and in the design of basic products; and by a great disparity in labor costs from one country to the next. Much of what one sees aboard a freighter is placeless merchandise; except for the cost of employing a person, it might have been manufactured almost anywhere, including the country of destination. A museum director in Los Angeles found it less expensive, for example, to have the museum's entire red sandstone façade quarried in India, air-freighted to Japan to be dressed, and then flown to Los Angeles than to have it quarried, dressed, and trucked in from Minnesota.

Companies ship city phone books from the United States to China to have the names inexpensively keyed in on mailing lists. Automobile insurance claims travel by the boxful from Miami to Manila to be processed by people who are not only cheaper to employ but who make fewer mistakes than the clerks for hire in Miami. And air shippers, exploiting the same small margins currency traders use, find it less costly to have, say, nine tons of rayon blouses machine-cut in Hong Kong and flown to Beijing to be finished by hand than to have all the work done in Hong Kong—before the blouses are flown on to customers in Berlin or Chicago.

On long eight- and ten-hour trips on the freighters, I

regularly left the flight deck, though it seemed always to be offering me some spectacular view of the Earth—Mt. Pinatubo smoldering in the depopulated Zambales Mountains on Luzon, or L'Anse aux Meadows, a bleak site on the northern tip of Newfoundland where Norse people established a community about A.D. 1000. Leaving these, I'd climb down the narrow, folding aluminum stairs and stroll the aisles at the perimeter of the cargo load. Containerized or shrink-wrapped in heavy plastic, tagged with routing labels in code, the shipments were frequently difficult to identify without the help of manifests or air waybills. One night out of Taipei: 17 cartons of basketballs for Boston; 5,898 pounds of sunglasses headed for Atlanta; 85 cartons of women's polyester pajamas for Columbus, Ohio; cameras, men's ties, battery-operated action-hero toys; 312 pounds of wristwatches for New York. What I saw very often seemed the fulfillment of mail-order-catalog dreams. The celerity in air-freight, in fact, and the freighter's ability to gather and distribute goods over huge distances in a matter of hours, have made the growth of 800-number stores like J. Crew, Lands' End, and Victoria's Secret possible. By promoting "just in time" delivery—neither a sweater, a comic book, nor a jet engine arrives until the moment it's needed—freight companies have also (1) changed the way businesses define inventory, (2) made it possible for stores to turn storage space into display space, and (3) forced governments to reconsider the notion of an inventory tax.

What planes fly, generally, is what people imagine they want. Right now.

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Back at D. F. Malan International Airport in Cape Town, I watched a six-man crew load freight—Cape wines, salted snook headed for New York fish counters, 3,056 pounds of ostrich meat bound for Brussels, one Wheaton terrier named Diggs for Toronto.

Standing there on the ramp, I asked my companion if he knew about the first shipment of airfreight, in 1910. No, he didn't. It was 542 square yards of silk, I said, carried sixty miles from Dayton to Columbus, Ohio. It cost Morehouse-Martens of Columbus $5,000, but they made a profit of more than $1,000 by cutting the fabric up into small pieces and selling them as souvenirs to customers at their dry-goods store.

He told me the fellow shipping ostrich meat, frustrated by a lack of cargo space out of Cape Town, had a restaurant in California interested, but without the space he couldn't close the deal. We were looking, at that moment, at the aircraft I had come in on, a 747-400 passenger plane with about 5,900 cubic feet of lower-hold cargo space (passenger baggage might take up only 20 percent of this). Depending on the demand for seating, KLM might occasionally fly a 747-400 Combi into Cape Town. In this aircraft, the aft section on the main deck is given over to seven pallets of freight, while passengers are seated in the forward section—an efficient way for airlines to take advantage of fluctuations in both passenger and freight markets.

Tons of fish, he said, let alone more ostrich meat, could be shipped from Cape Town, if only he could guarantee his customers the room. Today he'd be happy to squeeze a

surfboard into the bulk-cargo hold, the space farthest aft on the lower deck, a last-on, first-off, loose-loaded compartment, where mail, air waybills, crew baggage, and, today, the Wheaton terrier went. We continued to exchange stories about peculiar things one sees on board—a yacht headed for an America's Cup race; a tropical-hardwood bowling alley from Bangkok; in San Francisco enough boxed Bing cherries, tied three to a bunch and packed neat as flashlight batteries, to fill one 747 freighter after another (27,000 cubic feet). They're not supposed to, I said, but one of the pilots told me he liked to sit in the Ferraris and Lamborghinis he flew. "I've driven them many miles," the pilot mused, "and very fast."

Business was good, I told my guide, but strange. Two days before, on what pilots call the Tashkent Route between Europe and the cities of Karachi, Delhi, Bangkok, Singapore, and Jakarta (via Russia, Kazakhstan, Uzbekistan, and Afghanistan, because the Himalayas are too high and Iranian airspace too dangerous), I had seen rocket fire and streams of tracer ammunition in Kabul, Taliban "extremists" and their entrenched opponents. People were being shot dead below, but to the east a full moon was rising rapidly, orange and huge as the sun. It silhouetted sharply the sawtooth peaks of southern ranges in the Hindu Kush. And farther to the southeast, beyond the Khyber Pass and high above the Indus River, a hundred miles of lightning bolts flared and jangled along a storm front. With one glance I took it all in: rockets flaming across the streets below, the silent moon, rain falling in the Indus Valley from a ceiling of cloud, above which the black vault of the sky glittered with stars.

On the Tashkent Route, I continued, air-traffic controllers in Dushanbe, Tajikistan, pass you on to Lahore, skipping chaotic Kabul altogether. Their voices crackle on the high-frequency radio like explosions of glass, trilling aviation English in the high-pitched intonation of a muezzin. At Lahore, you can see the Pakistani border stretching away north into the Punjab, a beaded snake of security lighting. From here west all the way to Libya (whose air-traffic controllers reprimand careless pilots that it is not "Libya" but "Libyan Arab Jamahiriyah Territory"), religious and political tension is pointedly apparent from the sky. Coming up from Dubai, we would swing far out to the west, over Saudi Arabia, to fly wide of Iraq, then dogleg north across Jordan, staying to the east of Israel. Leaving Lebanon's skies, we'd enter disputed airspace over eastern Cyprus. Greek Cypriot and Turkish Cypriot air-traffic controllers do not play dangerous games with commercial aircraft, but, together with the Syrians, they contest the right among themselves to assign you flight levels and headings. Once across Turkey we'd bear north to stay wide of Bosnia-Herzegovina.

Every pilot I spoke with, I said to the young KLM freight manager, had a story of the white-orange flash of lethal fighting seen from above, the named and unnamed wars of the modern era, fought in Timor, in the Punjab, in what were once called the lawless hinterlands, but which are now as accessible as Detroit or Alice Springs.

On the return flight from Cape Town to Johannesburg, I glanced through data comparing this 747-400 with others

in KLM's fleet.* Each 747, despite being built to the same specifications and being fitted with the same engines, consistently burns slightly more or less fuel, or "performs differently against the book." Northwest Airlines flies eight 747-200 freighters into the Far East; I flew on four of them, trying to gain a feeling for their personalities. (With so much history, distance, and weather, I reasoned—so many minor accidents, replaced engines, and strange cargos—there had to be personality.) Once I stayed with a single aircraft through five crew changes, from Hong Kong to Tokyo, then on to Anchorage, Chicago, and New York before turning back for Seattle—in all about 12,000 nautical miles in 56 hours. Reading the plane's operating certificates (posted on a lavatory bulkhead in the cockpit) and its logbooks, and poking into all its accessible spaces, what I found was distinctiveness, not personality.

It was 2:30 in the morning and raining when we landed in Seattle. After the dehydrating hours aloft, mildly hypoxic, my tissues swollen from undissolved nitrogen, I was glad for the wet, oxygen-rich air at sea level. With a security escort shifting idly from one foot to the other at my side, I drew the night air in deeply and brushed rain across my face. I'd been with the plane for so many hours—I periodically rolled a pad and sleeping bag out on the floor of the flight deck to sleep—that an uncomplicated affection had built up for all it had accomplished while the crews came

*Virtually all wide-body passenger aircraft carry a diverse and often substantial belly cargo of manufactured goods, flowers, fresh food, and live animals. With so many people now living and working abroad, they also commonly carry large containers of personal effects and the coffins of returning nationals.

and went. Its engines were silent now, still. I walked beneath it in the dim illumination from warehouse lights.

The freighter's belly—this plane was 6729F—was glazed with a thin oil film. In it, and in exhaust grime on the engines' housings, mechanics had finger-traced graffiti. (Inside, on cargo compartment walls, ground crews often scrawl insults—some of a sexual nature—aimed at ground crews in other cities. On inaccessible surfaces within the wings, I was told by riveters at the Boeing plant, some paint declarations of love.) I made a mental note to check 6729F's technical log, a sort of running medical history of the aircraft, to see when it had last been "A-B-C-Ded," a forty-day swarming by mechanics during which every structural part, every rivet, every wire, is examined or X-rayed.

The fifteen-year-old plane's thin (.063 inches) tempered aluminum skin was scraped and dented and it bore a half dozen aluminum patches. (In an effort to keep a plane on schedule, some of these minor tears are first repaired provisionally with "speed tape.") Its windows were micropitted, its 32-ply tires slightly worn, its livery paint chipped. Looking aft from a point near the turn of its flat, streaked belly, I realized the plane had the curved flanks of a baleen whale, in an identical scale, exact to the extended flukes of its horizontal stabilizer.

Overall the freighter had a lean, polished, muscular patina. It flew in the working world.

IV

I first flew with horses on another Northwest flight, out of Chicago's O'Hare on a bitterly cold February night.* These sixteen were headed for lives on Hokkaido ranches among the well-to-do: a Percheron stallion; twelve Appaloosas, and three quarter horses, accompanied by two handlers.

We were delayed three hours getting out. The driver of one of the loaders, a steerable platform used to raise cargo fifteen feet to the rear cargo door, accidentally rammed the plane, punching a hole in a canoe fairing (a cover protecting the jackscrew that extends and retracts the plane's flaps, and which "fairs" or tapers this protrusion into the wing). We also had to replace an exhaust-gas temperature gauge on the number-three engine, the sort of maintenance that goes on regularly.

The pilot made a shallow climb out of Chicago to lessen the strain on the horses' back legs. He headed out over Wisconsin and Minnesota on a slight zigzag that would take us from one way point to another en route to Anchorage. Planes rarely fly a direct route between airports unless the skies are relatively empty, usually late at night, the time when most freight moves. Freighter pilots, some of whom wear bat wings on their tunics instead of eagle wings and

*Thoroughbred horses fly back and forth between the continents constantly during the respective national racing seasons. Slaughter horses, mostly young draft horses, are carried to the Far East from the United States and Canada, 116 head at a time in 29 pens on a 747. With a reduction in import duties on fresh meat in the Far East, smaller animals like the slaughter cattle killed in the Anchorage crash, have become less economical to fly live.

refer to themselves as "freight dogs," call it "flying the backside of the clock."

Soon after we're airborne I go down to look at the horses. The main deck temperature has been set at 55 degrees so I take a jacket. The animals are lined up in six stalls on the right side of the aircraft, the 2,100-pound black Percheron in the first stall with a bred quarter horse; behind them a leopard Appaloosa stallion with a bred Appaloosa; and behind them, downwind in the flow of air, four stalls of bred and "open" mares, with four fillies and colts. They aren't sedated, most are dozing. They've been left unshod to give them a better hold on the stall floor, and won't be watered or fed for twenty-four hours in transit. Hemmed in by the usual farrago—aortic valves, poultry-processing equipment, mainframe computers, golf clubs, men's knit underwear—the horses seem strangely peaceful. I can't hear their breathing or stomach noises over the sound of the engines. I turn the lights out and leave them be.

On the flight deck, a narrow space like a railway-car living room, the horse handlers are slumped with novels in a single row of three tourist-class seats toward the rear, the only three passenger seats available besides the jump seat. The flight engineer has just brewed a fresh pot of coffee. I settle in behind the captain to peruse the flight manifests. I gaze out the window. Every few minutes I look at the instrument panel in front of the copilot and at the hydraulic, fuel, and electrical panels in front of the flight engineer, sitting a few inches to my right.

The 747 is not the biggest freighter in the world, but in every other way—making long hauls economically on a scheduled basis—it is unrivaled. The biggest plane in regular service is the Russian Antonov 124, a fuel-guzzling, hulking beast of an aircraft that works at the fringes of the world of airfreight, hauling unusual loads on a charter basis. The only way to move emergency equipment (oil-skimming boats, fire-fighting trucks) or large quantities of emergency supplies (medicine, food, gas masks, cots) quickly around the world is on airfreighters, and the Antonov 124 ferries such material routinely, and many more unusual things: French fighter planes to Venezuela; 132 tons of stage equipment for a Michael Jackson concert in Bucharest; a Pepsi-Cola bottling plant, complete, to Buenos Aires; a 38-ton bull gear to repair an oil tanker stranded in the Persian Gulf; 36,000 cubic feet of cigarettes per flight on repeated trips between Amsterdam and Moscow during the breakup of the Soviet Union.

When we pass through 18,000 feet, the flight engineer sets our altimeters to read against an atmospheric pressure of 29.92 inches of mercury. We'll calibrate altitude against this pressure until we descend on approach into Anchorage, an agreed-upon standard that ensures planes all over the world will be figuring their altitudes on the same basis once they leave the airspace around an airport. We've also left local time behind. Now all our communications are based on Coordinated Universal Time (UTC), formerly Greenwich Mean Time or Zulu time, as it is still sometimes called (the Earth's time zones having once been divided among the letters of the alphabet). Another universal grid we are fixed in is degrees and minutes of latitude and longitude. And altitude, of course. (The altimeter

always shows altitude above mean sea level; if the altimeter reads 7,500 feet over Mexico City, you are 100 feet off the ground.)

These grids provide a common reference, and their uniformity makes flying safer; but there are dissenters around the globe, especially where time zones are concerned. Tonga, along with Russia's Chukotski Peninsula, insists on occupying a twenty-fifth time zone. When it's 12:15 Sunday morning in Tonga, it's 11:15 Friday night in Western Samoa, a few hundred miles to the northeast. And against UTC whole hours, central Australia stays on the half hour, Nepal keeps to a three-quarter hour, and Suriname adheres to ten minutes before the hour.*

Virtually everyone communicates over the radio in English, but it is often heavily accented English, and outside customary requests and responses, English is of limited use in areas like China or in what pilots call Sea Asia. Russian pilots, for their part, are unique in insisting on the use of meters per second instead of knots for airspeed, and on meters instead of feet for altitude. In addition, Russian commercial planes don't use the Traffic Collision Avoidance System, which warns of approaching aircraft; nor do they send out a signal so planes with that system will know

*It is largely forgotten today that the notion of "standard time" in the United States, as opposed to local time, was one promulgated by railroad commissions to coordinate the needs of railroads and other businesses engaged in long-distance commerce. A nationwide system, enforced by railroads and then by factories, was entrenched by 1883. Congress eventually gave its official approval, though several states—Utah, Minnesota, California—fought the inconvenience until 1917. The principal objection was that standard time distorted the natural rhythms of human life for the sake of greater efficiency in business and commerce. Today Cincinnati lives, more or less complacently, by Boston's sunrise.

they're there. To politely register their disapproval of these tenuous arrangements, European pilots flash their landing lights at approaching Russian planes (which air-traffic controllers have alerted them are there) and wait for a response.

The wide acceptance of such standardized measurements and procedures can lead to the impression that a generally convivial agreement obtains throughout the world. And when, in one week, you transport the same sorts of freight to Cairo, Melbourne, and Rio de Janeiro, it is also easy to draw the conclusion that people everywhere want more or less the same things. However pervasive, the view is illusory. The airplane's speed and geographic reach benefit the spread of a European and North American consumer ethic, but not all the world's cultures can be folded into this shape. One need only leave the airport in Lima or Calcutta or Harare to see how true this is. It is not merely poverty and starvation you see, the ringing of another music you hear, or inversions of Western intuition you observe. It is starkly different renderings of the valuable.

Again and again, stalled in boulevard traffic in hot, choking air, feeling the taxi bumped by a languid crosscurrent of beggars, I thought of the speed of the plane, how much it could leave behind. If we fled quickly enough, I thought, nothing would catch up.

One morning at KLM's corporate headquarters in Amsterdam, I spoke with a vice president in his corner office. Beyond us, planes were taking off every couple of minutes like salvos. "When I was a boy," he said, "I was given my father's watch. I thought that would be my watch for the rest of my life. But I have five watches now. I choose one in the morning to match my suit, a tie. You just buy them."

He spread his hands, a gesture of lament and consternation. In an adjacent office, another vice president told me, "Speed is the word. Air cargo is the answer to speed, it makes speed happen." I could not tell from his piercing look whether he meant it as a summary or an indictment.

An oceanic expanse of pre-dawn gray white below obscures a checkered grid of Saskatchewan, a snow plain nicked by the dark, unruly lines of woody swales. One might imagine that little is to be seen from a plane at night, but above the clouds the Milky Way is a dense, blazing arch. A full moon often lights the planet freshly, and patterns of human culture, artificially lit, are striking in ways not visible in daylight. One evening I saw the distinctive glows of Bhiwani, Rohtak, Ghaziabad, and a dozen other cities around Delhi diffused like spiral galaxies in a continuous deck of stratus clouds far below us. In Algeria and on the Asian steppes, wind-whipped pennants of gas flared. The jungle burned in incandescent spots on peninsular Malaysia and in southern Brazil. One clear evening at 20,000 feet over Manhattan, I could see, it seemed, every streetlight halfway to the end of Long Island, as far east as Port Jefferson. A summer lightning bolt once unexpectedly revealed thousands of bright dots on the ink-black veld of the northern Transvaal: sheep. Another night, off the eastern coast of Korea, I arose from a nap to see a tight throw of the brightest lights I'd ever observed. I thought we were low over a city until I glanced at the horizon and saw the pallid glow of coastal towns between Yŏngdŏk and Samch'ŏk. The

lights directly below, brilliant as magnesium flares, were those of a South Korean fishing fleet.

Over Anchorage we slam into severe turbulence at 34,000 feet. The plane seems suddenly to shrink, and we are pitched through the sky like a wood chip for ten minutes before we get clear of it and divert to Fairbanks. When I go below with a handler, the horses appear to have come through the violence unfazed. The handler knows each of the animals and speaks soothingly to them. As we proceed down the line, he recalls their breeding histories. Draft horses like the Percheron, he says, are the calmest breeds, and working quarter horses are bred for calmness. He isn't surprised they're all right, or that they settle down quickly.

If you ask pilots which loads they most remember, they mention either costly objects—a $319,000 Bentley, flying 70,000 pounds of gold into Riyadh—or animals, the things that are animated in a freight shipment. Most say Vietnamese potbelly pigs are the worst creatures to haul, their stench so permeating that pilots have to strip off their uniforms, seal them in plastic bags, and fly in clothes that they later throw away. As bad, they say, is a planeload of durians, a pulpy, melon-size fruit whose scent reminds most Western people of vomit. A problem that occurs on some cattle flights turns on their rank perspiration. Rising as a vapor, it penetrates the ceiling insulation and freezes to the plane's interior skin surfaces. Melted by warmer outside temperatures at lower altitudes on descent, the fluid funnels forward and begins dripping on the pilots.

When large animals—draft horses and bulls—kick their stalls in midflight, you can feel the plane shudder. Goats

and ostriches will chew at whatever cargo they can reach. One pilot told me about going down one night to look at a white tiger. Believing she'd been sedated, he drew close to the bars to peer in. She charged as ferociously as the cage permitted, sending the pilot reeling onto his back. The animal's roar, he said, drowned out the sound of the engines and nearly stopped his heart.

Pilots remember animals in some detail—wolf puppies turned loose in the cockpit, a killer whale in a tank—because they are alive and making these formidable journeys. Like the pilots.

We wait in Fairbanks until the Anchorage weather quiets and then fly back, landing in light turbulence. A 747 freighter taking off just after we land hits a wind shear and in less than two seconds accelerates from 210 to 260 knots. An hour later, on takeoff, we abruptly lose 20 knots of airspeed when a headwind collapses. We're barely airborne when the departure threshold on the runway passes under our wheels. Two hours later our automatic pilot malfunctions. The nose plunges violently and we are in a rapid descent. In one of the most assured and swiftest moves I've ever seen a human being make, the pilot recovers the plane and brings it back level before we fall 500 feet.

When I again accompany the handlers below, we find the horses awakened by the fall and spooked by our soundless approach. They glare a while, then doze off. The rich odors in their corrals don't drift up to the flight deck. I thought they might, and take the edge of indifference off the electronic atmosphere up there.

In those same minutes the sun had just risen (at 30,000 feet it clears the horizon about twenty-two minutes earlier than it does when seen from a spot on the Earth directly below), but the moon had not yet set, and for a while I held both in the same gaze, in a sky that goes from azure to milk blue between horizons. We are pushing against a 120-knot headwind, common this time of year over the North Pacific. When I ask whether the pilots have names for these winds aloft around the world, the captain says, "No, we haven't been flying long enough." I ask whether the jet stream—"the jets," they call these winds—blows strongest here. Yes, he answers, here and over the North Atlantic. By then the copilot has located something he's been searching for in his personal logbook. On this same route last year, he shows me, headed the other way with a tailwind, he made the fastest ground speed he's experienced in a 747—702 knots.

Far beneath us the winds are calmer. The burnished surface of the ocean seven miles below appears still as a slab of stone, and crinkled like an elephant's skin. I see only one ship headed southwest against the Okhotsk Current, far off the coast of Kamchatka, its wake flared at the characteristic 39-degree angle.

When Japan looms I feel suddenly very tired. I haven't slept for thirty hours—traveling to Chicago, then caught up in events surrounding the horses, anticipating en route to Anchorage an appearance of the aurora borealis, listening to the pilots tell stories, looking out the window at the remoteness of Alaska, at the spectacle of clouds. Beneath us, every day, I'd seen buttermilk, mare's tail, and mackerel skies, and then looked in vain through phrase books and small dictionaries for what they are called in Korean, in Spanish.

We touch down at Narita International Airport at 12:42 p.m. local standard time. At 12:45 we set the plane's parking brake at Gate 211.* At 12:54 Japanese officials open the door and a quarantine officer boards to inspect the horses. Once he is assured of their good health, he leads us down the air stairs where, one by one, we step gingerly through a plastic basin of disinfectant. The horse handlers, wearing fine-looking Western boots, hesitate a moment.

The wood stalls are to be burned. The horses will be in quarantine here for three weeks before being flown to Hokkaido. I remember the snorts of steam and billowing breath on the frigid ramp at O'Hare and wish I could see them now, standing, like us, in the sunshine and balmy breezes outside the plane.

V

From my accustomed seat, just behind and slightly to the left of the pilot, I have a clear view to the southeast over the South China Sea. Though it is slightly awkward to manage, I often lean into this window. Just those few inches closer and my view widens appreciably. I look back at the port wing, the sleek gape of the winking engines, at a pinpoint of nuclear light winking on a windshield ten miles away. At night, if I rotate my head 180 degrees and hold the upper

*Pilots use different methods to compute their actual (as distinct from scheduled) flying time. One is "block to block," from the pulling of the nosewheel chocks at one end to their being set at the other end. Another is doors closed to doors open. Northwest pilots are limited, on this latter basis, to 82.5 hours of flying per month and to no more than 30 hours in any seven-day period.

edge of this canted window against the stars, the world is utterly still. We do not appear to move at all.

Far to the south, just now, a ribbon of sunlit cumulus towers, fumaroles and haystacks, great pompadour waves of this cloud. I never tire of seeing them, the most dominating evanescent form on the planet. We have seen a great range of them since leaving Tokyo some hours ago. East of Honshu, over the Pacific, the ocean was occluded by a vast sheet of wool-nap cumulus. When that flat plain opened into a lattice hundreds of miles later, the formation appeared serried in three dimensions, away from me and down. These puffs eventually thinned and I thought the sky cloudless until I looked up to see a rice-paper layer of cirrostratus. Then it, too, thinned to blue space, and for a while there was nothing but an occasional fair-weather cumulus, built up over a distant Pacific atoll, until we came to the rampart of heaped clouds—*cumulus congestus.* For all their beauty, the impossibly slow tai chi of their movement, clouds are of almost no help, claim the pilots, in anchoring a sense of depth or distance in the troposphere. They accentuate, however, the peculiar and insistent, ethereal nature of the sky.

I need to stretch. None of the three pilots wants anything from the galley,* so I raise the smoke door (which

*The heritage of oceangoing vessels is preserved in the language and some of the design of modern airplanes. Pilots frequently call the plane a ship, its fuselage a hull. Its interior space is divided into decks that extend fore and aft. The captain might refer to starting an engine as turning a wheel. He steers the plane on the ground with a tiller and speaks of docking the ship, after which, on a freighter, cargo is always taken off the main deck on the port side (originally, the side of a ship designed for use in port). A rudder in the plane's vertical stabilizer changes its course. Waterline-like numbers stenciled on the interior of the fuselage indicate height above the ground. Sailboat fairings taper engine mounts into wings that bear green running lights to starboard, red lights to port.

would give us some protection in case of a main-deck fire) and descend the stairs to take a turn around the cargo. Unlike the pilots, I cannot resist a look each time the plane's contents change. I am drawn by the promise of revelation in the main hold. "Used clothing" might mean a boutique-consignment of East German military uniforms. A persistent rumor of fabled cargo might be confirmed.* The pilots, who speak animatedly about circus tigers, Lamborghini Diablos, and small wooden pallets of gold bars, each in its own burlap bag, seem uninterested or vaguely embarrassed by the bulk of what fills the space behind their heads.†

The specter of a fire down here is, of course, terrifying, as is the thought of a printing press or a stack of steel pipe breaking loose in turbulence. For this reason the contents of air shipments are carefully reviewed and documented; pilots receive written notification of even the smallest quantities of corrosives, explosives, and radioactive materials on board—anything that could start a fire. Cargo loads are tightly secured and neatly arranged so as to be accessible in flight. The flight engineer's last responsibility on walk-around before departure is to check each piece of fire-fighting equipment and make sure that each pallet and container is secure; the ones I watched were thorough about it.

*One story I heard many times but couldn't confirm concerned shipments of large bluefin tuna to Japan from Newport, Rhode Island. A Newport buyer with a small plane on standby reportedly offers returning sport fishermen a premium price for any bluefin over 500 pounds. The fish is iced, flown immediately to JFK, and put aboard the first available commercial flight to Tokyo.

†About four a.m. one December night in Hong Kong, I stood at the top of our air stairs scanning close-by office buildings with my binoculars. Decorated Christmas trees twinkled on a dozen floors. I'd seen Christmas trees banked with brightly wrapped gift boxes in Muslim Dubai and in the Buddhist city of Bangkok, as well as in Amsterdam and Houston. The displays, of course, had nothing to do with the Christianity of, say, Joseph of Arimathea. "This time of year," one pilot told me while we waited for cargo in Hong Kong, "we're flying freighters out of here wingtip to wingtip."

On flights to North America from the Far East's "new tigers"—Jakarta, Singapore, Bangkok, Hong Kong, Taipei—the planes ferried (in descending order, by weight) personal computers, sound-recording equipment, athletic shoes, photocopying equipment, and clothes. Traveling from North America to the Far East are comparable loads of motors and engines, personal computers, telecommunications equipment, and tractor parts. Such commodities formed the bulk of most shipments I accompanied, but it was the condiments, so to speak, that made a load memorable: two hundred Styrofoam cases of live tropical fish (labeled LTF), swimming in bags of oxygenated water, bound for Los Angeles from Manila; two Cadillac Eldorados—right-hand drive—for Osaka; canvas bags of homebound paper bills (the accumulation from currency exchanges); munitions of war (MUW) for Khartoum; bundles of mesquite wood, for restaurant cooking fires, out of Houston; and noisome industrial chemicals (OBX).

In a fully loaded 747-200, cargo is palletized on thin aluminum "cookie sheets," wrapped tightly in clear plastic weatherproofing (or opaque plastic, to discourage thieves), and secured against shifting on the pallet by webs or rope nets. Twenty-two rectangular sealed containers and pallets, dogged down to a floor of steel caster bearings and roller-track with red latches, stand in pairs down the middle of the freighter, leaving narrow outboard aisles. Two additional

units, canted to the taper of the plane, hug the starboard wall into the nose. In the tail, aft of a ten-foot-wide cross aisle directly opposite a cargo door, stand another four units. A twenty-ninth unit, the last, stands behind them, near the open wall rack that holds the plane's flight data recorder and cockpit voice recorder (the "black boxes").

I sideslip past the containers and pallets on the port side and look back from the cross aisle at the mass of our freight for Singapore and Bangkok. It shimmies in the cobblestone turbulence of what Wilbur Wright called "the infinite highway of the air," a rickety but firm, continuous vibration. (From a viewport on the flight deck, with the area lit dimly by only a few safety lights, the plastic-wrapped cargo looks like a double row of huge jellyfish strung up in a freezer.) I turn and clamber over the rearmost loads, reaching a white concave hemisphere marking the aft edge of the main deck. Here, as far as possible from the plane's compasses, is where any magnetized cargo is palletized.

Moving forward up the starboard aisle, I finally stand in an eerie place, at the forward edge of the main deck, looking at the backside of the fiberglass radar dome that fills the plane's nose. I look down into an open bay framed on either side by large jackscrews which push the nose out and up for loading through the front. The lip of this precipice, which I grip with my toes, is as close as one can get to standing on the bow of a ship. I spread my arms wide for balance, shut my eyes, and lean into the velocity of the plane. The sound of the engines is behind me, inaudible over the scream of air.

Chief pilots, or captains, men in their early fifties, "in the left-hand seat," tend to gaze to some purpose out the windows of the cockpit, while copilots, men (and, rarely, women), in their midthirties, remain focused within the plane.

In the evolution of modern jet flight, there has been a dramatic shift away from the use of navigation references outside the plane, such as rivers, to the use of electronically displayed information within the plane. Some of the copilots I spoke with, in fact, had only hazy notions of the geography they flew over. They were inclined to fly "heads down," studying a route map, reviewing the flight plan (a sequence of way points, an expected fuel burn, the speed and direction of winds aloft), and watching their instruments and display screens. On the most advanced commercial aircraft, it is the copilots who are frequently caught up in the protracted task of programming the plane's computers. ("I don't fly anymore," they joke, "but I can type sixty words a minute.")*

The chief pilots, many of them, possess a notable, unique knowledge of how the Earth has changed over the past thirty years; how much farther south the Sahara Desert has crept, how much the Aral Sea has shrunk, how far center-pivot irrigation has spread in Saudi Arabia. It's knowledge that predates satellite imagery and often is more historically integrated. Many of these pilots learned the Earth's surfaces when older planes held them to lower alti-

*Pilots refer to newer planes like the Boeing 777 and the Airbus 320 synecdochically as "glass cockpits," planes in which the information most frequently reviewed is displayed in color overlays on videolike screens. The instrument cluster in older jet aircraft is referred to collectively as "steam gauges."

tudes, when ground marks like pipelines and lakes were more important to navigation. Today, in advanced aircraft, they routinely fly high above the weather, on automatic pilot, and descend less often for fuel. A dispatcher in a windowless international office half a world away may organize a sense of geography for them and radio in, even telephone with any changes in the flight plan, due, say, to increased storm activity. There's little need to watch the weather, or anything else.

Pilots say they "fly by wire" now, no longer sensing the plane's response in their hands and feet. They refer to "cockpit management skills" more often than their "stick-and-rudder ability." In the 747-400, they monitor six separate cathode-ray screens, mesmerizing as small televisions. In this kind of self-absorbed travel, built on a dashboard knowledge of one's surroundings, a sense of both geographic scale and particularity is ruptured. Flights cover huge distances in a few hours; matriculation at a chain hotel, often reached on a crew bus driven down an advertising corridor like the airport's passenger corridors, is brief. English is spoken everywhere. Anacin, 7-Up, *Rambo,* CNN, Ray-Ban, and *Time* are omnipresent. Reality outside the plane slowly merges with a comforting, authoritative, and self-referential world found within it.

Jet lag is popularly construed as an affliction of the unseasoned traveler, a preventable distraction. No pilot I talked to regarded it as such but rather as a sort of spatial and temporal abuse which, by the time you reach your fifties, can overwhelm you on a single trip.

Over many days of flying, I fought my own idiosyncratic battle with jet lag, following the common advice of pilots to sleep when you're tired and eat when you're hungry. When I got home, after traveling 30,000 or 40,000 miles in ten days, I would fall into bed like an iron ingot dropped in the dust. On the road, like the pilots, I endured the symptoms of a jagged, asynchronous life. No matter how exhilarating a trip might have been, I sensed upon leaving the plane that a thrashing like the agitation of a washing machine had ended, and that, slightly dazed, I was now drifting off my path, a yawning ship. My tissues felt leaden. Memory seemed a pea suspended in the empty hulk of my body. I had the impression my mind was searching for the matching ends of myriad broken connections and that it was vaguely panicked by the effort. The fabric of awareness felt discontinuous. Time shoaled, losing its familiar depth and resonance. I craved darkness and stillness. I believed that without darkness and stillness no dreams would come and that without dreams there would be no recovery. Once, in a hotel, I slept on solely to dream.

If you drink copious amounts of water, breathe oxygen occasionally while you're aloft, eat very sparingly during the flight, and decline coffee and other diuretics, you can diminish the effects of jet lag. But the pilots and aeromedical officers I spoke with said the symptoms are so inevitable and intractable, you have to learn to accommodate them.

Pilots get regular checkups, many of them exercise, and most appear and feel fit. The physical hazards of long-term flying are relatively minor—an increased incidence of cataracts, high-frequency hearing loss (beginning in the right ear for copilots and becoming more severe in the left

ear with pilots)—or are unknown—the effect, for example, of regular exposure to high doses of cosmic radiation. Pilots more than copilots will tell you that whatever health hazards they may face, they love flying too much to give it up. Many think that jet lag is the principal cause of chronic moodiness, a prime source of tension in their domestic relationships. But they view separation and divorce as grim contemporary realities, and say resignedly that they are very well paid for what they do.

I liked the pilots I flew with. They have a remarkable ability to relax for hours in a state of alertness (pilots describe the job as "hours of boredom punctuated by minutes of terror"). They seem able to monitor an instrument's unwavering reading and run technical checklists repeatedly without mentally wandering or reimagining the information. Their hand movements in the cockpit are slow, smooth, direct; they concentrate on precision and routine, on thoroughness. The virtues they admire—dedication to a job, loyalty, allegiance to a code—are more military than corporate. Some, like generals, carry with them a peculiar, haggard isolation.

Standing between the pilots on the Singapore flight, my neck bowed beneath the overhead instrument panel, I could take the most commanding view possible of space outside the plane. From here, still over the South China Sea, I could see outlying islands in the Spratly Archipelago to the southeast. To the northwest were the distant mouths of the Mekong: Cua Tranh De, Cua Dinh An, Cua Ham Luong. A while later, Indonesia's Bunguran Selatan Archipelago loomed off the port side, the translucent sea turquoise over its reefs. Afternoon light from the bare orb of the sun filled the clear air at 37,000 feet with a tangible effulgence that made the island of Subi and the water seem closer. We looked down from the keep of our own wind, through layers of wind, to wind on the water; below that, the surface current ran at an angle to currents still deeper. Toward Karimata Strait, between Borneo and Belitung Island to the south, a single layer of thin stratus cloud cast its shadow over a hundred square miles of water. Beyond, the sea was brightly lit once more. Because detail on the water resumed there again with the same brilliance after fading in the foreground, the huge shadow's interruption created the illusion that the distant water was lit by light from another kingdom.

Ending a long silence in the cockpit, the captain said, "The Earth is beautiful."

On our approach to Singapore smoke began pouring out of the window vents—warm, humid air from outside condensing in our dry interior. The pilots enjoyed my alarm.

On the ground, while the plane was unloaded, and then reloaded for Bangkok and Tokyo, I strolled through mown grasses in an adjacent field. Two common mynah birds landed on the plane's port wing.

VI

The hotel in Seoul was just west of Mt. Namsan Park in Yongsan-Ku, in the city's southwest quarter. The crew bus would not leave for the airport for four hours, and I had

risen before sunrise to take a long walk. I wanted to see things that couldn't be purchased.

I walked north from the hotel through a cramped residential district. Seoul is a city of granite hills, of crags and pinnacles. On this winter morning it filled gradually with a diffuse gray light under heavy, overcast skies. As I wandered the narrow streets, I endeavored not to seem too curious about what was displayed on the shelves of small stores attached to small two-story houses. Instead I observed what sort of bicycles people rode, what kind of clothing they wore against the cold—indigenous solutions to common problems. I studied the spines of books displayed in a window, the Chinese, Japanese, and Korean titles mixed, their ideograms so clearly different in comparison. I could not see past a street reflection in the window glass whether a companion volume was in Arabic.

Some Westerners traveling today in the Middle East may experience what they take for irritation over religious differences; in Seoul—or Bangkok or Wuhan—the look a Westerner may get walking through residential streets seems more often one of resentment or bewilderment at the imposition of economic change. You are the one responsible, the looks imply, for swift, large-scale painful alterations to my culture; you see them as improvements, but they are designed really only to make business—your sort of business—flow more smoothly. It is you, they seem to say, who define, often and titanically, what is of value.

What I felt—the discomforting gospel of world-encircling consumerism of which I was an inadvertent symbol—I could have felt as an indictment in a dozen other cities. It needn't have been here, where I only wanted relief

from the impact of culture I felt every time the plane landed.

Early in the morning in a city like this, you may see several hundred years of history unfold in just a few hours. The earliest people out are those packing fish up from boats on the Han River, people selling charcoal to shopkeepers or transporting food in handcarts, a manner of life relatively unchanged from 1750. Appearing later are factory workers, headed for parts of Seoul where the smoke and grit ash of nineteenth-century Pittsburgh still cling. Then come department store clerks and employees of large firms, the lower and middle levels of white-collar work. Last out on the sidewalks are expensively dressed men, headed for the Samsung Building or for other corporate offices.

Some in the West see in such rearrangements net gains, others net losses. I do not lean strongly either way, though I'm saddened, as a traveler, by the erosion of languages, the diminishment of other systems of aesthetics, and the loss of what might be called a philosophy of hand tools. It is easy to rue the lack of restraint in promoting consumption as a way of life, but we daily accept myriad commercial solutions to our own discontent—the assuagement of new clothing, new investments, new therapies to ease our disaffections. Some who endure such accelerated living (our advertising presumes) find it a relief periodically to sweep everything into the past, making room for less obligating, more promising products or situations.

It is not difficult to disparage the capitulation in such manic living; what is hard is avoiding the impulse to blame, or the instinct to exempt oneself. Getting dressed at the

hotel, I had to smile at the labels in my clothing: J. Crew, Gap, Territory Ahead, Patagonia. My shoes, dark brown suede wingtips, had been made in Korea.

Once, suspended over the North Pacific, I held the image of a loom in my mind. If these flights back and forth across the Pacific are the weft, I wondered, what is the warp, the world already strung, through which my shuttle cuts back and forth? And what pattern will the weave produce?

I picked my way around rain-pocked mounds of snow back to the hotel, down tight alleys backed with fishmongers' crates.

The plane I boarded out of Seoul was a passenger flight with lower-deck cargo for Narita. There I boarded a freighter bound for New York via Anchorage. In the Jeppesen Manual that most United States pilots carry—a two-inch-thick ring binder of tissue-thin pages containing detailed information about airports—Anchorage is described as a consistently dangerous place to get in and out of. The nearby area experiences a lot of wind shear and turbulence; icing is common in winter.*

Pilots recall with little prompting the details of commercial airplane crashes going back many years. Each one is a warning. Their interest is almost entirely technical and legal, not macabre. While I was flying in the Middle East a freighter crashed in Kansas City, killing the three pilots

*The turbulence we encountered over Anchorage on the flight with the horses was the worst one pilot had ever experienced. On another flight outbound from Anchorage, the freighter built up the heaviest loads of ice the chief pilot had ever had to contend with.

aboard. Although the crew I was with read the story in the *International Herald Tribune,* no one commented. The pilots presume such reports are always confused and therefore misleading. They wait instead for the National Transportation Safety Board findings to appear in *Aviation Week and Space Technology.*

We had no trouble getting into or out of Anchorage, and we enjoyed an unperturbed flight to New York, with spectacular views of the Canadian Rockies. On the next leg, from JFK to San Francisco, I fell into conversation with the pilot about the history of aerodynamic design that produced the 747. Like many pilots, he had an intuitive sense of the volume of abstract space, and he was a gazer-out-of-windows. It was about one in the morning. Air-traffic control in New York had given us a direct path to San Francisco. Our flight plan showed no areas of turbulence ahead, and no one in front of us was reporting any. The moonless sky was glimmering, deep. I asked the pilot if he had ever heard of James Turrell. He hadn't.

I'd hoped for weeks to speak with someone who had. Turrell is best known for an enormous project called Roden Crater near Flagstaff in northern Arizona. He reconformed the crater with bulldozers and road graders, believing celestial space actually had shape, that one could perceive the "celestial vault" above the Earth, and that a view from within the crater could reveal that architecture by so disposing the viewer. Turell, a pilot, once said, "For me, flying really dealt with these spaces delineated by air conditions, by visual penetration, by sky conditions; some were visual, some were only felt. These are the kinds of space I wanted to work with."

People who have traveled to Roden Crater—heavy-equipment operators as well as museum curators—say, yes, you do see that the sky has shape from the crater. I'd like to go, I told the pilot.

After a while the pilot turned around in his seat and said, "He's right. I know what he's talking about. The space you fly the plane through has shape." I asked if he thought time had boundary or dimension, and told him what I had felt at Cape Town, that time pooled in every part of the world as if in a basin. The dimension, the transparency, and the agitation were everywhere different. He nodded, as if together we were working out an equation.

A while later he said, "Being 'on time' is like being on fire."

One of my last flights takes me to Buenos Aires, seat of the old viceroyalty on the Río de la Plata, the river of silver. Here, as in other places I visited, people in the freight depot are friendly and open, and sometimes quite sophisticated about ironies in the airfreight business. I go to lunch with four men who treat me to a meal of Argentine beef and a good Argentine red wine. Affecting philosophical detachment, they explain the non-European way to conduct business in Buenos Aires, the paths money might take here. We laugh. Three of us then go to a strong room to inspect a shipment of gold bullion.

I walk out to the tarmac afterward with the KLM freight manager. He is directing the loading of Flight 798 from Buenos Aires to Amsterdam, a thirteen-hour run. In the crackle blast of combusting kerosene, swept by hot winds,

I watch the pallets go aboard. These, I have come to understand, are the goods. This lovely, shrieking behemoth, the apotheosis of modern imagination and invention, is being filled yet again with what we believe in. I watch, as agnostics must once have watched at Chartres, for a sign, a confirmation of faith. I see frozen trout; fresh strawberries; eighty cases of live worms; seventy-three pounds of gold for Geneva, packed in light green metal boxes sealed with embossed aluminum bands, wrapped in clear plastic, banded again with steel strapping. An armed security officer stands by until the bulk-cargo door is closed, then stands at a distance, watching.

The last load in the aft compartment is four tons of horsemeat. The temperature is set at 53 degrees and the door is closed. The last load in the forward compartment will be 175 penguins. They have come in on the plane from Santiago and are headed for Tokyo. They wait in the noise and heat around the airplane while freight in the forward compartment is rearranged, the weight more evenly distributed.

The penguins stand erect in narrow cells, five cells forming a wooden crate. A wire mesh panel on the front, beginning at chest level, slants up and back, reaching the top of the crate just above their head height. So constructed, air can reach those on the inside of the load, thirty-five crates stacked in tiers on a single pallet. The gangs of five face in four directions; some see us, some see one another, some see the plane, some the back of another box. I recognize magellanic and rockhopper penguins. If they're making any noise I cannot hear it over the jet engines. A few strike at the wire mesh with their bills. Some of the rockhoppers

rise on their toes, cramping their heads, and flap their flippers repeatedly against the dividers.

After they are loaded, the temperature of their compartment is set at 43 degrees and the door is closed.

KL 798, a passenger flight, takes us up the southern coast of Brazil, above the Serra do Mar and Serra do Espinhaço and out over the Atlantic near Natal. There is a lightning storm near Recife, on the coast. I send my worn letter of introduction to the cockpit to see if it would be possible to watch and talk for a while. The purser comes back with a smile. Yes.

I take my place in the jump seat, assure the chief pilot I am familiar with how to operate the oxygen mask and with my responsibilities in case of an emergency. This is a 747-400. With this new design, the flight engineer's job has been eliminated; a relief crew of two is now asleep in bunks along the port side, just aft of the cockpit.

We watch cobra strikes of yellow-and-blue light on the starboard horizon. Against the display of lightning I hesitate to speak. I take in the instruments to learn our heading, the speed and direction of the wind, our altitude, the outside temperature. I'm aware of my faith in the integrity of the aircraft. I recognize the familiar, impetuous hurtling toward the void, a space to be filled only briefly, then to yawn again, hopeful and acquisitive.

Out over the Atlantic I lean forward and ask the captain how long he's been flying, which routes he knows best. Twenty-eight years, he says. He speaks of the South American and Caribbean routes. I think of the penguins two decks below, whose wings have become flippers, slamming them against the walls of their pens.