Cycling Cities: The European Experience

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Editors

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Amsterdam, Netherlands

World Bicycle Capital, by Chance

Ruth Oldenziel and Adri Albert de la Bruhèze

Throngs of workers pushing their sturdy bicycles onto the ferry taking them to their well-paid jobs at shipyards across the River IJ: this is the primal image of cycling in Amsterdam that dominated well into the 1960s. When deindustrialization hit, Amsterdammers kept on cycling. Today a very different crowd crosses the water: students on decrepit bicycles, urban professionals with hipster cycles, businessmen on higher-priced varieties, and parents with children in their cargo bikes. The streets leading to the train stations teem with cyclists of all ages and stripes; they jam public transit hubs and give policymakers sleepless nights. In 2014, cyclists were the biggest group in Amsterdam's modal split (32 percent)—and this group is growing. Public transit (10 percent) and automobility (27 percent) are far behind, and dropping in number. About 30 percent of Amsterdam's travel occurs on foot, according to the Dutch Ministry of Infrastructure and Environment.[1] Despite today's impressive numbers, the past century has seen fluctuations. Not only that. Amsterdam's past and current cycling success seems like an accident rather than the outcome of a deliberate policy. No political coalition ever had the courage to ban cars from the city center like the Dutch cities of Enschede and Groningen; none of them ever developed anything but a makeshift cycling policy. What, then, is the reason for Amsterdam's outstanding place in the urban cycling world?

Its historically high levels of cycling are certainly a factor. A number of other cities have high levels of cycling, but some have actually lost their critical mass of cyclists. High historical cycling levels and a cycling tradition may be necessary conditions to become a stellar cycling city, but are by no means sufficient: the political landscape also shaped the fate of cycling in Amsterdam. The city's social democratic majority always backed public transit—trams in the 1920s and subways in the 1960s—and at first supported car ownership, especially as an icon of social mobility.

The Street as Urban Battlefield

This 1957 photo reveals conditions on the city's main commercial and commuter street, the Leidsestraat. Policymakers left cyclists, trams, and motorists to "battle it out" for themselves in traffic. Pedestrians had their protected spaces, but motorists increasingly double parked on streets, bridges and sidewalks, blocking pedestrians and doorways. In 1971, authorities gave priority to pedestrians (shoppers) and public transit (trams). The new policy for the Leidsestraat: a ban on motorists and cyclists, most of whom were commuters.

The social democrats eventually abandoned this position amidst public outcry and in the face of powerful 1970s social movements. When the city demolished historic neighborhoods to build a new subway, an entire generation turned against large infrastructural plans and suburbanization, and embraced cycling, the human scale, and the historic city. However, no planners or politicians came up with a coherent bicycle policy. Instead, cycling in Amsterdam has been the perennial object of incremental choices and ad hoc policy.

It is therefore tempting to ascribe Amsterdam's cycling success to its robust cycling tradition, unique libertarian, alternative culture, and the historic center's advantageous scale and morphology. These factors are undoubtedly relevant. Stopping here glosses over a cycling history that was in fact full of conflicts, reverses, and organized struggle. Cycling's success in Amsterdam remains a political story, one that is often hidden beneath the placid exterior of business—or cycling—as usual.

Bicyclists as "Problem Children" 1920–1955

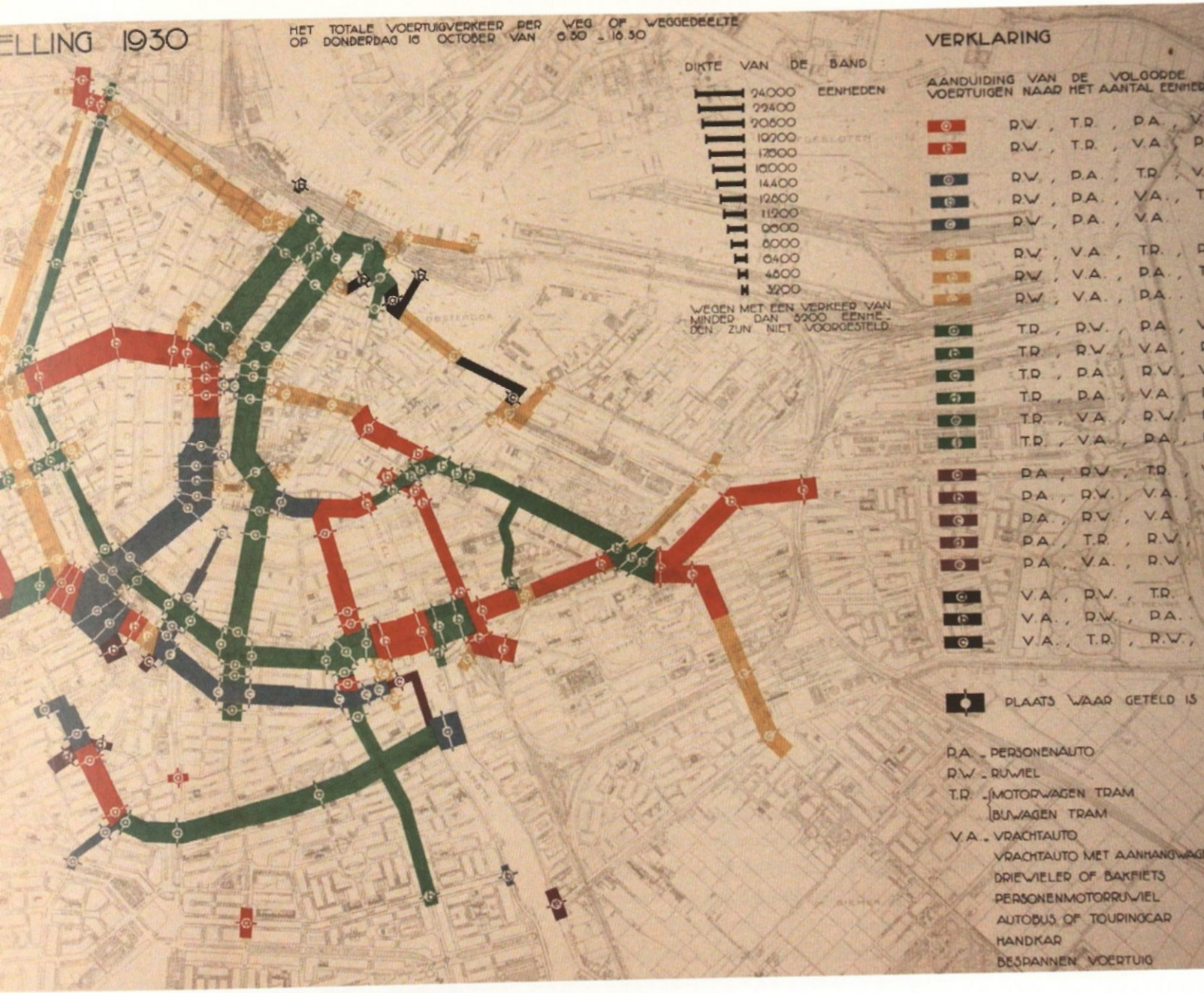
In 1922, Amsterdam prematurely prepared for the arrival of cars with an ambitious 10-year asphalting program.[2] Cars accounted for only 3 percent of the traffic. Not motorists, but scores of swirling cyclists profited from the new smooth, silent ride, if 1926 movie footage is any indication.[3] Since 1900, electric trams and pedestrians had dominated the streets. People walked to work; as soon as their incomes allowed, male wage earners took to trams to commute between the center and residential and harbor areas.[4] By the 1930s, however, most men were riding bicycles rather than the tram.[5] On one Tuesday in October 1930, traffic counters in the busy commercial street, Leidsestraat, registered 32,856 pedestrians and almost as many cyclists (30,204). Tram passengers were well represented (24,802) and the number of motorists paled in comparison (4,802).[6]

Policymakers left pedestrians and cyclists pretty much to their own devices, despite their numbers. They intervened only to facilitate the future: paving the way for automobility and modern public transit. Authorities realized that traffic was already overrunning the medieval city center and its seventeenth-century ring of canals. Radial streets in particular were too narrow and intersections ill equipped to handle the anticipated flows of fast motorized traffic. The City Council established a traffic committee to improve safety and to adapt the city to the demands of "modern motorized traffic" while maintaining its historic character.[7] Traffic propaganda films released by the patrician Discipline Union (*Tuchtunie*) in 1920—a conservative organization funded by automotive and touring interests—portrayed pedestrians as obstacles on the road to modernity. The movie ridiculed their undisciplined, foolish behavior.[8]

Local civil servants easily transferred these negative images to cyclists as they faced increasing traffic and ever more (fatal) accidents. Unruly cyclists simply got in the way of their policies. Cyclists were reckless, unpredictable, and undisciplined users of the street who hindered other traffic—cars in particular. This class-biased caricature popped up in many council reports until 1970.[9] As elsewhere, Amsterdam's (working class) cyclists cultivated a reputation for independence. They parked their bicycles wherever they liked without locking them; ignored signals and orders from traffic police, traffic signposts, and traffic lights; biked against the traffic; and passed cars, carts, and trams left and right. They did whatever they liked, and made life miserable for pedestrians and cars, at least according to authorities.[10]

Authorities may have considered Amsterdam's cyclists disorderly—and possibly even stupid—but they did not challenge their right to use the streets.[11] In 1937, the chief of the traffic police claimed that Amsterdam "has, among the cities of the world, its unique problem: you know it, the [cyclists]. They are our problem children."[12] The parent metaphor illustrates authorities' paternalism—an attitude also seen in other cities. Cyclists were unruly children who needed to be disciplined to become proper citizens of the street. Yet, they were not—as commentators in Italy or the United States called them, "pests" or "mosquitos" of the road who had to be stamped out or killed.[13] The distinction was crucial. Amsterdam cyclists may have been bothersome but the chief of police believed it was their customary right (*gewoonterecht*) to be on the streets.[14]

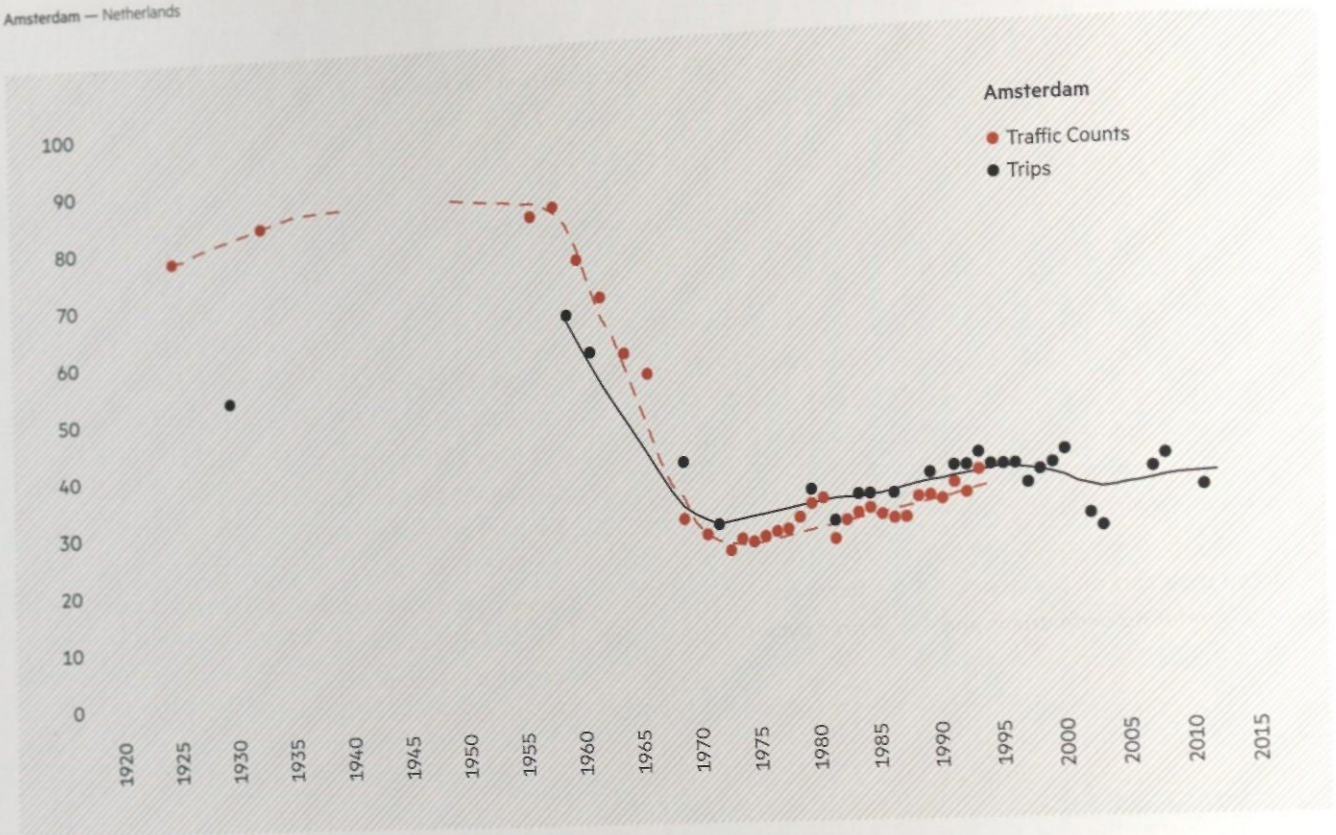
Amsterdam's traffic engineers were readying their city for the car in the midst of an ongoing battle between public transit policy and cycling practice. Cycling's



Bicycles Abound

The historically trade-oriented Amsterdam was expanding: to prepare, planners conducted numerous studies. This 1930 map documents the different modes of transit that prevailed in various parts of the city. The red, blue, and yellow represent streets dominated by bicycles. The green sections depict tram-dominated streets. The occasional purple areas were ruled by cars. Based on their findings, planners projected commuter distances between home and work not to take longer than 25-minute.

Amsterdam — Netherlands



Trend Line Amsterdam

Cycling's share of traffic (counts) and trips (travel surveys) excluding pedestrians in Amsterdam

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see appendices Amsterdam,
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popularity conflicted with the city's investments in trams. A communist council member answered his own rhetorical question: "Why are bicycles used so much in Amsterdam?" with "because the tram is so expensive." The powerful socialist Alderman, F.M. Wibaut, however, defended the city's investments: compared to other cities, he argued, Amsterdam ticket prices were reasonable.[15] Car lobby groups and the labor-dominated council backed investments either in automobility or in public transit. They ignored cyclists, with some exceptions. Planners granted Amsterdam's cyclists, like those in Utrecht, Eindhoven, and Enschede, a few dedicated tunnels and underground parking facilities near train stations (e.g., Muiderpoort and Amstel). The cycling facilities did not result from any municipal pro-cycling policy, but as a byproduct of national measures to eliminate traffic conflicts by elevating railroads in urban settings.

Amsterdam urban planners developed a different view on urban cycling than traffic engineers. In 1930, meticulous traffic counts showed that a vibrant cycling culture existed in Amsterdam, forcing urban planners to acknowledge cyclists. The modernist urban planner Cornelis van Eesteren and the influential demographer Theodoor Lodewijk van Lohuizen considered cyclists to be legitimate participants in a modern traffic system, and not just relics of the past. The planning group in charge of Amsterdam's new western developments translated pervasive cycling into a bicycle-based vision for urban design: new residential areas should be at cycling distances from places of work in the city center and the harbor.[16] The war and the economic crisis put these farsighted plans on hold, and they were eventually carried out in the 1940s and 1950s.[17]

Both the Great Depression and the German occupation during the Second World War stimulated cycling even in the absence of any deliberate pro-cycling policy: cycling flourished because the German military's thirst for gasoline created shortages for civilians everywhere in warring Europe, even in neutral cities like Basel and Stockholm.[18] Civilian car traffic halted and bicycles were a ready alternative. That said, the German authorities were not exactly cycle friendly. In Amsterdam, cyclists' "disorderly" conduct clashed with strict German rules favoring the flow of motorized (military) traffic.[19] German traffic rules—now enforced by the same Dutch police chief who thought cyclists had a "customary right" to the street—forced cyclists to clean up their act: keep to the right; do not ride side by side; always indicate turns clearly and in a timely fashion; keep your hands on the handlebars; do not ride alongside vehicles (especially trams) or hold on to them; do not transport children or adults. Other rules forbade cyclists to park their bicycles in public

spaces or to leave them unlocked and unattended after sunset.[20] Nurturing an anti-authoritarian culture, Amsterdam cyclists purposefully ignored, resisted, and defied these obligations. Amsterdammers especially resented German confiscations of bicycles, according to one German officer.[21]

Amsterdammers kept on cycling in large numbers in the postwar period, while traffic engineers focused on cars. Searching for ways to improve the flow of motorized traffic, traffic planners considered broadening radial streets and intersections, creating breakthroughs, and banning traffic—and focused particularly on the car parking problem. Car drivers randomly double parked their cars on the streets, bridges, and sidewalks, hindering pedestrians and blocking doorways. The Traffic Commission, aptly renamed the Traffic Problem Commission in 1951, and the City Council debated whether to introduce special measures for car parking (meters, discs, attendants, dedicated sites), adjust traffic lights, and discipline motorists.[22] In 1954, when cyclists made up 75 percent of the traffic in the city, the mayor asked the chief of police to propose car parking solutions. His plan, to turn the historic canals into parking lots, was met with outrage from the powerful historic preservation alliance. The plan was ridiculed and shelved—and its author retired far from Amsterdam. The radical plan did have one redeeming feature, however: it galvanized an anti-car countermovement very early on.[23] This motivated policymakers to keep searching for ways to manage the unruly traffic, in particular car drivers. Traffic managers were simply overwhelmed, taking reactive rather than proactive measures.

Cyclists, trams, and motorists were thus in fierce competition for the right to use the streets. A classic conflict site was the main shopping street (Leidsestraat), through which commuters from the southern neighborhoods and suburbs passed on their way to work in the center. Here, cyclists clashed with high-end commercial interests. In the 1920s, working class cyclists, supported by the socialists, protested against the bicycle ban—and won. In 1960, students from the local faith-based university protested a renewed ban—and lost.[24] The ban forced cyclists to take an alternative route (Spiegelstraat) and then go under the Rijksmuseum, a site that would become another battleground in years to come. In the fifteen years after 1955—the year of turning canals into car parks and with cycling at its zenith—cycling levels plummeted to reach an all-time low in 1973. At this dangerous tipping point, cyclists got organized and policymakers began to respond, albeit reluctantly.[25]

Accidents & Protests 1955–1975

Within a short decade, the relationship between cyclists and car drivers had changed radically. Indeed by 1973, while public transit barely budged (from 14 to 15 percent), automobility grew, glutting the city center (from 23 to 50 percent). At the same time, cyclists' share dropped almost half (from 63 to 35 percent) between 1960 and 1973.[26] The reversal elicited a fight from cyclists and pedestrians, particularly when the number of fatal car accidents began to rise dramatically.[27] At first, the dramatic reversal provoked a playful response.

"The bicycle is something but almost nothing," Amsterdam's Provo anarchists provocatively proclaimed in 1965, midway through cycling's steep decline. It was the bicycle's minimalism—its near-zero carbon footprint, in today's terminology—as well as cyclists' vulnerability that served the Provos so well in countering (car-governed) consumer society. Provo activist and industrial designer Luud Schimmelpennink translated the symbol into the most concrete of all Provo protests: the internationally famous White Bike Plan of 1965. Their free public bicycle share program ironically subverted the rule forbidding bicycles to be left unlocked. Bicycles—and people—should be free. Provos made bicycles countercultural, and green. Two years later, they managed to get a seat on the city council. Both from the streets and in the council they argued for healthier cities where cyclists and pedestrians would rule again.[28] Internationally, the Provo movement was an early anti-car protestor. Locally, Provos operated in a politically charged field between the left's traditional support for public transit and the new car lobby. Although most Amsterdammers still commuted by bicycle (55 percent) in the early 1960s, their numbers were rapidly declining. Cars (24 percent) and public transit (21 percent) followed at a great distance. However, policymakers continued to haggle over automobility and public transit investments.

It was the megalomaniacal traffic plan concocted by American David Jokinen in 1967 that galvanized the Provos to embrace the bicycle as their

Crammed into Trams

Between 1900 and 1920, electric trams and pedestrians dominated the streets of Amsterdam. Since the 1920s, the city's tram system—backed by the social democratic city council—has been competing with cycling as a mode of transit. This photo, likely from the 1940s, illustrates one of the tram's problems of the era; overcrowding. Another problem: the tram network was not developed enough to connect various neighborhoods. So, Amsterdammers sought an alternative—in cycling.

countercultural icon. Jokinen, a young American traffic engineer working in the Netherlands, was everything Europeans loved to hate: a brash, recently minted traffic professor, politically and culturally insensitive—and he relished it. He envisioned a car-governed Manhattan on the Amstel in the spirit of New York urban planner Robert Moses. Jokinen, subsidized by the car lobby Roads Foundation (Stichting Weg), encountered stiff opposition. A perfect foil for the Provos, Jokinen was only a hired gun brought in to dislodge a political logjam in the form of the large subway system that had been on the drawing board since 1922.[29] The car lobby favored the subway and wanted to frighten the left-leaning council into voting in favor by showing them what the alternative might be. In both their 1968 draft Second Memo Inner City and in their 1969 report Lines for Tomorrow (*Lijnen voor Morgen*), policymakers opted to improve urban life and facilitate suburbanization by investing in state-of-the-art public transit, in other words, a subway system.[30] Their support for a technically challenging subway in the peat bog that was Amsterdam's foundation became a political nightmare. The necessary demolition of historic Jewish neighborhoods roused grim specters in an already traumatized part of the city. Mass demonstrations turning into complete riots under police pressure eventually forced the council to eliminate overly ambitious sub-surface lines.[31] In the political impasse, cyclists gained political leverage.

Prior to the 1972 Traffic Plan, the Traffic Commission had recommended bicycle paths along new and redesigned streets. In some places, the commission attempted to create more room for cars by proposing that bicycles be encouraged to use designated bicycle-only streets and to allow cyclists to travel both directions in certain one-way streets.[32] Although recommending "some form of separation," the commission continued to dismiss city-center bicycle lanes for both practical ("no space") and principled ("traffic participants with the same rights") reasons.[33] Thus in practice, cyclists, motorists, and public transit were left to their own devices as they navigated the contested streets.[34] This also happened to be cheaper. The new 1972 traffic plan, despite widespread grassroots protests against automobility, said nothing about cycling.

A fundamental policy shift came only when the politicians began to feel pressure from the streets and the voters.[35] Where the Provos had been provocative and

playful, the parent activist group Stop Child Murder (*Stop de Kindermoord*) was deadly serious—and successful. In 1972, the parent organization began an energetic lobby to stop the record numbers of fatal street accidents involving playing children, pedestrians, and cyclists—even as cycling declined—by introducing the concept of "living streets" where children could play in safety.[36] A number of citizen and community groups like the Troublesome Amsterdammer (*De lastige Amsterdammer*), De Pijp (*Wijkgroep de Pijp*), Amsterdam Cycles (*Amsterdam fietst*), Gnomes (*Kabouters*), and the newly founded Cyclists' Federation (1975) added their voices to the chorus demanding calmer streets.[37] All denounced the rule of dangerous cars and pollution, demanding a livable city where children would have enough (green) space to play safely. They organized cycling street parades to demonstrate their massive numbers and to promote a car-free city with more cycling, affordable public transit, and safe walking. On the streets, they threw up barricades and fought with car drivers and the police; in the city council they struggled with municipal agencies and experts, and in the courts with judges. All called for living streets—not necessarily separate traffic flows—to buttress the rights of pedestrians and cyclists.

The Amsterdam Car-Free coalition (*Amsterdam Autovrij*) held regular cycling street protests as shows of force between 1974 and 1978, pushing policymakers and experts to (re)examine assumptions about traffic safety and urban livability. National funding for urban cycling infrastructures and new legal frameworks for living streets supported local activists in their negotiations with experts.[38] When cyclists demanded to be taken seriously as the solution for urban woes—insisting that cycling was cleaner, environmentally more friendly, took up less space, provided better overall urban accessibility, and was healthier than driving—they were pretty much treated like "unruly children."

Again, there was no policy. It would take more than a decade of political fighting in the council and countless battles in the streets before cycling's newfound positive image actually made an impact on traffic policy. By 1978—after fifteen years of precipitous decline—cycling had regained a bit of turf; automobility lost some; and public transit remained the same.[39]

Policymakers: Reactive, not Proactive 1975–1995

The streets finally forced policymakers to rediscover cycling. In 1978, urban planners came up with a genuine bicycle traffic strategy. By then the new city council's revision of the 1972 pro-car plan had reversed the decline in Amsterdam's cycling numbers.[40] In the same year, the Cyclists' Federation presented the council with a Bicycle Bottleneck Report (*Fietsknelpunten nota*) and organized a 15,000 bicycle-strong street protest to demand concrete measures. The bicycle coalition also announced it would take its lobby off the streets to work with policymakers. The newly elected city council embraced cycling as a serious issue.[41] The Traffic Commission established a cycling problem working group, prioritizing "the preparation

Playing Victim for a Cause

This 1977 aerial view of Amsterdam's Museumplein (Museum Square) shows social activists framed by the Dutch national museum. Their cause: reclaim the streets from reckless cars, at a time when cycling had hit an all-time low. Note the form of protest, new at the time: demonstrators lie down beside their bikes, representing fallen traffic victims. The goal was to force policymakers to take cycling seriously.

of cycling projects within the planned cycling grid." For the first time, the design principle was separate cycling routes, priority for cyclists at intersections, and allowing cyclists to travel in both directions on one-way streets.[42]

The 1978 policy framework stated that cyclists should be subject to the fewest intersections, enjoy priority at those intersections, and never have to wait more than 30 seconds at traffic lights. Neighborhoods would get connector roads and shopping streets would have cycle lanes. Another measure was the placing of countless maroon steel traffic bollards (*Amsterdammertjes*) that prevented cars parking on the sidewalks while allowing cyclists to weave in and out of car and pedestrian traffic.[43] Moreover, in the early 1980s national spatial planning policy called for a "comprehensive" new compact city concept to combat the suburbanization that had come under fire in planning circles and that discouraged cycling.

Despite the broad anti-car coalition, in their implementation policymakers slalomed between motorists and cyclists. Because they expected cyclists to resist mandatory use of paths and lanes, they only implemented traffic segregation in newly built neighborhoods like the Bijlmermeer.[44] In the central city, policy took another tack. Authorities built two separate but parallel rings in the 1970s: an outer ring for cars (Stadhouderskade-Nassaukade) and an inner ring for cyclists (Sarphatistraat-Weteringschans-Marnixstraat), where cars were merely guests. These were pragmatic solutions rather than principled design choices for a bikeable or walkable city. The Cyclists' Federation, a participant in the city's cycling policy group (*Werkgroep Fiets*), grew impatient with "governmental apathy" and "bureaucracy."[45] In 1982, the union organized a 20,000-strong bicycle rally to protest the city's failure to implement its promises.[46]

Indeed, the 1980s and early 1990s were rife with contradictions between policy and practice. In-house (commercial) parking for bicycles, begun in the 1930s, for example, came to a halt—almost without anyone noticing. Between 1970 and 1985, Amsterdam's many local bicycle storage areas, an essential resource for tenants cramped for space, disappeared when the city renewed old neighborhoods. When the city failed to reinstall them and profit margins fell, Amsterdammers parked their bicycles on sidewalks *en masse*. Things deteriorated when the national building code of 2003 dropped the requirement that developers should provide bicycle storage. The shift from in-house to sidewalk parking created a new combat zone between cyclists and pedestrians in contesting precious public space.[47] Bicycle parking at train stations was another battlefield. Urban and national authorities often worked at cross-purposes. The city attempted to create parking infrastructures, the national railroad authorities tried to get rid of parked bikes, and the city police fined cyclists for parking near stations. By the mid-1980s, the national government was no longer actively encouraging cycling.[48]

In 1992, the proposal to make Amsterdam's city center car-free—on the agenda for almost two decades—came to a sorry end. A referendum to ban cars from the city center was voted down—just barely. The failed referendum left Amsterdam's policymakers without a clear mandate and what followed was a spate of incremental changes—curb by curb, intersection by intersection, street by street.

Cycling Explodes 1992–2015

Amsterdam cycling policy has played catch up to the city's cycling practice. Since the 1990s, cycling expanded explosively in Amsterdam—surprising even the best-prepared policymakers. Traffic counts around the historic center (the Singelgracht cordon) showed a drop in cars (from 235,000 to 172,000) and nearly double the number of cyclists (from 86,000 to 140,000) in a fifteen-year period (1990–2006).[49] In metropolitan Amsterdam, cycling dominated the modal split of local trips with a 32 percent share in 2014.[50] However, growth was most spectacular in the center: skyrocketing to 87 percent for cycle trips shorter than 4 kilometers. Public transit and automobility decreased in the same period, from 28 to 22 percent and 25 to 13 percent, respectively.[51] Indeed, at this point cyclists once again ruled the streets. The 1978 framework continued to be the guide for policymakers' implementation strategies as they created a cycling network (*Hoofdnet Fiets*) and parking facilities.[52]

Reducing automobility by cutting back on parking was another tactic. The city had already been raising parking fees as a key policy instrument since the 1960s. In 1991, the authorities extended the policy by issuing limited number of parking permits. Car-owning

How the Bicycle Battles Traffic

This photo series shows the effects of car-limiting policies on cyclists in Amsterdam. Pictured here is the New Amstel Bridge in three different eras. In the 1975 photo [left], cars clog the street, while cyclists and mopeds are pushed to the curb. In the 1980 photo [center], a policy of restricting cars allows bikes to ride freely. And in the 2016 image [right], notice that car traffic is banned from the bridge—in one direction. As a result, pedestrians, cyclists, and trams now dominate.

residents in most neighborhoods faced long waiting periods for permits, limited parking spaces, high tariffs, and local parking taxes. Despite fierce resistance by car-lobby organizations (*Blij dat ik Rij*) and a local pro-car party (*Mokum Mobiel*), the city nevertheless pursued a living street policy: calming traffic, reducing automobility, and increasing traffic safety.[53]

Integrating users—and potential opposition—into policymaking has been another tactic. Since 1986, the city's Traffic Department has drawn intensively on the Cyclist Federation's user expertise. The department, advised by the Fire Department, the Cyclists' Federation, and organizations for the disabled, assesses all projects affecting car drivers, cyclists, pedestrians, and public transit.[54] The city also appointed a bicycle coordinator to align policy in the various boroughs, each with its own traffic policy, with that of the central city.[55]

By the year 2000, bicycle policy went mainstream. As far as cycling is concerned, the traditional divide between social democrats and right-leaning politicians has weakened. Still, subtle differences remain. In 2002, the conservative (VVD) Alderman for transport reported that he did not anticipate any increase in cycling. He therefore allocated a very modest budget for new bicycle infrastructure (€5 million a year) pronouncing it more than adequate.[56] His social democratic successor raised the budget dramatically (from €5 million to €70 million); earmarked extra funds (€17 million) for projects to encourage groups that tended to cycle less than Amsterdammers in general: (school) children, young adults, minority groups, (vocational) students, and lower income groups; and set the goal of achieving a cycling share of 37 percent.[57] His budget allocation suggested that the new administration realized that cycling was not a natural phenomenon: policymakers needed to maintain the traditional cycling culture and reach new groups.

Despite the best of policy intentions, the city proved to be unprepared for its cycling success. No doubt, traffic calming and car-reducing measures were responsible for making cycling such a part of Amsterdam's streets once again. However, cycling's phenomenal increase also resulted from its pivotal role in multimodal before-and-after transport by train commuters. In 1980, very few train passengers arrived at the station by bicycle (6 percent); public transit

was their mode of choice (66 percent). Thirty years later in 2008, the numbers had evened out (both 40 percent); the remaining fifth walked to the station.[58] This use of the bicycle in multimodal transit has been invisible because traffic engineers counted these bicycle trips as train journeys rather than as cycling trips. This omission in the model has left policymakers unprepared for what is happening in the street. Now that researchers are looking at the bike-train-bike as one system—and thus counting rather than omitting the trips that commuters make on their bikes to get to the train station—they have discovered that since 2011, the combination of bicycle and public transit kilometers has increased by 25 percent in large cities.[59] This research challenged basic policy notions that bicycles only matter for commuting distances below 7.5 kilometers. The findings are not yet part of data gathering or policy prognoses, however.

→ See map on page 195

The flip side of this multimodal use of the bicycle is the crisis of bicycle parking at train stations. Policymakers have had a hard time accepting, let alone dealing with, this unintended consequence of the resounding triumph of the bicycle in the city's mobility chain. In 2012, the transit Alderman defined the invasion by parked bicycles of public space as a problem, not as an indication of success.[60] He was not the only one portraying cyclists as alien intruders into public space: Amsterdammers and tourists alike view their haphazardly parked bicycles as dangerous obstacles at train stations.[61] Their massive numbers block access to the city, policymakers fear; cycle parking facilities are simply out of tune with reality, they admit. To solve these problems, the city is investing €15 million annually over eight years (2012–2020) to expand parking facilities at train and tram stations as well as widening bicycle lanes at the expense of car space. Quite ironically, then, Amsterdam's policymakers no longer focus on encouraging cycling; they now have to figure out how to manage its spectacular growth. They expect—or hope—there is a saturation point.[62] While policymakers in the rest of the world are working day and night to increase cycling levels, their Amsterdam counterparts' biggest headache is finding parking spaces for the cycling crowds—and tourists marvel at the sight. Nowadays the Bicycle Highrise (*Fietsflat*) near Central Station rather than the Rembrandt House is Amsterdam's hottest tourist attraction—and one of Amsterdam's most photographed sites. For authorities, the *Fietsflat* is a nuisance rather than the outcome of a sophisticated mobility chain or a symbol of sustainable urban mobility.

Summary

The stubborn popularity of cycling in Amsterdam may be due to the geometry, size, and fine-grained structure of its unique center with its compact, semicircular, dense layout, and long canals and small twisty streets. For those who live, work, shop, and study in the center or those who commute through the historic city to train stations or between many of the peripheral nineteenth-century neighborhoods, cycling is by far the fastest, most flexible, and cheapest mode of transport. Neither walking and public transit nor cars can compete, despite powerful backers who did—and continue to do—their best to change the odds. Twentieth-century expansion, and especially suburbanization, created longer transit distances that seemed much better suited to public transport and the car for a few decades. However, cycling managed to keep a firm base in the city center.

That said, our account of cycling in Amsterdam makes it plain that this cycling paradise had to be created and defended through political struggle—it was not simply an historical given. The attractiveness and efficiency of cycling in the center have always depended on political decisions about allocating space and facilities to competing modes of transport, be it trams, buses, cars, and even walking. True, Amsterdam's cyclists have been an unruly lot and difficult to discipline, but things could have turned out otherwise. That Amsterdam is now the world cycling capital is thanks to a determined struggle. Even when their numbers dwindled and automobility threatened to take over, Amsterdam's cyclists were quick to stand their ground. They proved to be tough street fighters in the era of automotive anarchy. Cyclists were not alone in the fight. They built on the actions of the urban preservationists, who were well organized as early as the mid-1950s.

Postwar policymakers believed cycling would ultimately bow to the car—and public transit—so it would be a waste of time and money to try to extend its lease on life. This soon proved to be a mistake. The early rise of the countercultural movement and the tough resistance to demolition of historic sites for the subway created a broad political base for a livable Amsterdam with as centerpiece domestication of the car and more room for bicycles. By the late 1970s, both a countercultural and an urban preservation movement had forced Amsterdam's political establishment to abandon its laissez-faire and reactive traffic policies.

Where Cycling is Second Nature

In Amsterdam, nearly everyone cycles as a matter of daily routine: men women, and children—of practically all ages and cultures. In this phot two young women ride without helmets, one riding side saddle on the bicycle's luggage rack (legal in the Netherlands). The bike is the hugely popular "granny" model, which has no gears. Often, these bikes are us even when they lack front and back lights, as well as protective covers f the bike's chain or the rider's coats. Note the rather flat back tire, which makes the rider's task more strenuous. This photo also illustrates an Amsterdam rarity: strictly separated bicycle lanes.

Thereafter the city adopted a pro-cycling policy, albeit on pragmatic rather than principled grounds. The new cycling facilities, both physical and legal, not only streamlined cycling in the old center, it also—thanks to a network of high-quality cycle paths that were extended throughout the metropolitan area—increased the distance and the number of people for which it made sense to take the bicycle instead of the car. The car-curbing policy proved most effective. Car drivers find it an expensive and time-consuming venture to visit Amsterdam's central city; cyclists have taken over the roads once intended for cars. In sum, popular well-organized resistance, a compact urban layout, a traditionally vibrant cycling culture, and the pragmatic mix of pro-cycling and car-limiting policies helped cyclists and pedestrians to recapture their historic monopoly of the city center, leaving cars and public transit to dominate greater Amsterdam. The position of the bicycle in the sophisticated bike-train-bike system has reinforced the bicycle's pivotal role in Amsterdam's urban transport beyond the city center. The many-parked bicycles on Amsterdam's streets and stations are the living testimony: a headache to some, a cause for celebration for others, but mostly an intended consequence of the success of a more sustainable mobility chain.


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Urban European Cycling: A Definition

Ruth Oldenziel

The history of cycling in fourteen diverse cities in Europe evokes the question whether we can speak of a European style of urban cycling. Europe may be known for its enormous diversity, yet its cities have shared common experiences and developments. Europe is also defined by the European Union (EU)—and the numerous organizations issuing guidelines and exchanging best practices. Indeed, Europe's urban cycling experience has evolved in multi-faceted ways.

Peace, Love... and Free Bicycles

In 1963, the Dutch countercultural Provo movement created the world's first free, public bicycle program: the "Witte Fietsenplan" ("White Bicycle Plan"). This 1969 photograph was responsible for transforming the White Bicycles into an international icon of the counterculture. Pictured here is Beatles legend John Lennon with Yoko Ono on their honeymoon, in an Amsterdam hotel. The white Provo bicycle figures prominently in their week-long "Bed-In" to promote peace. Since the 1960s, lobbying for pro-cycling policies has become commercialized. Dutch—as well as Danish—consulting firms now do a brisk business in promoting cycling-policy expertise.

The case studies show how each of the 14 urban areas developed its own unique cycling culture. Over the past century, local European policymakers have curtailed or encouraged cycling by: building or demolishing cycling infrastructures; granting or denying cyclists' rights to all roads; creating public transit systems in competition or in tandem with walking and cycling; and curbing or facilitating automobility. Based on local variations, we can divide the cities in terms of their current cycling levels into three categories: high levels of over 30 percent (Amsterdam, Copenhagen, Enschede, Malmö, and Utrecht); medium levels between 10 and 30 percent (Antwerp, Budapest, Eindhoven, Hannover, and Southeast Limburg); and low levels below 10 percent (Stockholm, Manchester, Lyon, and Basel).

The high-level cities are mostly compact urban centers, with a vibrant cycling culture since the 1920s and relatively neutral, not outright hostile, policies. Despite a rapid and steep decline in the 1960s, these cities recovered because policymakers liaised with activists to create pro-cycling and car-curbing policies. Public transit did not compete with cycling. Amsterdam and Utrecht cycling campaigners collaborated with powerful urban conservationists to enable a gradual curbing of automobility. In Copenhagen

and Enschede, cycling activists worked with visionary policymakers, who saw cycling as the key to urban renewal after their industries suffered hard times in the 1970s.

The medium-level cycling cities sprawled when their centers were (re)designed for automobility after the Second World War. Eindhoven developed cycling lanes to separate "slow" and "fast" traffic for the benefit of cars, while its inefficient public transit encouraged cycling. In contrast, Hannover and Antwerp adopted anti-cycling policies early on, investing in efficient public transit to compete with commuter cycling. Relations between their policymakers and social activists remain tense.

Even so, there were differences. In the hilly Dutch province of Southeast Limburg, mopeds became popular after the 1950s. The authorities adopted an anti-cycling policy when the mining industry collapsed in the 1970s, unlike Enschede and Malmö facing similar challenges. Policymakers in Hannover forged a coalition with the environmentalist movement by justifying affordable public transit, thus competing with commuter cycling. In Hannover and Southeast Limburg, cycling became a leisure activity. The modest cycling levels in Budapest were due to heavy communist investments in public transit as well as the Hungarians allowing automobility after their 1956 uprising. The city's cycling culture in the post-socialist era is not just recreational but also countercultural.

Low-level cycling cities were (re)designed to be governed by cars and public transit combined with harsh anti-cycling policies. Manchester's postwar planning reinforced its early urban sprawl and negative image of cycling. The compact border city of Basel facilitated international trucking and motoring by pursuing traffic separation, encouraging public transit, and banning cycling. Since the 1970s, however, cycling activists' close collaboration with the authorities has encouraged walking and cycling, gradually banning cars from the historic center. Cycling levels in Basel, like in Budapest, Stockholm, Lyon, and Manchester, have remained low and turned subcultural. Today the authorities in Lyon and Stockholm embrace cycling—Lyon has invested in public-private bicycle systems and Stockholm in super bicycle highway infrastructures.

In short, Europe's cycling practices show enormous diversity. At the same time, we do witness a shift shared by most cities. In the 1970s and particularly in the 1990s, bicycles, once considered old fashioned, became policymakers' favorite green machines for economic growth and public health. Cycling is now a sustainability index in every city. How did this shared sense of green values come about in Europe?[1]

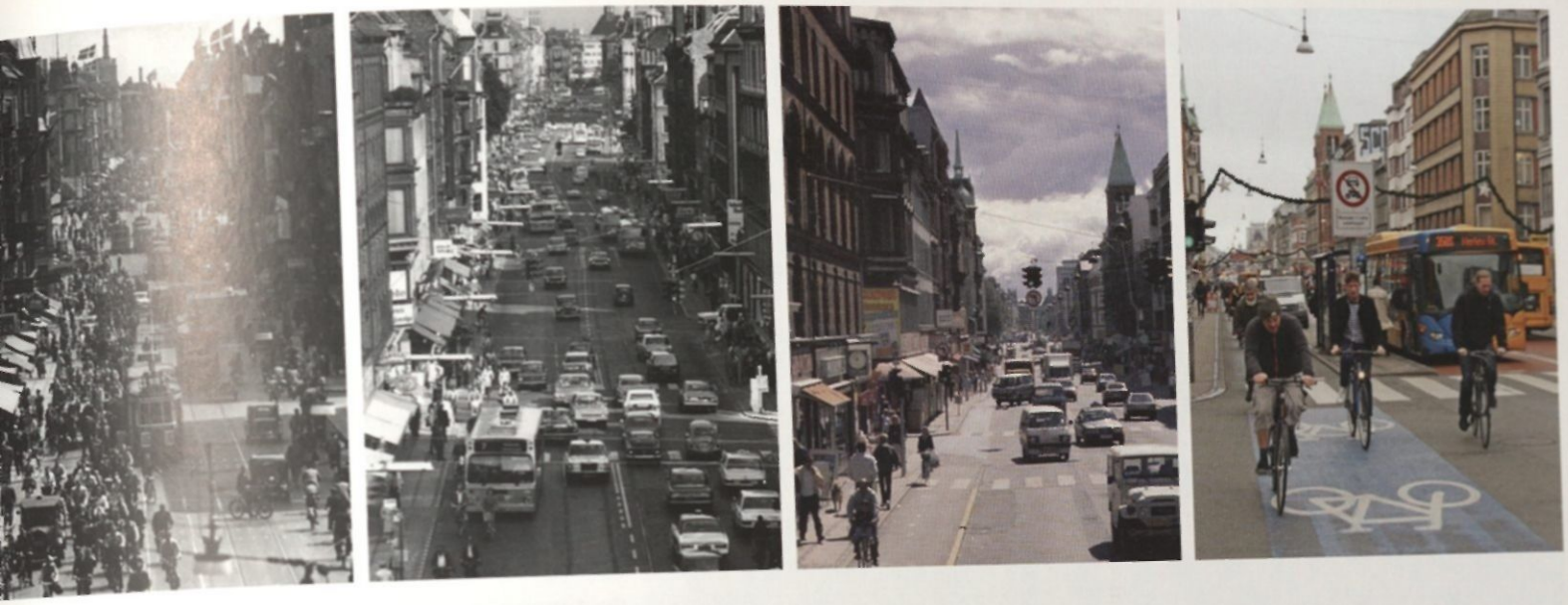
The 1970s: Europe's Cycling Policy Goes Global

Condemnation of urban automobility and pollution has gained momentum since the 1950s. Globally, the 1970s was the pivotal decade when urban cyclists' associations defined cycling as a public issue, putting pressure on city authorities while criticizing suburban-minded touring clubs. The first to adopt the bicycle as a green symbol of urban sustainability were the counter-cultural Provos in Amsterdam. Their free public bike sharing (*Witte fietsenplan*) in 1963 was part of a broad movement against materialism, consumer culture, air pollution, and automobility.[2] Their white bicycles became an international icon, especially after the widely circulated 1969 photograph of popstar John Lennon and Yoko Ono's honeymoon in the Amsterdam Hilton, showcasing the Provo bicycle on their "peace" bed.

The 1970s movement was not limited to anarchists and popstars. Parents were worried about cars killing their kids on the streets. The public was already

yclists Demand pace

n the 1970s, activist roups organized bicycle emonstrations across he globe. This poster, hich publicizes World ycling Day, emphasizes he international nature of he events—simultaneous lemonstrations in Amsterdam, Montréal, Paris, and many other ities. The text reads: "The whole world cycles along: for the rights of cyclists and pedestrians and the right of way for public transit."



enraged by fatal traffic accidents, but when death rates skyrocketed in the 1960s, French, Austrian, German, British, Swiss, and American community organizations no longer accepted the state of affairs. Nowhere were concerned parents as politically articulate and successful as in the Netherlands, where their street actions and bold symbolism, the *Stop Child Murder* campaign, forced the Dutch government to take swift traffic-calming actions in residential areas after 1972.[3]

Policy in Practice—on the Same Street

These photos depict Nørrebrogade, a street that runs through a populous district of Denmark's capital, Copenhagen. Note how the street in 1953 [photo left] is jammed with cyclists and trams during rush hour. In 1977 [photo, second to the left], buses replaced trams; policy allows cars to dominate, although cyclists still exist. Then, in response to activist pressure, authorities installed one of the city's first cycle lanes. By 1989 [photo, second to the right], a moderate number of cyclists enjoys a safe lane. And today [photo, right], policy for this street prohibits cars and sanctions wide bicycle lanes.

Cycling movement activists sought to reclaim the street from cars in their own cities, but also acted globally from the start. National cycling federations organized demonstrations all over Europe. The opening shot in 1971 was 10,000 French activists organized by Friends of the Earth protesting cyclists' rights as the road to a more sustainable future ("the car kills, stinks, and pollutes"). Cyclists orchestrated a World Cycling Day in June 1977 with parallel demonstrations in Amsterdam, Montreal, Paris, and other cities to demand rights for cyclists, pedestrians, and public transit. These events showcased broad-based support for livable cities and equal access to public space, opposing cars jamming the streets and threatening people's health.

The 1980s and 1990s: Europe Exports Cycling Expertise

In the 1980s, activists shifted their city street protests to local policymaking and even to Brussels, the key strategy being traffic engineering.[4] The decade marked negative reactions to the progressive movement and saw power shifting from national to local governments. Cities then lost both their state funding and the modest bicycle expertise developed by national agencies. In response, French cities, for instance, formed *Club des Villes Cyclables* in 1988 to exchange and develop cycling expertise. Other European cities hired former activists. Cyclist organizations in Dutch cities, Basel, Stockholm, Malmö, and Copenhagen thus helped their authorities to develop cycling policies by advancing activists' user-based knowledge as an alternative to state employed technocrats.[5]

In this decade, activists also responded to the disinterest in national cycling policies by establishing European networks of cycling policy expertise. The first was the Belgian electrical engineer-turned activist, Jacques DeKoster. Inspired by Dutch street activism in 1965 during his year at Philips in Eindhoven, he established a Brussel-based research and action group for everyday cycling (*Groupe de Recherche et d'Action des Cyclistes Quotidiens CRACQ*) in 1975. DeKoster formed an important transnational exchange between the French and Dutch world of urban cycling, organizing 28 study tours around Europe in search of best practices.[6]

Who Funds Urban Cycling?

This photo shows the main square in Lyon, one of the places where a private company—in this case the French JCDecaux—won the right to advertise in the city. In return for that right, the company provided 4,000 shared bicycles. Alternatively, in some urban areas, government agencies and non-profit organizations pay for bike-sharing programs. In Germany and the Netherlands, for example, the national railroads provide bike-sharing services. Whatever the funding scenario, the key question is: Should urban cycling be a strictly public-policy affair, or not?

The successful first Velo-city conference in Bremen in 1980 prompted twelve national cyclist federations to establish the European Cyclists' Federation (EFC) in 1983. ECF's conferences have grown beyond their European roots into a global platform for urban and recreational policies, first in Montreal (1992) and recently in Taipei (2016). Today such conferences attract 1,500 participants from 80 countries and hundreds of organizations displaying their products and services.[7] ECF, together with the bicycle industry, focuses on lobbying the EU for tax equity between motorists and cyclists, or for national Bike-2-Work programs through tax incentives, buying schemes, and mileage allowances based on the 1994 Dutch bicycle commuter tax scheme.[8]

The exchange of best policy practices is ECF's second focus. With EU subsidies, ECF together with Austrian private *Forschungsgesellschaft Mobilität* FGM-AMOR, the Swiss Velo consultancy, and Belgian non-profit organization Slow Traffic, developed a cycling audit and benchmarking instrument for cities (BYPAD) in 1999. Seven cities piloted the tool, growing to over 60 by 2005 and, despite EU funding running out, even to 130 cities in 2008.[9] BYPAD organized international seminars and themed study tours in Ceske Budejovice (Czech Republic), Munich (Germany), and Tartu (Estonia), and an online databank to track best practices.[10] Its developers tried to downplay the implied competitiveness so that cities with poor scores would not be discouraged. The benchmark is meant to help authorities learn from others and develop a bicycle policy in collaboration with local groups and external experts, like in Basel.[11]

The European-sponsored benchmarking tool spawned hundreds of local versions. National cyclists' associations used it to encourage local policymakers to improve their plans. The first was Copenhagen's Bicycle Account, carried out every other year since 1995.[12] The Dutch cyclists' union benchmarking (*Fietsbalans*) investigated 125 urban communities in 2000 and 2004, followed by 43 cities in 2006 and 2008. We have seen how Eindhoven, Southeast Limburg, Enschede, and Basel prodded their policymakers to develop better plans through these tools. The British CTC organized a nationwide benchmarking project between 2000 and 2008 and a best practice database. So did the German region of North Rhine-Westphalia and SVI (*Schweizerischen Vereinigung der Verkehrsingenieure und Verkehrsexperten*) for Swiss cities.

The 1990s and Beyond: Go Dutch, "Copenhagenize"—or Go Corporate?

Since the 1990s, cycling policy expertise has become an export product, successfully exploited especially by the Danes and the Dutch. Dutch urban engineering consultants exported their country's Bicycle Master Plan started in 1990. The program subsidized international outreach programs, symposia, and translations of key documents in English, German, and Chinese. Dutch experts consulted with local authorities and cycling organizations in many European countries.[13] In 1996, cycling activists, traffic engineers, and urban planners formalized the export of the nation's cycling expertise by establishing the Interface for Cycling Expertise (I-CE). It

established a Bicycle Partnership Program, Cycling Academic Network, and Metropolitan Cycling Lab.[14] The country's 2007 manual on cycling infrastructures in English was an international bestseller in policy circles.[15] There were many bilateral exchanges. Hungarian officials and cycling organizations collaborated with their Dutch counterparts; likewise their colleagues in Antwerp. In 2009, this city adopted a bicycle street counter as communication and marketing device from Odense in Denmark, bicycle taxis from France, and the bicycle street with cyclists' priority over motorists from Bremen. Most of the ideas were from the Netherlands: advance stop lines, cycle super highways between suburbs, educational programs for adults, a benchmarking tool (*Fietsbalans*), and a bicycle-centered platform (*Fietsberaad*).[16]

The Dutch experts focused on infrastructure, planning, and institutions whereas the Danes were more inclined to encourage cycling culture and marketing as well. From the start, Danish activists and policymakers had been important players in international circles with the Swiss, Germans, British, and the Dutch. They pioneered in establishing the Cycling Embassy of Denmark in 2009 to promote Danish cycling expertise—and Copenhagen's cycling culture in particular.[17] The Embassy included a city network, Danish Cyclists' Federation activists, but also consultancies like the Copenhagenize Design Company. Copenhagenize was founded by the Canadian-Danish designer Mikael Colville-Andersen, a film director and screenwriter. After creating Cycle Chic—a popular blog celebrating cycling culture in Copenhagen and elsewhere through compelling images of a new lifestyle—Andersen successfully trademarked the slogan "Copenhagenize" as a new brand. He combined cycling policy with his expertise in visual presentation, design, and marketing. Andersen successfully branded Copenhagen—and Denmark by extension—as the cycling center in an emerging international market for cycling expertise. Coinciding with hosting the UN climate change conference in 2009, the city also heavily invested in promoting cycling as a culture by appointing a Copenhagen bicycle secretariat that included ethnographers. The Dutch followed, but their private-public partnerships including consultancies like Royal HaskoningDHV and Mobycon kept their engineering focus.[18]

Branding cycling as a lifestyle is a popular trend for politicians. Many cities have adopted bicycle sharing programs to provide low-cost and flexible mobility for short trips such as commuting, shopping and for recreation or tourists. Inspired by the Dutch Provo movement, in 1976 the mayor of La Rochelle, Michel Crepeau, successfully instituted the first bicycle share program. Others wanting to replicate his success, ended up with corporate-sponsored rather than public bike-share schemes. Lacking national funds or policy support, cities from Paris to Barcelona outsourced the costs of urban street furniture to multinational advertising corporations like the U.S. Clear Channel and the French JCDecaux. Public-Private partnership became a means of raising taxes for urban services. The corporations' contracts for outdoor advertising on bus stops turned into a multibillion-euro and transnational business. To break JCDecaux's near monopoly in Europe, competitor Clear Channel funded an innovative, free bicycle-share scheme in the French city of Rennes in 1998. The Barcelona mayor followed suit by partnering with Clear Channel for a bicycle-share scheme. However, he succeeded in securing the revenue from car parking to fund the bicycle infrastructure. Barcelona's Bici system was an exception in shifting funding from car to cycling infrastructure as a deliberate policy choice.[19]

Today, most bike-sharing programs are standalone systems sponsored by government agencies, non-profit organizations, and public-private partnerships. Only a few are integrated with other types of mobility. In France, some vehicle operators lend bikes to customers when they park their car. A few services have developed partnerships with the public transit sector in order to link how people travel from A to B, or what experts call, the mobility chain. For example, Germany's national railroads offer commuters a (Call a Bike) service that is also open to others. With its high bike ownership, the Netherlands has a highly successful, single national bike-sharing program (*OV fiets*) for commuters, operated by the publicly funded railroad company. Discussions about financing such bicycle share systems highlight the key issues facing cities today. Is urban cycling part of public policy or should it be left to corporate players like banks and public advertising? And if corporate players are invited to help policymakers shape cycling mobility, who owns the data generated by the users of such bicycle share systems? Many questions remain unanswered. Indeed, the jury is still out on where urban cycling belongs in cities' mobility policies today.

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The Future of Cycling: A Research Agenda

Ruth Oldenziel

The basic research for this book was carried out in the mid-1990s, when little or no historical research had been done on a hundred years of policy and practice in a range of cities. *Cycling Cities: The European Experience* covers an even broader terrain. It presents the current state of the art. Except for some welcome exceptions dealing with the long-term perspectives, the research field of urban cycling is still wide open.[1] We highlight just six possible inquiries that consider the historical context as a way of understanding future mobility.

Making Cities More Livable

Over the past century, people have questioned the car's right to exist in the city. Since the 1960s, cycling advocates have promoted the bicycle as a space-saving means of travel. This 1979 poster, from the Dutch cyclists' union (ENFB) in Woerden, illustrates the space required for each form of transport. The poster's message is clear: cars take up a great deal of valuable urban space that could be freed up for more—and more sustainable—modes of transport. The poster's logic still applies: privileging cycling over cars makes cities more livable.

Cycling & Big Data

Cycling has promised huge public health and economic benefits. But how do we actually measure urban sustainable mobility? Since the 1960s, cycling proponents have promoted the bicycle as a space-saving means of urban transit to counteract clogged streets. Indeed, precious land use in cities is one pressing issue. Reducing CO2 is another. Policymakers are recently using modal split figures—how many trips people make on foot, by bicycle, public transit, or car—so that they can devise ways to get people out of the car and on the bicycle. Modal split figures potentially measure urban sustainability. And there are claims of health benefits. Indeed, the field of bikenomics—how to calculate cycling's costs and benefits—is the next research frontier in a world of big data.

Can we trust the numbers, however? Since the 1920s, policymakers have either not counted or undercounted cyclists and pedestrians when measuring their cities' economic growth. Cyclist numbers were often ignored. In a typical case for the city of Utrecht in 1951, traffic consultant Feuchtinger dismissed cyclists from the traffic count as an old-fashioned phenomenon that would soon cease to exist anyway. What

Bikes Meet Public Transit

For decades, policymakers have treated public transit and cycling as separate—if not competing—phenomena. Today, policymakers are starting to see the need to treat public transit and cycling as an interdependent system. On this map, Dutch researchers trace how the Netherlands' intricate urban transit expands cycling's reach beyond the city centers. Red indicates that the average Amsterdam and Utrecht cyclist needs to cycle for only 20 minutes (maximum) to reach one of the 200 train connections. By contrast, cyclists in areas marked white and blue are underserviced. This so-called bike-train-bike system challenges the previous policy assumption that bicycles are useful for short distances only.

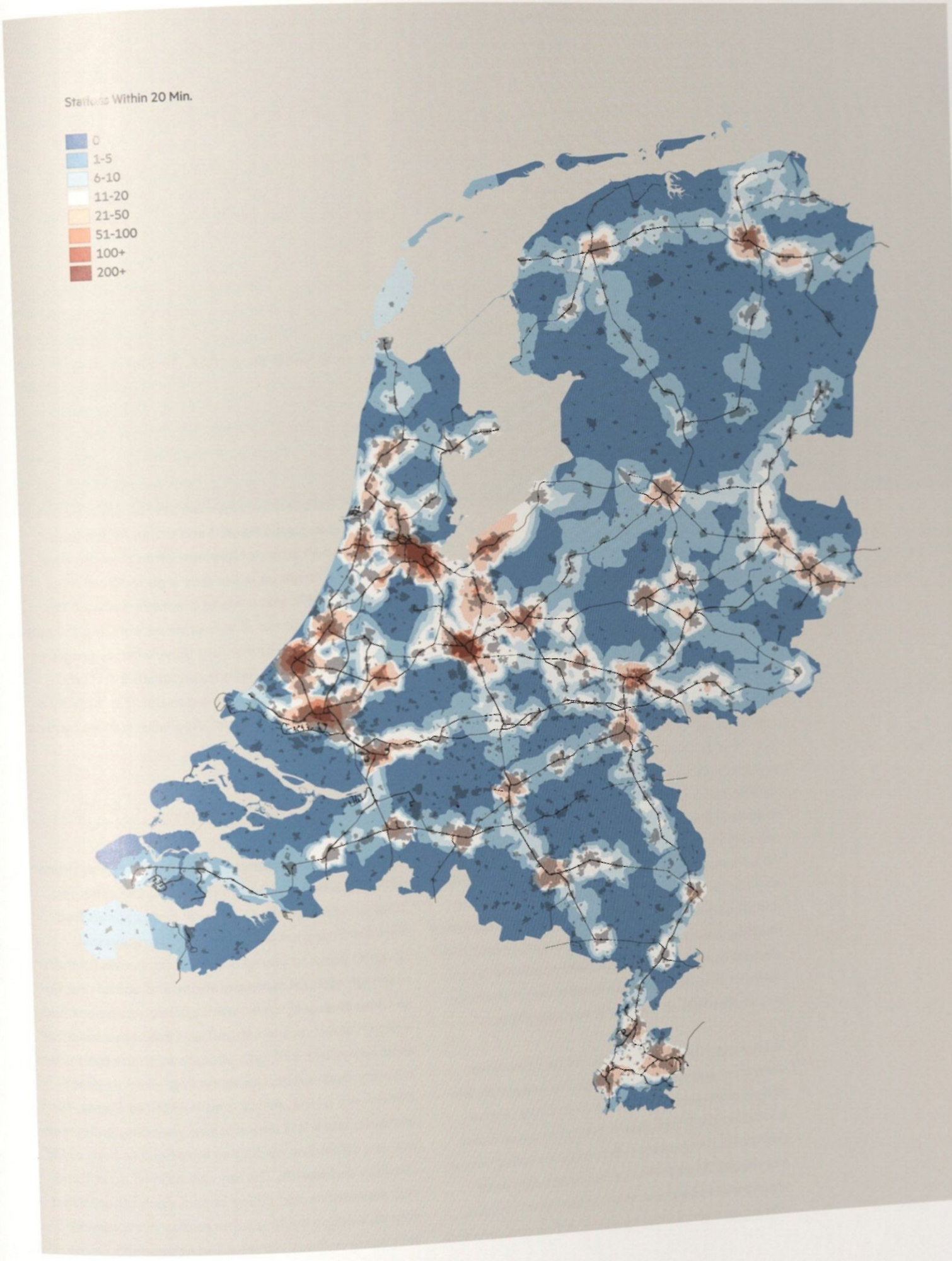
was true in earlier decades is still true today. The undercounting of cycling is systemic and will not disappear anytime soon. Cycling is often considered separately. The bicycle's role as before-and-after transport in combination with public transit is rarely counted. On the other side of the spectrum: cities are so eager to demonstrate their progress that we see them adapting to local political needs. Cities fudge their numbers. Commercial interests like car and bicycle sharing companies are also getting in on the act of collecting data, begging the question whether the public—and thus policymakers—can access them. Data collection is a contested issue. In short, the key research questions are: how are the numbers collected, what forms the basis of data collection, who owns the data, and how do we measure urban sustainable mobility?

Cycling & Technology Transfer

Cities often exchange best practices. Since the mid-1970s, activists and policymakers have learned from each other through international study tours, conferences, audits, and consultancy work. Both the Dutch engineering manual on bicycle lane design as well as the *Woonerf* traffic-calming standard found their way into many global planning circles from the 1970s. The Danes' keen understanding that bicycle users and their cultural practice of cycling are important factors for change, has found many admirers and imitators from Munich to Bogota. The European Union subsidized the standardization of best practice cycling policies for cities and has fostered cycling consultancy since the 1990s. French and U.S. multinationals have standardized corporate bike-sharing schemes that have gone global since 2006. Despite the worldwide exchange of best practices, we have surprisingly little hardnosed evidence of what has actually worked. By looking at the past, we can examine what scholars call "technology transfer": how do innovations find (or not) their way from one place way to another—and back? What is—or was—the effect of local circumstances, local appropriation, and transnational practices and standards?

Cycling & Innovation

In the past century, innovations came from the street, literally. The case studies show street-level engineering experiments, which both facilitated and hindered cycling's expansion: the engineering principle of traffic separation versus traffic calming. Separating "fast" and "slow" traffic flows was car-based to facilitate motorist's natural appetite to speed through cities. Since the 1920s, separating cyclists (and pedestrians) from motorists emerged as *the* way to reconcile speed with safety. Alternative post-1960s' attitudes consider streets as living organisms rather than fast traffic racetracks. Through traffic calming measures, engineers seek safety solutions by slowing down rather than speeding up traffic. From our case studies, we see that the policy choices for both are more to do with (financial and political) costs. Bicycle lanes and highways are more expensive to build, but cost politically less because bicycle lanes do not question automobility. Traffic calming measures are cheaper—as Amsterdam discovered. They demand political courage, as Enschede, Utrecht, and Copenhagen showed. Is it a coincidence that today's "cycling nations" like the Netherlands and Denmark with their elaborate traffic calming practices are "cycling nations" but Sweden and the UK, where traffic


Stations Within 20 Min.
0
1-5
6-10
11-20
21-50
51-100
100+
200+

separation dominates, are not? Which principle is better, anyway? What is politically possible and under what circumstances?

These infrastructural innovations are in the streets where cyclists ride. Most recent innovations focus on the bicycle itself and its integration in real-time information systems, connecting users, bicycles, and mobility systems into one seamless whole. They range from small to large; from the incremental to the spectacular. Information and communication technologies have also made bicycle share systems technically possible, which the Provos lacked at first. Policymakers entertain high hopes for e-bikes, going beyond the golden policy standard of 6.8 kilometers that cyclists are willing to commute, to an average of 8.9 kilometers.[2] The technological promise—to bring cycling to the next level of innovation—is impressive. However: are these innovations mere gadgets or the true engines of change towards a more sustainable urban mobility? In short, what type of innovations works best?

Cycling & Mobility Chain

Researchers have discovered to what extent people use the bicycle as before-and-after form of transport. For decades, policymakers have treated the use of public transit and bicycles as separate facts: they punished rather than facilitated cycling commuters. Already since the 1980s, Dutch bicycle activists and planners sought to create better links between cycling and public transit near train stations.[3] Others followed. The key insight that cycling is part of the mobility chain has been lost on policymakers. In 2008, 40 percent of train commuters at Amsterdam stations went there by bicycle (40 percent by public transit and 20 percent walked). This kind of cycling remained invisible because traffic engineers counted such bicycle trips as train journeys. Mobility researchers now consider the bike-train-bike system one of the most sustainable links in the overall mobility chain.[4]

Recognizing this mobility chain helps us to move away from analyzing technologies to understanding people when travelling from A to B. The question is whether the Dutch case is typical or exceptional. Can we find or create similar mobility chain systems elsewhere? To what degree can or actually does the bicycle as before-and-after transport replace, overlap, or complement e-bikes' action radius—and bicycle highways—for commuting distances over 6.8 kilometers? And what opportunities and constraints are generated for promoting sustainable urban forms of transit?

Cycling & Governance

Traditionally, urban public transit and automobility have had their institutional supporters. Public transit advocates in cities often maintain strong local ties; car advocates are allied to suburban and national constituencies. Cyclists and pedestrians fall between the cracks, politically speaking. Policymakers moreover treat cycling—again the magic 6.8 kilometers—as a narrow local issue, if at all. In policymaking and budgetary terms, cycling is an afterthought or a marginal phenomenon. Our case studies show that most local policymakers are listening to cyclists' concerns by including them in overall mobility strategies, if only loosely. The tensions of the city center (cyclists, pedestrians, public transit) and urban region (public transit and automobility) are often papered over. Cycling governance is not only a geopolitical issue for those within and beyond the city's beltway. The recent phenomenon of corporations entering the public space through sponsoring bicycle-share programs also forces us to ask: who is responsible and who owns the data these systems generate? Is mobility a commercial or public issue? And what role do cyclists and their organizations play?

Cycling & Culture

Cultural representations of city bikes and their urban riders have had an enormous impact. Over the past hundred years, cycling's cultural status has shifted from the bourgeoisie (high), to workers and civil servants (low), to young urban professionals (higher). Although cultural representations and actual practices often diverged, urban cycling's reputation has had a huge impact on the cultural and economic resources societies are willing to allocate to shape their urban mobility landscapes. Urban cycling—and its practitioners—in China, Africa, and the United States, for example, has a low status today, impeding policymakers who champion cycling as beneficial to their cities' livability and health. The key question is, do cultural representations and policy impact each other? What role do existing cycling cultures play in explaining why some policies succeed and others fail?

Considering Cars, Tallying Bicycles

Commissioned to devise a traffic plan for the Dutch city of Utrecht, high-profile urban planner Max Erich Feuchtinger requested a traffic count in 1951. To his surprise, traffic counters recorded cyclists in great numbers. In his car-centric plan, however, Feuchtinger dismissed cycling as a trivial, old-fashioned phenomenon that would soon disappear. Notice in the 1951 photo of curb-side traffic counters [photo, top] that there is no interaction with cyclists. When it came to cars, however, counters sometimes interviewed drivers individually [photo, left]. Traffic counters in this 1953 scenario asked Amsterdam drivers about their homes, working lives, and mobility options.