# From Bikes to Cars and Back Again: How Dutch Cities Became Cycling Cities

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Term	Definition
Amsterdam Fietst	Amsterdam Rides Bikes
ANWB	Algemene Nederlandse Wielrijders Bond, Royal Dutch Touring Club
Dooievaar	Dead Stork, Organization founded in resistance to technocratic planning in The Hague
ENWB	Eerste Enige Echte Nederlandse Wielrijders Bond, First Only Real Dutch Cyclists' Union, original name of Fietsersbond
Fietsersbond	Cyclists' Union
Fietsstraat	Bicycle street, plural: fietsstraten
Kabouter	Gnome, Dutch counterculture movement, successor of Provo
OV-Fiets	Public Transport Bicycle
Provo	Dutch Anarchist group in the 1960s
Stop de Kindermoord	Stop the Child Murder, movement led by Dutch parents protesting rapidly increasing child traffic deaths in the 1970s
Woonerf	Living street

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## **CHAPTER 1: INTRODUCTION**

"American planners don't listen to foreign examples" was a phrase I heard as I helped interview national subject matter experts on bicycle and pedestrian planning as the firm I was interning with developed a new strategic plan for the New Jersey Bicycle and Pedestrian Resource Center. As someone interested in learning about planning from countries around the world, I was surprised to hear that many American planners in influential organizations, like Departments of Transportation, are resistant to considering foreign examples. While cities like Amsterdam are widely acknowledged as examples of excellent cycling infrastructure, they are often dismissed as models for American cities to follow. "Dutch cities have always been great for cycling" the argument often goes as American planners seek to dismiss international examples. Amsterdam is seen as a stereotypical European city with a dense urban core and winding network of medieval streets which have always been friendly to cyclists. However, these common excuses fail to realize and acknowledge the decades-long work of Dutch cycling advocates and planners to build a comprehensive cycling city. Much like American cities, planning in Amsterdam was once focused on projecting highways and arterials through the urban core, transforming streets to maximize the flow of traffic. Yet, the city was able to recover from this destructive chapter of its history and reshape itself to become a livable, cycling friendly city. Amsterdam's revival from car sewer to a livable, cycling city can provide a model for cities around the world as they seek to undergo similar transformations.

While creating more livable and cycling friendly cities is always an admirable objective, it has now become a matter of urgency due to the climate crisis. In contrast to cars, bicycles move people without carbon emissions. While electric cars have become increasingly widespread, the construction of these vehicles and the infrastructure they drive on still emit vast

amounts of carbon, not to mention the harmful practices of extraction used to obtain the necessary materials. Bicycles inherently take up much less space in cities, requiring fewer resources to build and maintain networks and parking. Additionally, cycling can be integrated into public transportation networks to increase transit ridership and eliminate the need to drive. In addition to creating and enabling incredible amounts of pollution, the costly and destructive highways and arterials of car-centric planning have created environments which disconnect cities and force people to drive. As transportation emissions are the leading sector of carbon emissions in many countries (Bruntlett & Bruntlett, 2018), creating places where people can access the entire city through cycling and public transportation is essential to building sustainable cities and reversing climate change. Cities across the globe have started to develop new plans for increasing livability and cycling, but they should not forget that Amsterdam and other Dutch cities have already pioneered these transformations.

While often dismissed as irrelevant or overly idealistic examples, Dutch cities were once in a similar state as many American cities currently face. Amsterdam, Utrecht, and The Hague all suffered from the effects of car-centric planning during the 1950s and 1960s as urban highways and arterials bisected their urban cores. Livable medieval streets were widened and large portions of the streetscape turned into ever increasing lanes for cars. Accordingly, Dutch cities faced a long, arduous process of recognizing the need to build a more livable city and designing and implementing creative solutions to reclaim the streets for people. The experience of Dutch cities demonstrates how the car-centric city was created by planning and economic decisions, but can be reclaimed through a dedicated, comprehensive effort. The car-centric city was not inevitable, but intentionally created through a series of misguided policies which prioritized the flow of traffic and capital over all else. However, the fact that the car-centric city was built demonstrates

that it can also be deconstructed to create safer, healthier, and more livable places. In this way, Dutch cities are incredibly relevant to cities in the US and across the world as they seek to end car-centric planning. While every city has its own unique conditions, the experiences of Dutch cities in converting car sewers into bikeable and livable streets can provide a framework for change. As Dutch cities learned, there is no one size fits all solution, rather the framework for improving cycling and creating livable places is tailored to each context with the help of local residents.

Throughout the transformation of Dutch cities into lauded examples of cycling, participatory planning has been a vital component. In response to the top-down planning of the urban renewal era which prioritized traffic flow and barren modernism over people, many Dutch groups organized to have their voices heard in the planning process. Many of these advocacy groups centered cycling in their agendas as roads became increasingly dangerous for cyclists and the mass proliferation of automobility destroyed once livable city streets. After years of advocacy work, these groups were able to convince the Dutch people that radical changes were needed and helped to elect pro-cycling officials. Once in power, these officials drew on the expertise generated by advocacy groups and included them in bicycle working groups to design new policies and infrastructure. As plans were formulated, knowledge of local cyclists was used to identify barriers to cycling and design new cycling infrastructure and networks. In this way, public participation was crucial to the creation and success of Dutch cycling infrastructure as solutions could be tailored with local input. Additionally, this model was starkly different from the top-down approach of the urban renewal era where planners drew lines on maps and demolished entire communities. Accordingly, the importance of fostering a participatory

planning process and working with advocacy groups and local communities is an important lesson cities around the world can learn from the Netherlands.

Despite the excuses of many American planners, Dutch cities can provide excellent examples of how to transform a car-centric city into a cycling friendly and livable city. While this transition cannot occur overnight or even in a few years, the Dutch model provides a framework for an inclusive planning process capable of reclaiming the city for people. Through trial and error as well as public input, Dutch cities invented strategies to regulate automobility in cities to reclaim space for cyclists and pedestrians. This two-pronged approach of simultaneously making driving less convenient while making cycling safer and more convenient encourages people to shift modes of travel. Specialized infrastructure has been developed to deploy this approach in different parts of the city, from shared streets and traffic calming devices to separated bike lanes and bike parking garages. Additionally, this approach is guided by longterm policies envisioning a comprehensive cycling network, yet guided by short-term plans identifying key areas to improve, maximizing resources and visibility. Increasingly, Dutch cycling policies are incorporated into sustainability plans combating climate change by encouraging people to switch to active and public transportation. Accordingly, Dutch cities have developed comprehensive solutions to creating safe, healthy, and vibrant cycling friendly streets. In my thesis I argue that Dutch cities have undergone impressive transformations from dangerous landscapes of automobility to vibrant, cycling friendly places through a participatory model that provides an example for cities around the world to follow.

I begin my thesis by exploring the history of cycling and rise of automobility in Chapter Two, detailing how each of these inventions transformed both American and Dutch cities. For a brief moment in the 1890s, the bicycle dominated urban transportation, shaping cities and

mobility patterns across the globe. While the bicycle was quickly eclipsed by the private automobile in the US, cycling remained the dominant form of transportation in Dutch cities until the 1950s. However, during the 1960s and 1970s similar urban renewal programs were implemented in both American and Dutch cities, bulldozing neighborhoods and communities to create urban highways and civic centers. In this chapter I argue that while cycling remained prominent much longer in the Netherlands than the US, similar landscapes of automobility came to define cities in both countries.

In Chapter Three I explore the protest movements which formed in response to carcentric planning in Dutch cities during the 1960s and 1970s and the tactics they used to shift the tide against automobility. This chapter describes how Dutch communities organized social movements in a two-decade long struggle against urban renewal planning and its characteristic technocratic, car-centric planning. Additionally, I explore the tactics used by these organizations to develop their own alternative visions for a more livable city and how they rallied popular support. Once these advocacy groups finally elected pro-cycling governments, the expertise they had developed through their resistance movements enabled them to transition to subject matter experts who guided the development of new cycling policies and served as intermediaries with the community.

Next, Chapter Four considers the specific policies, decisions, and infrastructure Dutch cities employed to reclaim streets for cyclists. Having finally won local elections, pro-cycling governments and their allies faced the challenge of reclaiming streets from cars. While Dutch cities had historically been lively spaces conducive to walking and cycling, new solutions were needed to rebuild these lost spaces in the now car-centric city. This chapter explores the key policy and infrastructure decisions made by Dutch cities which enabled them to become the

renowned cycling cities they are today. Special attention is given to the incremental progress made and combination of short- and long-term planning to demonstrate how the seemingly overwhelming challenge of reclaiming the city from cars is possible.

Finally, I conclude by examining how lessons from Dutch cities can be utilized by cities around the world as they work to undergo the same transformations. Despite claims of irrelevancy by many American planners, Dutch cities can provide excellent models for how to build a cycling city as they had to overcome a similar legacy of car-centric planning. While a number of American cities have increased their efforts to improve cycling infrastructure, employing experience from the transformation of Dutch cities could help maximize the benefits of these projects. Ultimately, building cycling cities has the potential to help solve the twin crises of the climate emergency and systemic inequalities facing cities across the world and Dutch experience could help pave the way.

## **CHAPTER 2: HISTORY OF CYCLING AND RISE OF CARS**

At the end of the 19th century, a disruptive new form of transportation emerged, reshaping how people perceived and navigated cities. While initially status symbols for the wealthy, these new vehicles soon proliferated throughout society and began to alter cities in their image. Powerful groups such as manufacturers, clubs, and associations emerged as early lobbyist groups, influencing policy in favor of this new form of mobility. This new form of transportation was, in fact, the bicycle which achieved enormous popularity for a brief period during the 1890s. Cities were forced to adapt their streets to accommodate these new quick and nimble vehicles. However, in the United States, this moment was short lived as private cars quickly eclipsed bicycles as status symbols and soon became widely affordable. If bicycles were disruptive to cities, cars were downright destructive. Cities narrowed sidewalks, cut down street trees, increased corner radii as they sought to reshape their streets for cars. While cycling remained quite popular in the Netherlands until the 1950s due to a variety of factors, it too became the victim of rising automobility. During the urban renewal era, planners in both the US and the Netherlands used massive government investments to cut new arteries and highways through urban cores as they saw car-centric planning as essential to maintaining economic growth. Yet by the end of the urban renewal era in the 1970s, disillusionment was growing in the Netherlands as the inherent contradictions of car-centric and people-centric planning became increasingly visible.

The 19th century produced a variety of two-wheeled, pedal-powered precursors until the modern bicycle finally arrived in the form of the safety bicycle in the 1880s. While previous models such as the "penny farthing" placed riders five feet in the air atop a giant wheel supported by a trailing one, the safety bicycle proved to be a much lighter, safer, and easier to

use machine. The safety bicycle featured a triangular frame and equally sized wheels and established the model for bicycles to the present day. Compared to previous bicycle designs such as the "penny farthing," safety bicycles were safe and easy to ride as well as mass-producible, leading to a massive increase in the popularity of cycling in the 1890s (Turpin, 2018). Previously, sporadic interest in cycling existed, often in cycling racing, but the advent of the safety bicycle dramatically increased popular interest in cycling and inspired the middle and upper classes to purchase them in great numbers. However, bicycles were still seen largely as tools for recreation or sport rather than as a new form of mobility, capable of unlocking new urban spaces and patterns (Friss, 2015).

During the cycling boom of the 1890s, bicycle ownership skyrocketed in the United States, doubling from one to two million between 1893 and 1896. Most of these new bicycle owners belonged to the middle and upper classes as in 1898 a new bicycle cost around \$40 (equivalent to about \$1,400 in 2022) while the average worker earned less than \$800 per year. Accordingly, bicycles came to be seen as status symbols, a visible representation of wealth and conspicuous consumption. Many wealthier cyclists bought a new model every year which, in addition to displaying their status, helped to create a market for cheaper second-hand bicycles. Once the initial target market for bicycles-"white middle-class males"-became saturated, manufacturers began to market their products to women (Turpin, 2018, 6). Some manufacturers launched marketing campaigns to make cycling socially acceptable for women and created special models designed for skirt-wearing riders. Marketing materials simultaneously challenged and reinforced stereotypes by advocating the use of bicycles-and subsequent access to mobility, public space, and autonomy-yet created gendered variants based on assumptions of female delicacy. Additionally, special schools were created in many cities, including Amsterdam and New York, to teach people how to ride bicycles as almost everyone was a novice and generational knowledge had not yet developed (Friss, 2015; Jordan, 2013). As manufacturers continued to seek new markets, they began to target American children in the 1910s, which combined with the eventual mass proliferation of the private automobile in the US, would go on to establish cycling as mainly "an activity for white middle-class children" (Turpin, 2018, 6).



Figure 2.1: This illustration from 1896 depicts wealthy New Yorkers cycling on Riverside Drive.

As cyclists took to the streets in increasing numbers in the 1890s, cities around the world had to contend with hundreds of thousands of new users. Before the invention of the bicycle, streets were dominated by horse drawn carriages and carts, pedestrians, streetcars/trams, and push carts which all moved at a walking pace (Jordan, 2013). Accordingly, cities faced the challenge of integrating speedy and nimble bicycles into the slow-moving mass of existing street traffic. While many American cities had banned early cyclists in the 1870s from riding in the streets or parks, the rise of the safety bicycle and the popularization of cycling in the 1880s had successfully overturned these bans. In response to the cycling boom of the 1890s, many cities imposed new regulations on cyclists such as requiring them to abide by speed limits, carry lamps, and keep off sidewalks. Additionally, in 1897 New York became the first US city to pass a comprehensive traffic ordinance which included mandating the use of hand signals and established a minimum driving age for commercial vehicles. Bikes were seen as equal vehicles with carriages and the new ordinance required all vehicles to abide by the new rules created in response to the rise of cycling. While some conflicts with other road users who felt that cyclists were dominating the roadway continued, powerful cycling organizations ensured that favorable legislation was passed. For a brief moment the cycling lobby was strong enough to successfully campaign for the free passage of bicycles on trains in New York and strike down legislation mandating that all bicycles have brakes (Friss, 2015).

Like New York and many other cities, Amsterdam experienced a dramatic increase in cycling in the 1890s. Many features of this transformation were shared across cities including the initial role of the bicycle as a middle-class status symbol, cycling schools for new riders, and conflicts with existing road users. However, Amsterdam's 17th century cobblestone streets posed additional challenges to cyclists not found in American cities. As the city sought to regulate the influx of cyclists on its streets, in 1906 the mayor imposed a ban of cycling and automobile traffic on 49 city center streets. However, as in New York, cyclists proved to be a powerful lobbying force and successfully mounted a letter writing campaign and overturned the ban. Bicycles continued to be prohibitively expensive to the working classes until after the First World War when hyperinflation in Germany enabled the Dutch to cheaply import German bicycles. Accordingly, the average cost of a new bicycle dropped by over half between 1919 and 1925 to 61 guilders (equivalent to about \$600 in 2023). During this same period, tram fares

doubled or even tripled, encouraging many public transport riders to take advantage of the dramatically reduced cost of a bicycle and switch to cycling. By 1925, the first cycle lanes were created in Amsterdam, fully separating cyclists from the main roadway, yet some conflicts emerged as other road users were not formally restricted. Unlike New York and other cities, Amsterdam instituted few regulations to govern traffic until the 1920s when the city banned bikes from several shopping streets (to protect wealthy shoppers arriving by private car) and introduced stop sign wielding traffic cops (Jordan, 2013).

While separate cycling paths were not created until 1925 in Amsterdam, they emerged a decade earlier in other parts of the Netherlands. Driving the creation of cycling paths was the Algemene Nederlandse Wielrijders Bond (Royal Dutch Touring Club, hereafter ANWB) which represented upper-middle-class cyclists and early motorists who were primarily concerned with promoting cycling as a form of tourism or leisure. Concerned with the increasing prevalence of automobiles which drove quickly and raised large dust clouds, the ANWB sought to create cycle paths which would enable its members to peacefully and safely experience the Dutch landscape from their bicycles. These paths explicitly avoided main roads in addition to working-class communities which in the eyes of the ANWB did not compose part of the "nature-loving public" it set out to serve. During the First World War, cycle path construction continued thanks to Dutch neutrality as the ANWB promoted cycling as a part of an "inward-looking Dutch nationalism" which sought to reassure cyclists by encouraging tours of the Dutch countryside in place of foreign and automobile travel precluded by the war (Ebert, 2012).



Figure 2.2: ANWB members on a cycling tour in 1907.

After the end of the war, the Dutch government implemented a bicycle tax in 1924 of three guilders per bicycle (equivalent to about \$30 in 2023), leading to considerable backlash against the uniform application of the tax across classes. Beginning in 1926, the bicycle tax was increasingly used to fund the expansion of the Dutch road network, resulting in cyclists funding a significant portion of the interwar road construction. Additionally, in 1929 the Transportation Ministry agreed that all new roads would include a separate cycling path and by 1938, 74% of Dutch roads featured cycle paths. Accordingly, the ANWB undertook the initial construction of cycle paths before the Dutch government began to fund them as well. The Dutch government continued the ANWB's vision of creating bicycle paths as tourist and leisure facilities, building 40% of its network away from road corridors. By 1938, the Dutch government and the ANWB had each constructed roughly 2,500km of cycling paths. Overall, the ANWB's alliance of "car owners and cyclists–modern tourists and road users" allowed it to wield significantly more

political power than a typical cyclist organization and significantly influence Dutch cycling policy and infrastructure (Ebert, 2012, 132).

After the bicycle boom of the 1890s, middle- and upper-class Americans quickly lost interest in cycling. The expansion of working-class access to bicycles, combined with the introduction of cars in the first years of the 20th century, meant that bicycles were no longer seen as status symbols and rapidly lost their appeal to middle- and upper-class Americans. Accordingly, membership in the League of American Wheelmen cyclist organization evaporated from 100,000 in 1898 to only 2,000 in 1902 (Jordan, 2013). Meanwhile, many bicycle manufacturers, mechanics, and clubs/associations shifted their focus to the automobile. Additionally, the rise of the automobile followed a similar trajectory as the bicycle, initially as a symbol of status, mobility, and freedom as well as a tool for recreation and leisure for the wealthy. The powerful lobby of wealthy citizens who had advocated for better roads and accommodations for bicycles, now lobbied for these improvements for automobiles. While cars remained inaccessible to most people during the first years of the 20th century, they quickly began to influence visions for the future of the city and the outlook of early professional planners (Friss, 2015).

As increasing numbers of cars took to the streets of American cities, roads which had begun to be adapted for bicycles and streetcars were further altered. These earlier forms of higher speed transportation paved the way figuratively and literally for the expansion of automobility in American cities. Advocates of cars argued that they would improve public health by removing unsanitary horses from cities, increase economic efficiency by reducing congestion, and solving the problem of overcrowded tenement housing by enabling people to drive to new homes in the suburbs. As planners and engineers sought to reconcile cars with the city, many radical plans

were created to enable cars to travel quickly through the city and out to the suburbs. Many of these plans removed pedestrians from the road, relegating them to separate overpasses and walkways, and depicted broad, empty roads with a few free-flowing cars. Concurrently, planning for cars emerged in the designs of the City Beautiful movement which imagined massive, Haussmann-style boulevards sweeping away the old industrial city and bringing the light, freedom, and space of automobility. While cars quickly entered the discourse of conceptual planning, in reality most cities responded incrementally, creating ad-hoc plans to adapt to cars. Many cities adapted their urban environments by widening streets, repaving roads, and constructing bridges. Additionally, as streets were widened for car traffic, sidewalks were narrowed, street trees cut down, and corner radii (and crossing distances) increased. Furthermore, rising car traffic and, correspondingly, child traffic deaths meant that streets were no longer safe for children to play, prompting many cities to create purpose-built playgrounds (McShane, 1994). In these ways, automobiles fundamentally reshaped American cities in their image as car ownership skyrocketed.



Figure 2.3: By 1913, New York's streets were dominated by cars.

As car ownership grew around the world in the first decades of the 20th century, by 1920 the vast majority (80%) of all cars were in the US. At this time there was one car per six people in the US, whereas in the Netherlands there was only one car per 185 people. However, bike ownership levels were reversed, with one bike per 3.25 people in the Netherlands, while only one per 70 in the US. Driving this vast disparity in automobile ownership were several factors, most significantly the sheer scale of mass production of cars in the US. In the early 1920s, Ford's factories produced more cars in one hour than the Netherlands' largest manufacturer made in an entire year. Accordingly, a large supply of new cars and substantial second-hand market drove down prices in the US, while most cars had to be imported into the Netherlands. Contributing to the creation of a large second-hand market in the US was the role of cars as status symbols,

leading wealthy drivers to frequently buy the newest models. Another factor behind high car ownership in the US was the widespread availability of credit plans. These financial tools allowed buyers to pay in installments as little as \$5 per week. In contrast, no such credit plans were available in the Netherlands and cars remained out of reach for even the middle classes. Also, contributing to the low cost of car ownership in the US were vast petroleum reserves and low gasoline taxes. As a result, gas was about three times more expensive in the Netherlands in the first decades of the 20th century (Jordan, 2013). Accordingly, owning a car was much cheaper and more accessible in the US than the Netherlands in the early 1900s.

In addition to differences in affordability and production, spatial differences between the US and the Netherlands influenced patterns of car ownership. In the US, the availability of vast amounts of land, combined with a frontier mentality, contributed to the allocation of large areas of land to cars and sprawl in contrast to the spatially constrained environment of the Netherlands. Additionally, American cities were planned with wide streets in regular grids, even before the invention of the car, and were more easily adapted to automobiles than the narrow medieval streets of European cities like Amsterdam. Furthermore, Amsterdam strictly limited curbside parking until 1921, in contrast to the free public parking widely available in the US. The lack of parking in Amsterdam, combined with the mainly upper-class use of cars, meant that most cars were driven by chauffeurs who would drop off their occupants and drive to paid parking garages or back home. Accordingly, by the 1930s American streets were dominated by cars and traveling by bicycle was often dangerous and stigmatized as a lower-class practice. Meanwhile, cycling remained a significant form of transport in Dutch cities and respectable for all classes (Jordan, 2013).

In stark contrast to the expansion of automobility in the US, car ownership did not begin to grow significantly in the Netherlands until after WWII. An economic boom during the 1950s and 60s provided more people with the means to buy cars in addition to the introduction of buying through credit plans. Correspondingly, more money was available for the government to invest in reshaping urban spaces and many Dutch planners saw automobility as crucial to preserving conditions of economic prosperity. In addition to growing prosperity, declining production costs meant that while a VW Beetle cost 100% of the median income in 1960, it only cost 25% in 1970. Accordingly, many workers could now afford to buy cars, resulting in a 500% increase in car ownership between 1960 and 1970. Over a similar period, public transport modal share fell from 53% in 1955 to 18% in 1975. During this period, new car owners, motorist groups, and retailers all argued for increased access of cars to cities and parking. Meanwhile, cycling declined due to its "diminishing cultural status" and the creation of car-centric landscapes which created long distances between places. Many Dutch planners viewed the rise of suburbanization and car use as the inevitable product of consumer choice and began to plan new ways to accommodate cars into the built environment (Verlaan, 2021).

As they sought to cope with the rising demand for cars, Dutch planners increasingly imported ideas from the US, UK, and Germany. While many Dutch planners acknowledged the harm caused by building car infrastructure, they thought the negative economic effects caused by congestion and maintaining the status quo would be worse. Accordingly, a number of urban renewal-style schemes were built in several Dutch cities as planners saw arterials and ring roads as ways of bringing people back into the increasingly neglected urban core. For example, planners in Utrecht filled in the sections of the city moat and canal network to create a ring road and threaded four arterials through the core of the medieval city, framing their plans as necessary

for "renewal and expansion." However, many younger Dutch people began to argue that cars should be banned from city centers and gained increasing influence after the 1970s, supported by a 1971 a nation-wide survey which found that 64% of Dutch people were in favor of such policies. Increasingly, Dutch planners recognized the importance of balancing heritage and progress, and recognized the mistakes of the massive urban highways cutting through the fabric of the city in the US. Unlike many other countries, in the 1970s Dutch traffic engineers recognized that building new highways or adding lanes was simply unsustainable as they generated more traffic according to the principle of induced demand. Instead, they began to implement measures such as pedestrian zones and bike lanes to divert traffic away from vulnerable road users and city centers. After the 1973 oil crisis, the debate whether to impose large amounts of car infrastructure on Dutch cities was over, the resources were no longer available (Verlaan, 2021). Accordingly, at the end of the urban renewal era, Dutch planners had come to identify the harm caused by imposing car infrastructure on cities and began to listen to citizens and activists advocating for vulnerable road users.



Figure 2.4: Construction of a ring road for Utrecht in a drained canal in 1972.

While the bicycle was short-lived as a dominant form of transportation in the US, it established a model which lasted for 50 years in the Netherlands. In both countries bicycles played a crucial role in facilitating some of the major changes from 19th to 20th century cities. Cobbled or dirt streets were paved, the first traffic laws passed, and powerful clubs and associations formed. In the US, cars quickly supplanted bicycles, taking advantage of the adaptations cities had begun to make, yet in the Netherlands car ownership remained low until the 1950s, allowing bicycles to become deeply ingrained in the culture and landscapes of the country. However, car-centric planning was popularized in the Netherlands in the 1950s-60s thanks to a combination of skyrocketing ownership and urban renewal policies. While the US and other countries experienced a similar era of heavily car-centric planning during this time, the transition was particularly abrupt in the Netherlands. Cycling still played a key role in many Dutch cities as arterials were forced through urban cores and wide boulevards built to allow car traffic to speed through. Accordingly, the danger, pollution, and destruction of car centric planning was obvious in contrast to the livable, cycling friendly city streets it demolished. Yet, the Dutch people still had to convince their governments and planners to end the hegemony of the car.

## **CHAPTER 3: FROM PROTEST TO POLICY**

June 4th, 1977, began like any other day in Amsterdam as a group of cyclists arrived in the city's Museumplein Square. Yet as the morning wore on, wave after wave of riders continued arriving until they filled the broad avenue leading to the Rijksmuseum. As they arrived, they dismounted their bicycles and lay down in the road. Before long, the imposing avenue was a sea of prone cyclists and bicycles. This protest on world bicycle day was a culmination of over ten years of popular movements which sought to protect cyclists from the rapidly increasing presence of the car and its violent conquest of urban space. Over nine thousand demonstrators participated in this protest organized by the Fietsersbond (Cyclists' Union), the 1977 installment in a series of annual actions called Amsterdam Fietst (Amsterdam Rides Bikes). First organized in 1973, Amsterdam Fietst was a collaboration between a coalition of action groups representing causes ranging from the safety of young cyclists to environmental issues. These groups were united by their aim to create a safer, healthier, and more livable city and identified cycling as a key way to achieve these goals. After years of advocacy and organizing, the work of these groups finally began to pay off in 1979 when Amsterdam adopted a new mobility plan which "marked the paradigm shift towards a cycling-positive policy" (Feddes et al., 2020, 145). The decade-long social movement for cycling in the Netherlands demonstrates how advocacy groups were able to reshape governmental policies to favor cycling in the aftermath of the urban renewal programs of the 1960s and 1970s.



Figure 3.1: A poster advertising the 1977 Amsterdam Fietst, describing the protest "Against the traffic jams" and "For a livable Amsterdam."



Figure 3.2: Protestors lie down with their bicycles in the Museumplein Square during the 1977 Amsterdam Fietst.

Contextualizing the Dutch social movements for cycling in the 1960s and 1970s were the unique mobility conditions in the Netherlands. As discussed in the previous chapter, car ownership soared during this period, increasing by over 500% between 1960 and 1970 (Verlaan, 2021). While cycling declined significantly during this period, around 30% of all trips in Dutch cities were still made by bicycle in 1970. Accordingly, the Netherlands experienced a particularly abrupt transition to automobility and the large number of cyclists who remained on the road were forced to contend with ever increasing numbers of cars. Additionally, residents of Dutch cities saw the negative externalities of automobility, such as noise and air pollution, dangerous streets, and a less livable city in harsh relief due to the rapid proliferation of automobility. In response, numerous social movements arose to challenge the hegemony of the car and reclaim the city for people. Beginning in the mid 1960s, anarchist movements such as Provo and Kabouter connected the rise of cars to technocratic urban renewal era planning and promoted a more democratized vision of mobility and city planning. While these anarchist movements had little measurable effect on mobility in the Netherlands, they laid the groundwork for successors such as Stop de Kindermoord and Dooievaar which expanded the cause into a

popular, organized movement for the creation of safer and more livable cities through cycling (Bruno et al., 2021). These groups would help found Fietsersbond (Cyclists Union), the coalition group behind Amsterdam Fietst. However, the seeds of the movement first had to be planted.

As ever-increasing numbers of cars took to the streets of Dutch cities, claiming space once dedicated to people, Dutch cyclists felt their interests were being forgotten by both the government and traditional representatives like the ANWB (Royal Dutch Touring Club). Concurrently, Dutch urban renewal programs angered many citizens for the displacement they caused and the technocratic nature of the planning process. In 1965, a group of these disillusioned citizens formed the anarchist group Provo which sought to increase awareness for political and social issues by using "playful" strategies to provoke a response from the government. Additionally, the Provo movement "was firmly grounded in a wider political critique linking cars to unjust capitalist infrastructures, environmental pollution, and consumer ideology" (Furness, 2010, 56). In this way, Provo saw cars as an essential component of the Dutch government's technocratic urban renewal plans which brought in international planners to reshape Dutch cities with little input from citizens. Accordingly, for Provo, the bicycle became a symbol of resistance against car culture and everything it represented. In 1965 Provo launched its most famous intervention, the White Bicycle Plan to challenge the rising tide of automobility in Amsterdam. Activists painted 50 bicycles white and left them unlocked throughout the city for anyone to ride as long as they would leave them for someone else at the end of their journey. While the police quickly impounded the bicycles, Provo had effectively created the first bikeshare scheme and directly challenged the prevailing belief that cars were the future of urban transportation (Ploeger & Oldenziel, 2020). The White Bicycle Plan rose to international fame when John Lennon and Yoko Ono posed for a photo with one of Provo's white bicycles in the

bed of their Amsterdam hotel (Dekker, 2022). While Provo's moment in the spotlight was short lived, it helped to raise awareness against technocratic planning and the hegemony of the car.



Figure 3.3: John Lennon and Yoko Ono with one of Provo's White Bikes.

After the Provo movement dissipated, the group Kabouter (gnome in English) was formed in 1969 as their spiritual successors. Like Provo, Kabouter sought to challenge technocratic planning and the consumerist car culture it promoted. The name Kabouter was chosen to represent the struggle of a relatively small group challenging global forces of capital and automobility. Additionally, Kabouter was centered in a period of worldwide counterculture movements and incorporated the growing global acknowledgement of human environmental destruction into their advocacy for more livable cities. Like Provo, they also critiqued the polluting and space consuming nature of cars, advocating instead for free public transit and use of cargo bikes as alternatives. Kabouter also organized direct action events such as their sit-down protest in the Leidsestraat, a historic shopping street, which succeeded in closing the street to car traffic (Feddes et al., 2020).

In addition to their work as a countercultural group, Kabouter formed a political wing which won five seats on the Amsterdam city council in 1970 (Furness, 2010). The group's rapid entry into city politics was enabled by the electoral system in the Netherlands which made it easy for new parties to gain influence. Accordingly, the election of Kabouter members to the city council demonstrated popular support for their policies championing livable, sustainable, cycling friendly cities in place of car-centric technocratic planning. While the group was unable to implement their policies with only five representatives, they demonstrated to the major political parties their growing popular support. As Kabouter was able to quickly enter the political scene on their platform of cycling and livable cities, the major political parties had to take these voters into account if they did not want to lose more votes in the future (Dekker, 2022).

Building on the awareness created by groups like Provo and Kabouter, Dutch cycling movements became mainstream in 1972 through the creation of Stop de Kindermoord. After a wave of smaller scale protests in which parents across the country refused to let their children cycle to school over fears for their safety on increasingly car dominated streets, a national movement coalesced in the form of Stop de Kindermoord. Translated as Stop the Child Murder, this group made their views on the Dutch government's cycling policies instantly clear. The movement quickly established a widespread network of supporters as traffic incidents were the leading cause of death for children in Europe in the early 1970s (Feddes et al., 2020). Activists equated the government's negligence and seeming acceptance of child traffic deaths to "premeditated" murder. Stop de Kindermoord identified the central cause of rising child traffic

deaths as the fact that too much space had been given to cars. In response, the group presented a list of demands to the government including traffic calming and the creation of municipal cycling and pedestrian networks, to be funded out of the highways budget (Dekker, 2022). Additionally, Stop de Kindermoord took to the streets in a series of highly visible protests in which they "occupied sites where people had been killed in traffic incidents, organized street traffic closures to create play space for children, and held demonstrations on bicycles" (Bruno et al., 2021, 15). Images of children protesting for their right to safely cycle to school became powerful symbols and helped to depoliticize the cycling movement. Furthermore, Stop de Kindermoord built on its successes by creating a Manual for Participation and Action in 1975 to share its organizing experience with other groups (Dekker, 2022). Accordingly, by 1975 the Dutch cycling movement was no longer a series of fringe groups staging dramatic, yet largely ineffectual interventions. Stop de Kindermoord represented a mass movement that was beginning to form key alliances with government officials and other activist groups, laying the groundwork for change.



Figure 3.4: Families participate in a Stop de Kindermoord protest.



Figure 3.5: Child protestors with Stop de Kindermoord in the Dutch House of Representatives.

One of Stop de Kindermoord's significant allies was the group Dooievaar, founded in The Hague in 1972. Literally meaning "dead stork" to reflect the group's views on the current direction of the city as its symbol is the white stork, Dooievaar was founded by a group of young architects concerned about technocratic planning and urban renewal policies. The group believed that urban planning was plagued by "behind-the-scenes expertise and the executive's discretionary power made it impossible for legislators to exercise true democratic control" (Dekker, 2022, 233). Within their critique of urban renewal planning, the group also focused on the role of car centric planning and feared The Hague would come to look like American cities if it continued down its current path. In response, Dooievaar pioneered new methods of citizen-led planning through the creation of a manual demonstrating how activists could create a cycling network in their own communities with the input of local riders (Bruno et al., 2021). Applying their strategy in The Hague, Dooievaar created a system for cyclists to report barriers, challenges, and dangerous locations they encountered on their rides and used it as the basis to design a cycling network which they then presented to the city. The Hague's traffic planners then converted the plans into detailed drawings which could be used for construction (Bruno et al., 2021). Thus, Dooievaar created a model for a participatory planning process which built on the experiences of local cyclists and collaborated with city officials to create a formalized design plan. This process also demonstrated how activist groups could become experts in transportation planning and collaborate with city officials to implement effective changes in the built environment. By providing a direct connection between the cyclists of The Hague and the planners and engineers who shaped the environment they cycled through, Dooievaar created the model which Dutch cycling advocacy groups would use to transform their cities back for cyclists.

In 1975 Dooievaar, Stop de Kindermoord, and a number of other cycling and environmentalist groups joined forces to create the Dutch Cyclists' Union. While cyclists were already represented by groups such as the ANWB, many saw the group as dominated by "influential political liberals from Holland's biggest cities" and having lost sight of their role as a cycling advocate (Furness, 2010, 57). In response to the widely perceived failure of the ANWB, this new cyclists' union called themselves the purposely confusing ENWB, Eerste Enige Echte Nederlandse Wielrijders Bond, or First Only Real Dutch Cyclists' Union. After several years of confusion and ensuing publicity, the ENWB renamed themselves Fietsersbond or Cyclists' Union. While the group's members were mostly young, left leaning, university educated men, its policies and activism surrounding traffic safety and cycling were broadly supported. Similarly, pro-cycling policies were mainly advocated by leftist political parties but received support from across the political spectrum as cycling was seen as a largely non-partisan issue (Dekker, 2022).

Fietsersbond built on the successes of its parent organizations such as Stop de Kindermoord's policy of holding the government responsible for failing to protect cyclists, and Dooievaar's emphasis on participatory planning (Dekker, 2022). It also inherited these groups' focus on direct action, most notably in the form of Amsterdam Fietst. This annual action had been founded in 1973 by Stop de Kindermoord and other allied groups, but rose to increasing prominence under Fietsersbond. The 1977 Amsterdam Fietst featured dramatic imagery of cyclists lying down in one of the city's main thoroughfares to demonstrate the violence created by car-centric planning. The following year, the demonstration was held the week before municipal elections and Fietsersbond highlighted the voting record of each politician on cycling and traffic policies. Fietsersbond's broad front of coordinated actions finally succeeded with the election of a pro-cycling city government in 1978 (Feddes et al., 2020).

Finally, after a decade of resistance and protest, cycling groups in Amsterdam elected a city government which recognized the damage done by car-centric planning and sought to create a safer, more livable city for all. However, Fietsersbond now faced the challenge of transitioning from an activist group organizing dramatic protests to becoming subject matter experts who could help guide official decisions (Dekker, 2022). After the election of 1978, Fietsersbond was invited to participate in a bicycle working group with city officials. This invitation posed a dilemma as the organization had to decide whether to continue its activist approach and retain its fundamental principles, or compromise with the city in order to implement more attainable solutions. Ultimately 75% of the group voted to cooperate with the city in its bicycle working group. As Fietsersbond began to work with governments, it found that significantly less data and

experience existed regarding cyclists' behavior and travel preferences compared to drivers. In order to address this knowledge gap, the group employed Dooievaar's model of citizen participation, viewing cyclists themselves as the experts (Feddes et al., 2020). They advocated the importance of creating cycling policies through this experiential framework rather than simply quantitative studies. In these ways, Fietsersbond developed "counter-expertise" in order to resist the car-centric proposals of planners and engineers and instead propose their own solutions in terms officials could understand. Fietsersbond learned how to work within the constraints of established planning and engineering processes to advance pro-cycling policies and see positive changes installed in the built environment.

One of the key strategies Fietsersbond used to undo years of car-centric planning in Dutch cities was their extensive utilization of local knowledge. This process was centered on collaborating with local governments on "bottleneck memoranda" to identify barriers to cycling in the community. By surveying local cyclists, Fietsersbond compiled experiential knowledge on unsafe places, poor road conditions, missing links, and other barriers to cycling. Augmenting the group's focus on local knowledge, Fietsersbond also believed in the importance of having good connections in local governments as they sought to create pro-cycling alliances. As the group transitioned from focusing on protest to policy, they found that their detailed counter proposals were more effective in creating change in the built environment than simply criticizing carcentric policies. By creating these detailed plans, Fietsersbond effectively volunteered to outsource government planning as this work enabled them to directly influence local planning decisions. Through this framework, the group collaborated with Amsterdam's city government to plan a detailed bicycle network based on the experiential knowledge of local cyclists (Dekker, 2022). In contrast to the anarchism and social movements of the 1960s and early 1970s,

Fietsersbond had become a major policy organization by around 1980, providing a connection between everyday cyclists and the officials making decisions which affected their lives.

Between 1965 and 1980, Amsterdam and other Dutch cities experienced a major transformation in planning policy. Driven by the efforts of a wide variety of social movements and pressure groups, the era of car-centric urban renewal ended in favor of the creation of livable cities friendly to everyone, including cyclists. The dramatic interventions of early groups such as Provo and Kabouter helped to increase awareness of the inherent problems of car-centric planning and the physical, social, and environmental damage it was causing to cities. The next wave of movements featuring groups like Stop de Kindermoord and Dooievaar built on the national awareness of cycling issues to solidify popular support and establish frameworks for community activism and creating local change. After coalescing into Fietsersbond, this national movement was finally able to establish governmental support for its work and begin to reshape Dutch cycling policy as it transitioned from an activist to a policy group. The work of Dutch cycling advocates over this 15-year period demonstrates the work required to overcome entrenched car-centric planning practices. These advocates were ultimately successful thanks to their ability to form alliances with other social movements such as those focused on the environment and livable cities as well as their effective depoliticization of cycling. By cutting through narratives of car culture and ideological motivations, Dutch cycling advocates emphasized what really mattered: cars kill people. Uniting around this indisputable fact, these groups were able to frame their struggle in human terms which no politician could dare to challenge. Ultimately, Dutch cycling advocates demonstrated how the car-centric city can be reclaimed for people through a dedicated effort of coalition building and increasing popular understanding of the violent reality of automobility.

## **CHAPTER 4: BUILDING THE CYCLING CITY**

The election of 1978 proved to be a turning point for cycling in Amsterdam. With the election of a pro-cycling majority to the city council, cycling advocates found themselves at the reins of the city's transportation planning. After years of protesting and resisting car-centric planning from the city and national governments, these newly elected cycling advocates had to transition from resisting and protesting policies to creating their own. To make this transition, the new government invited cycling advocacy organizations, such as Fietsersbond, to form a new bicycle working group to begin to design and implement solutions to reclaim the city from cars. Like the newly elected officials, the members of Fietsersbond also grappled with the transition from an organization resisting car-centric policies, to one working with the government to craft new cycling-friendly plans. Ultimately, Fietsersbond's members decided that while collaborating with the government would inevitably result in some compromises, it was also a valuable opportunity to shape the future of cycling in Amsterdam (Bruntlett & Bruntlett, 2018). After years of car centric planning, the new city government and its partners faced an uphill battle to reclaim the streets for cyclists. While significant interest in cycling remained in Amsterdam and other Dutch cities, urban renewal programs had created wide streets for cars to speed along and bulldozed sections of the medieval, human scaled city to improve the flow of car traffic. Now Dutch planners and cycling advocates faced the challenge of reclaiming the streets for cyclists and designing new urban environments to rein in the hegemony of the private automobile.

While cycling had once been ubiquitous in Dutch cities, rising car ownership coincided with declining cycling levels and a sharp increase in injuries and deaths on the roads. To address these challenges, the newly elected pro-cycling government in Amsterdam and its partners had to design environments where cyclists and cars could coexist safely. The entirely car free city of the

late 19th century was clearly gone, so new solutions for livable streets needed to be created. With the participation of cycling advocacy organizations, Amsterdam created a comprehensive vision to create a cycling friendly city through infrastructure and policy changes. These improvements were designed to target the highest priority barriers across the city, creating visibility and support for cycling infrastructure while building towards a long-term goal of creating a comprehensive cycling network. These approaches utilized the knowledge and experience of local cyclists to create site-specific infrastructure, tailored to encourage cycling in a specific place. Accordingly, many new types of cycling infrastructure and programs were created including shared streets such as the fietsstraat (bicycle street) and woonerf (living street), cycling lanes through roundabouts, widespread bike parking facilities, and a national bike share program. Each of these improvements contributed to form a comprehensive cycling network where people could travel safely, conveniently, and quickly by bicycle or a combination of cycling and public transport. In this way, Dutch cities established a model for reclaiming cities from cars which cities across the world can follow as they seek to undergo similar transformations.



Figure 4.1: Amsterdam's Haarlemmerdijk in 1900, 1971 & 2013.

As the coalition of government officials and advocacy groups began to reclaim streets for cyclists, it became clear that a large portion of their work involved restoring streets to their original state. The three images above show how the same street in Amsterdam was converted from a lively, people-oriented street to a thoroughfare for cars, and back to a human-scaled street. This example shows how converting streets to move as many cars as possible destroys the fabric of the city. While in 1900, Haarlemmerdijk was a lively street with many shops and pedestrians, by 1971 most of the shops and people had been replaced with car traffic. However, the final image from 2013 demonstrates how the street can be reclaimed for people. With car traffic removed, the street is once again a lively part of the city with many shops, pedestrians, and cyclists. It is remarkable how Haarlemmerdijk in 2013 is much more similar to the same street in 1900 than in 1971. While the street today is specially designed to defend the urban environment against incursions of automobility, the result is a street that functions much as it did in 1900 before the rise of cars. This series of images demonstrates the challenges facing Amsterdam and other Dutch cities in the late 1970s. After years of protests and advocacy work, officials who understood the need to reclaim streets from cars had finally been elected. Now, these officials and their allies faced the challenge of designing new urban environments to protect human-scaled streets from cars and reviving the lively urban spaces which had been lost.

As government officials and advocacy organizations, such as Fietsersbond, began to build a more livable city after coming to power in 1978, they created a plan for a "compact city" to guide land use and transportation planning decisions. In contrast to previous urban renewal-era plans, the compact city plan prioritized smaller scale improvements to existing neighborhoods and emphasized conserving cultural and historical resources. Additionally, the plan sought to restore the lively and livable, mixed-use environments which defined cities before the rise of car-

centric planning. Concurrently, a new traffic plan was created which called for the expansion of the tram network, restricting parking, and returning space to pedestrians and cyclists which had been given over to cars. A few years later, the city government built on their compact city plan by creating the "Focus on the City" in 1984. This plan advocated for the creation of higher density mixed use developments in the city center, with a particular focus on new housing. During this period, new developments shifted from being built on greenfield sites on the periphery of the city to brownfields redevelopments closer to the city center. Furthermore, in 1991 the city held a major referendum where voters narrowly approved further restrictions to cars including eliminating free parking and removing large amounts of parking spaces. While this plan was vocally opposed by local business groups, it ultimately led to increased economic activity in the city (Dinca, 2015). In this way, Amsterdam defined a long-term vision for creating a more livable city in its original 1978 plan for a compact city, while continuing to support this vision and update it with new strategies and adaptations over the years.

In addition to creating long term visions with achievable intermediate goals, Amsterdam and other Dutch cities employed a multifaceted approach to encourage cycling and create livable environments. Harms et al. (2016) categorized these strategies into hardware, software, and "orgware." Hardware includes physical interventions in the built environment such as separated cycle lanes, intersection improvements, traffic calming, and bike parking which make cycling more attractive and convenient. Additionally, hardware improvements include making driving less convenient through traffic calming, rerouting traffic out of the city center, increasing costs associated with driving, and removing parking. Accordingly, these changes encourage drivers to switch to cycling as it becomes cheaper and more convenient. In addition to physical infrastructure, Dutch cities employed software, such as programs designed to educate and inform

people about cycling, to motivate them to switch modes. For example, bike education programs in schools have been shown to improve levels of cycling as children and their parents gain valuable skills on how to ride and maintain their bikes. The final component, orgware, includes the collaborative development of bike policies with input from the community and advocacy organizations as well as a long-term commitment to implementing these goals. While orgware often receives less attention than hardware or software, developing comprehensive long-term plans and seeing them through to implementation is a crucial part of improving cycling levels (Harms et al., 2016). In these ways, Amsterdam and other Dutch cities created a multi-pronged approach to reshape cities on a human scale, guiding physical and educational improvements through a participatory, comprehensive, and long-term plan.

Amsterdam's 1991 Cycling Handbook describes how the city created a participatory planning process to identify barriers to cycling and developed specific interventions in the built environment to solve these problems. By working with advocacy groups such as Fietsersbond, the city government identified the worst bottlenecks or barriers to cycling encountered in the city. While the city recognized the long-term importance of creating a continuous cycling network, it chose to address the worst bottlenecks or barriers to cycling first, regardless of which cycling route they were located on. This approach ensured that infrastructure improvements were installed across the city, helping to improve cycling conditions for as many people as possible, as well as increasing visibility and support for these policies. Additionally, bottleneck improvements were incorporated into comprehensive redesigns of streets, helping to reduce costs as well as introduce more livable and safer streets. The city government also stressed the importance of committing to a long-term policy of improving cycling infrastructure so the individual bottleneck improvements would mesh together to create a comprehensive cycling

network. These bottleneck improvements included construction of new cycle paths linking previously disconnected routes, raised intersections to slow drivers, priority for cyclists at traffic signals, and other infrastructure modifications. Ultimately, the Cycling Handbook envisioned the creation of fully segregated cycle paths along major roads with high-speed traffic, separated cycle lanes along main boulevards, and the creation of shared streets in quiet neighborhoods (Gemeente Amsterdam, 1991). Accordingly, Amsterdam adopted the bottleneck approach to decide how to deploy its limited resources as it worked to build a comprehensive cycling network over many years.

Some of the important infrastructure solutions implemented by Dutch cities as they worked to improve cycling conditions were the fietsstraat and woonerf. These shared streets were designed to encourage modal shift from driving to cycling by simultaneously making cycling safer and more convenient, while making driving less convenient. Fietsstraten (bicycle streets) were designed to improve cycling infrastructure on secondary city streets where there was no space or need for separated cycling lanes. Vehicle speeds on these streets are limited to 20mph through traffic calming devices such as raised intersections. Additionally, fietsstraten are paved with the distinctive red asphalt used on Dutch cycling paths as well as feature clear signage to ensure drivers understand they are guests on a cycling street. Parking is also reduced along these streets to create more space for cyclists as well as discourage trips by car. Another type of livable street pioneered by Dutch cities is the woonerf or living street. These residential streets are seen as primarily places for play and socialization, but allow residents to access their homes. Accordingly, these streets are designed to prevent through traffic by making travel inconvenient to all but local residents through features such as modal filters and limiting speeds to 10mph. This design simultaneously makes neighborhoods move livable through the creation

of a shared common space and the removal of noisy, polluting, and dangerous car traffic. (Bruntlett & Bruntlett, 2018). The fietsstraat and the woonerf demonstrate the importance of designing specific infrastructure solutions for different parts of the city as well as the comprehensive approach required to build a truly cycling friendly city.



Figure 4.2: A fietsstraat in Utrecht. Note the red asphalt and signs reading "auto te gast," cars are guests.

Another major component of improving cycling infrastructure in Amsterdam and across the Netherlands was the focus on bike parking and connecting cycling and public transport. Dutch planners noticed that bikes were often parked haphazardly at popular locations as the existing parking was quickly overwhelmed. Accordingly, new bicycle parking lots were installed at central locations as well as in residential neighborhoods. These policies sought to encourage people to cycle by ensuring ample parking would be available at each end of the journey. Additionally, Dutch cities focused on the construction of large bicycle parking garages at railway stations to enable people to cycle to and from the station. As a result, half of all rail passengers in the Netherlands cycle to and from the train. Dutch planners decided to focus on building bicycle parking at each end of the journey, as Dutch trains run at capacity and there would not be room to bring bicycles on the trains. To solve the problem of not having a bike at the destination, the Netherlands launched a nationwide bicycle sharing program called OV-Fiets (Public Transport Bike). This program is targeted at linking cycling and public transit, enabling rail passengers to complete their journey on a bicycle. Additionally, the OV-Fiets network is integrated into the national public transport smartcard, allowing passengers to easily access the program (Bruntlett & Bruntlett, 2018). In these ways, Dutch planners have recognized the importance of providing cycling facilities at the beginning and end of journeys in addition to along the way. These improvements helped to create a virtuous cycle of increasing cycling and public transport ridership.



Figure 4.3: A newly opened bike parking garage at Amsterdam Centraal Station.

While local policies such as Amsterdam's 1991 Cycling Handbook have been instrumental in planning and implementing a cycling friendly city, national policies have also played an important role. For example, the nationwide scope of the OV Fiets cycle share program enables people to travel to any Dutch city knowing a bicycle will be available for them to complete their journey. Additionally, the national government established a transportation planning hierarchy to guide decision making, placing pedestrians first, then cyclists, public transport, and finally private cars (Bruntlett & Bruntlett, 2018). This framework helps to ensure that safe, livable places are created by placing the most vulnerable road users first as well as acknowledging the negative externalities and inefficiencies of private cars. Furthermore, a national classification system was developed for employment centers, mandating the provision of public transportation access as well as requiring major employment sites to be located around railway stations. In this way, the national government regulates land use and transportation access to employment centers, requiring dense developments to be built with good public transport access. When combined with a focus on providing bike parking and bike sharing facilities at public transport stations, this policy helps to ensure the creation of places fully accessible through the combination of cycling and public transport. Finally, another national policy led to the installation of 20mph speed limits and traffic calming features on all residential streets as well as 30mph speed limits and separated bike lanes on major urban roads (Dinca, 2015). These strategies have helped to create a comprehensive cycling network of separated facilities on main roads with fast moving traffic and traffic calming features to ensure quieter streets can be safely shared.

While other countries have begun to improve their cycling infrastructure in recent years, the Netherlands remains the leading cycling country. The Dutch cycling network is distinguished

by its comprehensive and adaptable nature, creating safe, yet site specific infrastructure. Additionally, cycling routes are well connected, providing end to end facilities to encourage people to choose cycling as their preferred mode of travel. Along the way, infrastructure such as priority traffic signals, separated bicycle lanes through roundabouts, and comprehensive wayfinding and signage create a safe, encouraging, and easily navigable network. The infrastructure is also well maintained and lit to create a safe environment. Additionally, Dutch cities have shown how cycling infrastructure can be adapted to serve different communities. For example, narrow medieval streets can be converted into shared streets or fietsstraten, while cycle lanes can be installed on wide modernist boulevards. Overall, the different facilities complement each other and allow for continuous freedom of movement. This convenience means the Dutch cycling network is highly inclusive with people of all ages and genders choosing to cycle. Additionally, many different types of trips are made by bike from commuting, to running errands, to leisure activities. These trips are enabled by the provision of bicycle parking facilities at many destinations, some of which are beginning to include e-bike chargers (Pucher & Buehler, 2016). Accordingly, these key features of the Dutch cycling network demonstrate what cities across the world should prioritize as they seek to improve their cycling infrastructure and encourage riders. Creating a safe, well connected, and easily navigable cycling network, while simultaneously making driving less convenient, are essential to making a cycling-friendly city.

Much like the struggle to place cycling on the agenda by advocacy groups during the 1960s and 1970s, transitioning from resisting car-centric planning to building the cycling city was never easy. However, Dutch cities were able to undo years of destructive urban renewal planning and reshape themselves as livable, cycling friendly places. By collaborating with the advocacy organizations which put cycling on the agenda, city governments employed the

knowledge and experience of local cyclists as they worked to improve cycling conditions. The joint approach of creating comprehensive long-term plans and improving high priority bottlenecks across the city in the short term helped Amsterdam to build and maintain support for improving cycling infrastructure. Over time, these patchwork improvements fit together to form a comprehensive cycling network across the city. Furthermore, Dutch cities focused on the connectivity of cycling infrastructure at each end of the journey. Building high quality bike parking facilities, especially at transit stations, helped to make cycling a viable alternative to most car trips. Additionally, Dutch cities demonstrated the importance of building site-specific cycling infrastructure as different interventions are called for on narrow medieval streets and wide modernist boulevards. Simultaneously, improved cycling infrastructure should reclaim space from cars, making automobile journeys less convenient and encouraging modal shift. The experience of Dutch cities demonstrates that cities can successfully reshape themselves to be livable, cycling friendly places, providing a model for cities across the world seeking to undergo the same transformations.

## **CHAPTER 5: CONCLUSION**

Examining the history of cycling in the Netherlands demonstrates that Dutch cities won their reputation as great cycling cities through decades of advocacy as well as pioneering new infrastructure and policies. While cycling remained uniquely prominent in the Netherlands until the 1950s, Dutch cities experienced a similar era of car-centric, urban renewal planning as cities across the United States. In fact, Dutch planners often imported American ideas for urban highways and arterials. By the 1970s, similar landscapes of urban automobility had been created in both nations. Accordingly, the frequent excuses of American planners that Dutch cities have fundamentally different histories and have always been designed for cycling are simply ahistorical. While American planners and engineers continued to sacrifice their cities at the altar of automobility, Dutch cities reached a crucial turning point in the 1970s. After years of advocacy work, grassroots movements championing livable and cycling friendly cities finally elected governments who supported their plans to reclaim the streets from cars. Thus, a long process began as officials and advocacy groups worked together to plan, design, and build new streets that checked the hegemony of the car and encouraged walking and cycling. While American and Dutch cities might look radically different today, for a period during the 1970s they experienced remarkably similar conditions. Studying how Dutch cities diverged from carcentric planning to create livable, cycling friendly cities is crucial to understanding how cities around the world can now work to undergo similar transformations.

Among the many lessons which can be learned from examining the history of cycling in Dutch cities, the importance of participatory planning is crucial. Without the work of grassroots organizations which developed into influential advocacy and policy groups, Dutch cities may never have escaped the age of automobility. Additionally, these groups were essential to the

efforts of city governments as they worked to reshape streets for people. The local knowledge of these cycling groups helped planners to identify and prioritize sites for cycling infrastructure and develop solutions tailored to local conditions. Another key lesson from Dutch cities is the importance of simultaneously making cycling more convenient and driving less convenient. This two-pronged approach helped to encourage a modal shift through both push and pull strategies. Furthermore, the integration of cycling and public transport is another important component of Dutch cycling policies. Developing robust cycling infrastructure enables people to complete their first and last mile journeys by bike. These trips to and from public transport stations are often within easy cycling distance and users can be incentivized to switch modes if the infrastructure is properly integrated. For example, the creation of bike parking garages and bike share stations can help connect these modes of travel. Finally, the policies guiding cycling decisions in Dutch cities have been crucial to their success. Many cities have used a combination of short and long-term policies to ensure that visible progress is made addressing key barriers to cycling while contributing to the construction of a comprehensive cycling network. In these ways, Dutch cities provide numerous lessons which could be employed in cities in the US and across the world to improve cycling conditions and modal share.

Despite vocal opposition by some planners and engineers, most American cities need to fundamentally reshape their perspectives and policies if they want to become cycling cities. Recognizing cycling as a valid form of transportation and cyclists as equally important road users as drivers are some of the cultural shifts that need to take place. While many cities have recently begun efforts to improve cycling conditions, many of these attempts are half-hearted and do little to transform cycling into a valid alternative to driving. For example, infrastructure such as sharrows, painted symbols asking drivers to share the lane with cyclists, do not make cycling significantly safer or more attractive. Additionally, painted bike lanes directly adjacent to travel lanes are vulnerable to opening doors and illegally parked cars. Furthermore, these relatively cheap fixes allow officials to claim to support cycling without substantially improving conditions. Painted infrastructure is also frequently installed in patchwork locations rather than contributing to a comprehensive cycling network (Bruntlett & Bruntlett, 2018). However, Dutch cities have over 40 years of experience reclaiming streets from cars and creating places where cycling is a viable alternative to driving. Along the way, they faced many of the same challenges and developed solutions to fix them. For example, Amsterdam's 1991 Cycling Handbook describes design solutions to prevent illegal parking in bike lanes which had been a notable issue with the nascent cycling network (Gemeente Amsterdam, 1991). American cities already have communities of committed cyclists which have recently grown through the introduction of bike lanes in cities like New York. Working with these groups and building on the experience of Dutch cities would allow American cities to become cycling-friendly places.

Historically car-centric cities around the world have been increasingly demonstrating how it is possible to reclaim streets for non-automotive users. While New York City has been the site of many contentious debates surrounding bike lanes, the city has successfully completed a number of projects which have proved that car-centric American cities can become cyclingfriendly ones. For example, a recent project converted one lane of car traffic on the Brooklyn Bridge into a two-way cycling path fully separated from cars. This project has proved to be popular and encouraged a substantial amount of new cycling journeys over the river. However, there is still room for improvement as connections to protected bike lanes on either side of the river could be upgraded (Denys et al., 2021). Additionally, New York City has been developing a bike share network through its Citi Bike program. Since its creation in 2013, the program has

become increasingly popular, especially since the COVID-19 pandemic. Thanks to increasing popularity, plans are in place to triple the number of available bikes from 25,000 to 75,000 by the end of 2024 (Ley, 2021). Accordingly, New York City's efforts to improve cycling by building protected bike lanes and creating a large bike share network demonstrate the latent demand for cycling in American cities. If safe and convenient infrastructure is provided, American cities can become cycling cities.



Figure 5.1: The newly opened bike lane on the Brooklyn Bridge.

While New York has been making good, if somewhat halting, progress to improving cycling, Paris has been radically transforming its streets. Building on increased bicycle ridership and popular pilot programs during the pandemic, Paris is now investing almost 300 million euros over five years in 112 miles of protected bike lanes. The city has demonstrated how investing in high quality, connected cycling infrastructure builds ridership as the city now sees almost one

million cycling journeys each day (O'Sullivan, 2021). In 2007, Paris established one of the first large scale bike sharing networks through its Velib program. While Citi Bike in New York has outpaced the growth of Velib, the program remains one of the largest with over 20,000 bikes. The popularity of the program has grown rapidly in recent years, with ridership increasing by 54% from 2019-2020 thanks to a rapid expansion of cycling infrastructure which has continued after the pandemic. Significantly, increasing ridership has been correlated with a higher percentage of female riders as well as those from lower income groups (Buehler & Pucher, 2022). In this way, building safe, high quality cycling infrastructure creates more accessible and equitable cities. These exciting projects demonstrate how formerly car-centric cities can transform themselves into cycling-friendly places through dedicated efforts and informed planning.

Another success story of building an increasingly cycling-friendly city is Portland, Oregon. As seen in many Dutch cities, Portland residents protested the construction of urban highways-designed by Robert Moses--in the 1960s and 1970s, successfully halting the projects. Instead, the city chose to invest in light rail infrastructure and other transportation modes. Portland also pioneered the first urban growth boundary in the US, seeking to limit urban sprawl. Concurrently, the city began to establish a network of neighborhood bikeways as well as painted and protected bike lanes which eventually grew to over 300 miles. Accordingly, Portland has achieved the highest bicycle modal share of any major American city at six percent. (Bruntlett & Bruntlett, 2018). While this figure is substantially less than cycling levels in Dutch cities, it demonstrates how American cities can encourage cycling through dedicated policies and infrastructure. Through its work pioneering cycling infrastructure in the US, Portland proves that American cities can become cycling cities.

While American cities are increasingly working to decarbonize their transportation systems, electric cars receive much more attention than cycling and public transport. This vision for the future American city, heavily sponsored by the auto industry, views electric vehicles as a panacea, capable of solving urban transportation for the foreseeable future. While electric vehicles eliminate tailpipe emissions, they emit significantly more carbon during construction than traditional gas-powered ones. In comparison, walking, cycling, or using public transport result in significantly lower carbon emissions than electric vehicles or none at all. Furthermore, electric vehicles perpetuate all of the dangers and inequalities of automobility created by gaspowered vehicles. As cities recognize the imminent need to change their transportation systems in response to the climate crisis, electric vehicles should not be seen as an all-encompassing solution. While electric vehicles are an improvement over gas-powered ones, shifting people to active and public transportation is better for the environment and the city. Accordingly, this opportunity could be used to create comprehensive cycling networks, encourage a modal shift, and connect cyclists to public transport. Reshaping transportation networks this way would reduce carbon emissions by an order of magnitude more than electric vehicles while making cities safer and more livable (Harris, 2023). In reality, electric vehicles are a half-hearted attempt to reduce carbon emissions while perpetuating all of the dangers and consequences of urban automobility. Only by prioritizing active and public transportation can cities reclaim streets and public spaces for people, creating safer, healthier, more lively, and livable places.

In order to reshape American cities to become livable and cycling-friendly places, hesitant American planners must first be convinced. Often, American exceptionalism lies at the root of this resistance, allowing planners to claim that American cities are fundamentally unique. American planners frequently claim that the age of Dutch cities or the small scale of the country

makes them irrelevant to modern American cities. While every city has a unique history and present-day circumstances, cities around the world share common challenges and can learn from each other. As I have argued, Dutch cities were in a similar state as American ones after destructive urban renewal programs in the 1960s and 1970s, yet through dedicated efforts they reshaped themselves as livable places. Accordingly, the Dutch model for building cycling cities can be applied in the US because it provides a toolkit of high-quality infrastructure and adapts it to the local environment through an engaged planning process. To convince American planners that these changes are possible, a shift in planning culture is required. With increasing acknowledgment of the climate crisis, system inequalities, and the need for community engagement, planning culture has already been transformed significantly since the era of urban renewal. Building cycling cities can help achieve these goals which are becoming increasingly important to planners. Perhaps the most effective way to convince American planners is to consider how the Dutch convinced their planners through a sustained effort of community organizing for more livable, sustainable, democratic, and cycling-friendly cities.

While my thesis seeks to demonstrate the relevancy of Dutch cycling planning to American cities, future research could consider how to build support for and implement these policies. Thanks to the rapid transition from cycling to automobility in the Netherlands, Dutch citizens witnessed the violence of cars in sharp relief, fueling protest movements and advocacy organizations which eventually elected pro-cycling city governments. However, many Americans have become acclimatized to the violence of automobility and accepted it as a necessary condition of modern life. Further research could consider how to expose this violence as well as the massive negative externalities of automobility to demonstrate the harm cars do to cities. This work would likely involve identifying strategies to dismantle the narratives of car

culture that pervade American society and demonstrate the possibility to fundamentally reshape cities to become livable and sustainable places. At the 1939 New York World's Fair, General Motors' Futurama exhibit demonstrated a landscape of total automobility to millions of Americans, fundamentally shaping how they imagined cities and landscapes of the future. Perhaps a similar model, updated for the social media age, could begin to undo decades of car culture and reshape how Americans imagine their cities of the future.

While new strategies could be created to reshape the ways Americans view their cities, ultimately the planners and elected officials need to be convinced. Many American planners are hesitant to employ foreign examples of cycling infrastructure, yet this expertise is needed to transform American cities from car sewers into cycling cities. Planners are increasingly recognizing the looming crises of climate change and system inequalities facing cities around the world and in America in particular. Car-centric planning is deeply responsible for creating the systems and landscapes which heavily contribute to the climate crisis. Additionally, landscapes of automobility have spread its negative externalities unevenly along lines of race and class. Fortunately, planners are increasingly recognizing these existential crises and significant opportunities exist to build more sustainable and equitable cities. Creating comprehensive cycling networks should be an integral part of these efforts as they simultaneously slash carbon emissions, create livable environments, and improve affordability and accessibility of transportation. As American cities look to improve their cycling infrastructure, Dutch cities can provide valuable lessons and strategies to facilitate this transformation. Contrary to popular belief, Dutch cities created their world class cycling infrastructure through decades of advocacy and by inventing strategies to reclaim their streets from cars. Accordingly, the experiences of Dutch cities are incredibly relevant in the United States and across the world as cities seek to end

car-centric planning. While building cycling cities has the potential to address the greatest challenges cities currently face, international collaboration and coalition building are vital to ending the hegemony of the car.

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