II

The Automotive Revolution to 1923

> *Yet, although the common man was the principal beneficiary of the automotive revolution, this was not a case of the poor man coming to enjoy a luxury formerly limited to the rich. The rich themselves had never enjoyed anything like this before.*[1] *John B. Rae.*

While experiments on the construction of self-propelled steam vehicles began in the mid-1700s, it was not until the late 1800s with the advent of readily available electrical power, the development of the internal combustion engine, and cheaper steel that the modern automobile became possible.

Electrical power plants began in the 1880s,[2] development of the Bessemer steel process led to prices in 1888 dropping to one-fifth of its cost just 18 years earlier,[3] and the modern internal combustion engine was developed by both Daimler and Benz in the mid-1880s. Note that cheaper steel and the new development of power plants and electric motors were not developed for the automotive industry but rather for industry generally. Gasoline, petrol in UK English, was the only basic component of automotive development that was designed for .

In 1896, Scientific American was markedly prescient in laying out for its readers an automotive future that would take decades to achieve. They thought of motor vehicles as a,

> "...new method of transportation will be brought into active rivalry with the elevated and underground systems and the various cable, electric and horse lines…Like the ordinary cab, it can pick up its passengers and land them in any desired locality. And even when it is placed on a regular route through the main thoroughfares of the city, its mobility will give it an advantage over railway cars, electric cable or otherwise, which will render it specially suited to such work. A motor car [bus] of the same length as the ordinary cable car would carry the same number of passengers, but would carry them at considerably greater speed. This will be evident to any one who watches the course of traffic on a crowded thoroughfare like Broadway, New York …The existence of a double line of [street]cars moving on a fixed track and claiming the right of way over other vehicles is a hindrance to the even flow of traffic, for it both delays the traffic and is itself delayed. Let us suppose, by way of illustration, that the rails on Broadway have been removed, the street asphalted from curb to curb, and the cable cars transformed into motor cars having the run of the full width of the street, and free to overtake and pass each other at will. It is certain that the whole volume of traffic would move with less interruption that at present, and that the cars themselves would make considerably faster time.

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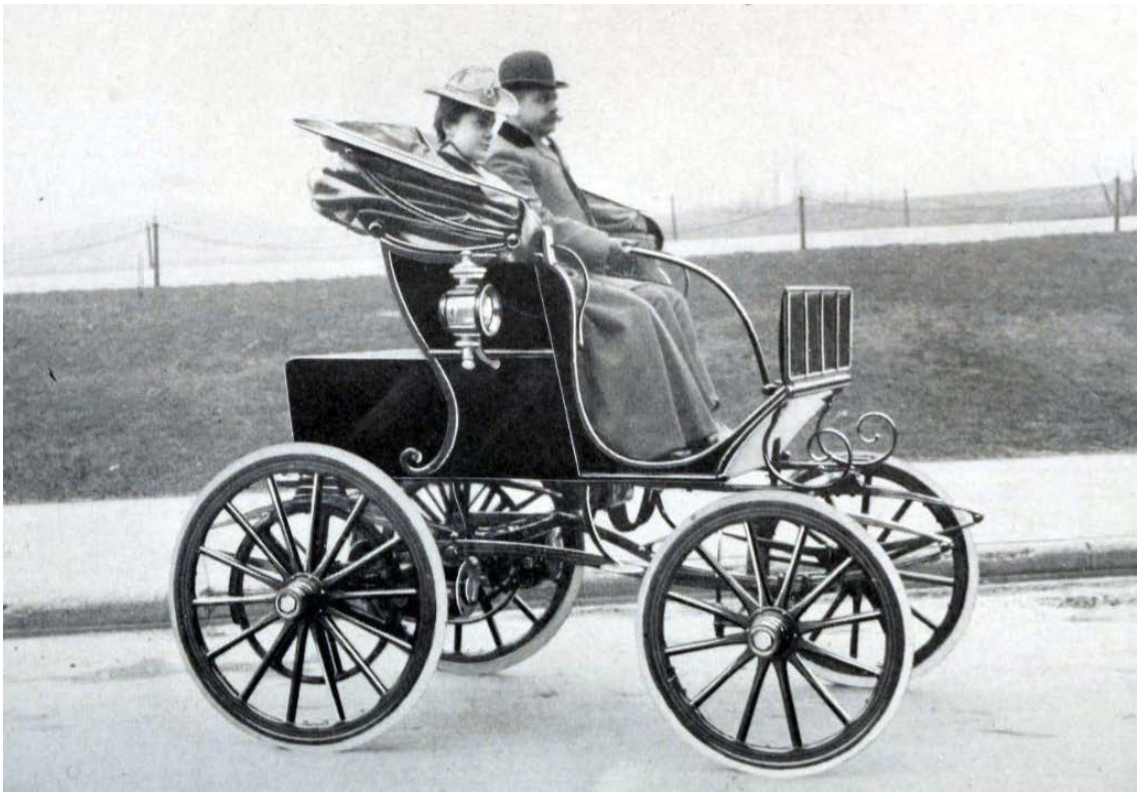
1. Rae, John B. The Road and the Car in American Life. MIT Press. 1971.
2. Historic Statistics of the U.S. Census Bureau, Vol II. 1975. p. 818.
3. Ringwalt, J.L. *Development of Transportation Systems in the United States.* Railway World Office. 1888. p. 201

> Of the incidental benefits to a city from the reign of the motor car (if it should ever come) it is scarcely necessary to speak. From the hygienic standpoint, they would be many and valuable. The deafening rattle of hard tires over Belgian blocks would give place to the silence of the pneumatic or cushion tired wheel; and its streets would be largely rid of the ever-present filth which the thousands of horses now upon its streets involve."[4]

The Automobile



In 1898, there were only 30 automobiles in all of America and yet in first five months of 1899, 80 companies were organized in the U.S. with a total capital of $388 million (about $10 billion allowing for inflation), then an enormous sum, building automobiles.[5]

After a coughing and sputtering start, by 1900 the automobile had become a reliable toy for the rich. In just the prior five years, average speeds sustained during auto races had climbed from 15 mph to 34 mph and reliability trials had improved from having half the field drop out with breakdowns to almost the entire field finishing.

Even though there were only 8,000 cars registered in the U.S., there was general public euphoria about the future of the auto and the public was right; each of the major surface automotive vehicles, the auto, the bus and the truck, would have major impacts on their lives.

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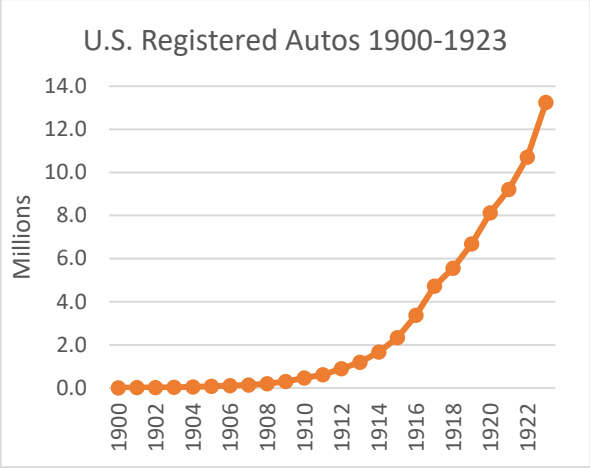
4. *The Motor Car in England.* Scientific American. December 12, 1896.
5. Baker, Ray Stannard. *The Automobile in Common Use: What it Costs—How it is Operated—What it Will Do.* McClure's Magazine XIII, No. 3. July 1899. pp. 195. Now at: https://babel.hathitrust.org/cgi/pt?id=mdp.39015030656105;view=1up;seq=209

At this time, we hear that, "trolley lines are wondering if automobile 'busses and coaches are destined to war against them,"[6] and that, "We have heard that horses must disappear from our streets ere long; we know that self-propelling ambulances, fire-engines, army wagons, plows, trucks, etc., will soon be as familiar as the trolley cars."[7] In fact, doctors were already using automobiles for house calls.[8]

It was the same kind of conversation that we are having in 2017 about autonomous motor vehicles where we know that the change is coming yet we are uncertain of the details.

For example, it was not certain then which type of propulsion would ultimately prevail.[9] Vehicle production in 1900 was 1,681 steam-driven, 1,575 electric and 936 gasoline.[10]

However, 90 percent of the vehicles displayed at the 1905 Auto Show were gasoline-powered vehicles.[11] From this point on, the gasoline-powered auto would grow rapidly until its use for both recreation and commuting would overwhelm public transportation.



Historical Statistics of the U.S., Part Two, p.716

Soon livery stables began to replace horses with automobiles. Cab companies began switching from horse and cab to taxicab. For some, the autos instant availability was a godsend. By 1905, in large and medium-sized cities, the number owned by physicians, who then mostly made house calls, was greater than the combined total of all commercial vehicles, excluding taxicabs.[12]

The 1906 San Francisco earthquake demonstrated how advantageous autos and trucks could be in an emergency. Cars did not panic in chaotic situations as horses often did, so the City of San Francisco began to replace horse-drawn vehicles with automotive vehicles.[13]

In 1906, President Woodrow Wilson (who was president of Princeton University at the time) said, "...nothing has spread socialistic feeling in this country more than the automobile. To the countryman they are a picture of the arrogance of wealth, with all its independence and carelessness."[14] The then president of the American Automobile Association, John Farson, responded that just as many farmers in the American West

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6. Moffett, Cleveland. *Automobiles for the Average Man.* Review of Reviews 21, no. 6. June 1900. p. 710.
7. Moffett, Cleveland. *Automobiles for the Average Man.* Review of Reviews 21, no. 6. June 1900. p. 704.
8. Krarup, M. C. *Automobile Development.* Outing 37, no. 5. February 1901. p. 548.
9. Moffett, Cleveland. *Automobiles for the Average Man.* Review of Reviews 21, no. 6. June 1900. pp. 704-10.
10. Flink, James J. *America Adopts the Automobile, 1895-1910.* MIT Press. 1970. p. 234.
11. Flink, James J. *America Adopts the Automobile, 1895-1910.* MIT Press. 1970.
12. Flink, James J. *America Adopts the Automobile, 1895-1910.* MIT Press. 1970. p. 71.
13. Flink, James J. *America Adopts the Automobile, 1895-1910.* MIT Press. 1970. pp. 98 & 126.
14. New York Times. March 4, 1906.

used automobiles for their labor as the upper-crust in American cities drove these "horseless vehicles."

Wilson did not seem to be aware of how many farmers would benefit with cars. By 1911, there would be 85,000 autos on farms, by 1920, 2,146,512 and by 1930, 4,910,300.[15] In 1920, it meant that 25 percent of all autos were on farms. One reason was that it allowed the leisure for farmers to drive to town to shop for produce shipped in from south especially during winter. They no longer had to grow it all.[16]

By 1906 auto owners were moving into distant suburbs because commuting by auto allowed it. The savings on cheaper property could even offset the cost of a car.[17] Suburban growth expanded again to accommodate the new reach of the automobile. Even though the poor roads made it difficult for the auto to average more than 15 miles an hour it was still sufficient to push the rim of the developable area out farther from the city center. However, since only the rich owned automobiles, it had no major effects in the early stages.

1910 Model T, Salt Lake City.

Then in 1908 Henry Ford produced the Model T and this low-priced automobile showed that in the future in could be a practical and useful tool for average people.

Ford opened the new Highland Park plant in 1910 and then in 1913 started his revolutionary Model T assembly lines there.

Within 14 years Ford would cut the initial price by two-thirds and one family in three would have a car.

Initially, tires were a problem because until 1904 there were no demountable rims and so drivers made the repair where the puncture occurred. Pneumatic tires were an optional and expensive extra until Ford introduced the Model T with them as standard equipment. The tire industry gradually improved the life of a tire to 10,000 miles by the 1920's from an average of one thousand miles in 1900. Then in the early 1920's manufacturers developed the low-pressure balloon tire, which is similar to the tire we know today.[18]

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15. Berger, Michael L. *The Devil Wagon in God's Country: The Automobile and Social change in Rural America, 1893-1929*. Archon Books. 1979. p. 51.
16. Berger, Michael L. *The Devil Wagon in God's Country: The Automobile and Social change in Rural America, 1893-1929*. Archon Books. 1979. p. 66.
17. Flink, James J. *America Adopts the Automobile, 1895-1910*. MIT Press. 1970. p. 71.
18. Flink, James J. *America Adopts the Automobile, 1895-1910*. MIT Press. 1970. p.285

Automotive technology developed rapidly during this period:

- 1901 Telescope shock absorbers are developed.
- 1902 Standard drum brakes are invented.
- 1908 Ford begins making the Model T. First-year production is 10,660 cars.
- 1911 Electric starter introduced Charles Kettering introduces the electric starter. Until this time engines had to be started by hand cranking. within one year a third of all entries in the auto show had them.[19]
- 1913 Henry Ford develops the first moving assembly line for automobiles.
- 1914 Dodge Brothers Co. introduces the first car body made entirely of steel.
- 1917 First U.S. traffic tower in Detroit, October 9, 1917 and first colored lights in 1920.[20]
- 1919 First single foot pedal to operate coupled four-wheel brakes.
- 1922 The Duesenberg was the first American car with four-wheel hydraulic brakes, replacing ones that relied on the pressure of the driver's foot alone.
- 1923 General Motors introduces Ethyl gasoline.[21]

By 1923 the auto had evolved into a vehicle that today's driver would know how to drive whereas the auto of 1900 would have been a totally unfamiliar vehicle.

1923-7 Ford Model T 1

As auto ownership grew, people took their outings in the auto rather than the streetcar, which cut into the streetcars' Sunday business—formerly their busiest day. Suburban commuters began using their autos to get to work and commercial strips began to open

19. Scharff, Virgina. *Gender, Electricity, and Automobility* in Wachs, Martin & Crawford, Margaret, eds. *The Car and the City:* The Automobile, the Built Environment, and Daily Urban Life. University of Michigan Press. 1992. p. 83.
20. Sessions, Gordon. *Traffic Devices: Historical Aspects Thereof*. Institute of Traffic Engineers. 1971. p. 35.
21. Donovan, Frank. *Wheels for a Nation.* Thomas Y. Crowell Co. 1965. p. 147.

in the suburbs to cater to them. At the same time, radios became popular and there was a tendency to stay home rather than seek amusement downtown. Thus, there was less and less reason to go downtown in the evening—another formerly busy time for the streetcars.

Public transportation franchises

There were four kinds of urban public transportation on city streets in the early 1920's, electric streetcars, unregulated jitney buses, regulated independent buses and a few buses operated by the streetcar companies themselves. Over time, they would virtually all evolve into being bus systems operated first by municipally sanctioned private monopolies, typically the original streetcar company, and later, some by the municipality itself.

Today, with minor exceptions, government-owned and operated motorbuses are virtually the only public transportation to run on U.S. city streets. The term public transportation has changed from its original meaning of publicly *available* transportation to publicly *owned* transportation. How that evolved in the latter half of the century is a fascinating story but it will take another book.

Prior to the advent of street railways, the only urban public transportation on city streets had been horse-drawn omnibuses. They used the public streets in the same way as the freight-carrying horse-drawn drays and other vehicles. Since the omnibuses were competitive, municipalities had no need to control them.

The next development in public transportation was that of the street railways on which ran horse or mule-drawn cars. For railed vehicles, it was necessary for the various municipalities to issue franchises to the various street rail companies giving them exclusivity of the rail lines they installed, set the fares, and designate what street improvements they had to make and maintain.[22] These were followed in the late 1800's by electric streetcars that required either overhead electrical lines or subterranean electrical wiring in addition to the rails.

States and municipalities chartered horse-powered and electric street railway companies to offer rail service on different routes in major cities. The various companies operated their own individual routes and no street railway had a monopoly in any significant U.S. city.

Municipalities required written agreements with the operators of street railways because of the construction of rail, and later electric lines, over and in public streets. Their installation had to be controlled, and road surfaces maintained. In cities of any size there were usually several companies operating horse and electric rail lines. They had exclusive routes and the municipality set the fares.

Around 1880, along with the rise of corporate trusts, financiers began consolidating the various horse-drawn street railways of most U.S. cities into monopoly operations. The

22. Detailed examples of such franchises are here: Carman, Harry James. *The Street Surface Railway Franchises of New York City.* Columbia University Studies in the Social Sciences, 1919. Reprinted by AMS Press, New York. 1969.

advent of street railway electrification starting in 1888 intensified the consolidations because it made more economic sense to have a few large electrical utilities rather than many small ones. In many cases, the electrical utility also ran the streetcar company.

This consolidation movement was complete before the arrival of the jitney bus in 1914. By that time, for the most part, privately owned monopolies provided urban transportation operating under municipal franchises. In turn, state controlled public utility commissions authorized the franchises.

There was no compelling reason for a motor bus operation to be granted a monopoly and any more than there had been for the horse-drawn omnibuses. For example, in London at the time the police merely monitored the buses for safety purposes.[23] The British bus operators themselves decided what routes they would ply and how much they would charge and where they would stop.

City Planning

Most important was the impact of motor vehicles' effects on city growth. The greatest worry of city planners had been the increasing centralization of big cities and the health problems that congestion caused for the population.

City planners began to see the motor car as one answer to their problem,

> The effect of the motor vehicle upon the city plan of the future, and that means upon city planning, will be beneficial in that it will aid in bringing about some of the most important results that city planners are striving to attain, such as … [t]he discouragement of further centralization by reason of the fact that distances can more readily be over-come and less time will be consumed by men and woman going to and from their work.[24]

As Henry Ford said, "We shall solve the city problem by leaving the city."[25]

> "From the rapid growth of the tendency from businessmen in large cities to locate their residences in more or less distant suburbs there has resulted, among other changes, a rapid improvement in the street paving demanded for the suburbs; and this is now being followed by great improvements in the main highways, one of the most influential factors in effecting this being the automobile."[26]

City planners had noticed that the 1910 census showed that the auto was already beginning to diffuse population,[27] but offsetting that was the ever-growing urban population; between 1910 and 1920 for the first time, urban dwellers exceeded rural ones.[28]

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23. Electric Railway Journal. May 8, 1915. p. 888. "The (London) buses have absolute independence to run when and where and how they like. They are not restricted as to fares..."
24. Lewis, Nelson P. *The Automobile and the City Plan.* Proceedings of the Eighth National Conference on City Planning. Cleveland. June 5-7, 1916. p. 54.
25. Flink, James J. *Three Stages of Automobile Consciousness*. American Quarterly 24, no. 3. October 1973. p. 456.
26. *Improving Suburban Roads and Streets.* Municipal Journal and Engineer 22. March 6, 1907. pp. 220-2.
27. *Crawford responding to Lewis*. Proceedings 8th National Conference on City Planning. June, 1916. p. 84.
28. *U.S. Historical Statistics*, Series A 57-72.

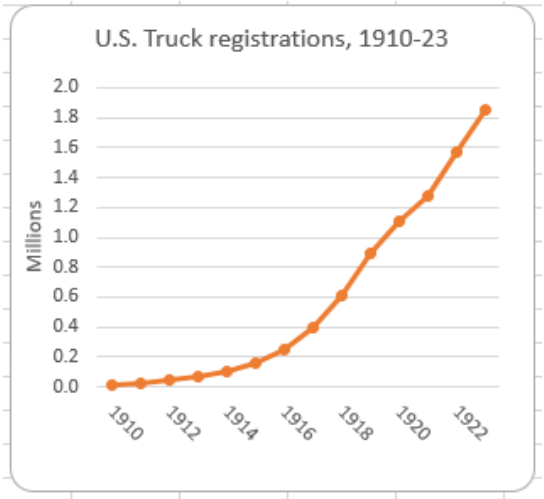
By 1921, planners were discussing that downtown department stores were getting smaller and there was a tendency to build more stores in different parts of the community.[29]

Another issue was the state of a city's streets. It had a major impact on the cost and convenience of operating any wheeled vehicle and the faster the vehicle, the more impact. Before the advent of the auto there had been a major bicycle craze that started in 1880 and ended as the auto came into fashion. The League of American Wheelmen, the leading organization of recreational cyclists, pushed for better roads in 1880 and this evolved into what was known as the Good Roads movement.

In 1880, only 2.5% of U.S. city streets were paved with asphalt and *Scientific American* warned that U.S. city street conditions were not good enough to allow development of autos.[30] Over time hard paved city streets increased to 17% of the total in 1902, 30% in 1909 and 47% by 1924.[31] However, when one scholar examined a variety of cities with markedly different street qualities and differing rates of auto acquisition, he could find no correlation. It appears that people bought cars regardless of their city's street conditions.[32]

The Early Trucks

In 1900 truckers estimated that heavy hauling by truck saved 25 to 40 percent over the same by horse and cart. "Trucks could haul four times as much produce as horse-drawn vehicles per square foot of street space occupied."[33] Trucks could make streets more efficient, requiring fewer vehicles to move the same amount of goods and thus cities could delay street widening.[34] They would also relieve traffic congestion because they were so much faster than the horse and cart that they replaced. They were also shorter, 1909 Sanford one-ton solid-tired truck thus using less street space.



While commerce saw the advantages of motor trucks at an early stage in the automotive era, it would be some time before they would replace the horse. While the percentage growth was fast, it was 1916 before there were 250,000 registered trucks in the U.S. Then, truckers added five times that amount in the subsequent seven years.

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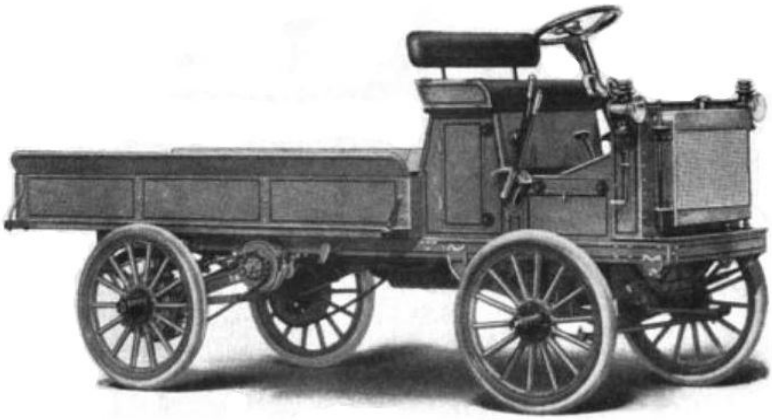
29. Brinckerhoff, H.M. *The Effect of Transportation Upon the Distribution of Population in Large Cities*. Proceedings of the 13th National Conference on City Planning. Pittsburgh. M ay, 1921. p. 64.
30. Scientific American, 73:40, July 20, 1895.
31. McShane, Clay. *Transforming the Use of Street Space: A Look at the Revolution in Street Pavements*. Journal of Urban History 5. May 1979. pp. 291-296.
32. Flink, James J. *America Adopts the Automobile, 1895-1910*. MIT Press. 1970. pp. 211-3
33. Flink, James J. *America Adopts the Automobile, 1895-1910*. MIT Press. 1970. p. 89.
34. Foster, Mark S. *City Planners and Urban Transportation: The American Response, 1900-1940*. Journal of Urban History 5, No. 3. May 1979. p. 368.



1909 Sanford one-ton solid-tired truck

1923 Ford Model T truck with solid tires

Trucks were a major early force that allowed residential dispersion. The streetcar had allowed residential dispersion into the suburbs. The truck allowed store supplies to be sent to the new stores opening to cater to these new suburban residents. Later these trucks would provide the wherewithal to allow jobs to disburse to the suburbs.

Motor Buses

> The electric tramcar [streetcar] possesses certain disadvantages so serious that we think it probable that had the motor omnibus been invented at the time when tramways were first authorized not a single mile of tramway would even have been laid down...tramcars, if not an obsolete form of transport, are at all events in a state of obsolescence and cause much unnecessary congestion and considerable unnecessary changes to the public. *History of London Transport. 1963.* [35]

35. Barker, T.C. & Robbins, M. *A History of London Transport,* Vols. I . George Allen & Unwin Ltd. 1963. p. 240.

Buses had developed differently in London and were firmly entrenched there long before they even became significant in the U.S. By 1910, motorbuses carried one quarter of London's public transportation passengers. In New York City, buses only ran on Fifth Avenue. Because of this major difference it is valuable to explore how each developed.

1906 LGOC Model B

There were two principal reasons for the more rapid development of buses in the U.K. First, the authorities banned street railways of any kind in central London. Thus, the only competition the motorbus had there was the horse-drawn omnibus; they did not have to compete with the streetcar. Second, the London authorities did not give exclusive franchises to the streetcar operators. The granting of long-term exclusive franchises in the U.S. would slow the development of the bus. Motorbuses were first introduced in London in 1899 but did not have a major impact until about 1906 when they became sufficiently reliable to warrant major investment. Even then 25% of the vehicles were out of service at any one time.[36]

By 1907 horse omnibuses in London still carried 189 million passengers annually against the 141 million carried by motorbuses.[37] The U.S., on the other hand was still almost wholly dependent on the streetcar except for the Fifth Avenue Coach Company's operations.

Motorbus costs were initially high because the technology was new and still developing. In fact, none of London's bus companies made a profit until about 1907.[38]

But London's regulatory environment gave them an advantage. Not only could motor buses traverse the center of London but they attracted passengers who were traveling from outside the center on one side of the city to go to the other side. These riders could use the motorbus without changing vehicles.[39] Then, as now, passengers much preferred a journey without transfers. To many, it was worth the extra cost.

In 1914, there were 3,000 double-decked motorbuses plying the London streets[40] whereas in New York City there were 141. By 1923, London's motorbuses carried more riders than the streetcars and were the major carrier of London public transportation.

The U.S. had taken the lead in urban transportation with its development of the streetcar and cities awarded exclusive franchises to the various operating companies. However, the streetcar companies fought the development of buses and it is likely that buses would have developed earlier in the U.S. without the hindrance of either the streetcar franchises or the anti-bus legislation formulated in the "jitney era."

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36. Barker, T.C. & Robbins, M. *A History of London Transport*, Vols. I . George Allen & Unwin Ltd. 1963. p. 131.
37. Barker, T.C. & Robbins, M. *A History of London Transport*, Vols. I . George Allen & Unwin Ltd. 1963. p. 134.
38. Barker, T.C. & Robbins, M. *A History of London Transpor*t, Vols. I . George Allen & Unwin Ltd. 1963. p. 135.
39. Proceedings of the 43rd American Electric Railway Association Convention held at Atlantic City, New Jersey, October 6-10, 1924. pp. 546.
40. Saltzman, Arthur and Solomon, Richard. *Jitney Operations in the U.S.* Transportation Research Record No. 449.

The table below shows clearly the changes in London between 1903 and 1912 and it is useful to compare London with New York at the same time.

Registered vehicles London Traffic Branch of the Board of Trade							
Year	Cabs *[taxis]*		Omnibuses		Tramway cars *[street railways]*		Total
	Horse	Motor	Horse	Motor	Horse	Electric	
1903	11,404	1	3,623	13	1,143	576	16,700
1904	11,057	2	3,551	31	928	810	16,379
1905	10,931	19	3,484	241	786	1,124	16,585
1906	10,492	96	2,964	783	905	1,396	16,636
1907	9,818	723	2,557	1,205	404	1,768	16,475
1908	8,475	2,805	2,155	1,133	323	2,003	16,894
1909	6,562	3,956	1,771	1,180	239	2,198	15,906
1910	4,724	6,397	1,103	1,200	120	2,411	15,955
1911	3,347	7,626	786	1,962	90	2,665	16,476
1912	2,385	7,969	376	2,908	60	2,919	16,557

Data source: Lewis, Nelson P. *The Automobile and the City Plan.* Proceedings of the Eighth National Conference on City Planning. Cleveland. June 5-7, 1916. pp. 37.

As in London, the merchants along New York's Fifth Avenue fought the construction of street railways, both horse and electric, because of the noisy rail lines and the ugliness of the overhead electric wires and their supports; they did not want to downgrade this exclusive shopping avenue.

Accordingly, New York's Fifth Avenue Coach Co. began motorbus service along Fifth Avenue in 1905 with a Brill bus[41] but they were not fully in the bus business until 1907 when they imported a number of 20-seat double-decker De Dion Bouton buses from France.[42] At this time, they auctioned off all their horses and horse-related equipment.[43]

While they appeared to have lost money through 1911[44] a subsequent examination showed they made a small profit; they had shown excessive expenses from their parent company.[45] By 1915, they were operating very profitably[46] with 141 buses. It was the only motorbus company of any size in the U.S. for the next 10 years.

The sole competition had been the horse-drawn omnibus that it replaced. Attempts in 1915 by the People's Five Cent Bus Company to break the Fifth Avenue monopoly failed even though they offered to provide the service at half the 10¢ fare then being charged.[47] It is doubtful if this new service could have provided the service for a nickel. While Fifth Avenue Coach was profitable, bus operation at that time was still more expensive than streetcar operation.

41. [41] Cycle and Automobile Trade Journal, November 1905.
42. [42] Motor Traction. May 2, 1908.
43. [43] Ogden Standard. August 10, 1907.
44. [44] November 24, 1911 New York Times.
45. [45] P.C. Jennings. *Motor Buses in New York.* Power Wagon. July, 1912. Portrays Fifth Avenue Coach as shifting profit to its parent company
46. 46 *Operations of New York Buses*. Motor Bus. July 1915. pp. 295-7.
47. Jitney Bus. June 1915. p. 77.

The effect of unpaved streets and solid tires made maintenance very expensive. Honolulu's streetcar company tried buses in 1915 as an alternative to extending their rail line but gave them up,

> Owing to the condition of the streets and roads traversed by our motorbusses, it became impracticable to continue their operation on any route without constant breakdowns and the service was discontinued.[48]

Cleveland and Chicago and other cities tried motorbuses during the 1912-16 period but it would be some years before the bus would be able to compete economically with the streetcar because of poor city streets and the state of bus technology. Bus operations were expensive both from the standpoint of wear and tear on the bus itself and the damage that solid tires did to the road surface. The subsequent smooth hard surfaced roads allowed for a much lower cost of operation.

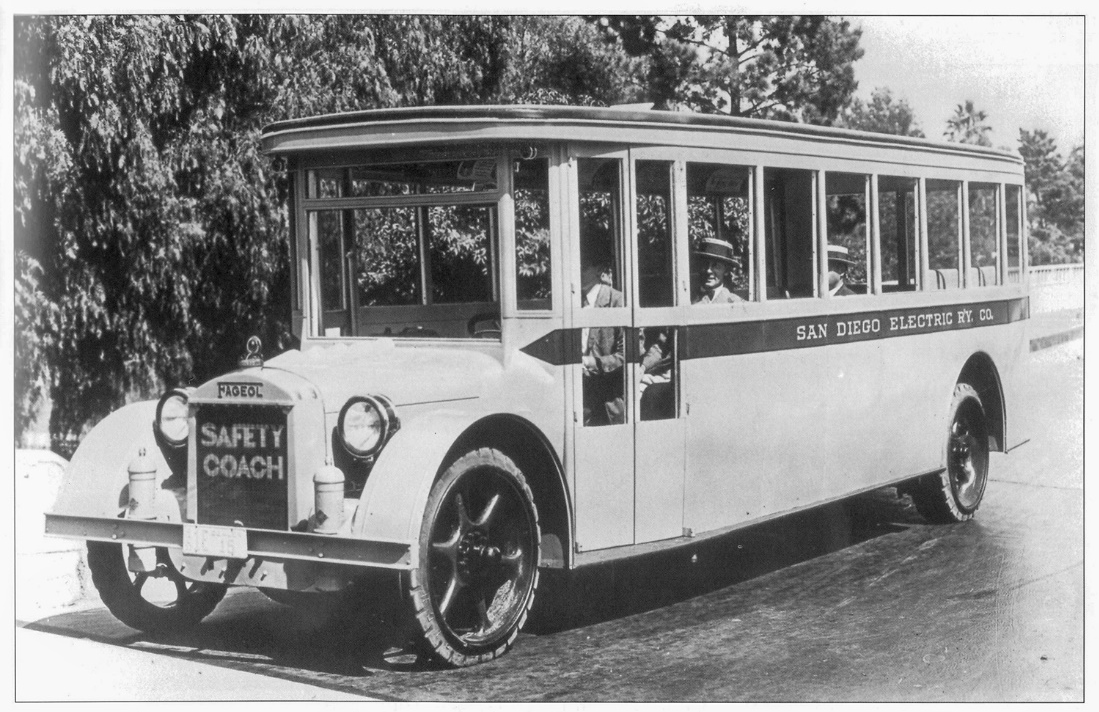
Buses continued to improve and then in 1922 the Fageol Company produced the first purpose-built bus. Up to this point, a bus had always been a bus body built on a truck chassis because buses were only a tiny fraction of the quantity of trucks produced. The first Fageol was a wake-up call. In 1920, U.S. streetcar companies had operated only 60 motorbuses. By 1923 that had increased to 121 companies operating 1200 vehicles.

In 1922, McGraw-Hill, the publishers of *Electric Railway Journal* launched a new magazine, *Bus Transportation.* This enraged many of the streetcar operators. Its first edition contained a petition signed by most of the California streetcar companies denouncing a magazine for "motor vehicles carrying passengers and freight for hire in direct and unfair competition with the electric railway carriers" which "was not in the best interests of the electric railway carriers."[49] However, the magazine's editorial slant was clearly intent on not offending their streetcar company readers. It pushed for an orderly, which is to say regulated, development of the motorbus.

It said it would be,

> ...one dealing with the transportation industry as to the transportation of passengers in urban and interurban areas in co-ordination and co-operation with such existing transportation agencies as may be operating in those areas."

48. Honolulu Rapid Transit Co. Ltd. *1915 Annual Report.*
49. *Editorial*. Bus Transportation. January 1922. p. 115.



1922 Fageol Urban Safety Coach with solid tires

It was firmly on the side of the streetcar companies while at the same time covering all sides of the issues. Articles in it conceded that jitneys were faster than streetcars[50] and allowed that, "Bus transportation is nothing more nor less than a logical development of the times..."[51]

They also recognized the opposition of the streetcar companies:

> "It seems incredible that the electric railways themselves in the past have been among the opponents of legislation that would allow them to run motorbuses. They actually feared that such recognition of the transportation usefulness of the motorbus would make all their investments passé. This was bad reasoning, for the bus did not need this legislation to prove what it can do. Thus far not more than a score or so of the 800 or 900 operating electric railway companies have undertaken motorbus operation, but these few pioneers give a clue to some of the valuable results that can be obtained with the motorbus.[52]

One contributor considered the costs of bus operation versus streetcars to be "a matter of conjecture"[53] and by others, dependent on their use. A careful analysis by the Massachusetts Public Utilities Commission found that streetcars were most economic on the busier routes. Where ridership did not justify frequencies of more than one streetcar every twenty minutes then buses were more economic. After some investigation the Connecticut PUC proposed,

> "the proper development of the bus as a transportation medium in these ways: In city areas not served by rail or where the bus is more economical than rail; in city areas as

50. Jackson, W. *The Past, Present and Future of the Motor Omnibus*. Bus Transportation. Jan. 1922. pp. 63 & 42.
51. Bus Transportation. January, 1922. p. 50.
52. Jackson, Walter. The Past, Present and Future of the Motor Omnibus. Bus Transportation. January 1922. p. 62.
53. Bus Transportation. January 1922. p. 41.

feeders to rail systems; in city areas on high-class residence streets..."[54]

In short, the streetcar companies were recognizing that the bus had its place.

The era of the modern bus began with the launch of the Fageol Safety Coach in 1922. It was the first bus not built on a truck chassis but rather purpose-built by the Fageol brothers as a bus for both urban and interurban use. At first only the interurbans had pneumatic tires but by 1923 all their Safety Coaches were fitted with them.

Also in 1922, the publishers of Electric Railway Journal launched a new journal dedicated to buses, *Bus Transportation*, much to the annoyance of streetcar operators.

This marks the time when streetcar operators began to seriously look at buses not merely as adjuncts to streetcar operations but as standalone operations.

The Jitney Bus

> *BETTER TRANSPORTATION AND FAIR PLAY*
> *Until about four months ago nobody had a chance to get even with a street car company. If you objected to anything: crowded cars, insufficient straps, no ventilation, poor service, you knew just where you could go; you would have to go there in the street car and the company would get your nickel. Anyway, it has been a case of the "public be damned;" and so the public was for years; doing considerable damning on its own account: but always as individuals, and consequently without effect. Besides, there was no alternative — it was streetcar or walk…. But just remember this: The street railway companies are not going to give up a single nickel they don't have to. They are going to fight the jitneys with ever weapon they can get, for this is a fight to the finish and no holds barred. Editorial. Jitney Bus. April 1915.*
>
> *"The jitneys are, of course, embryonic motor bus lines...They are welcomed by the public because they are cheap, comfortable, and quick." World's Work, 1915.*[55]

Another disruptive event in the automotive revolution was the discovery that automobiles could out compete streetcars on inner city routes. The jitney episode in urban public transportation is one that is usually treated as a momentary 'craze'; an aberration that flashed upon urban America and just as quickly died a deserved death.

However, the wildly successful jitney could have greatly improved public transportation had the authorities of the time come to grips with its advantages and not been swayed by the streetcar company lobbyists.[56] The episode is important for us to examine because it shows the long-term negative impact of poor public transportation policy.

54. *The Bus Is Finding Its Sphere in Connecticut*. Bus Transportation. January 1922. p. 6.
55. Editorial. *The Jitney*. World's Work 29. April 1915. pp. 618-9.
56. Eckert, Ross D. & Hilton, George W. *The Jitneys*. Journal of Law and Economics, Vol. 15. 1972.

1916 Jitneys at 18th & Castro, San Francisco

The precursors of the intra-city jitneys were the inter-city stage lines which large touring cars had started to run around 1910, predominantly in the West. The first jitney appeared on the streets of Phoenix, Arizona, in 1913 during a streetcar strike.[57] The following year on July 1, a certain L.P. Draper of Los Angeles took his first fare[58] and before the end of the year there were 700-1800 jitneys[59] carrying 150,000 riders daily in Los Angeles alone[60]. By April 1915 Los Angeles had 1,500 jitneys, San Francisco had 1,000 and Seattle 500.

Around the turn of the century a widely used slang term for a 5¢ piece was a "jitney." Origins of the term are uncertain although the Italian *jetone* or the French *jetnée*, both meaning a token, are alike in both meaning and sound.[61] Since a jitney was then the fare being charged by the new service, the vehicles logically became *jitney buses*, subsequently shortened to plain, *jitneys.*

Initially, jitneys were regular automobiles offering to carry passengers along fixed routes and normally paralleling existing streetcar routes. The appeal of the jitneys was that they were much faster than the streetcars.[62] Jitneys had higher top speeds and,

57. 57 Lochead, James K. *The Economic Status of the Jitney Bus.* February 15, 1917. Unpublished thesis. UC Berkeley, Bancroft Library.
58. Jitney Bus. July 1915.
59. Eckert & Hilton and Lochead have widely differing estimates.
60. Lochead, James K. *The Economic Status of the Jitney Bus*. February 15, 1917. Unpublished thesis. UC Berkeley, Bancroft Library.
61. Mencken, H.L. *The American Language*. Alfred A. Knopf. 1980. p. 234.
62. Jackson, Walter. *The Past, Present and Future of the Motor Omnibus*. Bus Transportation. January 1922. p. 62.

because they carried fewer passengers, they made fewer stops. The combination meant much higher average speed. Faster service combined with an element of novelty and some prestige attracted those who placed a high value on their time, particularly business people.

The jitney drivers would often deviate from their routes and provide door-to-door service, albeit at a higher price. The additional revenue generated by the jitneys was greater than the reductions suffered by the streetcar companies, which meant a higher combined ridership. By providing a superior form of commuting the jitneys had increased the number of people using public transportation.

Even the American Electric Railway Association admitted that there existed a market for "service of a somewhat higher character than it is possible for the street railways to furnish."[63]

To make a full time living of jitney driving some operators offered cut-rate taxi service in the off hours or even package delivery services. Some operators would ply their routes only during the rush hour before and after their regular jobs.

The identities of the jitney operators of the time have been lost for the most part but records survived in Hamilton, Ontario for the 1915-16 period. They show that jitney operators were either tradespeople (electricians, machinists, carpenters, teamsters and chauffeurs) or shopkeepers (grocers and cafe proprietors). Their frequent change of jobs and addresses suggest they were a marginal group probably badly hurt by the recession.[64]

The jitney's disadvantages were weather and a poor safety record. The majority were open cars and heavy rain would reduce jitney service by a third or more. Mostly Model-T Ford's, they were not particularly safe vehicles since Ford designed them primarily for farmers rather than for heavy loads in an urban environment. The accident rate for jitneys was high; Los Angeles' traffic accident rate in 1915 was 22% higher than before the introduction of jitneys. Such high rates were at least partially due to the difficulty of controlling the individual drivers. Years later jitneys would organize as "route associations" and that would take care of this problem.

However, the rapid expansion of jitney ridership continued despite safety problems. The high ridership testified to the strength of the new service's appeal to the public. Jitney owners even formed the International Jitney Association to include their Canadian colleagues[65] and in 1915 began their own national periodical, *Jitney Bus*.[66]

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63. Doolittle, F.W. *The Economics of Jitney Bus Operation*. Journal of Political Economy 663, 674-5 (1915)
64. Davis, Donald F. *Competition's Moment.* Urban History Review. October 1989. Vol. 18, no. 2. p.108
65. Davis, Donald F. *The North American Response to the Jitney Bus.* The Canadian Review of American Studies, Vol. 21, No. 2, Fall 1990.
66. Jitney Bus (renamed Motorbus in September 1915) published April 1915 through July 1916. Palmer Publishing Co. New York City.

Ford Model T jitney in 1915

Jitney Bus, the magazine, used the terms *jitney, jitney bus* or plain *bus* interchangeably. When *Jitney Bus* published its first issue in April 1915 there were more buses shown than automobiles. The editorial comment the following month was,

> In due course motorbus transportation will emerge out of its present somewhat chaotic state into a condition of stable organization. There will doubtless be in every city and town one or more regular lines of buses traversing their appointed routes with at least as high a degree of regularity and frequency as the trolley cars do now.

The June 1915 headline read, “Large Motorbuses: With Capacities of Ten to Forty Passengers Coming Rapidly Into Use.”

The progression from being an auto jitney drivers' publication to a bus publication was quick. Within five months the publishers renamed it *Motor Bus.* Their first editorial said,

> Most of the buses at this time are ordinary touring cars. The touring car, however, is being superseded by the regular motorbus...While the street car companies are showing a hostility, not unnatural, to the competitor who is materially reducing their profits, we venture to predict that inside of a few years the present-day street car interests will have huge investments in the more economic means of transportation. It should be remembered that traction[67] interests' business is the carrying of passengers. If a more economic method of transporting passengers is discovered, they would be foolish to

67. Traction was a common reference to any mechanized street rail conveyance.

> persist in their obsolete system. Never again, however, can the traction interests have a monopoly of public transportation. They must learn to compete, as other businesses compete.

The rapid expansion of jitney use continued across the entire United States from Portland, Maine in the East to San Francisco in the West. From a standing start in 1914, licensed jitneys reached an estimated peak of 62,000 in 1915.[68]

1915 New York City Jitney Bus

The primary causes of the 1914 jitney's sudden explosive growth was due to a confluence of forces. The flat fare caused the streetcar companies to overcharge for inner city runs, auto prices were declining rapidly principally because of Henry Ford's activities, used-car dealers for the first time had excess inventory and the quality of streetcar service was steadily deteriorating. The severe recession of 1914 ignited this explosive mixture which put many tradespeople in financial difficulty so they put their autos to use.

The impact on the streetcar companies was harsh. Some companies lost as much as 50% of their ridership.[69] Many believed that the day of the streetcar was over.[70] Almost immediately streetcar companies began laying off employees in response to the inroads that the jitneys were making into their revenues. Streetcar companies demanded that the

68. Eckert, Ross D. & Hilton, George W. *The Jitneys*. Journal of Law and Economics, Vol. 15. 1972.
69. Saltzman, Arthur and Solomon, Richard. *Jitney Operations in the United States*. Transportation Research Record No. 449. p. 67
70. Strong, Dr. Sydney. *A Nickel a Ride.* Survey. March 13, 1915. p. 663.

authorities legislate the jitneys off the street. They objected to "cream-skimming" and the lack of regulations and taxes for jitneys.

Local governments typically required the streetcar companies to run uneconomic routes (or main routes at uneconomic times) in addition to the profitable main routes during the busier hours. In return, the authorities allowed them to charge a flat fare, typically a nickel, that compensated them on an overall basis. "Cream skimming" referred to the jitneys taking streetcar customers for relatively short distances on the main routes during the busiest hours.

In addition, most local governments required the streetcar companies to maintain pavement over their tracks or to provide street lighting and most had to pay special municipal taxes.[71] Given this economic structure, the streetcar companies had legitimate grievances about the jitneys' encroachment into public transportation.

The tenor of the battle that ensued was that of Big Business vs. the Little Guy. The general population was initially much in favor of the jitney owners and support came from odd places. The Hearst newspapers, the Los Angeles Record, and the Kansas City Star were pro-jitney as were some of the unions although most were not, out of loyalty to the streetcar union.[72] In 1914, the Record wrote,

> "We hold as a sound economic principle that every mode of transportation in operation prior to the advent of the (jitney) bus should sustain its appeal to popular favor and profit making upon its intrinsic merit and not upon protective legislation...The Trolley Trust will not succeed in throttling the People's Five-cent auto car service. The masses are aroused on this question and they will come to the front in such numbers and in such vigorous fashion in defense of the auto men that it will result in a greatly extended auto service in behalf of the public. That's the Record's prediction."[73]

The Public Utilities Committee of the Los Angeles Council reported about jitneys that:

> "We are convinced that this mode of conveyance is not temporary in character, as some believe, but that it has come to stay as a permanent feature as transportation convenience. “We hold it as a sound economic principle that every mode of transportation in operation prior to the advent of the motor bus should sustain its appeal to popular favor and profit-making upon its intrinsic merit and not upon protective legislation. "

The Los Angeles Council as a whole subsequently endorsed this view.[74]

The jitneys only operated in the center part of a city during rush hours offering a better, faster and seated service.

If the streetcar company had neither a monopoly nor any of the costly obligations that the municipalities had forced on them, then logic would have likely dictated a different response. First, they could have chosen a zone fare. It would have resulted in, say, a 3¢ fare in the inner city with up to a 10¢ fare for trips to the suburbs.

Had they done this, it is likely that the jitneys would never have expanded to the extent they did since a 3¢ fare would not have been attractive enough; jitneys were more

71. Eckert, Ross D. & Hilton, George W. The Jitneys. Journal of Law and Economics, Vol. 15. 1972. p. 304.
72. Amalgamated Association of Street Railway Employees.
73. Los Angeles Record editorial, October 1, 1914.
74. Electric Railway Journal. January 30, 1915. p. 257.

The Zone Fare

It was near universal in the U.S. for streetcar companies to charge a flat fare within city limits, which in 1914 was 5¢.

Charging a fare commensurate with length of travel is what the U.S. transit industry called a "zone fare." This was the common fare structure world-wide except in North America.

Under the flat fare policy, the short distance streetcar rider was subsidizing the longer distance rider.

expensive to operate than streetcars. The jitneys could not have competed with a 3¢ fare except by offering premium service at 5¢, such as those people willing to pay more for faster service.

Alternatively, left to their own pricing, the streetcars may have charged a premium, say 5¢, for rush-hour travel that was always the more costly. It would have resulted in the jitneys still offering rush hour service to supplement the streetcars, but it would have benefited the streetcars financially since the cost of additional streetcars just to handle peak hour traffic was unprofitable.[75]

Zone fares would reduce streetcar fares along the city center routes and make the streetcars less expensive and thus more competitive with the jitneys. While the lower income inner-city resident would be better of with cheaper fares, the suburban dweller would face fare increases. The prospect of this alarmed both the real estate developer and the suburban homeowner. Both foresaw that such fares would result in declining values of suburban properties.

The streetcar companies allied themselves with the suburban real estate developers. The developers foresaw that the logical outcome of continued jitney operations would be zone fares or some other way for the streetcars to charge fares in proportion to the distance traveled. Jitney operators were suggesting this as a way of heading off anti-jitney legislation.[76]

However, the streetcar companies were having serious financial difficulties. Operating streetcars had never been that profitable. The excessive profits had come from stock manipulation and the corruption involved in obtaining the franchises. These days were already over and the operating profits were quite slim.[77] But the suburban public was totally dependent on the streetcars as their only form of transportation and the owners, often absentee, were so arrogant, that many saw the upstart jitney as a form of liberation from the streetcars. As the *Independent* of the time said,

> Nothing can stop the jitney now, no corporation, no legislation. The era of extortion and corruption is over.[78]

75. Thirlwall, J.C. *The Jitney Problem* — I & II. Scientific American Supplements No. 2069 & 2070. August 28 & September 4, 1915. p. 143. & Schwantes, Carlos A. *The West Adapts the Automob*ile: Technology, *Unemployment, and the Jitney Phenomenon of 1914-1917*. Western Historical Quarterly 16. 1985.p. 10 & 11 & *Editorial: Costly Service in the Rush Hour*. Electric Railway Journal, Vol. XLVII, No. 19. May 6, 1917.
76. Jitney Bus. August 1915.
77. Mason, Edward S. *The Street Railway in Massachusetts*. Harvard University Press. 1932.
78. Quoted in Schwantes, Carlos A. *The West Adapts the Automobile: Technology, Unemployment, and the Jitney Phenomenon of 1914-1917*. Western Historical Quarterly 16. 1985 pp. 307-326.

Costly service in the Rush Hour

It is generally conceded that service given during the rush hours costs much more than that operated during the remainder of the day. The difference in cost, which is obviously due to the extremely low "service factor" of [street]cars that are used only for one or two hours day, depends upon the sharpness of the daily peak, and in cases where the evening rush lasts an hour, or but little more, it is possible for the service at that time to involve actually double the normal expense of operation. Such cases, as a matter of fact, are by no means uncommon.

Editorial, *Electric Railway Journal*, May 6, 1916, p. 848

Unfortunately, that was not to be. Apart from inter-city lines and some remnants in small pockets the streetcar interests succeeded in eliminating the motorbus. They could hardly do otherwise.

However, the streetcar companies could not respond in this way because both the public and the establishment were adamant that the flat fare be retained. At the same time, many of the streetcar companies could not encourage the motorbus because of the over-inflated investment they had in streetcar infrastructure. They could not afford to write this off. There was no choice but to drive the jitney buses to the wall.

It was the Progressive Era and much of the populace held socialist ideas. The general attitude of the times towards business was very poor and, given the behavior of many large business operators of the time, not surprising. The general populace saw the streetcar companies (often referred to as the Trolley Trust) as Greedy Capitalists sucking the blood of the Working People. The public knew about the bribery scandals resulting from the political maneuvering necessary to obtain streetcar franchises. The profits made in the subsequent promoting and selling of shares in the streetcar companies also made the headlines.

Other allies for the streetcar companies were the municipal governments reluctant to lose the tax revenue and services that the streetcars were providing. In addition, it was easier for local governments to deal with the streetcar monopolies than with individual entrepreneurs.[79]

Such coalitions allowed local governments to begin tightening the noose around the neck of the jitney operators. The jitneys' main advantages were speed and flexibility of operation at a cost that made them competitive on the inner-city routes. Thus, local and state governments took actions designed to reduce these advantages and began to legislate all or some of the following:[80]

- require liability bonds amounting to 25-50% of the jitneys' net earnings,
- require minimum route lengths,
- require jitneys to operate a minimum number of hours each day,

79. Davis, Donald F. Competition's moment. Urban History Review. October 1989. Vol.18, no. 2.
80. Motor Bus. June 1916. pp. 449 & 457.

- require that jitneys carry all city employees free of charge,
- confine jitney operations on certain days to odd numbered license plates and even numbered on others,
- require jitneys adhere strictly to their assigned routes or to charge double or triple fares if they did deviate from them.
- require jitney operators to specify routes and times of operation in advance,
- exclude jitneys from high-ridership areas,
- prohibit jitneys' use of streetcar stops or stopping close to intersections,
- prohibiting jitneys waiting at the curb for riders,
- require a 10 mile an hour speed limit for jitneys,
- require jitneys to come to a full stop at all intersections,

The high fixed costs of liability bonds and the minimum working hours requirement drove all the part timers off the street. As a consequence of these actions the jitneys in use in the U.S. declined to 39,000 in January 1916.

The final blow came in 1917 when, with the jitneys already on their knees, the streetcar operators successfully argued that the War Industries Board should be, "suppressing entirely all useless competition with existing electric railways." The Board decided to direct steel, gasoline, and tires away from jitneys. By 1918 there were only 6,000 jitneys left.

Thus, the era of the jitney 'craze' ended. The authorities lost the opportunity for a nation-wide supplement for public transportation because they did not harness the many advantages of the jitney bus and use it as a supplement to conventional service as happened in Atlantic City.

Very few jitney lines lived on. Local governments allowed the King Drive jitneys in Chicago to continue until at least the 1960's[81] and San Francisco's Market Street jitneys until about 1989. The sole remaining legal fleet of the jitney era has evolved into a thriving, safe and profitable service in Atlantic City, New Jersey, where the jitneys bested the streetcar company, made peace with the municipal government and thrived.[82]

What everyone had missed in all the furor was that the jitney was merely the precursor of the motorbus.

Franchises

The arrival of the jitneys in 1914 instantly made inroads into the revenues of the streetcar companies. Municipalities were quick to defend this threat to their community's core transportation system. They quickly rationalized regulating, even prohibiting motor bus service, to protect the streetcars.

> ...the commission must protect these regulated companies actually furnishing reasonable

81. Suzuki, Peter T. *Vernacular Cabs: Jitneys and Gypsies in Five Cities*. Transportation. Res.-A. Vol. 19A, No. 4, pp. 337-347, 1985.
82. Saltzman, Arthur and Solomon, Richard. *Jitney Operations in the United States.* TRB Record No. 449.

> and adequate service from unfair and unnecessary competition as well as anything else, possibly proposed by the public, that would tend to deprive them of their common law right to a fair return on the property judiciously dedicated to the service of the public.[83]
>
> The conditions demand early and far-reaching action by the states to secure the best systems of local transportation, based on regulation and co-ordination rather than on wasteful and inefficient competition. Unnecessary duplication of service and temporary rate cutting results in economic waste and an irregular, impaired service….Regulated service that is coordinated is greatly to be preferred over unregulated competition in this field of public utilities as in all others; for, being natural monopolies, regulation should take the place of competition to avoid needless economic waste.[84]

Others added,

> What is to be done?...If we regard it as an essential instrumentality of public service, it must be protected as well as controlled. On the other hand, if it is a mere obsolescent private enterprise, in whose stability and continued expansion the public has no vital interest, then gradually its privileges may be withdrawn, its obligations lightened, and its ultimate fate be left to the verdict of time and the arts.[85]

This was happening at a time when many responsible people were recommending that the street railways be publicly owned. It was a time of mounting socialism and anti-big business sentiment. The changing attitude in the U.S. was brought about by incoming socialist immigrants from Europe, the first appearance of major corporations, corruption of politicians by the Robber Barons—or vice versa. The apparent insensitivity of the owners of large combines, such as Carnegie and Frick, to the concerns of working people, and the growing congestion of people in the cities only added fuel.

One indicator of public sentiment of that time is the number of votes cast for socialist presidential candidates. The first one ran in 1892 and the votes cast for them increased every election until 1912 when the Socialists gained 6.2% of the national vote. From then on the socialist vote declined.

More important was the growing belief that scientific planning of the economy was superior to the spontaneous economic order that had developed under capitalism.

Reform thought often seemed to parallel socialism because both criticized prevailing economic theories and stressed the need for community action. Above all, both wished to control the chaotic system of unbridled individualism which they identified as America's prevailing economic ideology. Both saw the common enemy as capitalistic exploitation.[86]

Where American sentiment had been solidly individualist, after 1890 it began to turn towards more collectivist ideas. Much of the public began to view competition as *wasteful* and *destructive*. They viewed collectivism as H.G. Wells did,

> ...the denial that chance impulse and individual will and happening constitute the only

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83. Washington Utilities Commission quoted in Pond, Oscar L. *A Treatise on the Laws of Public Utilities— 3rd Ed.* Bobbs-Merrill. 1925. p. 821 §791.
84. Pond, Oscar L. *A Treatise on the Laws of Public Utilities— 3rd Ed.* Bobbs-Merrill. 1925. p. 769-70, §710.
85. Wilcox, Delos F. *Public Regulation of Motorbus Service.* Annals of the American Academy of Political and Social Sciences, Vol. CXVI, No. 205. November, 1924. p. 108-109.
86. Gilbert, James. *Designing the Industrial State: The Intellectual Pursuit of Collectivism in America, 1880-1940*. Quadrangle Books. 1972. p. 27.

> possible methods by which things may be done in the world. It is an assertion that things are in their nature orderly; that things may be computed, may be calculated upon and foreseen.[87]

Others looked forward to the grand plans of the socialists and collectivists and,

> ...contrasted the wastefulness of the competitive society to a civilization whose parts worked as a single *whole*, one which could best be understood by analogy with mechanical engineering.[88]

New Jersey's Public Service Railway Company

The remarkable bus ridership achieved in the early 1920's in New Jersey holds valuable lessons for anyone studying the effects of regulating public transportation. They demonstrate that bus development in the U.S. lagged behind that of Europe principally because of the state and municipal regulations that inhibited bus development.

The first public transportation in New Jersey was a horsecar rail line that began in 1862 with a charter from the state legislature. The first successful electric street railway ran in 1890 after the Newark City Council approved it and, in the process, taxed the line five percent of its gross annual receipts.[89] The electric lines quickly replaced the horsecar lines because they cost less per passenger to operate and were at least twice the speed.

Over time the various New Jersey electric street railways consolidated into the Public Service Railway Company, a division of the Public Service Company of New Jersey, which also operated gas and electric subsidiaries. Ridership on the streetcars grew steadily and uneventfully until the arrival of the first jitney buses in mid-1914. By mid-1915 there were 300 jitneys in Camden alone.[90]

Naturally, the various New Jersey streetcar companies complained about the "unfair competition" (see page xxx) and by April 1915 introduced a bill into the state legislature to put jitneys under the control of the New Jersey Public Utilities Commission.[91] This bill failed to pass and tension between the jitney operators and the Public Service Railway Company grew.

As of August 1915, there were almost no restrictions on jitneys in the area covered by Public Service Railway. Then in April 1916 the New Jersey legislature finally passed the Kates Act, after first tabling it in the face of a demonstration by the jitney operators described as, *"The greatest aggregation of motor vehicles ever lined up in Trenton."*[92]

The Act authorized municipalities to regulate jitney buses in major cities, provided for a franchise tax of five percent and required insurance of $5,000 per bus. Newark City Council already had in place jitney bus regulations which included specifications for the

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87. H.G. Wells quoted in Gilbert, James. *Designing the Industrial State: The Intellectual Pursuit of Collectivism in America, 1880-1940.* Quadrangle Books. 1972. p. 48.
88. Gilbert, James. *Designing the Industrial State: The Intellectual Pursuit of Collectivism in America, 1880-1940.* Quadrangle Books. 1972. p. 53.
89. Speech on the opening of Public Service Terminal in McCarter, Thomas N. *One Phase of a Jerseyman's Activities.* Country Life Press. 1933. p. 193.
90. Electric Railway Journal. August 21, 1915. p. 333.
91. *Traffic and Transportation.* Electric Railway Journal. April 3, 1915. p. 691
92. Electric Railway Journal. February 5, 1916. p. 291.

buses and bonding and, with the passage of the Kates Act, the city began to act on these regulations.[93]

One effect of the regulations was that the use of touring cars as jitney buses declined since it was usually necessary to have a motor bus rather than just a car to be licensed by most New Jersey municipalities.[94] In some communities, notably Hoboken and Atlantic City, riders overwhelmingly preferred touring cars because they were faster and gave more frequent service. In any case, these new regulations did not appear sufficiently onerous to hinder the growth of the jitney buses.

Newark's bus riders more than quadrupled from 8 million in 1917 to 37 million in 1919. Rapidly increasing streetcar fares helped stimulate ridership on the less expensive and more flexible jitney buses in the post-World War I era.[95]

The president of Public Service Company, Thomas N. McCarter, who succeeded the astonishing Albert Stanley (see opposite page) was an attorney nationally known for his public utility expertise. He was strongly opposed to the jitney buses and in 1920 he said of them, "...this bastard competition of jitneys...is run by the man with his office under his hat, who is here for a minute, there for a minute, and who passes his dirty bus on to somebody else. It is a fly-by-night business."[96]

The New Jersey Public Utilities Commission was not sympathetic. A P.U.C. official wrote,

> *No industry of whatever character can justly complain of fair and proper competition...Who is the patron of the jitney? A little study will convince anyone that he is the one who desires, and through the jitney usually secures, three things. First, frequency of service; second, rapid transportation from origin to destination of journey; and, third, low rate of fare for such transportation. If he can secure these three requisites it is safe to say he would rather not be jammed in a small vehicle, standing in a stooping position because of lack of head room, jostled over pavements, subjected to tobacco smoke and generally poor ventilation and to many other inconveniences, to say nothing of the danger from careless operation, than ride, also jammed if you please, in a trolley car where he can at least stand upright, which he can at least get out of without compelling half the occupants to get out before him if he happens to be in the rear, where, he can have a smooth and comparatively comfortable ride, which is possible on any even fairly well maintained trolley property and under crowded rush hour conditions...How shall this individual be recovered as a patron of the trolley service? And the answer naturally is: Give him what he wants. (emphasis added)*
>
> *It is the function of the trolley company, therefore, to furnish more frequent and rapid service on lines where jitney competition exists...A proper system of zone fares combined with frequent and proper service will doubtless do more to combat jitney*

93. Electric Railway Journal. September 11, 1915. p. 467.
94. Conlon, Leo F., H.C. Eddy and Frank J. Daly. *In New Jersey the Motorbus Is Used Very Largely for Handling Short-Haul Urban Traffic.* Bus Transportation. August, 1922. p. 427.
95. Jackson, Walter. *The Place of the Bus— IV.* Electric Railway Journal. May 29, 1920. p. 1088.
96. Address before the Company's Section of the A.E.R.A. in McCarter, Thomas N. *One Phase of a Jerseyman's Activities.* Country Life Press. 1933. p. 299.

competition than anything else.[97]

But McCarter did not listen and the following year remarked, "We are in business to transport the people. It is a monopoly—a natural monopoly—which is the justification for the state regulating our price at all."[98]

McCarter's Public Service Railway had been losing money since 1918 and that continued into 1920 even though they carried a record 362 million streetcar riders that year. However, the jitney buses carried about 78 million in 1920 and McCarter needed these riders as a way to get his company back to profitability.[99]

In June of 1920 McCarter filed bills of complaint against 36 jitney operators saying they were, *"A hindrance to the railway's obligations."* He said he took the action because the New Jersey legislature failed to legislate jitney bus regulation by the Public Utilities Commission.[100] The courts rejected the suit.[101]

The following year the legislature passed the Elliot Act that classified the jitney as a public utility when it operated on the same streets, in whole or in part, where street railway tracks existed. However, it grandfathered in those jitney buses that had local consent prior to March 15, 1921.[102]

The effect of these changes was to upgrade the jitney bus fleet. Newark standardized bus specifications and operators had to submit plans of their buses to the city authorities before gaining permission to operate. In addition, buses had to have destination signs, interior lights, mirrors, doors and guard rails.[103] At the same time a majority of the jitney bus route associations adopted *pooled receipts* programs.[104] Members of the route association pooled all fares collected during the day and then disbursed the funds to members according to hours worked. This gave them the benefit of being able to offer riders free transfers to other jitney buses.

Despite the new regulations the jitney buses continued to gain riders. In 1920 those jitneys competing with Public Service Railway carried 78 million riders. The following year that increased to 103 million and in 1922, 141 million.[105]

From 1918 to 1921 Public Service Railway lost money and, while their union threatened to strike, the company could not afford the 30 percent wage increase the

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97. Eddy, H.C., New Jersey PUC. *The Street Railway Outlook.* Electric Railway Journal. October 4, 1919. p. 691.
98. Address to Resolutions Committee of the 1920 Republican Convention in McCarter, Thomas N. One Phase of a Jerseyman's Activities. Country Life Press. 1933. p. 310.
99. Address to Newark Chamber of Commerce on December 20, 1920 in McCarter, Thomas N. One Phase of a Jerseyman's Activities. Country Life Press. 1933. p. 319.
100. *Court Fight on Buses*. Electric Railway Journal. June 12, 1920. p. 1229.
101. *Transportation New Notes— Reargument on Jitney Case Refused*. Electric Railway Journal. January 21, 1922. p. 137.
102. Conlon, Leo F., H.C. Eddy and Frank J. Daly. *In New Jersey the Motorbus Is Used Very Largely for Handling Short-Haul Urban Traffic.* Bus Transportation. August, 1922. p. 430.
103. Conlon, Leo F., H.C. Eddy and Frank J. Daly. *In New Jersey the Motorbus Is Used Very Largely for Handling Short-Haul Urban Traffic.* Bus Transportation. August, 1922. p. 431.
104. Conlon, Leo F., H.C. Eddy and Frank J. Daly. *In New Jersey The Motorbus Is Used Very Largely for Handling Short-Haul Urban Traffic.* Bus Transportation. August, 1922. p. 427.
105. *A Review of How the Buses Are Handling Passengers During the New Jersey Transportation Controversy*. Bus Transportation. September, 1923. p. 414.

Route Associations

A route association is typically an organization of bus companies and individuals that negotiates on behalf of their members with municipal authorities over fares, uneconomic routes or times, senior and children's discounts. In return for these politically desirable outcomes the municipalities allow fares to be higher than they would be otherwise. In addition, the association disciplines its members according to mutually agreed standards; they police themselves quite rigidly so as not disturb the cozy relationship with the municipality. The advantage for the municipal authority is that it only has to deal with one self-policing entity. For example, Atlantic City authorities currently deal with the Atlantic City Jitney Association which disciplines its members. It requires the minimum of rules and no significant oversight on the part of the city.

union was demanding.[106] In attempting to gain revenues the company continually sought fare increases. In October 1921, it asked for an increase from 7¢ to 10¢ but was given only 8¢.[107]

In response to all the complaining from Public Service, a *Newark News* editorial suggested that all restrictions be taken off streetcars so they could battle to a finish with the jitneys for the right to survive.[108] Many New Jersey municipalities agreed with this view.[109]

However, McCarter continued characterizing the competition as,

1. "...the unlimited, indiscriminate, unregulated competition of irresponsible jitneys..."[110] *and*, "...this jitney evil..."[111]

McCarter refused to understand the role the bus would play in the future. He said in 1923,

If we are engaged in an industry that has become archaic, we must pay the price. This is the history of our own industry. The old stage gave way to the horse car; the horse car to the cable car; and the cable car to the electric car. Of this we cannot complain. But no one whose judgment is seasoned or entitled to respect upon this subject believes that the jitney bus can ever replace the electric railway industry.[112]

His frustration was understandable because in his battle against jitneys he was almost alone in the U.S. He would complain that excepting New Jersey there were only six other large cities that allowed competition, San Francisco, Louisville, Akron, Atlanta, Houston, and Norfolk. He had to contend with 1100 of these buses operating in direct competition with him.[113]

106. Letter to New Jersey Governor George S. Silzer of December 18,1923 quoted in McCarter, Thomas N. *One Phase of a Jerseyman's Activities*. Country Life Press. 1933. p. 354.
107. *Eight-Cent Jersey Fare*. Electric Railway Journal. October 15, 1921. p. 717.
108. *Auto Immeasurably Inferior.* Electric Railway Journal. February 4, 1922. p. 217.
109. *New Jersey Transportation Tangle Grows More Acute.* Bus Transportation. September, 1923. p. 513
110. *Address to American Electric Railway Association*, Washington, D.C. on February 16, 1923 in McCarter, Thomas N. *One Phase of a Jerseyman's Activities*. Country Life Press. 1933. p. 348.
111. Letter to New Jersey Governor George S. Silzer of December 18,1923 quoted in McCarter, Thomas N. *One Phase of a Jerseyman's Activities*. Country Life Press. 1933. p. 353.
112. Address to American Electric Railway Association, Washington, D.C. on February 16, 1923 in McCarter, Thomas N. *One Phase of a Jerseyman's Activities*. Country Life Press. 1933. p. 348.
113. Letter to New Jersey Governor George S. Silzer of December 18, 1923 quoted in McCarter, Thomas N. *One Phase of a Jerseyman's Activities.* Country Life Press. 1933. p. 352.

On August 1, 1923, with Public Service still unable to raise wages, the streetcar workers struck. Almost overnight the existing Newark buses, and some temporarily imported, handled more than twice the riders they had previously. While service was not totally satisfactory, the buses did manage to handle the bulk of the traffic.[114]

The strike ended on September 21, 1923,[115] when the court ordered Public Service workers back to work. In the process, the P.U.C. changed Public Service's fare structure from a flat fare of 8¢ to a fare of 5¢ within city limits. They could charge an additional 5¢ charge for travel beyond the city limits. It was, effectively, a modified zone fare. The jitneys quickly responded with lowered fares, free transfers and ticket books to remain as competitive as possible with the new streetcar fares.[116]

In 1923, Public Service streetcars were carrying 400 million riders and the jitney buses 200 million. Thus, the buses were carrying a third of the area's total riders. The buses were catching up and McCarter came to his senses. He began to buy the operations of the licensed jitney operators.[117]

The 200 million bus riders carried in 1923 in the Public Service Railway service area was 30% of all the urban bus riders in the United States. While 30% of urban public transportation in this New Jersey area was by bus, in the rest of the United States it was only 3.5%.

At the end of 1924, *Bus Transportation* would report that Public Service Railway had 600 buses and was in the process of taking over more. During the same year, Public Service began abandoning its smaller streetcar lines in Lodi and Plainfield and substituting buses.[118] By 1925, Public Service was operating 800 buses out of a total of 1,623 New Jersey city buses.[119]

The die was cast. Public Service would slowly take over the rest of the independents and gradually convert their own rail lines to buses. The last streetcar of Public Service Railway would run in 19 xx.

This ten-year episode contains remarkable lessons. The first was that the high bus ridership in New Jersey occurred simply because the authorities allowed bus operators to compete. It resulted in bus ridership that was more comparable to London than to the rest of U.S. The second was that non-monopoly operators can provide any uneconomic service, such as senior citizen passes or late-night service, through route association membership. This is important to understand since one of the major arguments against

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114. *A Review of How the Buses Are Handling Passengers During the New Jersey Transportation Controversy*. Bus Transportation. September, 1923. p. 413.
115. Conlon, Leo F., New Jersey PUC. *Transportation Conditions in New Jersey Becoming Stabilized.* Bus Transportation. October, 1925. p. 507.
116. *New Jersey Transportation Tangle Grows More Acute.* Bus Transportation. September, 1923. p. 513
117. Letter to New Jersey Governor George S. Silzer of December 18,1923 quoted in McCarter, Thomas N. *One Phase of a Jerseyman's Activities.* Country Life Press. 1933. p. 357-8.
118. *Electric Railways Now Operate 1914 Buses Over 2,405 Miles of Route*. Bus Transportation. October, 1924. p. 447-8.
119. Conlon, Leo F., New Jersey PUC. *Transportation Conditions in New Jersey Becoming Stabilized.* Bus Transportation. October, 1925. p. 507. The total of 1,623 does not include the 334 touring car jitneys operating in Atlantic City and Hoboken.

allowing private participation in urban transportation is that private operators will only run economic routes and ignore other service.

Traffic congestion

Some foresaw that the arrival of the auto and the truck with their faster speeds and maneuverability would help congestion. Scientific American argued in 1897 that when the motor vehicle replaced horse-drawn ones and streetcars it would relieve traffic congestion because of the vehicles speed and maneuverability.[120] However, they did not foresee the congestion that automobiles themselves would eventually cause.

Before 1920 city planners paid little attention to the automobile or to the growing traffic congestion.[121] Then traffic congestion caused by the 40% annual growth[122] of the automobile began to be a problem in cities across the U.S. and city officials had to wrestle with it.

American City could write in 1916 that cities of under 200,000 population did not have traffic congestion. By 1923 they would note how much the situation had deteriorated in just seven years.[123] That same year *Scientific American* wrote,

> Already the main thoroughfares of the more densely settled sections of the country are showing signs of congestion, and on holidays and Sundays the situation has become unbearable. It is in the larger cities, however, that the crowding of the streets has reached a point where it has become a daily and serious problem, with promise, if emergency measures are not at once undertaken, of producing on the main thoroughfares, and particularly at certain intersections of the main streets, an absolute deadlock during the busier hours of the day.[124]

By 1916 the automobile and the truck were in sufficient use to begin affecting traffic. In Newark, for example, the horse-drawn traffic decreased ten percent between 1912 and 1915.[125] But still, "...horse-drawn trucks moving slowly through the busy streets of the cities necessarily congest traffic very considerably."[126]

As late as 1924 the U.S. Chamber of Commerce lamented the effect of horses on traffic congestion since, "The greater number of these vehicles are drawn by horses and contribute to the congestion far more than would the same number of motor trucks."[127]

Streetcars, confined to their rails, had to let off their passengers in the middle of the street which was unsafe. It was bad enough with horses and bicycles on the streets but the arrival of the automobile made it really dangerous. Cities began adopting white-

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120. The Motor Car in England. Scientific American, 75:423. December 12, 1896. p97.
121. Brownell, Blaine. *Urban Planning, the planning profession, and the motor vehicle in early twentieth century America*. Shaping an Urban World, Cherry, Gordon E. ed. London. 1980. p. 69.
122. Compound annual growth, 1918-23. Source: *Historical Statistics of the U.S.*
123. American City. April, 1924.
124. *Solving the Street Traffic Problem: Speeding Up Traffic by Separating the Through and Local Traffic.* Scientific American. July 1923. p. 36.
125. Goodrich, E.P. responding to Lewis. Proceedings of the 8th National Conference on City Planning. Cleveland. June, 1916. p. 73.
126. Gillespie, John. *The Automobile and Street Traffic*. Proceedings of the 8th National Conference on City Planning. Cleveland. June, 1916. p. 63.
127. U.S. Chamber of Commerce. *The Motor Truck In Our Great Cities.* National Municipal Review. April, 1924. p. 215.

painted safety zones (see photo) at streetcar stops[128] so that passengers could make it safely to the curb. Theoretically, autos were supposed to stop outside of this zone until all passengers had been loaded and unloaded. This process impeded traffic and led to greater traffic congestion. In practice, the police were lax and the procedure remained dangerous. Buses simplified this process since they could pull directly to the curb.

No one disputed the streetcars' detrimental effect on traffic congestion. The editors of *Bus Transportation* described as "startling" the extent to which traffic moved faster during a 1923 New Jersey streetcar strike.[129] During a 1922 streetcar strike in Chicago, the absence of streetcars added 50% to the street capacity at a time when the traffic volume was approximately fifty-fifty for horse-drawn and motor-driven commercial vehicles.[130] And there were a lot more pedestrians in those days; in Chicago a quarter of the general population walked to work and for stockyard workers it was half and those that walked averaged nearly two miles each way.[131] The streetcar had such a negative effect on traffic congestion that city planners even suggested eliminating them.[132]

By 1920 the conversion to one-way streets was growing rapidly[133] together with the use of traffic lights. Their successful use on Fifth Avenue New York had increased speeds 50%.[134] However, the New York police reported that while it was possible to train the automobile drivers to observe the signals, the pedestrians were "*hopeless.*"[135]

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128. Gillespie, John. *The Automobile and Street Traffic.* Proceedings of the 8th National Conference on City Planning. Cleveland. June, 1916. p. 60.
129. *Editorial. A Review of How the Buses Are Handling Passengers During the New Jersey Transportation Controversy.* Bus Transportation. September, 1923. p. 414.
130. Kelker, R. F. *The Severity of Chicago's Traffic Problem.* Electric Railway Journal. Vol. 60 No. 13. September 23, 1922. p. 482.
131. Brinckerhoff, H.M. *The Effect of Transportation Upon the Distribution of Population in Large Cities.* Proceedings of the 13th National Conference on City Planning. Pittsburgh. May, 1921. pp. 54-55.
132. Goodrich, Ernest P. *The Urban Auto Problem.* Proceedings of the 12th National Conference on City Planning. Cincinnati. 1920. p. 84.
133. Goodrich, Ernest P. *The Urban Auto Problem.* Proceedings of the 12th National Conference on City Planning. Cincinnati. 1920. p. 81.
134. Goodrich, Ernest P. *The Urban Auto Problem.* Proceedings of the 12th National Conference on City Planning. Cincinnati. 1920. p. 91. Reported that travel time along 5th Ave from 14th to 57th streets formerly took "30-45 minutes and now takes 12-15 minutes."
135. Goodrich, Ernest P. *The Urban Auto Problem.* Proceedings of the 12th National Conference on City Planning. Cincinnati. 1920. p. 92.

During the 1920's traffic congestion was made worse by the dramatic tripling of auto ownership. Congestion was ameliorated somewhat by the reduction of horse-drawn freight and their replacement with the faster and more compact motor truck. The other major activities during this period were the restrictions placed on the parking of automobiles.

It is well to remember that during this period the heavy traffic congestion was in the central part of the cities whereas today the congestion tends to be heaviest on freeways and highways approaching the central city.

Parking

As the parking of autos on city streets was becoming a nuisance, planners were suggesting the elimination of automobile parking not only in central business districts but also along the main thoroughfares heavily used by horse-drawn trucks.[136]

During the 1919 Christmas shopping time, traffic congestion in downtown Los Angeles reached such a crisis that the City Council promptly enacted a strict no-parking ban. But this had such a negative effect on business that they rescinded the measure only 16 days later.[137]

Parking became a problem generally by the early 1920's because of a total lack of off-street parking to handle the burgeoning traffic. The only parking space available was on city streets.

At their 1920 conference, one city planner suggested private parking as solution to parking problem,

> *"The parking of automobiles in New York City is becoming a very serious problem. There is very little space which may be assigned to the use of the public for parking automobiles. Automobiles may be left at the curb for considerable periods of time, except in the most congested sections of the city. This privilege is frequently much abused. People having places of business in the city who live outside of the city drive into town and leave their cars at the curb in front of their places of business until they are though with their day's work...The need of parking space is seriously felt by department stores, hotels and theatres, whose patrons at present have to travel several blocks before they can find space where they may leave their cars, even if they are attended...a prophecy is hazarded that eventually no vehicles will be permitted to park except directly in front of property owned by those occupying the car..."*[138]

Another called for new buildings to arrange for a minimum amount of parking in each new building.[139] Others said that, "...since parking charges in privately owned buildings are too high to be popular....cities should provide public parking."[140]

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136. Gillespie, John. *The Automobile and Street Traffic.* Proceedings of the 8th National Conference on City Planning. Cleveland. June, 1916. p. 63.
137. Foster, Mark S. *The Model-T, the Hard-sell, and Los Angeles's Urban Growth: the decentralization of Los Angeles during the 1920's.* Pacific Historical Review, 44 (4). 1975. pp. 466-7.
138. Goodrich, Ernest P. *The Urban Auto Problem.* Proceedings of the 12th National Conference on City Planning. Cincinnati. 1920. p. 86.
139. American City 8/24-421
140. Young, Hugh E. *Day and Night Storage and Parking of Motor Vehicles.* American City. July, 1923. p. 44-46.

1923 - The Watershed Year

> "Let me say emphatically that the trolley can be relegated to the limbo of discarded things, along with the stage coach, the horse car and the cable car; that the motorbus is the vehicle best adapted to the requirements of the surface transportation in cities, that the motorbus is superior in speed adaptability, safety and comfort and it figures less than the trolley car in cost..." Grover A. Whalen, New York's Commissioner of Plants and Structures.[141]

The year 1923 was a watershed year for surface transportation. By the early 1920's the automobile had grown from being a novelty strictly for the rich to an important element of commuting. Ford's Model T, originally $850 in 1908,[142] was down to $269 by 1923[143] and Ford was producing half of all U.S. autos.

The artificialities of the Second World War aside, public transportation ridership would peak in this year and subsequently decline for all time. Horse-cars ran on New York's cross town runs for the last time in 1923; the operator had neither been able to afford to electrify and he "was not amenable" to the motorbus.[144] The Fageol Company had just introduced their new bus in 1922 and the automobile had taken the shape that we would recognize and know how to drive even if rear view mirrors and bumpers were optional extras and the wheels were wooden.[145] It was also the peak year of streetcar ridership in Britain and the year when bus ridership first exceeded streetcar ridership.[146] Manufacturers introduced the heavy-duty low-pressure balloon tire that, within a few years, would change the equation completely in favor of the bus. Most importantly, it was the time when U.S. passenger travel by private automobile overtook that of public transportation.

At the same time buses were becoming more economic under some circumstances more economic than streetcars. Streetcar operation was much cheaper than bus operation before 1910 but by 1923 under certain conditions the opposite could be tree. It was dependent on certain conditions, some technical and some political. Unpaved streets had mitigated against motorbuses as had the unavailability of heavy-duty pneumatic tires. Cities were improving their roads at a rapid rate and manufacturers were introducing pneumatic tires for buses. Some jurisdictions found favor with streetcars and some with buses and the regulations for the operation of each followed that preference.

But for fifty years after this time investors shied away from rail—for either subway or streetcars. The bus was maturing and some knowledgeable people were saying that the future of public transportation was in the bus. It was a major turning point for public transportation but few knew it.

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141. Clark, Ezra W. *Some Factors Which Must Be Considered in Bus Transportation*. Bus Transportation. January 1922. p. 14.
142. Flink, James J. *America Adopts the Automobile*, 1895-1910. MIT Press. 1970. p 55.
143. Burness, Tad. *Cars of the Early Twenties*. Chilton. 1968. p. 110.
144. Saltzman, Arthur and Solomon, Richard. *Jitney Operations in the United States.* TRR No. 449. p. 65
145. Burness, Tad. *Cars of the Early Twenties*. Chilton. 1968. p.30
146. Barker, T.C.& Robbins, M. *A History of London Transport*, Vols. I . George Allen & Unwin Ltd. 1963. p. 233.