AFD Ep 392 Links and Notes - Horse Power [Bill/Kelley/Rachel] - Recording Aug 8
[Bill] Intro: Horses have been omnipresent in many (though not all) human civilizations for thousands of years and they were a fact of life from the first cities and towns of the European colonies in North America. When the automobile revolution arrived, horses disappeared almost overnight from most people's lives, practically vanishing in just a few decades. But up until that point, even in the most modern, industrial cities of the United States in the 19th century, horses had a profound effect on every individual and American society as a whole. Vast quantities of agricultural output were dedicated to supporting a horse-based economy. They were pooping everywhere and even dying everywhere. And even the cities that were beginning to grow themselves by virtue of emerging mass transportation modes found themselves literally shaped at every level by the street congestion of horse carriages and horse-drawn railcars or by simple biological facts about the distances horses could travel or pull things. It is this period that we're interested in today: The massive presence and implications of horses in the modern American city of the 19th century before the automobile age (and especially before the widespread electrification of cities and their transportation in the 1890s).

In cities, horses moved people (individually or in groups), mail, farm produce, last-mile merchant cargo, coal, ice, wood, heavy volumes of beer or milk, fire engines, hearses, and much more. In the countryside, they performed many of these functions but also pulled farm equipment like plows. https://www.geriwalton.com/jobs-for-horses-what-work-they-did-in-the-1800s/

One source estimates that in 1850, animal sources of energy in the United States provided 52.4 percent of the total work output, and of this, non-farm or urban work animals produced 2.8 billion horsepower-hours (HPH) while farm-work animals produced 2.6 billion HPH. These figures are probably under-estimates, and it was not until 1880 that inanimate converters in the United States surpassed the power produced by horses, oxen, and mules, both urban and non-urban. [...] In an age of rapid urbanization, horses flourished, and census and city records suggest that horses were urbanizing more rapidly than people in the third quarter of the nineteenth century. Nineteenth-century cities with populations over 100,000 averaged roughly one horse for every fifteen people, although the ratio of humans to horses varied widely from city to city. Even where the ratio was low, however, the total number of horses could be quite large. For example [according to US Census Bureau data], 130,000 horses worked in Manhattan in 1900, while Chicago had 74,000 horses and Philadelphia 51,000. These figures do not include animals working in the city but stabled outside the city or the farm animals that trekked cityward everyday, carrying fresh produce for urban consumers.
https://www.tandfonline.com/doi/pdf/10.1080/10630730802097765 (Joel A. Tarr & Clay Mcshane (2008) The Horse as an Urban Technology, Journal of Urban Technology, May 2008)

A few other notes before we jump into this week's topic. First, we will talk briefly at various points about the arrival of automobiles as a point of contrast or comparison with the situation that existed before. But our focus today will be on the horses because we've got some episodes coming up in the near future that touch on a very specific aspect of the introduction of automobiles, and we'll talk a lot more about them at that point. Second, today's episode will draw very heavily on one chapter from the massive 2016 book "The Rise and Fall of American Growth" by Robert J. Gordon, which we'll be returning to in a number of future episodes. This very dense and data-heavy book exhaustively charts the American consumer economy and standard of living in the explosive 100 years following the Civil War. The first half of the book specifically focuses on the period between the Civil War and World War II, which is where we've directed so many of our episodes over the past year and a half. The thesis of the book is that an entire century (and not just the post-World War II era) were almost inconceivably exceptional and dynamic economic and technological times in US and world history and probably can't be

replicated again. This chapter is useful to our discussion today because it's about the unrepeatable transition away from horses after centuries of urban omnipresence.

With that, let's jump in and put ourselves into the viewpoint of the typical urban American of the 19th century before the 1890s. What were they experiencing from horses being everywhere? Rachel will start us off by talking about the public health implications.

Subtopics:

- **[Rachel] Public health implications** (p.145/159)
    - "Furthermore, as American cities grew and gridlock of intersecting horsecar lines developed in cities like Chicago, criticism focused on the inherent defects of the horse itself as a machine of propulsion. Horses dropped thousands of tons of manure and gallons of urine on city streets; died in service, leaving 7,000 carcasses to be carried away each year in Chicago alone; and carried diseases transmissible to humans." (Gordon p.145)
        - He then quotes another source: "The smell of manure heaps and the clouds of flies they attracted were some of the most objectionable nuisances [that] stables created. The nuisance was especially bad in the summer. On New York's Liberty Street there was a manure heap seven feet high. New York streets...were often covered with layers of manure." [Bill apologizes for not writing down from the endnotes which source Gordon was quoting.]
    - "The inconvenience, filth, and disease caused by horses was everywhere to be seen:" (Gordon p.159)
        - He again quotes another source: "Horses were ubiquitous in the urban landscape: standing, walking, trotting, sometimes shying, starting, falling, rearing, plunging, or bolting. They were large beings with which to share space...the smells of manure, sweat, and horsehair mingled with other urban smells of garbage, human waste, and industrial production. Horses contributed to the symphony of urban noise – hooves clattering and scraping on the streets, wagons rattling and banging, wheels creaking, harnesses jingling, horses whinnying, neighing, growning, and bugling." [Bill again apologizes for not writing down from the endnotes which source Gordon was quoting.]
    - https://www.newyorkalmanack.com/2021/02/the-unpleasant-side-of-life-with-horses-in-cities/
        - Each horse produced up to 30 pounds of manure per day and a quart of urine. All of this ended up in stables or along the streets. That added up to millions of pounds each day and over 100,000 tons per year (not to mention around 10 million gallons of urine).
        - By the end of the 19th century, vacant lots around New York City housed manure piles that reached 40 or 60 feet high. It was estimated that in a few decades, every street would have manure piled up to third story levels.
        - Streets covered by horse manure attracted huge numbers of flies. One estimate claimed that horse manure was the daily hatching ground for three billion disease spreading flies in the United States. In winter, manure mixed with the dirt of unpaved streets to form a detestable, smelly, gooey muck. In summer, the dried and ground-up manure was blown everywhere and the smell was overbearing. When it rained,

mini-rivers of manure flooded the streets and sidewalks, often seeping into basements.
    - In 1880, New York City removed an estimated 15,000 dead horses from its streets. But sometimes a big carcass would simply be left to rot until it had disintegrated enough for someone to pick up the pieces.
    - In the late 1800s, the city hired drainage engineer George E. Waring Jr., who had worked on Central Park, to start cleaning things up. He pushed for new laws forcing owners to stable horses overnight (instead of leaving them in the streets) and mobilized crews to gather manure and horse corpses to be sold for fertilizer and glue. What they couldn't sell was dumped. And the City tried harder – sewage infrastructure was improved, and the first streetcar lines appeared (horse-drawn, but able to carry more passengers than a carriage); in addition, public transport was encouraged and street cleaning crews were established.
    - "The horse in the city is bound to be a menace to a condition of perfect health," warned one leading urban health authority in 1901. Public health officials charged that windblown dust from ground-up manure damaged eyes and irritated respiratory organs, while the "noise and clatter" of city traffic aggravated nervous diseases. Since, noted Scientific American, the motor vehicle left no litter and was "always noiseless or nearly so," the exit of the horse would "benefit the public health to an almost incalculable degree."
- **[Bill] The horse-centered economy**
    - Jobs:
        - The enormous organizing power of teamsters related in no small part to the essential role of horse-drawn wagons in American commerce, although the Teamsters did not become a union until 1887: https://en.wikipedia.org/wiki/International_Brotherhood_of_Teamsters#Early_history *There were 8,500 licensed carters in New York in 1855. [Simple, two-wheel, single-axle] Carts dominated urban traffic until the 1850s, and they were probably still an important element of freight traffic as late as 1875. In the 1850s, however, two-horse and four-wheeled wagons increasingly took over urban freight movement. [Partly because they changed the ratio of horses to human driver employees.] These larger wagons were driven by teamsters, largely an urban occupation. The number of teamsters grew exponentially between 1870 and 1900, according to the U.S. Census. In New York City, the number of teamsters grew 311 percent, in Chicago 675.5 percent, in Philadelphia 350.7 percent, in St. Louis 243.8 percent, in Boston 412.6 percent, and in Baltimore 157.6 percent. In each case, the number of teamsters was growing at triple the rate that the human population grew. And, increasingly, urban freight operations were taken over by large business corporations that employed hundreds and even thousands of teamsters and horses. The teaming trades required more skill than carting. Carters usually controlled only one horse that they led on foot. Controlling two horses was much more complex. Smooth handling was vital, since abrupt starts and stops could damage freight and passengers. Moreover, they played havoc with legs, the weakest part of the equine machine. Poor driving could weaken, even permanently injure the legs of horses.* https://www.tandfonline.com/doi/pdf/10.1080/10630730802097765

    - “Horse-related merchants such as liveries and harness, carriage, and blacksmith shops were replaced by automobile showrooms or repair shops, and ‘horse accessories’ were removed from streets, including hitching posts and watering troughs.” (Gordon, p.164) *[Horsecar] companies maintained extensive blacksmithing shops and replaced horseshoes on schedule, not just when broken down, as a form of preventive maintenance. Street railway companies restricted the equine workday to just five hours, far fewer than those for human workers. This practice reflected the results of early trial and error testing. The constant starts, stops, and heavy loads of street railway service seemed to increase lameness dramatically in animals that worked longer than five hours, so the limitation was always defended in economic, not humane terms.* https://www.tandfonline.com/doi/pdf/10.1080/10630730802097765
- Land & grain: A quarter of US land (and grain production?) was allocated to feed production for horses (Gordon p.4 / p. 131) During much of the first industrial revolution and even into the 20th century, work horse breeders were fixated on how to breed horses that were more machine-like and more efficient in terms of the conversion of less food to more power. https://www.tandfonline.com/doi/pdf/10.1080/10630730802097765
- *Owners commodified horse wastes also at a time when society was more attuned to saving materials. Horse waste was sent to farmers, who valued stable manure and even street sweepings for fertilizer. [...] Northeastern cities had a large numbers of truck farms on their outskirts, which also grew vegetables in greenhouses during the winter months. Greenhouse farmers prized manure, in part because it gave off heat as it decomposed. Long Island farmers perceived New York City “as a veritable manure manufactory.” However, by the end of the nineteenth century, farmers were switching to chemical fertilizers. By the 1890s, stables had to pay for the removal of manure that had been a sellable product ten years earlier.* https://www.tandfonline.com/doi/pdf/10.1080/10630730802097765
- *Even in death, horses remained a marketable commodity. Rendering firms converted their hides to leather, hair to furniture stuffing, muscles to pet food, fat to soap, and whatever remained to a fertilizer additive. The corporate dimension of equine death was complex. Insurance companies would not pay if owners shot their own horses. Large stable keepers retained veterinarians to do this or relied on agents of humane societies. In the 1870s, New York’s ASPCA killed between 200 and 300 horses a year. In the 1890s that increased to over 2,000 horses a year. Urban public health boards also had veterinarians who would kill diseased horses, since the loss of a city’s transportation system would imperil its human population. The owners of large stables also supported humane groups in the hope that they would help constrain any cruelty visited on their capital investments by teamster. One veterinarian reported that the second leading cause of equine death in cities was lameness. Veterinarians shot numerous horses, operating on a strict economic basis: “Is this animal worth saving?” Sometimes, if horse prices had dropped or business was limited, it was more profitable for owners to simply work horses to death since a carcass might be worth more than a live animal. Rendering plants bid competitively for the right to pick up dead horses, promising in at least one case to pick them up within three hours. Rapid pick-up was a necessity from their perspective, since decomposition could ruin many byproducts.* https://www.tandfonline.com/doi/pdf/10.1080/10630730802097765

- Rural life: We're talking a lot this episode about the cities, but it's worth thinking briefly as well about the role of horses in rural life, not just on the farms themselves, but in transportation and by extension social lives, because it will serve as an important point of comparison as we think about the cities.
    - "Poor transportation kept farmers from social gatherings with those beyond a radius of a few miles reachable by horse and buggy, in contrast to urban residents, who needed to travel only from house to house or block to block for their interpersonal contact. 'Social contacts were few and commonly limited within a radius of a few miles; the educational facilities were meager and the opportunity to bargain in the sale of farm products or the purchase of supplies was almost absent. All this has been revolutionized by motor vehicles.'" (Gordon p. 163) The book notes that 93% of farmers in Iowa had adopted automobiles by 1926, which was already greater than the rate of urban auto ownership.
    - "The smaller the town, the greater the threat to local merchants as the automobile allowed farmers and local small-town residents to drive to the nearest large town or small city. Previous loyalties to the local merchants were frayed as the circumference of feasible travel expanded." (p.164)
    - http://arsenalfordemocracy.com/2020/09/01/aug-30-2020-school-buses-arsenal-for-democracy-ep-322/
- **[Kelley] Urban planning implications: Supplementing The Walking City** (p. 143 etc)
    - To give you an idea of how much the manure issue shaped the city, I have to look no further than my very own street, lined with brownstones with the classic NYC "stoop" where the first floor is a full floor above ground level. This was a design necessity so that houses were raised above the horse manure (https://gothamist.com/arts-entertainment/why-we-have-stoops)
    - It's not hard to see that prior to the railroad, folks had to live pretty close to where they worked as they had to walk there or ride a horse there. Most cities were about three miles in diameter so you could get to where you were going in about an hour on foot. Because neither wealthy or poor people could get anywhere fast, they all lived relatively close out of necessity.
    - The earliest urban transit system was the Omnibus, which was drawn by horses. This was introduced in 1833 in NYC and by 1853, one entrepreneur counted 3100 omnibuses passing a single location in a thirteen hour span in NYC.
    - In the 1850s, commuter railroads were introduced and gave middle and upper class people the option to live farther from their workplace, but most folks still walked.
        - This passage is summarized above: "Before the Civil War, transportation within cities was so slow that housing could spread only a few miles from centers of employment. Rich employers lived quite close to their working-class employees; indeed both walked to work. The 'walking city' of the early nineteenth century was unlikely to be more than three miles in diameter, a distance that could be walked across in about an hour. This began to change with the arrival of the railroad, which provided to the rich and upper middle class an escape route from the teeming city. Starting in the 1850s, commuter railroads were established that followed the main intercity railroad corridors. Now the city began to appear not as a circle but as a star, its points representing the new suburbs established along the rail lines extending out from the city… fast steam-powered commuter rail service was a futuristic world apart from the conditions of public transit within the city in the late nineteenth century, where until 1890 the horse

was the dominant prime mover of intracity passenger and freight transportation. … The main mode of transportation in Philadelphia between 1850 and 1880 was still walking for 80 percent of residents. Movement about the city by any means other than walking depended on the horse. Horse-drawn carriages for hire served as the nineteenth-century equivalent of the modern taxicab. Urban transit, whether the provider was privately owned or a public agency, had three characteristics that differentiated it from the taxi – reasonable price, fixed schedules, and predetermined routes. The earliest urban transit vehicle was the horse-drawn omnibus, a natural evolution of the stagecoach… Omnibus service grew rapidly [in US cities] after its 1833 introduction in New York City and by 1853 the entrepreneur Jacob Sharp, soon to initiate streetcar service, counted 3,100 omnibuses passing Chambers Street on Broadway within thirteen hours, which translated into one every fifteen seconds. Service spread rapidly in the 1840s and 1850s to most other large and medium-sized cities in the Northeast and Midwest." (Gordon, p.143)

- For a sense of how imperfect the omnibus was - "The omnibus was expensive to run, for rutted and muddy streets created so much friction that three horses were typically required to haul a bus occupied by ten passengers. 'It could take crews of men working with ropes and planks two days to rescue an omnibus that had slipped on the planking and into the quagmire' (Young, 1998, p.36). The *New York Herald* opined in 1864, 'Modern martyrdom may be succinctly described as riding in a New York omnibus.' Even in New York City there were few paved roads north of 42nd Street; 'Beyond that was only a dreary waste of unpaved and ungraded streets with a scattering of squatters shanties. Even in the built-up area there were many unpaved streets where passengers struggled through the mud to read the horse-cars and omnibuses.'" (Gordon, p.144)
- Listeners should also check out our April 2021 bonus Patreon episode "General Averell's Asphalt Empire" for the history of how cities began to pave their streets. http://arsenalfordemocracy.com/2021/04/06/preview-apr-6-2021-general-averells-asphalt-empire-arsenal-for-democracy-ep-363/
- Additionally, fares were high - typically 12 cents/ ride, when most working-class men earned only $1/day, so this was not accessible to everyone.
- Street car railways improved the experience in the 1840s and 1850s by making the ride smoother and allowing a pair of horses to draw 30 or 40 people, decreasing the cost of the ride to five cents and increasing speed from three to six miles per hour.
    - Summarized above: "As a result of the high ratio of horses to passengers, [horse-drawn omnibus] fares were high, typically twelve cents per ride in New York City at a time when working-class men earned only $1 per day. As a result, ridership mainly consisted of the upper middle class. A substantial advance was achieved in the conversion in the 1840s and 1850s to horse-drawn street railways, which forced the omnibus off the streets in many cities. The new so-called horsecars combined the 'low cost, flexibility, and safety of animal power with the efficiency, smoothness, and all-weather capability of a rail right-of-way.' Reduced friction allowed a pair of horses to pull thirty to forty passengers in a vehicle that had more inside room, an easier exit, and more effective brakes than the typical omnibus. Average speeds doubled from three to

six miles per hour. Average fares for a single ride dropped from twelve cents to five cents." (Gordon pp.144-145)

- "Horsecars also introduced transit innovations that persist to this day, including a flat fare independent of distance, and multiple-ride books of tickets sold to commuters at a discount. Still, only 17 percent of employed persons regularly rode the horsecars from home to work because of the expense. The apogee of the horse-drawn streetcar occurred in the 1880s, when more than 100,000 horses nationwide were engaged in pulling 18,000 streetcars on 3,000 miles of track. More than any other development in transportation, the horse-drawn streetcars made possible the separation of residence and workplace, a major change in the arrangement of cities that occurred primarily in the last half of the nineteenth century. Though horsecars were an advance over the horse-drawn omnibus, the conditions faced by passengers were primitive by modern standards. The cars were without heat or light, and 'crews put a foot of hay or straw on the floor in winter to help riders keep their feet warm.' Initial attempts to place heaters under the floors were rejected after a number of fires resulted." (Gordon p.145)
- While the ride was smoother, horsecar lines still had its urban planning limitations. The growing number of horsecar lines jammed up the city and, like we've been talking about horses created a large amount of manure and carcasses.
    - Summarized above:"as American cities grew and gridlock of intersecting horsecar lines developed in cities like Chicago, criticism focused on the inherent defects of the horse itself as a machine of propulsion...The search for a replacement of the horse preoccupied individual entrepreneurs and city planners in the last half of the nineteenth century. (Gordon p.145)
- "Despite the overnight conversion from horsecars to electrified streetcars in the 1890s, the national population of horses grew by 25 percent in the 1890s, for horses remained the primary means of power in both urban commerce and rural agriculture. The continued role of horses despite the invention of steam railroads and urban electric streetcars had the same limitation – fixed rails. As the economy grew, it was still dependent on the horse for the flexible travel to any final destination, a role that would be supplanted by motor transport starting in 1900." (p.159)
- In 1898, the first urban planning conference was convened in NY to speak specifically to the problem of horse manure. The conference was supposed to last ten days, but on the third day participants gave up and disbanded.
    - *At its peak, New York had an estimated 100,000 to 200,000 equine inhabitants. Each of those horses produced anywhere from 15 to 30 pounds of manure per day, coupled with around a quart of urine that ended up either in their stables or anywhere along their street routes.*
    - *And as equestrian enthusiasts are well aware, horse poop begets flies. Lots of flies. One estimate cited in Access Magazine claimed that horse manure was the hatching ground for three billion flies daily throughout the United States, flies that spread disease rapidly through dense human populations.*
    - *By the end of the 19th century, once-vacant lots around New York City housed manure piles that stretched dozens of feet—often between 40 and 60—into the sky. The problem of horse manure had quite literally become larger than life.*

        - *And the problem comprised more than just excrement. When a horse, worked to the bone, plopped over dead, the city then had a rotting carcass to address, not to mention the flies and road congestion that accompanied it.*
        - Like Rachel mentioned, the public health problem of horse carcasses was very real and presented an urban planning problem - where do they go?
        - The problem wasn't unique to NY. Cities across the world faced the same challenge. An estimate from London suggested that within 50 years, manure piles would be 9 feet high across the city.
        - https://www.atlasobscura.com/articles/the-first-global-urban-planning-conference-was-mostly-about-manure
    - Of course, horse-drawn transportation gave way to the automobile, which traveled faster, traveled farther, and was a more pleasant experience for the rider. It also solved the manure problem.
        - "The automobile was instantly superior to the horse-drawn carriage and replaced horse-drawn vehicles as soon as horse owners could afford to buy the new 'horseless carriages.' The limitations of the horse went beyond its piles of manure. Horses could pull vehicles only at around six miles per hour and had a range of no more than twenty-five miles before a given horse became exhausted and had to be replaced." (Gordon p.151)
        - "Painted parking stripes appeared on downtown streets, and signs slowly arrived to regulate parking and signals to regulate traffic. The previously clear delineation between the central business and residential districts became increasingly blurred as the space-consuming by-products of the automobile age expanded, including parking lots, automobile dealerships, repair shops, and service stations." (Gordon p. 164)

    - There must have been stables and carriage houses everywhere, right?

[Bill] Conclusions:
"A basic difference between the railroad and motor vehicle, viewed as fundamental inventions in the history of transportation, is that the railroad did not replace the horse but rather raised the demand for horses by extending civilization into hitherto unreachable parts of the country, whereas the motor vehicle directly replaced the horse and led to its disappearance as a prime mover." (Gordon p.131) "The steam railroad was not a substitute for the horse, but rather a complement to it. By opening vast new lands for agriculture, railroads increased the demand for agricultural horses. Though railroads expanded the extent of the national market, their mobility was limited by where their tracks had been laid. Only horses could 'provide short-distance hauling to and from the railroads and between points not on the railroads...horses made the railroads useful in the first place.' In contrast, both electrified urban transit, including streetcars and rapid transit trains, were substitutes for the horse, as was the automobile. We have cited counts of street traffic in cities that indicate that horse-drawn vehicles were dominant in 1905 but had largely disappeared by 1917. That short period of transition for urban streets is one of the most rapid in the history of invention. By 1929, horses had largely disappeared from urban America, though the replacement of the horse by farm machinery was not complete until the late 1950s. The transition of America from a rural to an urban society that occurred between 1870 and 1940 inherently could only happen once...The retirement of horses and their attendant street waste and disease could only happen once." (Gordon, p. 170)

Foreshadowing of the auto age: “Competition among drivers of competing companies led to collisions involving omnibuses, pedestrians, and horse-drawn wagons hauling merchandise. In 1853, a Philadelphia newspaper complained: ‘A ferocious spirit appears to have taken possession of the drivers, which defies law and delights in destruction.’” (Gordon p.144)