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THE ROLE OF RAILROAD IN THE DEVELOPMENT OF THE AMERICAN WEST
—Railroad, Migration and Urban Growth

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ABSTRACT: This paper explores the role of geographical expansion of railroads, one of the most important Fransportation vehicles, in the history of American west development, analyses its implication on the unprecedented migration movement and the resulted urbanization in the west and concludes with the fact that the appropriate interference by the governmnet, especially in the early period, is vital to regional development practice, because of market failure at the initial stage, infrastructure construction conducted by the government always plays as the first impetus to any regional development process. Only through this bridge, can some physical factors, such as population, be attracted to feed the backward area. As a result, cities grow fast and the region develops well. The experience can be shared by all countries. Besides reviewing the history of west development in America, focusing on the relationship between railroads expansion and urban growth, which was realized through population migration. A comparison on the particular pattern of regional development between U. S and China is made as well at the end. It is noted that despite of the common first impetus, government subsidies and the common final result, urbanization, the path for the America is bottom-up, whereas that for China is top down, that is to say, development should originate from big cities, then to towns, and finally radiate into rural areas.

KEY WORDS: migration; railroad; urban growth

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1 INTRODUCTION

No one can doubt that one of the most exciting sounds in nineteenth century America was the whistle of a locomotive. Throughout the whole century, especially in the second half, railroads played a dramatic role in transforming the American west from a barren land into a populated one, and from a wild nature into an urbanized society. Why could railroads develop rapidly? How did railroads play a decisive role in promoting the settling of America's last frontier? After examination of the railroad development in three consecutive periods, it is obvious that federal policies acted as the first impetus to the whole process. The immediately followed rail construction greatly facilitated migration, which, combined with the commerce brought along the lines, gave rise to cities in the West.

The remainder of this paper is organized as follows. Section 1 reviews the history of railroad construction in America and describes the central role of the federal government in building the railroad industry. Section 2 then examines the effect of railroad expansion on westward migration. Finally, section 3 discusses the urbanization caused by railroad development. It looks

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specifically at the rise of Chicago.

2 WESTWARD EXPANSION OF RAILROADS

2.1 Decades before 1850

When the first railway with steam-powered locomotive appeared in America in 1850, it signaled a revolution in transportation that was to write a new chapter in the history of that country. After that date, the tiny spark spread throughout the whole nation rapidly. According to historian John Stover, "of the twenty-six states in 1840, only four (Arkansas, Missouri, Tennessee, and Vermont) had not completed their first mile of track." (STOVER, 1997). At that time, however, most of the railroad construction was located in the Northeast states, which "accounted for more than 60 percent of the mileage in 1840, with Pennsylvania first in the nation in mileage (754), New York second (374), and Massachusetts third (301)". At that point, "only a twelfth the 3000 miles of road lay west of the Appalachians."(STOVER, 1997).

The geographic concentration changed little in the forties. Of the 9000 miles of line that had been completed by 1850, "the New England and Middle Atlantic States still had a clear lead with more than 5300 miles of railroad tracks, or nearly 60 percent of the national figure."(STOVER, 1997). All states between the Appalachian Mountains and the Mississippi were served by the new arrival and the increased miles of line. Compared with the progress that would be made in the following decades, the expansion rate during the forties was so slow that the extent of the rail network was pushed just from the Appalachians to the Mississippi, lagging behind the population's rate of westward movement during the same period.

Ironically, construction was much cheaper in western states. The fairly even terrain and the potential traffic volume there often permitted a lighter type of construction. The average cost per mile was no more than \$21 000, far below the national average level of \$34 000 per mile, \$39 000 in the New England and \$46 000 in the Middle Atlantic states. (STOVER, 1997).

The reason for this uneven distribution of lines was the lack of money. For the industry as a whole, there was little investment from the eastern bankers and European market. The condition was worse in the West. In the fifties, the general image of the West was the Great American Desert, unfit for settlement and civilization. Railroads to the West, as a result, were not particularly appealing to investors. It was the insecurities and risk associated with the future of western lines that channeled the limited capital exclusively into the well-developed eastern region.

Thus, most of the funds raised by railroad corporations came from potential immediate beneficiaries, the individuals living along the routes and in the terminal cities. They were called upon to subscribe to capital stock and to buy bonds by corporations, which apparently could not meet the demand of the capital-intensive industry, given the sparse population in the western states.

2.2 The Decade Before the Civil War

The decade before the Civil War was the turning point in the history of American railroads. The new land grant policy played a major role in promoting rail construction at a rapid rate, though lands granted were modest in size, normally being six alternate one-mile-square sections on each side of the right of way, with grants being given to the states.

After the first grant in 1850 and before the Civil War, nearly twenty million acres were granted to the first tier of trans-Mississippi states plus Wisconsin, Michigan and Florida. Since railroad construction required huge initial investment of capital that was beyond the means of the infant industry, the principal contribution of the grants to railroad expansion was their provision of a source of credit so that construction could start. As historian John Stover described, "typically the new line which obtained government land mortgaged its acres long before it completed final certification with the government. But the average railroad often also obtained cash in outright sale of the land." (STOVER, 1970). As the rail lines grew from 9 000 to more than 30 000 miles in the decade, the total investment in the industry also tripled from \$300 000 000 in 1850 to \$1 150 000 000 in 1860(STOVER, 1997), most of which came from the land granted.

The combined force of trans-Pacific trade and the land grants started the rapid expansion of railroad into the trans-Mississippi west. In 1860, the total mileage of iron network in the Middle West had reached eleven thousand miles, more than thirty percent of the national figure. The mileage in the Old Northwest increased by roughly eightfold, compared with the national average rate of fifty percent. Generally, the frontier line in 1860 had moved well west of the Mississippi. A railroad map of the same year shows that the network had almost kept up with the pace of the westward moving frontier (Fig. 1) . A period of unprecedented rate of development was around the corner.

2. 3 Period after the Civil War

The more generous government subsidies proved to be crucial for the western railroad construction after the Civil War. For the first transcontinental line, the Pacific Railway Bill signed by President Lincoln secured two companies, the Union Pacific and the Central Pacific, each a four-hundred-foot right-of-way and ten alternate sections of public lands for each linear mile of track. In addition, they could get a thirty-year loan in the form of U. S. bonds at 6 percent interest. The amount ranged from sixteen thousand dollars per mile of level ground, thirty-two thousand dollars for the plateau region, to forty-eight thousand dollars per mountainous mile. In 1864, a new bill increased the land grants to twenty sections per mile and the Northern Pacific was

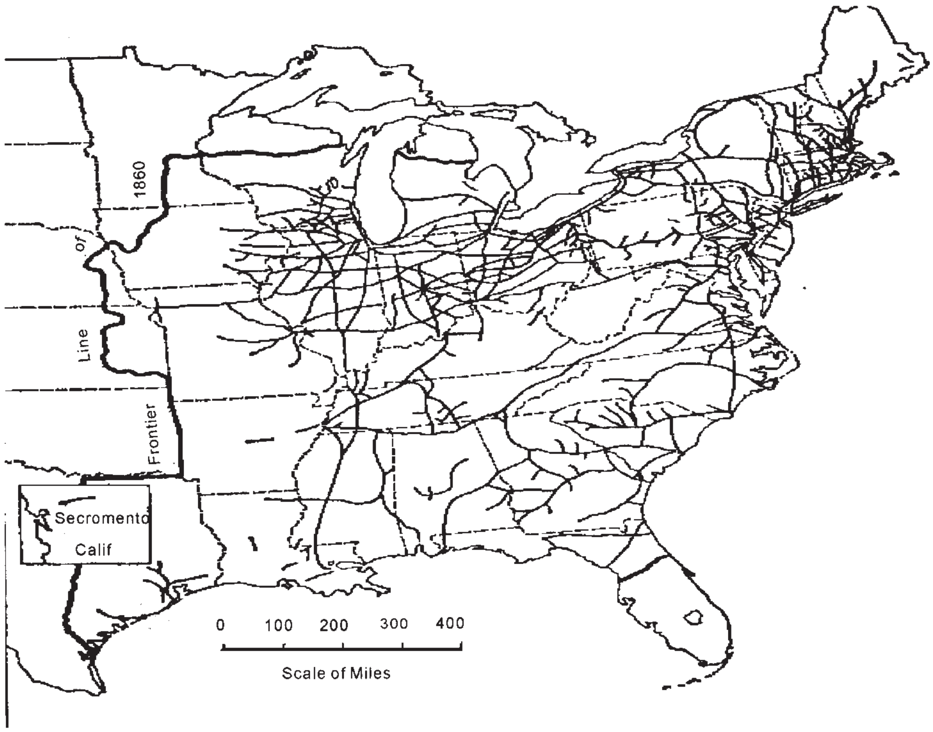

Fig. 1 American rail network on the eve of the Civil War

even offered forty sections for each mile. Nearly nine-tenths of these lavish grants were given directly to the railroad west of Mississippi.

With the large amount of subsidies, many railroads headed for the Pacific coast moved ahead of the frontier. The rail lines reached many prairie states at least a decade before they were admitted into the Union. ” In the case of the last five states admitted (Wyoming, Utah, Oklahoma, New Mexico, and Arizona), railroads preceded admission by more than twenty years. ” After the completion of the first transcontinental rail in 1869, other parallel lines to the Pacific soon followed. The total rail mileage west of the Mississippi river more than doubled in each decade up to 1890: 3 000 miles in 1865; 12 000 miles in 1870; 32 000 miles in 1880; 72 000 miles in 1890. (STOVER, 1997). The five transcontinental roads with other subsidiary lines framed the network in the west, and pulled millions of settlers and pioneers into the Great West (Fig. 2).

3 WESTWARD MOVEMENT OF MIGRANTS

The period from after the Civil War to the end of the nineteenth century was the most dynamic in both rail construction and population migration throughout American history. It was in this period that the westward movement of migrants reached its peak. We can observe this from the population change in western

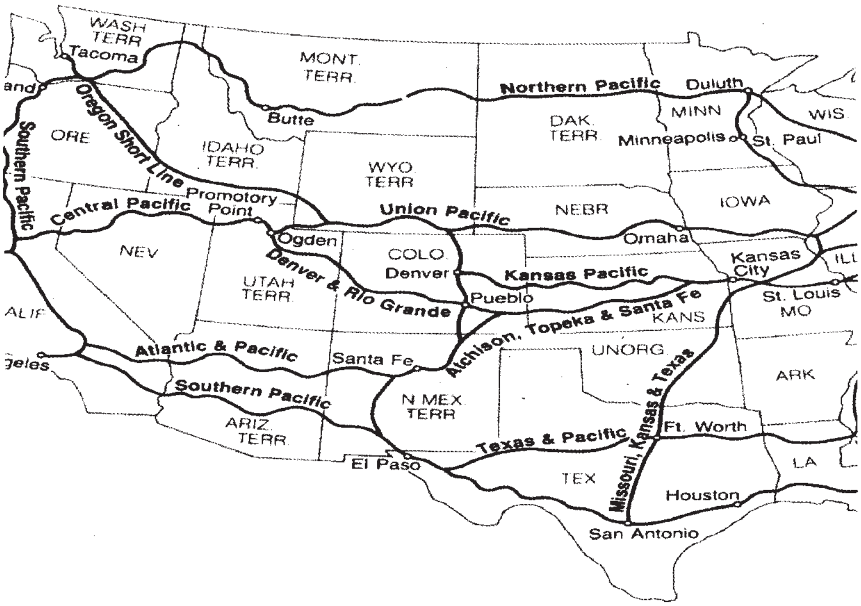

Fig. 2 Early western railroad lines

states, since most of the increased population stemmed from the inflow of migrants. The population in the first tier states west of the Mississippi (from Minnesota south to Louisiana) nearly tripled from 3 172 400 to 9 783 101. The second tier, including South Dakota, Nebraska, Kansas, Texas, even increased eightfold. The figure of the Mountain West states increased five times. All were well above the national average level of 2. 42. (ICPSR, 1998).

In order to understand the theoretical relationship between railroads and East-West migration, we must consider the decision-making processes of individuals who decided to migrate. When numerous people made this decision, the result was mass migration. Most people decided freely and rationally. As historian Richard White said, "given a particular set of circumstances and a choice among a limited range of options, a move to the west was the best response they could make to conditions confronting them"(WHITE, 1991).

Among many factors influencing the decision to migrate, three were most important. The first was the actual income gap, the returns to migration, between residents in the East and settlers in the West. Just like in a stream, where it is the head drop that drives the water to flow, the income gap encouraged and attracted potential migrants into the vast west. The second was the cost of migration, which included transportation fees and the cost of settlement, such as purchase of land by farmers and psychic uncertainty. The third, too often ignored, was the accessibility to information about the West. Since great uncertainty existed, those with knowledge about the situation in the West were more likely to see the potential profits to be made there and take the risk of migration. Next, we can see the impact of railroads on migration from the three aspects above.

3. 1 Higher Return with Railroads

In the second half of the nineteenth century, Americans experienced a succession of stages as the miners, ranchers and finally the farmers conquered the West. Railroads participated fully in western economic development by greatly enlarging access to eastern and European market. Although "miners had worked deposits of gold and silver before the arrival of the railroads, they could only develop the richest deposits because of the astronomical cost of supplies and equipment and the expense of shipping out gold and silver by wagons and pack wagons" (WHITE, 1991). So the life span of the mining boom was very brief. After the surface deposits dwindled, corporations began to take the place of individual entrepreneurs in quartz mining and dug deeper beneath the surface. Railroads, then, proved to be an efficient vehicle to transport heavy supplies into the mines and move tons of ores to the smelters. It helped to transform mining from a frenzied rush into an industry with stable profits.

The availability of transportation in the western farming region helped create a shift from subsistence to commercial farming by opening new markets for agricultural goods. As a result, millions of settlers poured into the West after the Civil War and most of them were farmers. The railroads sped Texas-raised cattle from the Kansas cow towns to the Chicago stockyard by making the traditional long drive unnecessary.

The arrival of railroads made higher income in the West attainable to would be migrants. It served as a bridge between the East and the West. Once the abundant resources were transformed into solid comparative advantages in eastern market, higher return was at hand.

3. 2 Lower Cost with Railroads

Early railroad passenger fares were frequently high. The pattern apparent in western migration was its domination by members of the middle class relatively prosperous farmers, merchants, and professionals. The poor could not afford to migrate west because they had to pay the high price of transporting themselves, their families and their equipment West before the operation of railroads.

By the late forties competition had reduced the fares to perhaps 2. 5 to 3. 5 cents per mile in New England and in the Middle Atlantic States and no more than 4 to 5 cents in the rest of the nation (STOVER, 1997). Though many people still chose to make their way west in wagons, the railroads provided a fast and rather cheap form of transportation into the West.

With the expansion of the railroad network after the Civil War, the bulk of the rate cutting occurred in regions where several lines served the same route. In 1881, a ticket from New York to Chicago reached a low of five dollars, and at one time in 1884 the Chicago – to – St. Louis fare dropped to only one dollar. The transcontinental traffic had been so heavy in the spring of 1886, when a New York to California ticket cost only twenty-nine dollars and a half, that a western rail official claimed that they were now carrying "tramps" (STOVER, 1998) . The immediate result of lower transportation cost was the flood of migrants into the West along the East – West track lines. Both the poor and the wealthy began to join the migration, since the poor could now afford train travel and the rich could get reliable service for less money. Evidence suggests that the migratory stream flowed into places located on the same general longitude as the place they had originated. By 1900, 74. 3 percent of those living outside their state of birth lived entirely or partially within the latitudes of their state of birth (WHITE, 1991).

3. 3 Richer Information with Railroad

Most migrants felt that the decision to go West was too important to be based on stories circulated by strangers. They wanted information from people they knew personally, from reliable people who had seen the region firsthand. This reliance on individual contacts in deciding to migrate meant that reliable information did not flow freely and evenly throughout a region. But the arrival of rail lines opened a channel through which people could learn more about the West.

These rail lines not only provided transportation; they also carried vigorous promotional campaigns, advertising the economic opportunities in the West. Railroad companies wanted increased migration because they had land to sell and because they wanted to build up business along their lines. They distributed millions of pamphlets and brochures, sent agents east and did everything possible to present the western agricultural frontier in favorable terms. For example, Henry Villard, president of the Northern Pacific, "employed almost a thousand agents in England and continental Europe, and their advertising literature painted the climate and the soil of the Northwest in roseate colors." (MORISON *et al.*, 1969). All these contributed to the fullness of information people had about the west.

Once the mass migration took place, people had to choose their destinations and careers. Although many migrants first engaged in farming in the Great Plain, their eventual goal was to reach the cities.

4 URBAN RISE IN THE WEST

The transition from a rural to an urban nation was one of the greatest developments in American history after the Civil War. The city had always been the center of market activities. Migrants into the West were not evenly distributed throughout that region, but followed the pattern of going from farm to village, from village to large towns, and finally to a metropolitan center. As a result, they were concentrated in the cities, where wealth from trade, commerce, and manufacturing accumulated. Located on the junction point between East and West, Chicago illustrated clearly the dramatic process of urban development.

The railroad capitalism of the late nineteenth century endowed power to great urban centers. This is especially the case for Chicago. The extraordinary growth of the city can be attributed to the proliferation of railroads and their effects. In 1850, only one railroad, the Galena and Chicago Union, entered the city (Fig. 3). As the Northeast was becoming heavily industrialized, easterners began to invest in cities such as Chicago, transforming it into a transportation and commercial center. In 1852, another four lines were completed, connecting Chicago both to the Atlantic and the prairie West. The success of the early railroads caused investors to invest in new lines. In 1856, "Chicago was the focus of ten trunk lines with nearly 3000 miles of track (Fig. 4); fifty-eight passenger and thirty-eight freight trains arrived and departed daily." (MAYER and WADE, 1969) In 1880, there were many lines originating from Chicago, seven to the East, six to the West, and three to the South. The young metropolis became the focus of a growing transcontinental network and the world's largest railroad center (Fig. 5).

Over the track, then, came the flood of settlers and passengers from the east and from abroad to populate Chicago. The population of Chicago was only a little more than four thousand in 1840. But in the following decades, it increased from nearly thirty thousand in 1860 to one point seven million at the end of that century, with 298 977 in 1870, 503 185 in 1880, and 1 099 850 in 1890. (Minicipal Reference Collection, 2001).

The railroads themselves served as an engine of economic growth. Their construction consumed huge amount of wood. Chicago's lumber industry developed rapidly, cutting the forests of the Great Lakes and shipping them westward, not only for the construction of the railroad system but also for countless homes and towns on the Great Plains. At the same time, purchase of land by the railroads and the subsequent development of that land contributed to the city's prosperity.

Since shipping freight by railroads was less costly than by steamboats or ordinary roads, the railroads radiating out of Chicago opened an undeveloped hinterland of great size. Chicago entrepreneurs devised the practice of commodity trading on the city's Board of Trade, providing a world market for the thousands of farmers who converted the grassland into a fruited plain. Chicago meatpackers financed the western cattle industry, and the south side stockyard became the city's largest employer. (HINE and FARAGHER, 1999)

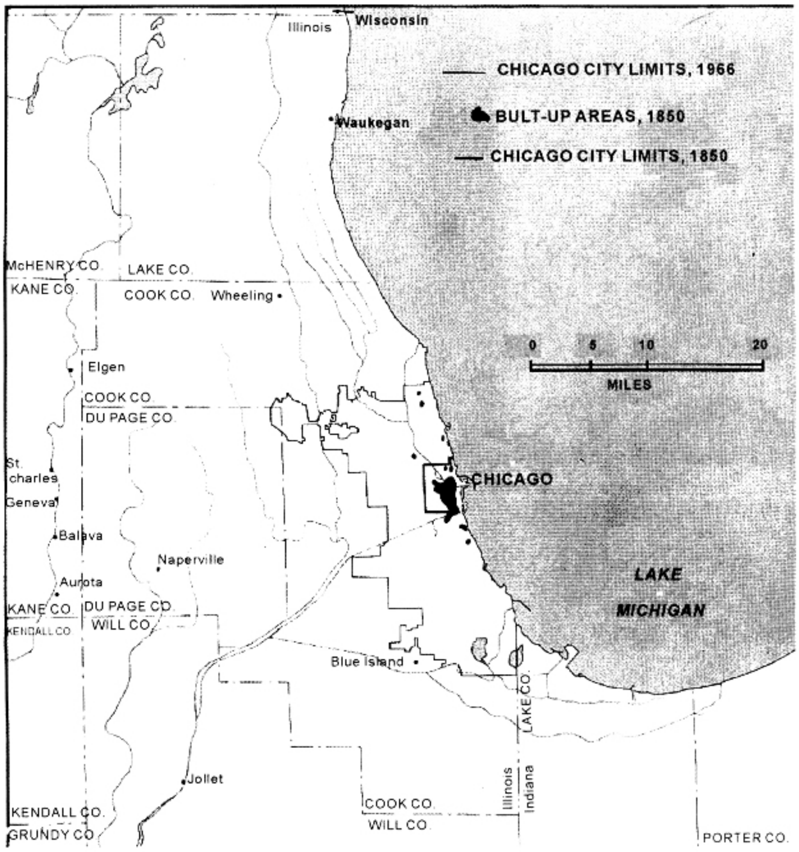

Fig. 3 Urban development in Metropolitan Chicago to 1850

As historian William Cronon has pointed out, the city soon replaced Cincinnati and St. Louis, which depended on the steamboats, as the headquarters for the late nineteenth century colonization of the trans-Mississippi West. The rise of Chicago demonstrated the victory of the railroad over other forms of transportation, particularly the canals. Though in the early years, canals did play an important role in the city's development, the emergence of railroads diverted most freight and passenger traffic away from canal and lake transportation. The result of this was the decline of the steamboat, the predominance of the railroad, and the rise of Chicago as a railroad town.

5 CONCLUSION

Unlike canals, railroads usually ran across borders between states. Their construction, therefore, was beyond the reach of any one state or local government. But it was federal policies that were crucial to the development of railroads. It cannot be denied that some discoveries found in the West, such as gold, did promote railway development. But the most powerful force behind their expansion was the federal subsidies, and particularly the land grants. The American railway network developed from behind the westward moving frontier before 1850, then kept pace with it in the fifties, only to zoom far ahead of it after the Civil War. The federal subsidies to railroads increased from almost nil, to a moderate amount, and then to lavish grants over these three periods respectively. With this government banking, the railroad industry expanded and was increasingly profitable. As a result, many lines stretched into the wild West.

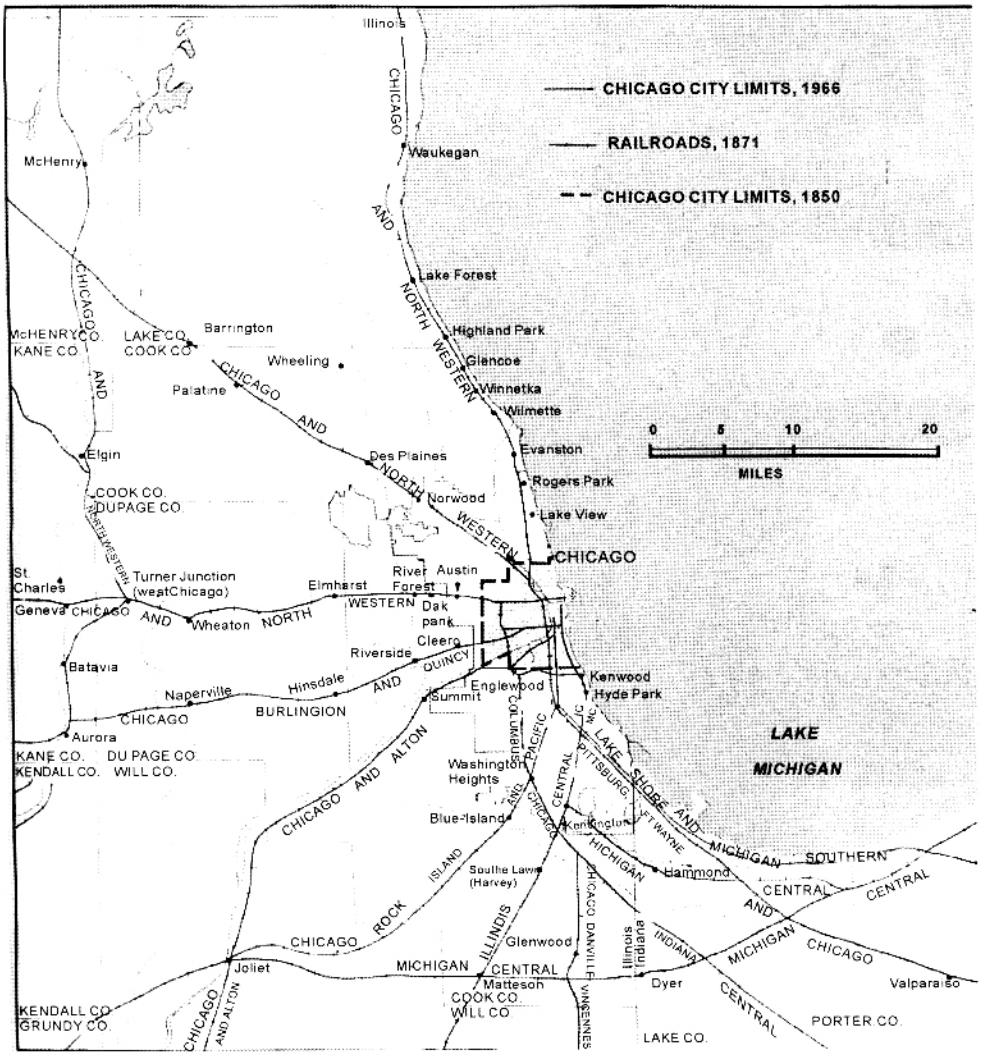

Fig. 4 The railroad system of Chicago, 1871

Not long after the government decided to support the industry, railroads raced for the Pacific Coast. With an integrated domestic market caused by the railroads, the west proved lucrative to many. Higher return from industries, lower cost of migration, and more information about the West were all made available by the arrival of rail lines. Floods of migrants followed the rail routes to pour into western villages, towns, and metropolis either. More money for railroad construction now flowed in from eastern and European investors, which meant that railroads could now develop more independently.

Hence, government can function as a catalyst for development, especially in times when capital is scarce. By tracing the sequence of government subsidies to railroad expansion, migration, and finally to urbanization, we can see the stages of western development. Government intervention served as the initial impetus to the whole process. This is not only true of the American experience, but also true of the regional development in other countries. The Chinese government, for example, has implemented a series of favorable policies in its West. Despite the differences in ownership and policies between U. S. and China, the common goal is to give

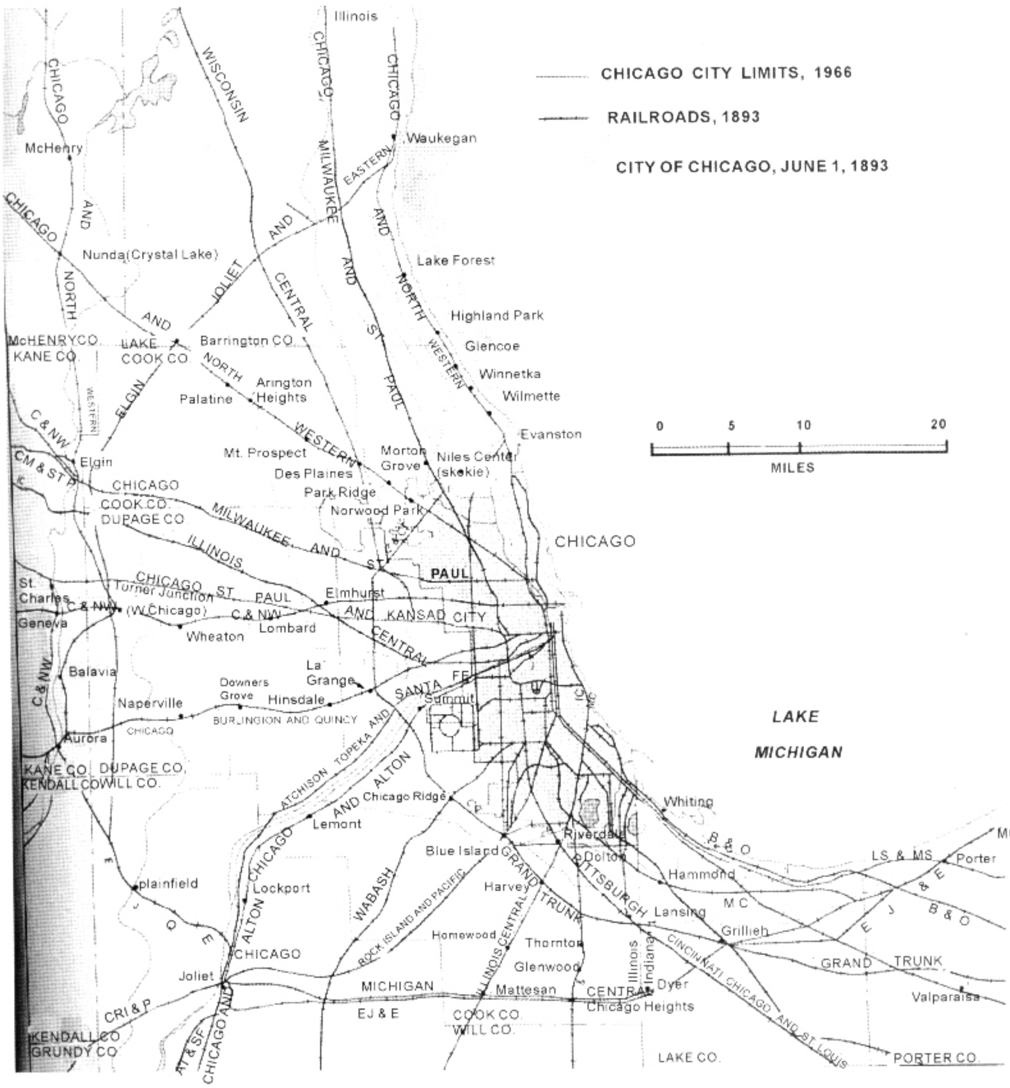

Fig. 5 Railroads entering Chicago, 1893

the less developed region incentives to develop and then let it run its course.

However, development of the West in U. S. and China must follow different paths. As far as the development process is concerned, America experienced a bottom-up one, which originated from mass migration into the Great Plain, accumulation into small villages and towns, and finally into metropolis. But for China, since it is impossible for migrants to pour into the West, the appropriate strategy should be on the reverse, that is, to attract non-physical factors, such as capital, information into big cities there. With the growth of big cities, some adjacent central towns will be brought along through a diffusion effect. They can radiate into next order towns as well. In the end, an up-bottom urban hierarchy can be formed. In this way, resources can be utilized more efficiently. The environmental disasters caused by extensively development, such as mass mining, in American western history can be avoided.

Despite differences in particular process, urbanization should be shared by both countries as the result of development. City has the advantage of accumulation effect, which can put resources into more efficient use. This is the reason why most commercial and manufacturing activities choose cities as their destinations and why people choose to move there as well. Whatever the particular country is, urbanization is the inevitable outcome of the regional development practice. Then, starting from the same origin and reaching the same destination, each country must pursue a path development according to its own special needs and conditions.

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