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An Ecological Reflection on the Food Self-Sufficiency Debate of the Antebellum American South

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남북전쟁 이전 미국 남부지방 식량자급 논쟁의 환경사적 검토

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Abstract : The antebellum American South has been characterized by the lingering backward images of plantation, slaves and cotton. The South specializing in the cotton cultivation is compared with the manufacturing East and the breadbasket Midwest. Douglass North who examined the interregional trade assumed that the South up until 1860 relied on the Midwest for the foodstuffs. Statistical and literary evidence, however, disputes the North's model, showing instead that the southern region attained self-sufficiency in foodstuffs at least in the late 1830s or early 1840s. The South's food self-sufficiency is attributable, to a greater extent, to the region-wide environmental movement of scientific agriculture launched to address the aggravating soil problems from cotton monoculture. Diversification and crop rotation lied in the center of the new regime. The new agricultural system combining corn, cotton and cowpea ensured the procurement of hoecake, hog meat, and cotton. The most significant outcome of the good farming regime, however, was the enhanced environmental consciousness which came to prevail the best farmer's reckless rush for profit maximization.

Key Words : cotton, crop rotation, diversification, food self-sufficiency, scientific agriculture, the American South.

요약 : 남북전쟁 이전 미국의 남부지방은 플랜테이션, 노예, 면화 등 주로 부정적인 이미지로 중서부지방과 동부지방에 대비되었다. 환금작물 생산에 특화된 남부의 농업은 제조업 중심의 동부나 곡창지대를 안고있는 서부와는 확연한 차이를 보이는데, 이들 세 지역의 교역관계를 분석한 더글라스 노스는 남부지방의 경우 지역내부에서 소비되는 식량은 전적으로 서부에서 수입하였다고 설명하였다. 그러나 수집된 각종 통계와 문헌상의 기록으로 미루어 남부는 적어도 1830년대 말에서 1840년대 초에 자체적으로 충분한 양의 식량을 확보하기에 이른다. 그리고 그렇게 될 수 있었던 데에는 다년간의 면화재배로 척박해진 토양을 개선하기 위해 농촌지식인이 중심이 되어 범지역적으로 전개한 '과학적 영농' 운동의 역할이 컸다. 새롭게 보급된 다각적 농법에서는 윤작이 강조되었는데, 특히 옥수수, 면화, 콩의 돌려짓기가 널리 채택되었다. 이를 통해 주요 식량원인 옥수수의 자급이 가능해졌고, 남아도는 양은 단백질 공급원인 돼지의 사료로 활용할 수 있었으며, 면화재배에서 얻어지는 수익도 체감의 악순환을 벗어날 수 있었다. 그러나 다각화의 가장 큰 소득이라면 질소고정에 효과적인 콩과작물을 통해 면화 단작으로 척박해진 토양을 되살릴 수 있다는 환경인식의 형성이었다.

주요어 : 과학적 영농, 남부지방, 다각화, 면화, 식량자급, 윤작

1. Introduction

Douglass North's(1966) *Economic Growth of the United States 1790-1860* has been the seminal work in capturing, on the macro-regional scale, the periodic structure of American economic growth. With this publication, North has pulled the previously disconnected strands of the debate together and unified them into a coherent whole. In this 300-page volume replete with tables and graphs featuring price index,

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terms of trade, public land sales, and freight rates, the author seeks to shed light on the determinants of the pace and character of American economic growth in the interim between the early Republican era and right before the Civil War. He assumes that the growth of the United States reflects the evolution of a market economy. Special concerns are given to what he conceives as essential parts of America's economic growth, or exports and the multiplier-acceleration effects.

The central proposition in his rationale, however, lies in the so-called "interregional tripartite trade model" which is constructed on the foundation of one classic concept of economics, *i.e.*, regional comparative advantages. The basic tenet of the North model is this: The fledging American economy, since the end of the War of 1812, incorporated not one but three distinct trade regions of the Northeast, the West(Midwest), and the South. Each of these three regions pursued its own geographical advantage, specializing in what it could best produce: the Northeast in manufacturing, the West in agriculture, and the South in staple crops of cotton, rice and tobacco. And the main independent variable of American economic growth during this period was 'king' cotton(Fig. 1).

The expansion of European market demand led the South to increasingly devote its land, labor, and capital to the cultivation of the staple crop. North's provocative assumption is the South's dependence on other regions, on the Midwest for foodstuffs and on the Northeast for manufacture products. North's idea of the wholesale importation of foodstuffs from the Midwest has been challenged, with the debate still going on. It has involved influential scholars from various disciplines. The criticisms and responses exchanged between challengers and advocates proved a fruitful adventure in terms of the methodological advance.

This paper reconsiders the most fundamental issue in this debate, *i.e.*, southern food self-sufficiency. The following questions are posited: Was the section solely dependent on the agricultural Midwest for its livelihood? Or did it maintain a certain degree of self-sufficiency? Answering these key issues, the study tries to test the plausibility of the North model and find alternative explanations. The blueprint for this essay is a macro-geohistorical perspective. According to Earle(1996), American geographical history is characterized by four big pictures: a periodic structure, a dialectical dynamic, a series of spatial reconstructions, and a series of power ratchetings. North's time period of 1790-1860 corresponds in Earle's periodization to a period of "probable" regional specialization(1780s-1830s) and regional diversification(1830s-1870s). This paper aims to fit critically North's thesis into this long-wave cyclical scheme.

American *geohistoire* is the outgrowth of the seemingly miscellaneous but highly rewarding combination of the tradition of classical geographical history of F.J. Turner and early deterministic geographers, the staple theory of the Canadian school of economic history, the American economic history represented by serial history instead of statistically sophisticated cliometrics, Wallerstein's macro-geographical mani-

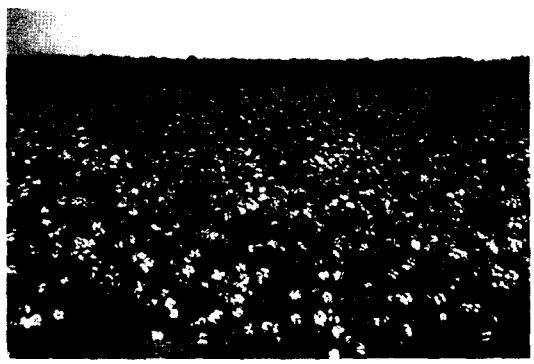

Fig. 1. Cotton Field in the South

Cotton in the antebellum American South was a driving force for the development of regional and national economy. More than just being a global staple, cotton played an integral role in setting the pace, rhythm, and specifics of daily life of Southerners - White, Black and Colored. The cash crop, however, deprived soils of integral nutrients(photograph by author).

festation of world systems, Braudel's macro-historical conceptualization of *long duree*, Tilly's social science history, and finally the environmental history. Once North asserted the necessity to synthesize a geographical perspective with various fields of economics, adding the complaints that "very little work has been done in using the principles of location to analyze the historical growth of regions in America"(North 1955, 243). This is what makes North's economic history relevant to our discussion of American geographical history and, particularly, to Earle's rhythmic time-space rhetoric of the American way.

The essay focuses on identifying the emerging regional diversification regime and southern food self-sufficiency around the turn-of-the-cycle period of 1830s and 1840s. Emphasis is given to the sectional problems of soil erosion associated with the continual, exploitative cultivation of the southern staple cotton. The main thesis of this paper is that the macro-geohistorical depression of the transformational phase delegitimized the previous regime of specialization and monoculture and replaced it with an alternative regime of crop diversification. This dialectical dynamic was an extension of the mode of cyclical crisis-and-recovery or creative destruction. In the following four sections, I clarify the main issues raised by students of southern history; revisit the inland waterway trade along the Mississippi River; address the impact of the technological change in transportation upon the interregional trade pattern; and revise the purely economic interpretations of the North model by integrating the ecological perspective. For this essay, I review earlier literature. I also collect statistical and literary information from the census schedules of the US Census Bureau, *DeBow's Review*, Cole's wholesale commodity price supplement, *Hunt's Merchants' Magazine*, agricultural periodicals, and secondary sources including works by Callender, Bruchey, Fishlow and Hilliard. The statistical data is used in mapping the geographical distributions of essential foodstuffs to visualize the contrast between the regions.

2. Many Souths

The picture of early societies in the United States varies according to regions and scholars. In an insightful essay titled "Cash is Good Thing to Eat," Morrill(1976) touches on the principal theme of the 19th-century agricultural history in the United States. He asks, were they subsistence farmers or market-oriented profit maximizers? Understanding the subsistence economy of early America as an independent and viable social form, Morrill emphasizes the utility of the concept of the household mode of production. To him, cash is merely an ultimate means of payment and, therefore, it is just another product. According to him, the subsistence household mode of production has existed for a long time, and reached its full flowering during the period from 1750 to 1850. Main(1965), on the other hand, recognizes multiple forms of rural economic behavior and distinguishes three types: frontier regions where wealth differences were minimal and most persons owned some land; subsistence farm societies which represented the frontier in arrested development; and commercial farming areas in which wealth differences were more pronounced with a third or more of the population being landless laborers. In general, these plural societies were a prominent factor on marginal land. In the areas, integration tends to be least marked, and elements of disunity of plurality are more pronounced(Peget 1960).

Plain folk, the symbol of the autarkic Southerners, might represent Morrill's household mode of production and Main's subsistence farmer. The greater portion of Southerners remained landowning farmers who belonged neither to the plantation society nor to the destitute and degraded poor class. The plain folk included the small slaveholding farmers, the landed non-slaveholders such as herdsmen on

the frontier, pine barrens and mountains and tenant farmers. They connote the sum of the solid virtues: integrity, independence, self-respect, courage, love of freedom, love of their fellow man, and love of God. The great majority secured their food, clothing, and shelter from some rural pursuit, chiefly farming and livestock grazing. Hogs thrived fattening on mast and nuts, and corn grew just as well in the southern counties(Owsley, 1982, 32). A farm economy meant a diversified self-sufficient type of agriculture where the money crops were subordinated to food crops and where the labor was performed by the family or the family aided by a few slaves.

This romanticized image of southern rural life, however, is demystified by Wright(1970), who reveals a slave-cotton regime with a highly unequal distribution of wealth. Indeed, plantations where a great number of slaves resided were the centers of rural population and, in that sense, the major food-consumption sites. The debate of food self-sufficiency in the cotton South revolves, then, around the plantation economy. As early as 1840, *Hunt's Merchants' Magazine* described exactly what would later become the North model:

> "The republic is vast in its territory. It produces in each section, mineral, agricultural, and manufactured products which are required in the other staples and their various forms of manufacture, their fisheries, and their importations of foreign goods, necessary article, which are to be distributed elsewhere. The South yields its cotton, rice, and sugar, which command a good price at the North or Midwest. The Midwest, in turn, pours down from the wide territory bordering its vast rivers and lakes, large quantities of wheat flour, and other agricultural productions which are required at the East"(*Hunt's Merchants' Magazine*, 1840, 3(4), 274).

DeBow's Review, which was founded in 1846 at New Orleans and soon became a major source of the southern and western antebellum history, also devoted no small portion of spaces to the topic of the interregional trade of agricultural products. Bruchey's(1967) collection of contemporary readings on cotton and the growth of the American economy and Callender's(1909) on economic history contain some discussions of interregional relations. One thing that this scholarship shares is that the Midwest-South transaction of foodstuffs was not a myth but a reality. Christy(1856), for example, wrote about the 'tripartite alliance' by which the western farmer, the southern planter, and the English manufacturer became united in bonds of common interests. Even a House of Representatives Report of 1881 by Nimmo took the trade of agricultural product between the South and Midwest for granted.

In academic circles, the basic idea of three interlocking trade blocks was first formulated by business historian G.S. Callender. Investigation of the Mississippi River transportation system led him to lay primary emphasis on the movement of western foodstuffs. Then Schmidt(1939) wrote "Internal Commerce and the Development of National Economy before 1860," in which he pointed out that the absence of markets for western products was resolved by the extension of cotton into the Southwest. Later, Genovese(1962; 1965) elaborates on the traditional view of southern plantation as a major market to sustain western agricultural development. Interestingly, the inferior quality of southern hogs is presented by him as supporting evidence. From somewhat different perspective yet with similar results, Fogel(1965) suggests that a sizable share of western products were shipped to the South via the North Atlantic port cities of New York, Philadelphia, and Baltimore. These stories have been cited, adopted, developed and integrated into the North model.

There has also been evidence to the contrary. Many scholars contend that the cotton South was self-sufficient in foodstuffs. The earliest revision to North's interpretation came from Easterlin's(1962) critique. He points out two important things. First, the major food deficit area was the industrializing East, not the South. Second, southern plantations were usually self-sufficient at the least in pork and

corn. The causal monism of the North model became the main target of Bruchey's(1964) criticism, as well. He asserts that North overemphasized the strategic role of cotton as the vehicle of growth. He further insists that the importance of income from cotton in maintaining interregional specialization and division of labor before the mid-forties was lower than claimed. Specifically, Bruchey disagrees with the idea that significant capital was lost in the South as payments for foodstuffs exported to the region.

The previous speculative comments and arguments in response to the North model gathered momentum with Fishlow's(1964) experiment with a much more rigorous fact-finding analysis. After compiling the statistics concerning receipts and re-export of Midwest-originated foodstuffs in New Orleans, he confirms that the trade between the Midwest and South was always of limited importance to both regions. He infers that as early as 1839 the volume of western products shipped directly eastward was greater than those re-exported via the Crescent City. After 1849 this latter trade dwindled rapidly and became insignificant by 1860. Gallman(1970), an authority in the estimation of agricultural production during the 19th century, rigorously calculates the amount of meat output and the demand for the meat based on the data drawn from census schedules and contemporary literature. From the calculation, Gallman concludes that self-sufficiency was a logical economic strategy in most areas of the South because of the complementarity in labor requirements for cotton and corn, and the relative cheapness of land.

In the similar but slightly different context, Hutchison and Williamson(1971) estimate the conversion ratio from feed to attainable weight of meat and then, by subtracting human consumption requirements, they determine food-deficit and food-surplus areas. The results provided strong support for southern self-sufficiency. They insist that the southern planter-farmer was far from the single staple crop agriculturist, as some scholars presume. However, they acknowledge that New Orleans was exceptionally supplied by foodstuffs from the Midwest. Since there were few cotton-specializing farms or plantations in 1850s and probably in the earlier period, Gallman's and Hutchinson and Williamson's calculations and other subsequent results seem incontestable. As Wright and Kunreuther(1975, 529) understand, many farmers grew only small amounts of cotton as a surplus land crop, devoting most of their acreage to generating food for household consumption. They describe this pattern of behavior as a safety-first mentality. Farmers insulated themselves from market fluctuations, ensuring that their families did not fall below tolerable levels of subsistence. This mode of behavior, as the authors pointed out, was a standard of wise practice for 19th-century farmers.

In connection with this issue, Lindstrom's(1978) so-called 'Eastern demand model' is of great relevance. This model holds that the antebellum American economy was too complex and diversified to be rationalized by a single model like North's. She thinks it was the growing demand for eastern goods within the East itself which led to the overall success of the regional economy. In her model, the interdependence between hinterlands and major metropolitan cities is emphasized. Turning to the South, Lindstrom(1970) tests the assumption that the cotton-producing population normally cultivated enough grain to meet its needs. She understands that it was the case, especially, in the Upper South which consists of a rich grain belt. This region, although devoting considerable attention to the production of southern staples, in fact produced grain far beyond its own needs. The Middle South partly because of inadequate transportation facilities maintained output at a level assuring self-sufficiency in normal crop years. Equally, the people living in the Lower South provided only a limited market for the flour and corn of the Midwest. In the meantime, contributions from geographers to the general argument

was successfully made by Hilliard(1972), who emphasizes the role of the dietary mainstays of corn and pork in securing food self-sufficiency. He suggests that other local sources of food such as beef, mutton, poultry, egg, games, honey, fish, seafood, vegetables, and fruit proved more than enough to meet nutritional requirements of the population. Hilliard's *Hog Meat and Hoecake* addressing post-1840 southern food self-sufficiency debate has remained a classic reference.

The two contrasting interpretations - dependence versus self-sufficiency - have dominated the debate until recently, when an alternative theory is proposed. That is a model which argues for the Southerner's dependence on the western agricultural products prior to 1840. Mercer(1982), for instance, insists that pork as a corn derivative was certainly the major export to the South. He observes that a Midwest-South pork trade did exist in 1840 and probably earlier, and that such a trade would certainly play a positive role in western economic growth. However, his argument seems impressionistic in that it is based solely on the similarity of waterway location between pork-specialization and pork-deficit areas of the Midwest and the South.

The most insightful revision, however, has been made in a series of articles by Earle(1992a; 1992b; 1993a; 1993b). For him, the period between the late 1830s and the early 1840s is quite important in the context of frontier closure and geohistorical depression within the rhythmic alternation of long-waves of American macrohistory. During the period, he argues, Americans redirected their energies from frontier expansion to the elaboration of maturing regional economic systems in spaces previously settled. It was also around this time that cotton planters introduced a crop rotation system which incorporated cotton, corn, and cowpeas. This system worked effectively, enabling both the maintenance of soil fertility and household subsistence through reliable supplies of corn and pork. It also guaranteed profits comparable to the cotton monoculture system to which it could be compared. Ensuring self-sufficiency in the cotton belt, crop rotation blunted demand for food staple provisions from the Midwest and the Upper South. Earle gives partial support to North's thesis in that he recognizes the pre-1840 dependence of the South on the Midwest for at least some foodstuffs. Earle's rationale will be elaborated later with new evidence I found in various sources. Before touching on that, let us briefly look at what happened on the Mississippi River.

3. Interregional Trade and Changing Trajectory

Prior to 1840, the Mississippi River was crowded with boats carrying western products. Floating up and down the water highway, the fleets fed the Southerners with western meats and grains. These inland transactions proceeded in tandem with the expansion of the settlement of the Mississippi Valley. The population of the valley was estimated in 1800 to be 482,772 persons, having increased about one and a half per cent per annum since 1790. By 1810 it increased to slightly over one million persons. In 1820, it doubled yet again to be 2.2 million persons. The population counted 3.6 millions in 1830 and increased to 5.3 millions in 1840, or ten persons to the square mile(DeBow, 1853, 1).

The Mississippi River, along with small and large tributaries, drains the expansive territory west to the Appalachian Mountains, laden with the abundant agricultural products on it. The Missouri River, the principal branch of the Mississippi, has few substantial obstructions for the navigation, with the exception of Great Falls at 2,575 miles from the confluence with the Mississippi. The Ohio River, another important artery, is joined by the Allegheny and Monongahela rivers at Pittsburgh and has a much more rapid current. Navigation was frequently interrupted at low water by chains of rock on the bed. There are about hundred islands between the

mouth and Pittsburgh in addition to a great number of sandbars. The principal tributaries of the Ohio include the Wabash, Cumberland, and Tennessee, of which the last is the largest(Fig. 2).

The level of the Ohio River fluctuates significantly according to seasonal changes of precipitation. In the summer and autumn, it often dwindles to a small stream, affording limited facilities for navigation. The lowest water is generally in the months of July, August, and September. The melting of the snows in the spring and heavy rains in late fall or winter fill the river to overflowing. As waters rise, trade and navigation became activated. There were no remarkable waterfalls in the river besides the ones near Louisville. Even over these, boats passed in high water and a canal helped to circumscribe the barrier.

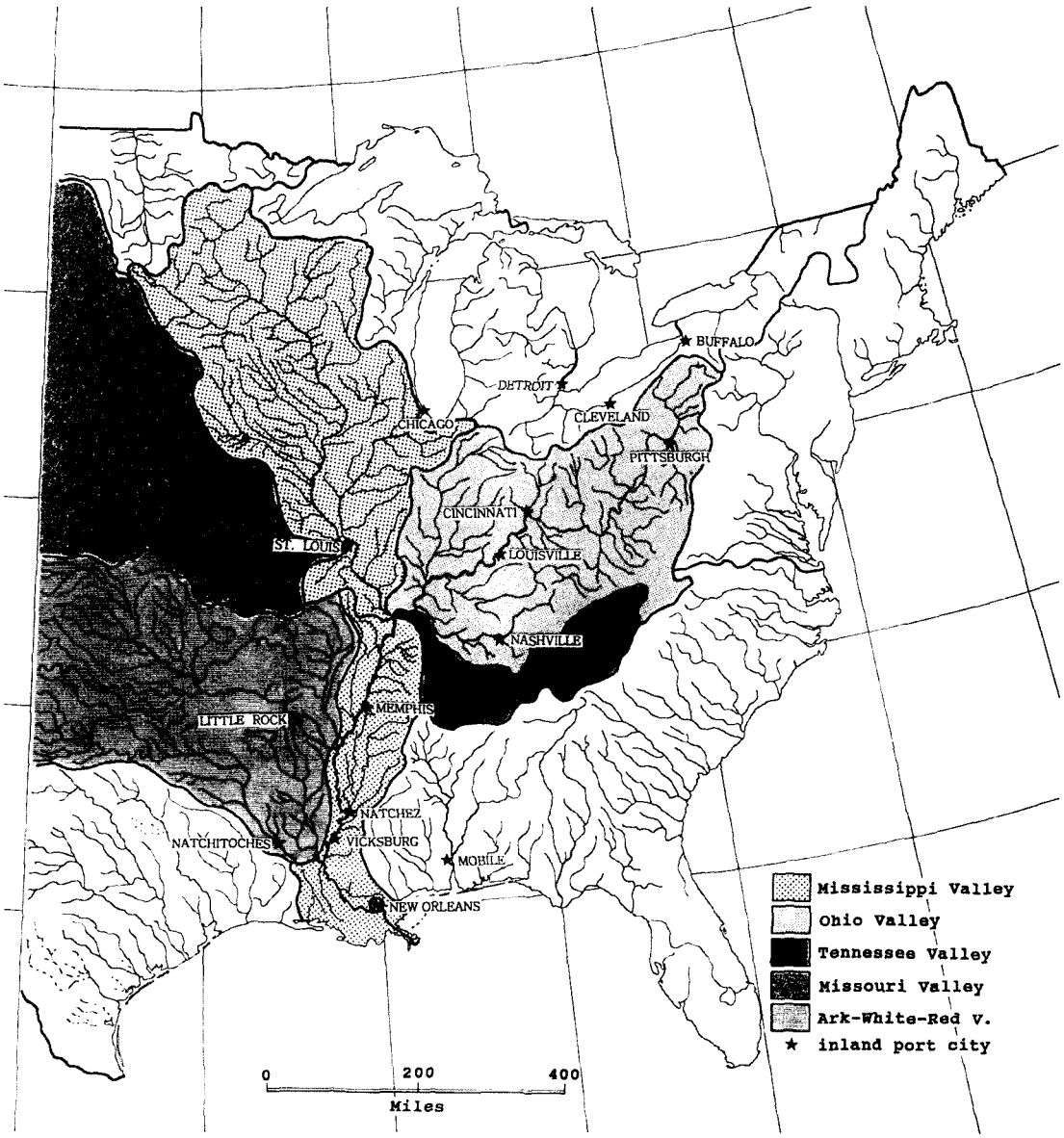

Fig. 2. The Great Mississippi Valley

The free and uninterrupted navigation of these great inland waters was a matter of prime interest to the country. The mouths of the Mississippi, however, were undergoing incessant changes with the sacrifice of coastal and international trade. Old channels were filling up and new ones forming(DeBow, 1853, 11).

After the War of 1812, the American economy found its momentum in the Mississippi Valley. One Southerner said, "we build up the West in purchasing its hemp and its staples and the North in consuming its wheat and its fruits"(*Debow's Review*, 1846, 1(2), 164). Supporting evidence is everywhere: plantation records, traveler's account, daily newspapers, and record of port entries. These materials suggest that the growth of the Midwest in the first half of the 19th century was driven partly by the Southern markets. When it comes to inland commerce, the core was the gateway town of New Orleans. The other important nodal points included Pittsburgh, Cincinnati, Louisville, St. Louis, Nashville, Memphis, Vicksburg, Natchez, and Natchitoches.

Nine-tenths of the trade in the Mississippi Valley was carried out by flatboats, barges and pirogues. Additionally, incipient steam vessels shuttled upstream with a relatively slow speed of sixty miles a day on average, with upward loading consisting of dry goods, pottery, cotton, sugar, wines, liquors and salted fish, as well as passengers. Downriver shipments featured grain, flour, tobacco and bacon. As of 1839, the price of passage on the Mississippi and Ohio Rivers was about three dollars per hundred miles for long distance, and four to five cents per mile for short distances. Deck passengers paid one dollar per hundred miles. The usual speed of the boats were six miles an hour up stream, and from ten to twelve down(*Hunt's Merchants' Megazine*, 1839, 1(3), 282).

The Falls of the Ohio at Louisville provided the city with substantial commercial opportunities. The barrier of water transportation resulted in stoppage of commodities at transshipment sites in their movement past the city. The locational advantage built up the city as a distributing center(Nimmo, 1881, 128). Pork packing and processing was by far the most important in the city's profitable commerce. Cincinnati was just as thriving. The city was the most *hoggish* place in all the Midwest, becoming known as the 'porkpolis' of the United States(Johnson *et al.*, 1922, 214). Cincinnati was a principal pork-processing center as early as 1823, but its preeminence began to be materialized only after 1833. Around the mid-19th century, Cincinnati boasted ten slaughter houses at the outskirt, each employing about one hundred hands(DeBow, 1853, 375-376).

The mess pork dressed there was provided for the maritime merchants and the Unites States Navy. The prime was packed up for ship use and the southern markets, while the clear pork went out to the cod and mackerel fisheries. Bulk pork - or meat intended for immediate use or smoking - was sent off in flatboats for the lower Mississippi. The great mass, however, was sent into the smokehouses, each of which cured from 175,000 to 500,000 pounds at a time(DeBow, 1853, 378). Here the bacon was kept until shipment, when it was packed in hogsheads containing from 800 to 900 pounds.[1] The bacon besides flowing into the plantations and the urban market of New Orleans was shipped to consumers in the iron manufacturing regions of Pennsylvania, Kentucky, and Ohio; to the fisheries of Pennsylvania, Maryland and Virginia; and to the gulf coast of Mississippi. Large quantities were also directed to the cities of the Atlantic coast. Flatboats slowly worked down river carrying pork and byproducts such as lard oil, candles, soap, grease, glue, potash, and Prussian blue.

Meanwhile the newly opened Southwest began to gain reputation as a secondary center of cotton cultivation. A larger market was thereby created for the grain, pork, flour, provisions, and livestock of the Ohio Valley. In the frontier economy, domestic ani-

mals had special ramifications. Livestock as a main source of protein differ in their biological capacity to convert feed into energy. Pigs are the most efficient converters, beef cattle the least efficient. Swine mature quickly and require little capital. Naturally, hogs became the most effective animal protein source for the frontiersmen(Spedding *et al.*, 1981, 239, 253-255, 303; Grigg, 1995, 14). The pork-packing industry of the Midwest started in 1818, when eastern capital was invested to take advantage of a growing market. Eastern drovers frequently went out to the Midwest for the purpose of making their annual purchases(*American Agriculturist*, 1843, 2(8), 225). As a matter of fact, the urbanized North far outdistanced the South as a market for livestock and grain products. The early market demand before 1840s, however, came primarily from the southern plantations whose slave labor were busy harvesting cotton and cane.[2)]

The analysis of the quality of southern hogs in proportion to the quantity offers another supporting evidence for the Mississippi trade. Traditionally the southern hogs loitered around, feeding itself with acorn, nuts and mast. The quality of southern hogs did not match the better-fed, better-bred and better-housed hogs in the Midwest. According to Genovese(1965), the average weight of mast-fed southern hogs fell far below their counterparts in the Midwest. Thus, the South had to import substantial quantities of hogs and pork. Exceptionally, Tennessee and Kentucky did not need to import western foodstuffs; they were actually major providers of the wrongly named 'western' products of pork, beef, flour, and corn to other southern states.

Alongside hogs, corn constituted another major cereal in the South. Domesticated originally in New Spain, Indian corn or *maize* had become indispensable source of food for the native Indians, the pioneer white, and the African American plantation labors. Corn has wider range of viable habitat compared with wheat or oat. In the early days the grain was imported from the Midwest. Corn arriving in New Orleans was not correctly reported, for much of it was landed out beyond the limits of the local merchants' control. A number of flatboats were "arrested" by plantations on the Mississippi River and its tributaries. The boats found ready and favorable markets before reaching the duty-imposed levee of the Crescent City. New Orleans' demand for corn alone reached 75,000 bushels per month.[3)]

The principal means of transporting foodstuffs were waterway vessels. In most circumstances, agricultural products were unable to bear the high cost of overland transportation. Livestock was better suited than small grains in that they were driven to markets on hoof. However, cattle- or hog-driving accompanied many things to be cared. Waters, in contrast, provided an effective means of moving gross bulk products. Widely employed in the Mississippi River commerce were flatboats, barges, and pirogues, as well as late starter steamboats.[4)]

Embarking in business in the early 1810s, the steamboat came to deal with tons of cargo. The voluminous agricultural products were dispensed among cities including New Orleans, St. Louis, Cincinnati, Pittsburgh, Louisville, and Nashville. As time went on, the freight shipped on the waterways in the Mississippi River Valley increased at a surprising rate, with minor fluctuations over time(Table 1). The kinds of the western products that steamboat customarily transported during the 1830s can be sensed by looking at *Steamer Farmer* which came down from Cincinnati to New Orleans on February 14, 1834. Loads from the steamship included hams, bacon, whiskey, lard, pork, sausage skin, flour, gin, shoulders, cotton, butter, and beef(*The Merchants' Daily News*, February 14, 1834). Outside the commercial zone of New Orleans merchants, immense amount of commodities was exchanged among inland port towns.

The number of flatboats, however, was not diminished by the introduction of the steamboat. The boat remained, as it did, a simple and cheap mode of transportation, and thus widely used even after the

Table 1. Steamboats at New Orleans, 1813-1860

year	steamboats	growth rate	freight	growth rate	value	growth rate
1814-15	40		77,220 tons			
1819-20	198	79.8%	106,706	27.6%	$12,637,079	
1824-25	502	60.6	176,420	39.5	19,044,640	33.6%
1829-30	989	49.2	260,900	32.4	22,065,518	13.7
1834-35	1,005	1.6	399,900	34.8	37,566,842	41.3
1839-40	1,573	36.1	537,400	25.6	49,763,825	24.5
1844-45	2,530	37.8	868,000	38.1	57,199,122	13.0
1849-50	2,784	9.1	886,000	2.0	96,897,873	41.0
1854-55	2,763	-0.8	1,247,200	29.0	117,106,823	17.3
1859-60	3,566	22.5	2,187,560	43.0	185,211,254	36.8

Source: G.S. Callender, 1909, *Selections from the Economic History of the US*, 315.

advent of steamboat era. The states of Kentucky, Indiana, Illinois, Missouri, Arkansas, and the Republic of Texas annually sent more than 20,000 heads of horned cattle on flatboats to New Orleans. The chicken trade was also profitable and greater in volume. *Merchants' Daily News* reported on April 21, 1834 that a flatboat came down from Louisville laden with 3,000 heads of chickens and turkeys. Although navigational hazards constantly endangered the relatively less mobile flatboats and, indeed, less than two-thirds freighted in the up-country never reached New Orleans due to accidents(*DeBow's Review*, 1846, 1(1), 48), they were without doubt convenient and economic means of river transportation. The flatboats and flatboat men were principal agents of the lively commercial activities on the Mississippi River.[5] The life on the Mississippi River dotted with flatboats, steamboats and other minor vehicles devoted to the inland commerce was so vibrant that DeBow(1853, 138) added a eulogy for the gateway entrepot of New Orleans, saying "There is no twilight at the 30th degree north latitude."

Moving through space requires expenditures of time, capital, and effort. Frictions of distance are implicit or explicit determinants of human spatial behavior(Abler, 1971, 1). The friction can, however, be overcome by the development of efficient transportation systems. In the 19th-century America, transportation advances came with the steam engine, the canal and the railroad. These all increased the accessibility to the Midwest. As a geographical term, accessibility means a measure of the ease with which transfer occurs between the places and areas of a system. The demand for accessibility, then, is a quest to decrease the transport effort or to augment locational utility. The time-space convergence from transportation innovation has ramification on spatial economy, leading to centralization or specialization(Jannell, 1969, 351). The American Midwest was the typical case which attained specialization in crops and livestock by virtue of technological shifts in transportation.

The development of transportation and communications in the 1840s had implications on two broad fronts. Above all, sectionalism which set the East and Midwest alliance in opposition to the South started to be consolidated. Next, on the economic side, interregional trade changed direction from Midwest to South to Midwest to East. To begin with, a dense network of canals intermingling with navigable waterways gave birth to the Great Lakes trade. The editor of *DeBow's Review* at New Orleans, sensing the imminent threat to the southern port city, reminded the Southerners of the encroaching eastern power through the chain of northern lakes:

"It is common enough for us at the South and Midwest to dwell enthusiasm upon the growing greatness of the Mississippi trade, and speculate upon the possibility of its almost indefinite extension. We forget that for inland commerce the Mississippi has at least one rival, and that the position occupied by the great Father of Rivers, in relation to the wide western domain, is precisely that which the continuous chain of lakes on the northern frontier occupies in relation to the greatly important country bordering upon them. Connecting the different lakes with the city of New York, a system of works has been constructed and is in progress, which, taken together, are valued at nearly fifty millions of dollars"(*DeBow's Review*, 1846, 1(2), 159).

The water highway of the chain of lakes is linked to the East. Lake Erie, by far the most important among the five, is the only one in which there is any perceptible current. This current and the prevailing westerly winds worked against its utility for transport. Moreover, the shallowness of the water - 100 to 270 feet in depth - renders it more easily affected by frost, its navigation being generally obstructed by ice for some weeks every spring. However, Lake Erie is open and unimpeded almost throughout the year. Lake Erie is connected via the Erie Canal with the Hudson River and then to the Atlantic Ocean, via the Ohio Canal with the Ohio River and to the Gulf of Mexico. It was reported in 1840 that sixty steamboats and many sailing vessels such as ships, birgs, schooners, barques and sloops were employed in the trade(*Hunt's Merchants' Magazine*, 2(June 1840), 525). The shore of the great western lakes boasted numerous settlements, inhabited by populations actively engaged in commercial pursuits. The principal towns on the lake include Buffalo, Dunkirk, Ashtabula, Erie, Cleveland, Sandusky, Portland, and Detroit(*Hunt's Merchants' Magazine*, 1840, 3(3), 219).

In terms of the number of inhabitants and the extent of commercial transactions, Buffalo was the largest town on the Great Lakes, being in fact the 'New York of the western regions.' The town of Buffalo, located at the eastern corner of Lake Erie, reported in 1840 a population of about 16,000 persons. During the navigation season when lakes were generally open and unimpeded by ice, forty to fifty steamboats varying from 200 to 700 register tons were constantly plying between Buffalo and the several ports on more distant shores of the lakes(*Hunt's Merchants' Magazine*, 1840, 3(3), 220). As is evidenced, the Erie Canal, which was the earliest and perhaps the most important public work in US history, had great effect in the trade with the East.

The advent of railroads made significant impacts on the cost of carrying goods and passengers, the size of market and the productivity. Lower transport charges were linked to greater productive efficiency and a net gain to the economy. This constituted the direct benefits or what Fishlow(1965) called 'social saving of the innovation.' Advantages and savings attributable to the new mode of transportation include increased speed, freedom from seasonality, small risks, direct routing, labor savings, low insurance rates, and enhanced safety. With the railroad, two things occurred at the same time. The railroad, on the one hand, contributed to the expansion of agricultural hinterlands and market centers. Driven by the railroad, the highest market demand occurred in the Atlantic metropolitan markets. The newly opened eastern market, in turn, was a great impetus for the expansion of the western agricultural backcountry. The wholesale commodity prices of corn and flour, for example, were higher in the New York market than those of New Orleans. Even the differential in the price of pork, a southern dietary mainstay, between the two cities remained a minimal level(Cole 1938). In this way, the eastern demand became a major source of real incomes for western farmers, facilitating the process of specialization in western agriculture.

Comparison with other transportation systems highlights the superiority of rail. Vessels moving from port to port in the interior were liable to be locked up by ice; even when navigation was free, further, watercrafts were dependent upon the capricious changes of the wind and currents. Sand bars

on the bed, rocks, falls and rapids, as well as changes of the channel caused tremendous problems to both traditional vessels and steamboats. Accidents from the overheating of steam engines were not a rare case. Occasional heavy rain, stormy weathers and droughts in addition caused troubles to watercrafts and river-port trade.[6] Flatboats suffered from sinking or swamping, resulting in a full or partial loss of cargo. Overland transportation flowed just as slowly under abnormal weather conditions.

Initiation of the railway system representing rapid, cheap, convenient, certain and safe lines of transportation was a kind of innovation destined to radically transform the spatial economy. The contingencies of climate, wind, cold, or rains did make little effects. New transportation systems powered by the steam engine enabled the western agriculturists to ship their products to markets in the distance. Actually, the competition and rivalry among Boston, New York, Baltimore and Philadelphia to reach interior was a critical factor for the development of the Midwest(*Hunt's Merchants' Magazine*, 1840, 3(4), 278). The new age coming with the railroad was once called in somewhat monarchical term 'industrial feudalism.'

In the interior of the western territory, rail lines extended to the border of the lakes, interlocking with numerous canals and navigable rivers and streams. From the banks of these lakes and rivers, direct lines ran eastward to the principal cities. The railways linked the western breadbasket with the prominent eastern markets, thus furnishing to the whole country a more fluid and accessible systems of commercial arteries than have ever existed previously. The improvement of these internal routes were assisted in large part by Federal and State governments in the forms of land grants, right of way land sales and financial aid.

Lower transport costs in association with greater commercialization led to diversification. As transportation costs fell, locational constraints on crop profitability shifted so that the new rail system became an important element in crop choice. The situation invokes Gregson's(1996) endowment-contingent model which assumes that farmers owning land of diverse soils profitably exploit this diversity when transportation costs fall or when demand for farm produce increases. The Upper South including relatively heterogeneous environments such as the *piedmont*, or intermontane valleys of Tennessee and Kentucky, must have been in a better position to achieve diversification than the Lower South.

Changes in transportation vitally affected the future of southern market centers. Take New Orleans for instance. The city as a center of distribution or re-export began to lose its grip on the entire Mississippi Valley. Even though New Orleans was not built upon the foundations of sand as Nimmo(1881, 172) insisted, the Crescent City at the 30th degree north latitude was watching itself fade to the twilight.

4. Scientific Agriculture and the Macro-Geohistorical Implications

Hog Meat and Hoecake(1972) has been the most influential work on the southern food self-sufficiency debate. Sam Hilliard, the author of the classic, challenged North's core argument and convincingly asserted that "within the system of cotton production, the growing of food crops was often an ancillary business, but absolutely prerequisite to the proper functioning of the cotton-producing system." To him, viewing the South as being either self-sufficient or dependent upon the Midwest for food seemed too simplistic. Hilliard instead argued that within the South a number of agricultural regions existed with each solving its problem of food supply predicated on its situation and resources. The geographical revision of the North model suggested by Hilliard is that the South as a region was largely feeding itself.

To visualize the regional differences in the South's

major food sources of swine and corn, I collect statistics from census to produce several maps presented here. From the maps, it becomes clear that the South prevailed the other two regions in terms of both total and per capita swine production(Fig. 3). Even in 1840, the South had 14,451(55%) out of a total of 26,298 heads of swine. Of note is that the Cumberland states of Kentucky and Tennessee and piedmont states accounted for a large share. When it comes to corn production, the South once again surpassed the Midwest in three consecutive decennial censuses from 1840 to 1860. As early as the 1840s, the South produced 224,740 bushels(59.5%) of corn in contrast to the Midwest's 105,853 bushels and the East's 46,899 bushels(Fig. 4). Although Ohio, Indiana, Illinois and Missouri had uncontestable superiority at the state level, the South on the whole showed a high level of subsistence. Overall, the American South displayed the capability to produce enough foodstuffs. However, it was, as we shall soon see, only after the injection of diversification regime into the ecological disaster that the South could achieve this remarkable level of self-sufficiency.

Productive land is characterized by the elements of life placed by nature in the thin mantle of soil. Soils vary considerably in their characteristics of structure, depth, texture, nutrient and acidity, and this affects both the range of crops that can be grown and the level of crop yields which can be reached(Grigg 1995, 40). The American South had for a long time specialized in cotton, maintaining so complete a monoculture. B. Wailes, president of the Association of Southern Cultivators, commented in 1843 that "for a long period there has been no process more generally adopted and uniformly followed than that pursued to cultivate the greatest possible quantity of land in cotton to a given force"(*Southern Cultivator*, 1843, 1(2), 92).

A revisionist economic historian Temin(1967), while looking into the cause of 1840s rising cotton price, challenged North's line of reasoning that the several short-lived rises in cotton price in the antebellum era were due to a periodic exhaustion of cotton-growing capacity. Temin instead maintained that there was no evidence of the exhaustion of cotton-growing capacity in the antebellum period, much less of a periodic exhaustion. The primary cause of the rise in the price of cotton was, in his judgment, the rise in demand in Britain. Yet, soil erosion was already a section-wide problem in the 1840s and increased in severity over time. Contemporaries were aware of the decreasing return from the cotton monoculture which continued to exhaust the South. Figure 5 shows that average cotton price reached the highest in the 1810s. During the boom, planters rushed to cultivate the cash crop to the detriment of soils, and overproduction was led to the fall of cotton prices in the late 1820s and early 1830s. The short interim of higher prices in the mid-1830s helped to alert the exhaustion of soils.

The American South was subject to the threat of intense rainstorm(Trimble, 1985, 17). Still worse, southern agricultural practices in the past were far less sound than those of the North. In the Northeastern region under a diversified agricultural system, several crops were rotated and animal waste added. Plantation monoculture system, however, was unable to evade the encroaching vicious effects of soil erosion. In the Old South, the exhausted land was abandoned rather than ameliorated. Put differently, the system of 'land rotation' was preferred to crop rotation. Crop rotations employed, if any, were primitive to say the least.[7] The cultivation of cotton at the expense of self-sufficiency was risky because it incorporated not only the uncertainties of cotton yields and prices, but also food prices as well. The environmental havoc of monoculture was most harmful to the southern system as a whole. Spreading soil impoverishment did not go unnoticed. Frederick Olmsted who traveled the southern backcountries recorded in 1861 signs of the soil exhaustion in *The Cotton Kingdom*.[8]

The problems associated with cotton cultivation lay in the simple fact that production of the cash

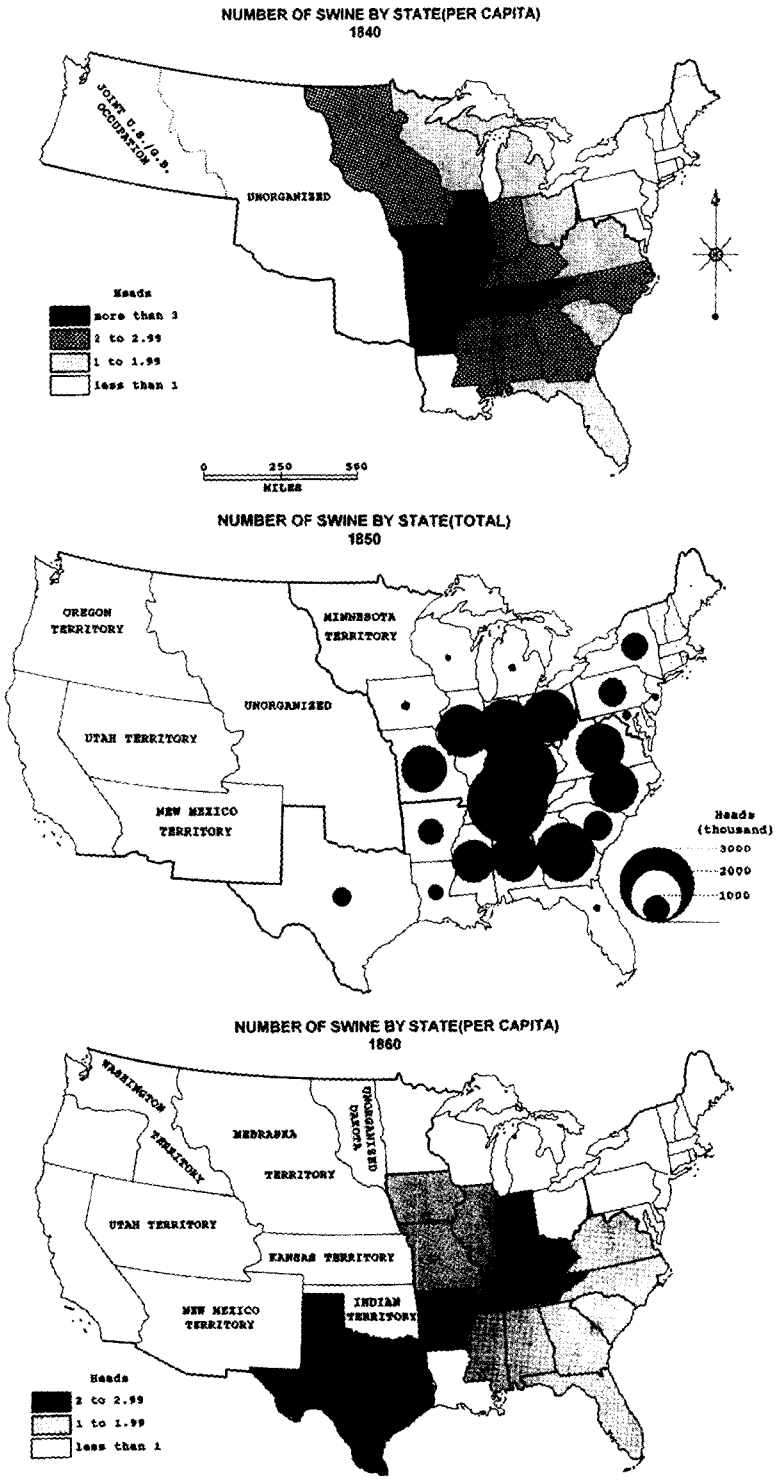

Fig. 3. The Swine Production

Source: U.S. Census of 1840, 1850, and 1860

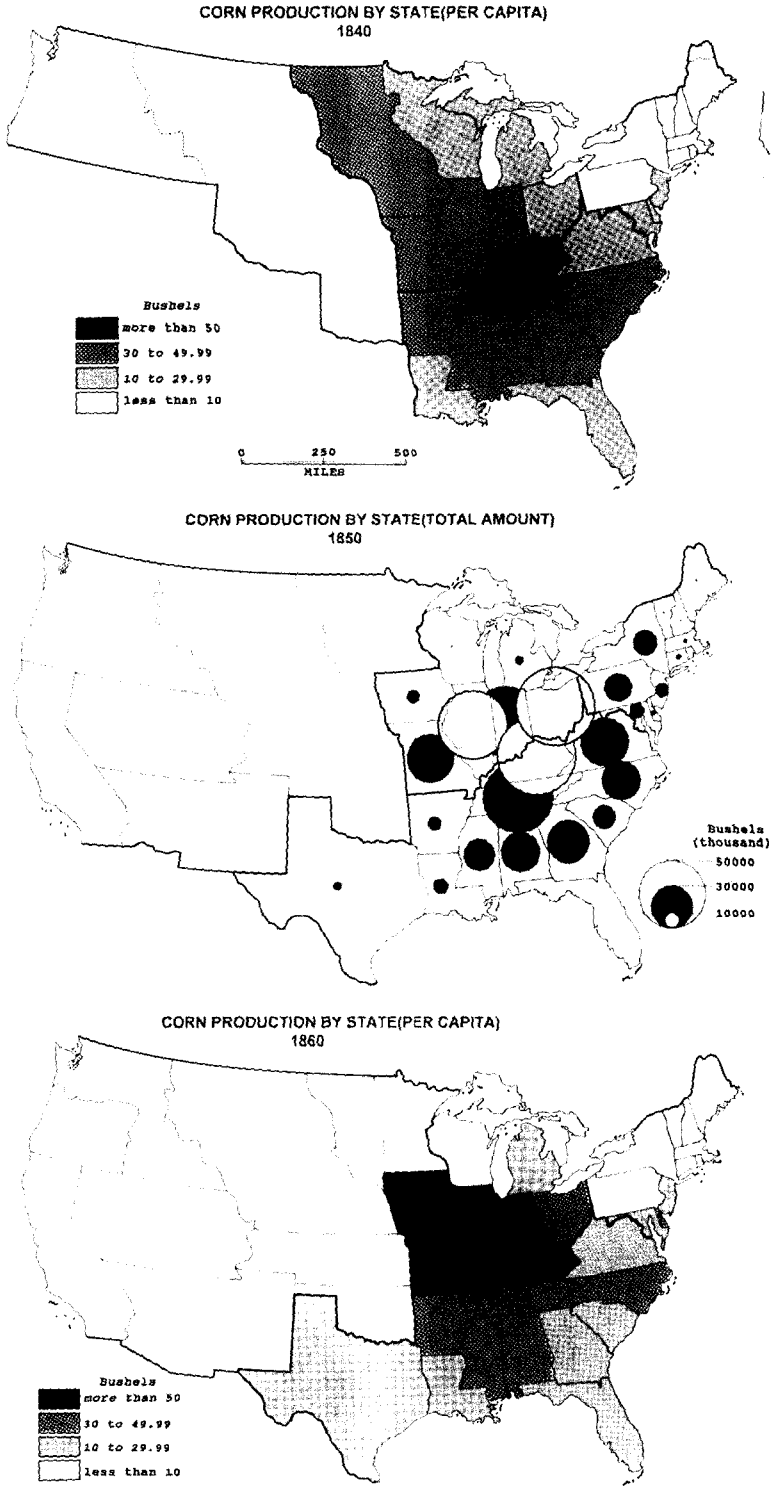

Fig. 4. The Corn Production

Source: U.S. Census of 1840, 1850, and 1860

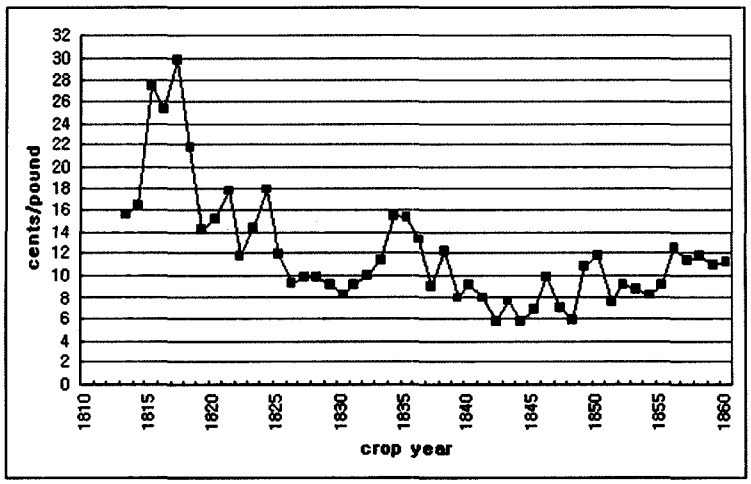

Fig. 5. Weighted Average Cotton Price at New Orleans, 1813-1860

Source: *DeBow's Review*, various years.

crop was hard to resist. Briefly put, cotton was the chief source of wealth. A. Dillard hit the point when he said that cotton was the 'life and soul' of commerce and the destination of nations and that the prurient itching of many farmers to be rich blinded them to the ruinous effects of their careless mode of cultivation, leaving them neither inclination nor leisure to restore their worn-out lands(*Southern Cultivator*, 1852, 10(7), 201). As such, the wisdom of monoculture was called into question at various times by many environmentally-leaned contemporaries. An anonymous writer for *DeBow's Review* suggested a more diversified direction be applied to a portion of the capital and labor apportioned to cotton cultivation, but to little effect(*DeBow's Review*, 1846, 1(3), 235). The persistent belief that success in agricultural pursuits depends less on the science and skill of the cultivator than on the number of acres cultivated posed an insurmountable conceptual obstacle. In the mean time, the injudicious flaying system continued, worn out fields, carved out red hills, and gullied steeps were the result. Cheap and plenty farming land available in the Lower South and the Southwestern frontier kept planters from managing their land as a permanent investment, which became a chief reason for land abuse.

Establishing a farmstead in the 1850s, whether carried out on the prairie or in forested areas, in the North or in the South, at the frontier of settlement or in well-settled regions, involved a variety of costs which were definite and inescapable(Danhof, 1941, 319). The sums considered necessary to carry on farming operations were surprisingly large. Mounting pressure on the soil was inevitable in an attempt to recover the capital invested. Slightly noticed and rarely mentioned is the role of financial systems in aggravating soil depletion. As a matter of fact, cotton raising itself was a basis for securing loans. Since the elasticities of demand for both raw cotton and finished cotton goods were extremely low(Wright, 1971, 111), the cotton planters could claim substantial monopoly power in world cotton markets, had they been able to control its output. The advances were acquired from the cotton factors of the port cities of New Orleans, Mobile and Galveston.[9] The peculiar system of obtaining advances in money or farm supplies on cotton in the field stressed the soil. In Seller's(1991) phrase, "history's most revolutionary force, the capital, was wresting the American future from history's most conservative force, the land."

The cotton boom pushed market production

steadily into the southern interior. Cotton hinterlands began to be specialized, taking comparative advantage of producing the extractive staple for the mills within the emerging megalopolis in Atlantic seaboard and also those of the European core. Since credit was the lifeblood of commerce, southern land and soils were exploited under the invincible and invisible regime of capital. Reliance on circumstances beyond local and regional control accompanied risk. The external factor represented by capital operated with sufficient force as to become the overriding determinant(Peget, 1960, 326). Genovese (1965, 87) pointed out that the commercial exploitation required by capitalism made greater demands upon the soil. Daniel Lee, editor of *Southern Cultivator*, was quoted by Genovese as estimating forty per cent of the southern cotton land was exhausted by 1858.

To this economic-*cum*-ecological depression, the response from the part of the dialectical dynamics emerged in the name of what I would call 'scientific agriculture' movement, which involved well-known figures such as Ruffin, Liebig, and many other agrarian scientists serving as editors of agricultural periodicals. Around the turn of the macro-geohistorical regime, various journals started to be initiated featuring generalized designations in their title like planter, cultivator, farmer, and agriculturist. Each region embraced at least one periodical on account of differences in environment. *Southern Planter*, *Albany Cultivator* and *Michigan Farmer* are a few examples. Although there were differences in inaugural date, titles, formats, and regions, the thrust was the same: soil improvement and productivity increase.[10]

Conscious Southerners set out to remedy the malady of soil exhaustion in the region. Tarver of Georgia, for example, succeeded in 1850 in resuscitating some fields which were abandoned by the former owners(Commons, *et al.*, 1910, 132). Yet, physical redress was not the permanent solution for the denuded soil. The land needed 'food' and rest, and it must be other than the naked fallow. The attempt to address the impending problems was made in various ways. Southern agricultural periodicals repeatedly urged the adoption of crop rotations, manuring and scientific plowing. It was emphasized, however, that these regimens should be based solidly on local environmental conditions. Southerners tried to differentiate theirs from that of Northerner's, with good reason.

At the outset, corn was adopted widely. Corn served to fatten the hogs and together with bacon and pork constituted main food sources for the slaves and their masters. On the plantation, the twin crops of corn and cotton were often planted in alternate years, but their rotation possessed little value as a means of preventing the exhaustion of the soil(Hammond, 1897, 452). The early Alabama agriculturist N. Cloud wrote a series of articles about his 'improved system of cultivating cotton.' Incorporating rotation(cotton, corn, small grains, fallow), heavy manuring(litter, muck, marl), skillful plowing, and seed improving, he obtained 5,989 pounds of crops to the acre in 1840. In his system, the manure of stock lots, or what he said the 'gold mines of the planter' played an integral role(*American Agriculturist*, 1843, 1(12), 363; *Southern Cultivator*, 1843, 1(2), 12).

The applications of barnyard manure to the cotton field, however, required considerable labor and care in storage, hauling and application. Growing interest in calcareous fertilizers like marl, lime and other alternatives reflects the difficulty in acquiring sufficient organic manure from the backyard barn. The alternative manure was not easy to obtain, either.[11] To give an example, Peruvian guano created expectations from the part of planters and farmers experimenting with exhausted lands, but the price was so high that even the affluent hesitated to make a definite decision.

For the places remote from towns or sources of manures, the use of organic fertilizer to stabilize soil was a challenging task. Here is the dilemma.

Planters could not annually rob their farms without either supplying manure to the soil or without risking the depletion of soil fertility. At the same time, they had to shift profitable and efficient slave labor for the seemingly secondary and, in the short term, unprofitable work. A proper crop rotation offered a desired alternative. The object of rotation is to give the land rest and refreshment as it is termed. Crops carry back to the soil so much of its materials as they have taken from it. A rotation of crops covers completely the nakedness of the earth, and protects the surface from washing and leaching rains, sustaining the fertility of the soil.

In the new regime the important thing is the proper selection of the crop to be rotated, simply because land varies widely from place to place. Every variation in the combination of soil, slope, climate, and susceptibility to erosion means a variation in the usage and treatment necessary to keep the land permanently productive(Bennett, 1947, 3). In an essay contributed to *Farmers' Register*, J.H. Couper provided what he called principles of a rotation of crops, which is insightful. His main regimen was eight-fold: 1) consulting, in the selection of crops, the climate, soil, market demand and local circumstances, 2) plants possessing a system of broad leaves to be alternated with those having narrow leaves, 3) fibrous rooted to be alternated with tap and tuberous rooted, 4) the recurrence of the same plant on the same field to be removed as far as possible, with their return being so much the longer delayed as they have the longer occupied the soil, 5) plants which require during their growth the operations of stirring and weeding to be alternated with those which do not, 6) the application of manure to be made to the most valuable and exhausting crops, 7) the succession of crops to be so arranged that the work shall follow in easy, regular and economical order, 8) land to be left bare as short a time as possible and be kept covered with plants valuable in themselves or contributing to the increased value of those which are to follow(*Farmers' Register*, 1834, 1(1), 12).

Another southern planter proposed a combination of cotton, corn, wheat, oats and peas. He cultivated cotton and wheat for sale, and corn, oats and cowpeas for the use of his plantation. In his scheme, Peruvian guano was administered for manuring wheat, and the peas plowed in for cotton(*Southern Cultivator*, 1852, 10(9), 268). The wholesale adoption of cowpeas was a great departure from the previous regime - land rotation and successive cultivation. Under monoculture system, acidity increases, the nitrogen-fixing bacteria in the soil are reduced, and so are the soil organisms that improve structure and texture(Grigg, 1995, 42). Continuous cultivation of cotton caused soils to become acid, leading to nutrient deficiency and, in the long run, to soil erosion. Nitrogen is of utmost importance in improving acid impoverished soil(Fig. 6).

There was a sustained attempt to systematize the nutritional mechanism of crop plants. One subtle yet

Fig. 6. Beans on a Louisiana Cotton Plantation

Peas and beans are effective in fixing nitrogen and for this reason have been known as prime soil-renovating crops. Most antebellum Southern planters anxious about the aggravating soil problems and the decreasing returns turned to leguminous crops such as cowpeas, beans and other minor species for resolving the region-wide agrarian problems of monoculture. Leguminous crops including cowpeas were rotated with cotton, corn, and other small grains in the antebellum Southern plantations. The nitrogen-fixing crops were sometimes planted alongside of cotton - a practice which continued during the postbellum period and is still maintained in today's Southern rural areas as is indicated in the cotton plantation on Bayou Boeuf of Rapides Parish in Louisiana(photograph by author).

significant discovery by Liebig(1840) was the mechanism that some plants, especially leguminous ones, absorb a portion of nutrition from atmosphere. This turned out to be critical knowledge with respect to efforts directed at diversification. In the United States, peas, beans and clover constituted some of the crucial leguminous plants. As early as 1842, the *American Agriculturist* noted the experience of one Louisiana planter, Michael Cordy of Bayou Sara. In his case, the land had deteriorated very little even after 30 years of cultivation. For him, the cultivation of the cowpea was the principal means of resuscitating the land(*American Agriculturist*, 1842, 1(9), 283). What clover did for the northern farmers was what the pea did for southern planters. The legumes or clovers could be either plowed under or taken for hay.

According to the supervisor of the Eighth Census of 1860, the 'cow pea' of the South is more closely allied to the bean than to the pea family. It contains a high percentage of nitrogen, and, when ploughed under as manure or consumed on the farm by stock, adds greatly to the fertility of the soil. He called the cowpea the 'great renovating crop' of the southern states. The leguminous crop did not grow well north of Virginia. The southern states raised over 7 million bushels of peas and beans in 1850. In ten years, the crops increased to over 1.1 million bushels. North and South Carolinas, Georgia, Alabama, and Mississippi raised the greatest amount of the crop. It is said that if sown immediately after the harvesting of small grains, cowpea crowds out weeds, shades the land, and opens up the soil(Gray, 1958, 824).

Realizing that a continued succession of cotton would deteriorate soil in any case, a state agriculturist of Tennessee, W. Phillips, reemphasized in 1843 the beneficial effects of rotation, especially that of involving cowpea, and manure for detoxicating poisonous excretions(*Southern Cultivator*, 1843, 1(11), 87). He urged that farmers should make it a primary object to improve the soil. As for him, *good farming* led to 'a steady improvement of soil with the greatest yield.' However, he resigned to be the *best farmer* who would act as a maximizer and rational man to add property value fastest and keep his land and stock in a condition to be sold for prime value. "This[maximizing behavior] has been unfortunately the mode of judging in all our slave holding country," Phillips explained, "which has brought us to the necessity of manuring or rotation, if we would do as well as we have done"(*Southern Cultivator*, 1843, 1(11), 88).

5. Concluding Remarks

The American South was not a homogeneous region that could be explained by a grand narrative. Vidal de la Blache(1911) once identified France's geographical identity with diversity. Equally, the South, even though it is hard to resist the deep-rooted images of cotton and slave, would not be reduced to a simplified stereotype. The South was not the land exclusively owned by planters, slaves, or plain folk. As Jackson Main suggested, the southern society as a whole has been characterized by intra-regional diversity. The purpose of this paper was to reconsider Douglass North's thesis from a macro-geohistorical perspective. As has become clear around this time, if socially diversified and geographically heterogeneous southern characters have been muted amid racial clamor and staple-crop stereotype, the dynamic southern history has been draped with the logic of southern backwardness and its dependence on the Midwest for its dietary requirement.

Macro-geohistorical perspectives deconstruct this mystified southern imagery. Based on Earle's paradigm, I lay the American South on the dialectically alternating waves, or agrarian regimes. The shift of the cycle was driven by geohistorical and economic depressions, and the bust was represented by soil exhaustion around the late 1830s and early 1840s. Before and after this dividing line, two regimes of

specialization and diversification changed hands. Prior to the period, the Midwest served as the major provider of foodstuffs to the South which was engrossed in cotton monoculture. In the interregional trade through the corridor of Mississippi River, the role of flatboats, barges, and other humble water vehicles was indispensable. Seasonal changes in water level, sandbars on the riverbeds, falls, and cheaper cost provided those boats and steamers with an unwavering market niche.

Transportation innovation materialized by the Erie Canal and railroads opened the wide-range of western hinterlands to the eastern markets. During the dynamic period of the 1840s, the major commercial center of New Orleans was downgraded to merely a re-export center of the western agricultural products destined for the eastern and international markets. Around that time, the main food-deficit area was not the South, but the East was. The southern plantations were no longer the major markets for the western meat, corn and flour. The Upper South seems to have twisted the picture in that the main products of the states of Kentucky and Tennessee which included corn, pork and flour were customarily named, wrongly, as 'western' products in contemporary local newspapers. That said, the extent of the Midwest-South trade was certain to be limited. The prime carriers of the western product to the eastern market were railroads on the land and steamboats plying back and forth through the Great Lakes and Erie Canal. Along with this advance in transportation, the urban rivalry driven by industrialization and urbanization in the Atlantic market centers helped to push the frontier of the western hinterland further west. Owing to the internal improvements, the dense networks of canal, overland routes and railroads were resulted and the demand for western agricultural products increased in proportion.

That the South was no longer the major consumer of western products in the late 1830s is attributable to the introduction of a new agrarian regime of diversification. The main argument for the emergence of the diversification was made from an ecological point of view, associating it with cotton monoculture and ensuing soil erosion. On the cotton price curve, it is estimated that the crisis of low prices in the late 1820s and early 1830s was the reflection of misuse of soils and overproduction. Then followed the decreasing soil fertility. As it turned out, this ecological bust invited increasing concerns for the abuse of the earth and foretold the seeking for the solution for the problem. Diversification was one of the most practical alternatives. The new regime of diversification from 1830s to 1870s was driven by the scientific agriculture movement. In this campaign, environmentally-oriented farmers and planters experimented with new agricultural systems and spread useful information by way of agricultural periodicals.

Improved farm management, scientific tillage, seed hybridization, manuring, and crop rotation, among others, were given special emphasis. The sustainable agrarian system of crop rotations were the key element in the diversification regime. Especially, the employment of nitrogen-fixing cowpeas and other small grains which were planted between the cultivation of the exploitative cotton and the corn proved effective. Now, the South did not need to rely on wholesale imports of foodstuffs from the Midwest. Hog meat and hoecake were sufficiently provided internally; income from cotton remained stable or increased by virtue of efforts at improving soil fertility; and, more importantly, Southerners learned the precious wisdom of soil conservation via cowpeas.

Notes

1) From the following description we can sense the importance of the pork packing industry of Cincinnati both to the citizen and to the countrymen: "The hauling of hogs from the slaughterhouses to the packers, is itself a large business, employing full 50 of the largest class of

wagons, each loading from 60 to 110 hogs at a load··· There are perhaps 1500 coopers engaged in and outside of the city, making lard kegs, pork barrels, and bacon hogsheads··· Then there is another large body of hands··· engaged getting out staves and heading, and cutting hoop-poles, for the same business. Lard is also packed to a great extent, for export in tin cases or boxes, the making of which furnished extensive occupation to the tin-plate workers. If we take into view that the slaughtering, the wagoning, the pork-house labor, the rendering grease and lard oil, the stearine and soap factories, bristle dressing, and other kindred employments, supply abundant occupation to men whose works cease on the approach of winter, we can readily appreciate the importance of a business"(DeBow 1853, 376, 378-379).

2) Lewis Thompson at a Louisiana plantation raised the cash crops, corn, oats, sweet potatoes, peas, pumpkins, and other vegetables in sufficient quantities to supply the plantation needs. For meat, however, the plantation was dependent chiefly upon the outside and annual purchases of one hundred or more barrels of mess pork. Thompson's New Orleans factor purchased pork, flour, lime, brick, nails, wagons, hoop poles, and barrels for him(Sitterson, 1949).
3) By reference to the arrivals out of departures for New Orleans, flatboats count 341 out of 387 in 1843, 278 of 306 in 1844, and 842 of 976 in 1845(*DeBow's Review*, 1846, 1(6), 489, 494).
4) DeBow(1853, 137) provided us with a graphic description of the flatboats: "Hundreds of long, narrow, black, dirty-looking, crocodile-like rafts lie sluggishly, without moorings, upon the soft batture and pour out their contents upon the quay··· These rafts or flat-boats, as they are technically called, are covered with a raised work of scantling, giving them the appearance of long, narrow cabins, built for the purpose of habitation, but designed to protect from the weather a cargo often of the value of from three to fifteen thousand dollars. They are guided by an oar at the stern, aided with an occasional dip of two huge pieces of timber, which move on either side like fins, and float with the stream at the rate of three miles the hour. Such was the carriage of the products of the upcountry twenty years ago!"
5) "Here is a boat stowed with apples, cider, cheese, potatoes, butter, chickens, lard, hay all offered for sale, in the mass or by the lot. Pork, alive, in bulk, in barrels, fresh, salted, smoked, of all sizes and conditional; the corn-fed fatness of Ohio, and the lean acorn-growth of Illinois"(DeBow, 1853, 137).
6) "The Mississippi has fallen rapidly since our last report, and is not 7 feet 6 inches below high water mark··· since Thursday evening, we have been visited with several copious rains··· indeed, business generally appears to be in a languid condition; and··· there is "nothing doing" or··· transactions have degenerated into a kind of retail business, the sales being made chiefly to the ship chandlers and grocers in the city"(*Merchants' Daily News*, New Orleans, June 2, 1834).
7) In Virginia, the primitive rotation was characterized by a successive cultivation. The best land was apportioned to the cultivation of tobacco. If not rich enough for the cash crop, the land was planted in corn two or three years in succession, and afterwards every second year. The intermediate year between the crops of corn, the field was 'rested' under a crop of wheat. If the exhausted soil denied the crop, the field was exposed to close grazing. No manure was applied, except on the tobacco lots(Ruffin, 1852, 36-37).
8) "The native soil of Middle Georgia is a rich argillaceous loam, resting on a firm clay foundation. In some of the richer counties, nearly all the lands have been cut down, and appropriated to tillage; a large maximum of which have been worn out, leaving a desolate picture for the traveler to behold. Decaying tenements, red, old, hills, stripped of their native growth and virgin soil, and washed into deep gullies, with here and there patches of Bermuda grass and stunted pine shrubs, struggling for subsistence on what was once one of the richest soils in America"(Olmsted, 1861, 530).
9) Lewis Thompson, a owner of a Louisiana plantation, for instance, maintained contractual connection with the New Orleans factorage firm of Bogart, Foley, and Avery which purchased supplies for the plantation and marketed its produce. Thompson paid his factor eight percent interests for credit extended him from time to time(Sitterson, 1949).
10) The editorial of the first issue of *Southern Cultivator* captures the point of the contemporary agricultural problems: "In commencing a work of such importance to the cultivators of the soil, we have been influenced by no other motives than to contribute our humble but zealous efforts to the restoration of the exhausted lands of the country, to introduce an enlightened system of agriculture. We have seen and felt the blighting effects upon the interests and independence of southern planters, which have been produced by the too common and fatal system of agriculture almost universally adopted, and it has long been to us a source of deep anxiety"(*Southern Cultivator*, 1843, 1(1), 6).
11) J.H Hammond procured marl from Shell Bluff and boated it 12 miles up the stream to his plantation at Silver

Bluff on Savannah River. It required 11 hands to man the boat. They brought about 1,100 bushels of marl at a load(*Southern Cultivator*, 1843, 1(2), 9).

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