KENTUCKY RESOURCES.

TRANSPORTATION SYSTEMS,

TOGETHER WITH

A REVIEW OF TRANSPORTATION PROBLEMS AND OPPORTUNITIES TO BE DEVELOPED.

PAPERS READ AT THE STATE INDUSTRIAL AND COMMERCIAL CONFERENCE, HELD IN LOUISVILLE, OCTOBER 4th, 1887.

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THE COMMERCIAL AND THE RAILROAD DEVELOPMENT OF KENTUCKY.

By Basil W. Duke.

The subject of this paper, as given me by the committee, was "The Railroad Development of Kentucky, Present and Prospective." I found some difficulty in determining how to treat a subject of that nature. The development of the railroad system and that of other interests (of a material and commercial character)—that is to say, the general development of the State—are so closely connected and interdependent, that it is impossible to consider them altogether apart from each other, and hardly possible to assign definite limits to the consideration of either.

If it were enough to simply enumerate the railroads constructed and operated within the territory of Kentucky, mention the dates of their inauguration, note their present status, define their routes and state their mileage, the task would be a comparatively easy one. But certainly much more than this is required. The railroad development of any community, properly regarded, means something more than is included only in the extension of lines and branches and increase of mileage. Regarded solely in its material, physical aspect, and leaving out of question, altogether, the influence the railroad has exerted as a factor in education and moral civilization, it yet comprehends matter beyond the mere laying down of tracks and provision of equipment. In other words, in this, as in all other subjects of real importance, impulses and consequences, as well as agencies, should be studied and rightly estimated. The investigation of the origin, progress and accomplished extent of railroad construction, necessitates inquiry into the causes which have induced and stimulated such construction, and the reasons which may still further impel it.

The history of such development will be imperfect, unless it can be shown how and to what extent, effect has responded to effort, and results have satisfied the conditions which suggested or demanded that railways be made.

Without commerce, the arts and industries would languish and perhaps perish. Without some systematic means of transportation, commerce, in its modern character and import, would be impossible. The intense and ceaseless competition pervading all the industrial and commercial world, and by which communities are as much affected as individuals, makes the employment of the best and most perfect methods of transportation, very largely, the measure of success; and every community seeks an expression of its commercial necessities and wants in an adequate railway system. The oft repeated assertion that nothing of human institution can remain stationary in any form or condition, may not be, and I believe is not, absolutely true. But, unquestionably, a community may attain a certain stage of material and commercial development, when non-progression is not only relative but actual decadence, because its capital and business will be attracted and absorbed by other communities which do employ improved methods. The effect may be likened to that which would happen in modern warfare, should one nation suddenly discover and use a fire-arm vastly superior to any now known. All other nations would at once be relegated very nearly to the condition of savage peoples whose armies are equipped with bows and spears, and be virtually incapacitated for contest with the possessor of the new weapon. The railway has wholly abolished and taken the place of the old methods of travel and carriage, by land, for great distances. It has made possible travel and traffic which, a century ago, no man could have imagined; has rendered easy and rapid communication between points so remote that only the curious and adventurous traversed the intermediate territory; and has opened to civilization and commerce vast regions which, a generation since, were visited only by the explorer and hunter. At the same time, in facilitating commercial intercourse, it has so quickened industry, so expanded the needs and desires of mankind, and, as a consequence, so immensely increased production and trade, that it has multiplied many fold the traffic

which the water-routes carry, and, for the conduct of local business, stimulated every possible means and form of transportation. Nevertheless, railway construction is not always attempted judiciously, or to the best advantage of all concerned. Lines which are little needed, and render no service commensurate with the cost of their construction, are sometimes built with money which would have sufficed to complete roads that could be operated successfully. It is no easy matter to suggest criteria by which the necessity or benefit of additional railroad service to a territory already provided with it may be determined. Very many considerations must influence the solution of such a question, and the *data* are not always the same in all cases.

In his exceedingly interesting paper, published in October, 1881, entitled the "Standard of Railway Service," Mr. Edward Atkinson has essayed to compute the railway extension that will be necessary within the next twenty years from that date, to meet the demands of the whole country. Assuming, as a standard of comparison, the railway mileage of Massachusetts at "1,950 miles in a territory of 7,800 square miles, or *one linear mile to each four* square miles of territory," and defining this as 100 per cent., he divides, for the purposes of such comparison, the States and Territories into five classes, and estimates the increase of mileage in each, within the period indicated, which their growth in population and general development will probably require. It will be observed that he does not base his comparison upon Massachusetts' ratio of railway mileage to her entire area of 8,315 square miles, for the reason, perhaps, that, to use his own words, "a large part of the State is mountainous or sterile, and does not need railway communication to one-half the extent in which such service will be called for in the near future in many other States." It is to be regretted that Mr. Atkinson, deterred, doubtless, by the magnitude of the subject, and the apprehension that what was meant to be a brief paper might swell into a volume, has merely stated conclusions, with barely a hint of the *data* and reasoning upon which they are predicated. He computes, that by the date of the expiration of these twenty years, there will have been needed and built 117,500 miles of new railroads; basing his cal-

culation upon the rate of construction in the year 1881, and allowing for "at least one commercial crisis and a railway panic," in the two decades. He places Kentucky in class second of this division, which he thinks will require one linear mile of railway to eight square miles of territory. He, therefore, estimates that, in 1900, Kentucky will require 4,710 miles of railroad, as against 1,598 miles in operation in 1881. But this computation is made on the estimate, so long received, of the area of Kentucky as being only a little over 37,000 square miles. Computed on an area of 42,600 square miles, which more recent, and, we have reason to believe, more accurate surveys have assigned her, the railway mileage in Kentucky, according to this formula of Mr. Atkinson's, should be, in the year 1900, 5,325 miles, an increase over the mileage of 1881 of 3,727, and over her present mileage of 3,190; larger, too, than that of Massachusetts in 1881 by 3,375.

There are peculiar reasons, however, why Massachusetts should require an amount of railroad service, in proportion to her territory, much beyond other wealthy and prosperous States; reasons which make all comparison, of the kind attempted, difficult, and may cause the most careful deductions to prove fallacious. Massachusetts has a much larger population, in proportion to extent of territory, than any other State, with the exception of Rhode Island. In 1880 her population, per square mile, was more than double that of New York, and nearly treble that of Pennsylvania. While, notwithstanding the sterility of her soil, nearly every available acre is in cultivation, the great bulk of this population lives in the towns and cities, is engaged in manufacturing, and must be fed with breadstuffs and meats largely drawn from distant sources of supply. I confess to some surprise at the extent of the urban population of Massachusetts, compared with that of the agricultural States, upon an examination of the list of towns and the multitude of their inhabitants, as furnished by the census of 1880. Beside a vast number of villages of a population less than one thousand, Massachusetts counted, then, one hundred and sixty-nine (169) towns with a population of more than one thousand, of which forty-seven (47) had a population of more than five thousand. At the same date Kentucky had forty-

three (43) towns with a population of more than one thousand, of which ten (10) had a population of more than five thousand. The mere distribution of food supply to this manufacturing population, having to be made daily, promptly and regularly, would, of itself, necessitate a railway service more comprehensive than would be required in a State like Kentucky, whose people are fed by the country at their doors. The vast traffic of the manufactories also demands the amplest railway accommodation to furnish the immense quantities of fuel consumed, to bring and distribute the raw material used in the mills, and then to collect and carry away the fabrics. Kentucky will require—does now need—more miles of railway than Massachusetts has or wants; but it is inconceivable that she will ever require as large a railway mileage in proportion to her territory, while it is already apparent, I think, that she will require one greater than Mr. Atkinson computes.

In neither Kentucky nor Massachusetts was railway construction commenced and prosecuted in advance of the complete settlement of the country and occupation of the soil, as has been the case with some of the newer States and Territories. The railroads did not here anticipate population and call into existence the commerce and business they were meant to serve. They were not built here, as in the far west, to carry immigration and give value to lands which, in their absence, were not worth cultivation. The railway lines, now in operation in Kentucky, were constructed in obedience to the demand for more adequate methods of transportation, in lieu of others which failed to meet the increasing traffic which yet grew out of interests on which labor and money had already been expended and business previously existent. Our future railway extension will almost certainly be only in response to similar needs, in aid of properties whose potential values may be well ascertained, and to fully utilize resources which have long been partially at the service of industry and trade.

The past railroad development of Kentucky has been practical and useful, and not at all either experimental or speculative in its character; the future prosperity of the State will depend, in no small degree, upon whether it will continue to be as conservative. I have already called attention

to the difference between the development of a territory of whose population and traffic the railroad is the original and chief instrument, and of one where it is intended to serve the wants of a population already resident and actively engaged in the prosecution of an existent commerce. To understand properly what railway service has already done, and may yet do for this Commonwealth, we ought to consider, to some extent, what were her means of communication and commercial exchange before the era of railways. In this connection it is not less useful than interesting to trace the paths by which immigration first entered Kentucky, and by which her people, in the earlier period of her settlement, held communication with the older communities whence they came. To those who would appreciate a graphic and exhaustive treatment of this certainly very attractive feature of the history of our fathers, I would commend the perusal of a pamphlet of acknowledged accuracy, "The Wilderness Road," by Capt. Thomas Speed, of Louisville, the second in number of the Filson Club publications. For all that I need say on this head, I am quite content and cannot do better than to quote briefly from his narrative.

Speaking of the extraordinary western movement of population—almost entirely directed to Kentucky—which immediately succeeded the Revolutionary war, he says: "Much interest attaches to the ways of travel over which these immigrants came. Through the great wilderness a vast concourse made its way. But the direction, character and features of the roads are but little understood. There is no description in existence showing them as they appeared when alive with western movers. It is only by reference to numerous authorities, many of them rare and difficult to procure, that any account can be obtained. Many interesting facts are found in the almost illegible manuscript of old letters, journals and diaries, and many exist only in traditional form.

"Capt. Imlay, an officer in the Revolutionary war, who wrote from personal observation, and whose book was first published in 1792, gave a brief account of the courses of travel from the East to Kentucky. From him we get a very distinct statemen

of two routes of travel—the one down the Ohio river, the other 'through the great wilderness,' by way of Cumberland Gap.

"He says travelers from the more northerly States passed along a road which ran out from Philadelphia, through the upper and central points of Pennsylvania to Pittsburg, and from thence made their way down the Ohio river. South of this Pennsylvania road another led out from Baltimore, passing Old Town and Cumberland Fort on the Potomac river, and along Braddock's road to Red Stone Old Fort (now Brownsville), on the Monongahela river, sixty miles above its mouth. From that point travelers also made their way to Kentucky by water. This lower road subsequently became the celebrated National Turnpike or Cumberland road, the General Government having improved it and made it a post road, and a great connecting link between the East and West.

"Even as late as 1792, when Imlay wrote, there was no such convenience as a regular business of carrying passengers and their luggage down the Ohio, but at Pittsburg or Old Fort a flat-boat or passenger boat might be obtained, according to the good luck of the traveler. Notwithstanding the obstacles and dangers of the way, much the greater number of immigrants seemed to consider the route through the wilderness—the mountains of Virginia and Cumberland Gap—as preferable. Capt. Speed says of this, the 'Wilderness Road:'

"The distance from Philadelphia to the interior of Kentucky by way of Cumberland Gap was nearly eight hundred miles. The line of travel was through Lancaster, Yorktown and Abbottstown to the Potomac river at Watkins' Ferry; thence through Martinsburg and Winchester, up the Shenandoah Valley through Staunton, and following the great trough through the mountain ranges, it passed over the high ground known as the 'divide;' there it left the waters which 'run toward sunrise,' and reached an important station at the waters of New River, which run to the west. At that point another road, which led out from Richmond through the central parts of Virginia, intersected or rather came into the one just described. Thus were brought together two tides of immigrants. Near the 'forks of the road' stood Fort Chissell, a rude block-house, built in 1758 by Colonel Bird, immediately

after the British and Americans captured Fort Duquesne from the French, and called it Fort Pitt. From Fort Chissell to Cumberland Gap was nearly two hundred miles. The routes of travel marked out at that day are still used. The roads which lead through the Valley of Virginia, commencing at the Potomac, and passing through Martinsburg, Winchester, Staunton, Lexington, Pattonsburg, Amsterdam, Salem, Big Spring, Christiansburg, Ingles' Ferry, Newbern, Mac's Meadows, Wytheville, Marion, Abingdon, are the same which were laid out and traveled in the early days."

The road, or rather "trace," was first marked out by Daniel Boone, and, Capt. Speed justly says, is a "monument to his skill as a practical engineer and surveyor."

"The Legislature of Virginia very early recognized the necessity for a wagon road to Kentucky. In 1779 an act was passed to the effect that, whereas great numbers of people are settling in the country of Kentucky, and great advantages will redound from the free and easy communication with them; commissioners were appointed to explore the country on both sides of the mountains, and trace out the most convenient site for the road.

"But no wagon road was made until many years thereafter. The settlers came in such greatly increasing numbers that, by the year 1790, the population of Kentucky was 73,000, and in 1800 it was 220,000. A very large proportion came over the Wilderness road, and that way, as we have already seen, was the only practicable route for all return travel; yet it was only a track for weary, plodding travelers on foot or horseback, whether man, woman, or child.

"There is a striking difference between routes selected by the pioneers and those selected in later years for railroad construction. The one is the opposite of the other in some respects. The pioneer avoided the water-courses—the civil engineer seeks them. The pioneer went directly across the various streams east and west of the Cumberland range; he crossed the Holston, Clinch, Powell, Cumberland, and Rockcastle; he climbed and descended the mountain ridges which lay between the rivers. The civil engineer, on the contrary, in locating the railroad which connects Virginia and Kentucky,

threaded the rocky defiles of New and Kanawha rivers, and entered the level lands of the State through its northeast corner. The rugged sides of a mountain water-course afford the poorest natural foot-way, and necessitate frequent crossings from side to side. In constructing a railroad, however, these obstacles are removed. The side-cut and the tunnel open a pathway unknown to the pioneer."

This is unquestionably true of what, I may term, the details in the course of any given route; but, as a rule, the railroads, and the ruder tracks which preceded them, have followed the same general direction of travel and communication. In that region, of which Capt. Speed particularly speaks, upon the frontiers of Virginia, where nature seems to have exerted herself to prevent the intrusion of man, there are piled obstacles which not only deterred the pioneer, but, we can readily believe, might have turned even those whom some rough satirist has characterized as "Nat'rally better ingineers than the ingineers themselves, the b'ar, the buffler and the Injun." And the fastnesses which the pioneer dared not penetrate, were not attempted by his immediate successors and descendants. Not so, however, as regards the routes, no matter how arduous or rugged, which the pioneer could and did explore. They were followed by the generation which took his place; at least so soon as there was adequate inducement and any methods of commercial exchange. When the continuous flow of immigration westward had partially populated the territory north of the Ohio and that south of the Tennessee, the Kentuckian began to trade with his neighbors over the same roads by which his fathers had come into the land. He did not, indeed, venture where the skill and energy of those who constructed the Chesapeake and Ohio have since pushed its daring course, but by means of the pack-horse and the flat-boat he traded with those who dwelt on the upper Ohio. He retrod the steps of his sires along the "Wilderness Road" to swap and barter with his kinsmen in Virginia and East Tennessee; and doubtless there are old men yet living who remember to have heard the Kentucky drovers crack their whips as they pressed through the Saluda Gap into the Carolinas.

Subsequently the steamboats served the same traffic on the

river, and the turnpikes pursued the same course to the south. And now the railway lines are reaching out in precisely the same directions. The iron tracks stretch along the banks of the Ohio and point towards Cumberland Gap.

With the extraordinary increase of population which has been mentioned—a growth which, when the circumstances of the times and the difficulties attending immigration are remembered, may be regarded as unparalleled in the history of American civilization—it is not surprising that a people so enterprising and energetic should have invincibly desired to extend their commerce, and utilize to its best capacity the magnificent region they had won from nature and the savage. In 1800 Kentucky had a population, according to the United States census returns, of 220,995. In 1810 the population had increased to 406,511, and in 1820, when the first children born upon her soil had scarcely reached middle age, she counted 516,317 souls within her borders. Very soon after the hardy and restless pioneers had broken the forest and begun to till their fields, they looked anxiously about for somebody with whom they might trade. The fertile soil supplied them abundantly with bread; the superb timber which covered it with the material with which to construct dwellings; and the skins of the game which fell before their rifles with clothing. But they were not the sort of people to be satisfied merely with food, shelter and raiment; although they were provided, indeed, with coonskins as currency. In a comparatively brief period they were able to produce the cereals largely in excess of what was needed for their own consumption, and from the beginning the Kentuckian has been a lively breeder of live stock.

They brought with them, too, from Virginia a crop which is cultivated almost entirely for commerce, and always has commanded, and always will command, money when it can find markets. Tobacco seems to have been one of the first, as it has always been one of the most important, crops grown in Kentucky. It is related that Boone, during one of his earliest explorations of the country, and some years before the current of immigration set in, was very nearly captured by a band of Indians while he was "handling" a small but

excellent crop of the staple, which he had raised near one of his cabins in the heart of the wilderness. With all the elements of wealth and material for commerce around them and ripe for development, it is not to be supposed that such a people would remain idle and fail either to see or improve their advantages. Aggressive, and imbued with the instinct of civilization and progress, they were not inclined to relapse into barbarism. But where were they to find markets? It was comparatively easy to float down, but extremely difficult to work up the broad stream of the Ohio. Yet we find that, as early as 1793, a line of Ohio packet boats (flat and keel-boats) was established between Cincinnati and Pittsburg, with offices for the insurance of goods at the termini and at Limestone—afterwards Maysville.—*Kentucky Gazette, Sept. 10, 1793.*

Col. R T. Durrett, of this city, has shown me the original advertisement of this line, signed by Jacob Myers, who established it. He informs the public that "the subscriber is now erecting armed sailing and rowing boats to go up and down the Ohio river from Pittsburg to Limestone." Previously, passengers were compelled to buy the boats in which they traveled, and letters were, for the first time, sent by this line rather than by special messengers.

The route through the wilderness, which was toilsome and barely practicable to the immigrant, was altogether unsuited to the kind of traffic the newly-settled territory could afford; and, even had these difficulties not existed, it would have been carrying "coals to Newcastle" to take tobacco for sale to Virginia, or corn and hogs to Pennsylvania. There were no neighboring peoples—in the first twenty-five years after the settlement of Kentucky—with whom they could buy, sell or exchange. The States north of the Ohio—with the exception of a few settlements in the eastern part of what was subsequently the State of Ohio, and at Cincinnati—were for more than half that period in the undisputed possession of the Indians.

Tennessee was settled later and more slowly than Kentucky. Alabama and Mississippi were virtually unsettled until as late as 1805-6, and immigration to those territories was not large until after the close of the Creek war in 1814.

The only direction, from 1790—when, it may be said, they were first in condition to seek it—until, perhaps, 1810, in which the people of Kentucky could hope to find a satisfactory market and outlet for aught they produced, was down the Mississippi; and the mouth of that river was for years closed to them, because in possession of the greedy and bigoted Spaniard, who would permit commerce with none but himself, and whose sole idea of the value of commerce was that it might be loaded with imposts and exactions. It should not be a matter of wonder that, curbed and harassed for years by such an obstacle, the people of Kentucky became impatient to the verge of revolt; and that the ambition of Burr found aid and comfort from men like Wilkinson, angered that resources, they were astute to discern and eager to develop, should be so hindered and retarded. By the treaty with Spain of 1799, the right to navigate the Mississippi and deposit at New Orleans, was guaranteed the citizens of the United States; but the treaty was violated in 1802 by the Spaniards, and the discontent of the Kentuckians became more bitter than ever. In response to the general and determined sentiment regarding the free navigation of the river, Mr. Jefferson resolved to purchase Louisiana, and so end the trouble. Fortunately, at the date of this determination, Spain had ceded Louisiana to France, and the question came under the consideration of Napoleon. That sagacious prince preferred that a friendly power should acquire territory he might have been unable to defend against an implacable and energetic enemy so strong on the seas as was Great Britain, and the purchase was concluded without difficulty. Immediately upon the acquisition of Louisiana in 1803, a very considerable trade sprang up between Kentucky and New Orleans, increasing and extending to other points upon the Mississippi, as the country along its banks became settled, and gradually pushing into the interior and up the tributaries of the great stream. It was conducted by means of flat-boats and keel-boats. Laden with pork, flour, corn, tobacco, apples, and potatoes, and quite frequently coops of poultry, these boats would descend the Ohio into the Mississippi, generally stopping to trade wherever custom was offered, but sometimes, especially when the cargo was entirely of tobacco or flour, making no stop short of New

Orleans. Reaching that city, the flats would be broken up, while the keel-boats, laden with return cargoes, would be poled and cordelled back again, and up stream, to the point of departure. The entire year was sometimes consumed in making the round trip. This tedious method of transportation was followed by the steamboat—serving the same commerce but vastly enlarging it.

In October, 1811, the era of steam was inaugurated on the western waters, and its great impulse given commerce. At that date Fulton's steamboat, the New Orleans, left Pittsburg for the port whose name she bore. She was intended to run between New Orleans and Natchez. But in the next year, boats were built to serve the trade of the Ohio and Mississippi rivers from Pittsburg to New Orleans; and in the period between 1812 and 1819, some forty steamboats were plying between the Crescent City, Louisville and the intermediate points. These steamers ranged in capacity from 25 to 700 tons burden. Capt. H. M. Shreve, of Louisville, was, perhaps, the most prominent and successful of these pioneer steamboatmen.

He contested Fulton's patent, and his claim to the exclusive steam navigation of all of the waters of the United States. In March, 1817, he demonstrated, what even until that date had been doubted, that steam was not only the most efficient motor, but destined to supersede all others, by making the voyage with the "Washington" from Louisville to New Orleans and back in forty-five days. The tonnage of the Washington was 400. The steamboats carried the same character of freight, chiefly, which had been previously transported. The most important additional articles, for some years at least, were hemp and beef; the latter transported both dressed and upon the hoof. Very few beef cattle, in comparison with other live stock, were driven to the South from Kentucky; but, as the capacity of the boats was enlarged, it was quite common for a steamer to carry fifty or sixty fat beeves on her lower deck; and in cool weather, carcasses of cattle, slaughtered at Louisville or other points, were frequently hung up between decks, and sold at the villages and landing places of the lower Mississippi. Kentucky's trade with the East was, for many years, confined to the receipt of consignments of merchandise thence, making no

shipments of consequence in return. The merchandise so obtained were dry goods, shoes and similar articles. These goods came from Philadelphia by canal to Pittsburg, and from Baltimore by wagons to Wheeling. From Pittsburg and Wheeling the freights were brought down the Ohio to Maysville, Covington and Louisville, and from these points distributed by the dirt roads, and afterwards by the turnpikes. For many years the greater part of this merchandise was hauled from Maysville to Lexington, and redistributed from the latter point to all parts of Eastern and Central Kentucky. It was hauled in immense canvas-covered vehicles known as "road wagons," which pursued their tedious way in long caravans, and were driven by a class of men almost as peculiar, and perhaps as rough, as the keel boatmen of the rivers. The Kentucky merchants bought little in those days from New York, and until as late as 1856 or '57 practically all shipments from Kentucky to New York were made via New Orleans. Inland travel, no matter how great the distances, was, until 1812, almost entirely done on horseback. But not until the commencement of turnpike construction, in 1830, were wheeled vehicles in general use, and the stage coach largely introduced and patronized.

About 1810, or it may be a little before that date, Kentucky began to find opportunities and avenues of trade with her neighbors nearer than New Orleans. Her own population, as I have stated, at that date was 406,511. The settlement of the extreme eastern portion of that territory, first styled by the whites the County of Cumberland, and which subsequently became the State of Tennessee, was commenced as early as 1762-3, but scarcely deserved any other term than that of exploration, even along the Holston and Wetauga rivers, until 1777. But nearly cotemporary with the influx of immigration into Kentucky, and doubtless stimulated by it, a tide of population was pouring into Eastern, and even so far as the fertile region of what is now called Middle Tennessee. In 1790 the population of Tennessee was 35,791, nearly half that of Kentucky at the same date; in 1800, 105,602, and in 1810, 261,727. The productions and exchangable commodities of Kentucky and Tennessee were too nearly identical in kind to admit of any very extensive trade between

their people; nevertheless commercial, as well as social intercourse, prevailed. But the settlement of Tennessee was of immense commercial advantage to the Kentuckians in another way.

By expelling the Indian tribes, or removing all fear of their hostility, and by making the country more practicable, in other respects, for travel, it cleared the way for trade from Kentucky with communities farther to the South and East. The Kentucky drovers were able to drive their hogs and horses, and subsequently mules, through the Cumberland and Saluda Gaps into North and South Carolina, and via Knoxville into Georgia. But with the settlement of Alabama and Mississippi, still larger commercial possibilities were afforded. These States were principally devoted to cotton culture, commenced at an early period of their settlement. Large plantations and numerous agricultural laborers, which yet did little in the way of food production, were just the elements out of which markets for the Kentucky trade were constituted. Kentucky furnished the planters pork and flour by the rivers (the Mississippi, Tennessee and Alabama), and sent them droves of hogs, horses and mules via Nashville. The population of Alabama, in 1820, was 127,901; in 1830, 309,527; in 1840, 590,756. The population of Mississippi, in 1820, was 75,448; in 1830, 136,621; in 1840, 375,651; in 1850, 606,506. Hugh N. Starnes, in an article on "The Cotton Gin; its Invention and Effects," published in the Southern Bivouac of December, 1885, says of the increase in cotton culture throughout the entire cotton-producing region of the South:

"By 1800, the crops had reached 93,000,000 pounds, worth $15,000,000; a five fold increase, while the population had increased only thirty per cent.

"During the next decade the increase in the cultivation of cotton was checked, as was all business, by the war with Great Britain—the cotton crop in 1820 amounting to only 128,000 pounds. But the high prices following the war greatly stimulated its production.

"The consumption of cotton by New England mills had increased from 500 bales in 1800 to 90,000 in 1815, and their output amounted in value to $24,000,000. With the mills of

New England as well as those of Great Britain to feed, the South Atlantic States fairly "boomed" again. Immigrants flocked in from Virginia to engage in the cultivation of cotton, leaving their worn-out tobacco farms behind them as a heritage to their successors. New lands were purchased—and stolen—from the Indians. Negroes were brought by the thousands from Maryland and Kentucky, while Pennsylvania and New Jersey sold out their few remaining slaves at a fine profit, and at once, by a most natural transition, turned abolitionist. Every hand that could be spared from other employments, white or black, bond or free, male or female, was appropriated to this one culture. And so, by the year 1830, the cotton crop, thus stimulated, had reached 457,000,000 pounds, or 1,038,848 bales."

But the demand for the breadstuffs and provisions raised in Kentucky, for her horses and mules, which the rapid population of Alabama and Mississippi (consequent on this vast increase in cotton cultivation) produced, was not the sole commercial advantage which it brought her.

At a very early date the cultivation of hemp began in Kentucky, and its manufacture for exportation was commenced as early as 1802. So long as its use as an article of commerce was confined, or almost entirely limited, to cordage for vessels, it had received no especial encouragement or impetus, on account of the extreme difficulty of getting it to the markets where it was needed for such purpose. But with the immense growth of cotton in the States of the lower Mississippi valley, there was a corresponding increase in the production of hemp in Kentucky.

Manufactured into bale-rope and bagging, it was shipped to New Orleans, to be sold to the planters, who used it for baling their cotton; and until the "iron tie" came into general use, only a few years ago, it continued to be largely so employed. Collins, in his history of Kentucky, states that in 1841 Mason and Fleming counties, alone, grew three thousand tons of hemp. While much the larger part of the crop was converted into bagging, the raw material, in small quantities, was shipped east via New Orleans, and thence by ocean to New York.

While, for some years after 1820, the steamboats, which had

rapidly increased in number, were adequate to the transportation of the traffic and products of Kentucky beyond her borders, an imperative need began to be felt for better methods of communication within her own territory. About 1825 the idea of building macadamized roads along the most frequented and important routes of trade and travel took fast possession of the popular mind, and subsequently culminated in the establishment of that exceedingly serviceable and valuable system of turnpike roads which, for many years, afforded, and even yet affords, Kentucky benefit which can scarcely be estimated. In 1829 the construction of the turnpike road from Maysville to Lexington was vehemently agitated by the people of the counties along its proposed line. Gen. Jackson vetoed, May 27, 1830, the appropriation of $150,000 voted by Congress in its aid; but the veto seemed only to intensify the determination of its projectors. The State subscribed $50,000 to its capital stock, and it was pushed to a speedy completion. As an evidence of how well it fulfilled the expectations formed of it, it is recorded that in August, 1834, a six-horse wagon drew on it three loads weighing, respectively, 14,469, 14,529 and 15,724 pounds.

But the railroad era was now at hand. The Lexington and Ohio Railroad, meant to be constructed and operated between "the town of Lexington and some one or more suitable points on the Ohio river," was chartered January 27 1830. The ultimate objective point of the line was Louisville, but for several years no effort was made to extend it beyond Frankfort. The names of the incorporators will be yet remembered, as among the best known and most public spirited citizens of their generation. They were John W. Hunt, John Brand, Richard Higgins, Benj. Gratz, Luther Stevens, Robt. Wickliffe, Leslie Combs, Elisha Warfield, Robt. Frazer, James Weir, Michael Fishel, Thos. E. Boswell, Geo. Boswell, Benj. Taylor, Elisha I. Winter, Jos. Boswell, Daniel Megowan, Jno. Norton, Madison Johnson and Henry C. Payne. It is interesting to note how completely this old charter has been the model for all subsequent ones granted in Kentucky. It has been closely and faithfully copied as if confessedly embodying substantially every provision a rail-

road corporation should want, and all that the State should grant. As indicative of the estimate obtaining at that date, of reasonable rates of transportation, I may be permitted to transcribe the provision relating thereto, couched in the language which—except in respect of the sums and amounts specified—has been so closely followed in subsequent charters: "And they shall have power to charge for tolls (and the transportation of persons), goods, produce, merchandise and property of any kind whatsoever, transported by them along said railway between Lexington and the Ohio river, any sum not exceeding the following rates, to wit: on all goods, produce, merchandise, or property of any description whatsoever, transported by them on the railway between Lexington and the Ohio river, it shall be lawful for them to charge for every one hundred pounds transported sixty miles and upwards, two and a half mills per hundred pounds weight for each mile; for every hundred pounds weight transported over twenty miles, and under sixty miles, three mills for each mile the same may be transported; for every hundred pounds weight transported a distance not exceeding twenty miles, three and a half mills for each mile the same may be transported; and the transportation of passengers four cents per mile for each passenger; silver and gold bullion, money of all descriptions, and mails, are excepted from the rates herein established, and for which the company, by their president and directors, or a majority of them, or their agents, shall be, and the same are hereby, authorized to contract especially for their transportation upon such terms as the parties interested may agree on."

Identically the same provision was inserted in the charter of the Louisville and Frankfort Railroad Company, incorporated as part of the projected line to the Ohio. Each charter was subsequently amended more than once in this respect, and in some instances the companies were permitted to charge higher rates for both merchandise and passengers. In view of the assertion which some writers have recently made, that both the English and American railway was originally intended to be operated in accordance with the old English idea of the public highway, whereon all persons should have the right to

place vehicles upon payment of tolls to the proprietors, I would call attention to the following provision in this old charter of 1830, which was also repeated in the charter of the Louisville and Frankfort, as showing that no such idea obtained in Kentucky: "And it shall not be lawful for any other company, or any person or persons whatsoever, to travel upon or use any of the roads of said company, or to transport persons or merchandise, or property of any description whatsoever, along said roads, or any of them, without the license or permission of the president and directors of said company." In the charter of the Lexington and Ohio Railroad Company we find, moreover, a provision that "the shares of the capital stock, and all the estate, real and personal, belonging or appertaining thereto, shall be exempt from the imposition of taxes by the Commonwealth of Kentucky for the term and space of twenty years from the passage of this act," a policy which, with some modification as to the periods of exemption, has been adhered to until the present time. The construction of the Lexington and Ohio out from Lexington was commenced immediately after its incorporation; the first *stone* rail was laid at Lexington October 22, 1830. In an old copy of the American edition of *Woods' Treatise on Railroads*, edited by Geo. W. Smith, of Philadelphia, and published in 1832, I find the following note: "The Lexington and Ohio, from Lexington to Louisville: about seven miles have been placed under contract and the grading of them finished. The superstructure is composed of stone sills, on which iron bars are laid in the usual manner. This division of the road will be finished this season."

January 25, 1835, the first locomotive and train of cars ran over the line from Lexington and arrived at the head of the inclined plane at Frankfort, a distance of 27 miles, in two hours and twenty-nine minutes. The motive power previously employed had been furnished by horses. It may be a matter of some interest, if not importance, to those who desire to trace the railroad development of the State, to know that the first railroad accident in Kentucky occurred on the Lexington and Ohio, two miles east of Frankfort, March the 16th, 1836, by which three persons were killed and several wounded.

The Lexington and Ohio, having become indebted to the

State in the sum of one hundred and fifty thousand dollars, the road was sold to satisfy this indebtedness and the State became the purchaser. The Legislature placed the property in charge of the Board of Internal Improvement, and the Board leased the road to Messrs. R. W. McKee and Philip Swigert. Very soon afterwards—February 28, 1848—the Lexington and Frankfort Railroad Company was incorporated as the successor of the Lexington and Ohio, over the same line, and the State became a stockholder in the new company to the amount of one hundred and fifty thousand dollars, payable by a surrender to the company of all the powers, rights and franchises acquired under its purchase of the Lexington and Ohio. The Louisville and Frankfort Railroad Company had been previously incorporated—March 1st, 1847—and by an act, contemporaneous with that chartering the Lexington and Frankfort, it was provided that both roads, when they were completed, might be operated as a continuous line from Lexington to Louisville upon such terms as might be agreed on between the respective companies. The Louisville and Frankfort Railroad was completed in 1851. An agreement was made July 30, 1859, by which the whole line of road was operated under a joint directory. February 2, 1866, the charters of both companies were amended to permit them to build a road from Lagrange to Covington—known so well since as the "Short Line"—and January 19, 1867, the two companies were consolidated, taking the name of the Louisville, Cincinnati and Lexington Railway Company. In 1881 (November 1st) the roads were purchased by the Louisville and Nashville Railroad Company, and have since been a part of that system.

The commerce which was sufficient in 1830 to induce enterprises like the two roads, whose history has just been briefly related, and others projected very nearly cotemporaneously, continued to expand; and the growing population and importance of Louisville, as a trade centre, began to be felt as a large, if not controlling factor. All trade with the South being yet conducted by steamboats, and all important shipments to New York still going via New Orleans, the river traffic continued to swell in volume.

In 1838 the railroad from Louisville to Portland was con-

structed and operated for a short time. It was intended to connect eventually with the Lexington and Ohio; but for some reason the people living between Louisville and Portland became dissatisfied with the road and threatened to tear up the tracks, so that it was soon discontinued.

In 1838 the attention of the people of Central and Northeastern Kentucky was attracted to the projected construction of the Charleston and Ohio Railroad. Charters had been obtained in the States of South Carolina, North Carolina, Tennessee and Kentucky, incorporating a railroad company to be constructed and operated from Charleston, South Carolina, to Lexington, Kentucky, with branches to reach the Ohio river at Louisville Covington or Newport, and Maysville. Large sums in aid of this road were subscribed by the States of South and North Carolina and Tennessee; but Kentucky refused the project of State aid, although the city of Lexington and some of the counties subscribed liberally. The Hon. Robert Wickliffe, of Lexington, published an address to the people on this road, which was remarkable not only for the ability with which the particular enterprise was advocated, but for its treatment, at that early day, of the general subject of railways, and its strong, almost prophetic, insistence upon the value of the mineral resources of Eastern Kentucky, and the importance, present and prospective, of the commerce of the South Atlantic States. Some of Mr. Wickliffe's arguments arouse, at this period, a feeling akin to amusement, although it is easy to understand that, fifty years ago, it was necessary to so discuss the subject; and if they amuse, it is not because they are fallacious, but because they are now so universally recognized as truisms. He says: "Although railroads are in their infancy, and in course of experiment only, enough is known of them from actual use to prove that they are the *safest, cheapest and most expeditious mode of transportation over land, known in either ancient or modern times;* and further remarking, that, as no wise man will travel by water or trust his property at sea, when he can be equally as well accommodated by land, so no wise people should ever put to the hazard of the winds and the waves what they can as well transport by land. In making this remark, I would not be understood as discouraging

commerce by water because of the perils of the rivers or seas, but I mean to urge that what a nation can do on land, should be done on land and not on the water; that what is *risked on land* is often damaged, but seldom totally lost; but that which is sunk in the ocean or rivers is a clear loss to all.

"If a *swindler, thief, or robber* deprive a man of his property, his labor is not lost, but the property shifts hands, so that the loss to the State of the amount taken is saved; not so when the sea swallows up the vessel or cargo—there all is lost and nothing gained. The annual loss to the world on the ocean is prodigious, and to the United States alone appalling." Mr. Wickliffe saw very plainly, what few people before that time had understood, but what every one now understands, that as a country of any considerable extent—and especially one of an area so vast as that of the Southern States—becomes populated, the water-courses, be they ever so frequent or free of impediments, can not adequately supply the population or conduct a large and varied traffic. There must be immense interior tracts of territory to be reached by some other means. Mr. Wickliffe makes the statement that "our trade to the South over land is three fold in value the amount of what we take by water." * * * "Was the question propounded to me which trade to yield, that of the rivers or of the land, I am ready at once to decide; while, on the one hand, I admit the value of our river trade, on the other I consider our intercourse with the south over land invaluable and indispensable to us—so much so, that without it we would, in our ruinous trade elsewhere, become bankrupt in a twelvemonth."

Speaking of the live stock driven by the Kentuckians to the South, he says: "Our traders have penetrated the whole Southern Atlantic country with their stocks in quest of markets, and now occupy them unrivaled by any other people whatever, to an extent and value almost incredible. They have found in the States of Virginia, North Carolina, South Carolina, Georgia, Alabama, and the Territory of Florida, the most valuable outlets and markets for our labor and enterprise which any people ever possessed. It is from this trade that our almost countless millions have been drawn and paid to the

British for their fabrics through the cities of New York and Philadelphia. Those valuable citizens have sought every city, town and village—yes, every farm-house—where the live stock of Kentucky could find a purchaser; and, without expense or patronage, have thus far sustained our credit and increased our wealth." But he realized that the drover could not supply the increasing demand for that most important Kentucky product, the hog, and that the method involved too great a tax upon producer, trader and consumer. He said: "From the slow travel of the hog, it takes the drover from thirty to sixty days to take a drove of hogs to market—the hands from ten to twenty days to return after sales are effected; consequently, from the great number of hands necessary to drive the hogs to market, there exists in this trade a waste of time and labor that ought, if possible, to be avoided. Besides, each hog averages a clear loss of twenty pounds in weight before he is sold; then add to this, also, that the average cost of taking a hog to market is four dollars, so that a drover who drives five thousand head to market loses ten per cent. in weight in his hogs, and has to pay twenty thousand dollars for taking them to market. This loss is, of course, that of the grower in the end, and falls as a tariff on the labor of the country; so that, to take our stocks of hogs over land to market, can fall very little short of five hundred thousand dollars annually, besides the loss of time and weight. * * * I am here asked, what is the remedy for the loss in weight, and for the expenditure of half a million yearly, and the loss of time-productive labor, and the jeopardy in making fall sales, which attends the present mode? I answer, the South Carolina Railroad is the sure and only remedy; and to prove that it is, I will first premise that all transportation of salted pork or bacon to South Carolina, Georgia, Florida, etc., by the Mississippi and the ocean, is out of the question, and can be practiced but with certain loss to whomsoever shall attempt it—not to mention the hot and sultry regions through which pork and bacon must pass, and the great length of time that it will be exposed to the humidity of a wet atmosphere, the dangers of the rivers and sea are too great to be encountered. But added to these objections is the fact that the places of

consumption of our pork are principally the countries that lie between our country and the Atlantic, and are as inaccessible or as difficult of access from Charleston and Savannah as they are to Lexington; or, in other words, if a vessel shall pass the whole course of the Mississippi and the reefs of Florida with a load of pork or bacon and reach Charleston, or other seaport of the South, with her cargo sound, the pork will then, to find a market, have to be sent in wagons or carts some hundreds of miles into the interior and towards Kentucky for consumption; and thus it is that no sensible man can think of sending the hogs of Kentucky to Carolina or Georgia, in the shape of either pork or bacon, by the way of the Mississippi; canals are not thought of, and every man must know that wagons or horse-power will not do to take either five hundred miles to market. Hence, I conclude that if ever our stock reach the Southern markets, either salted or dried, they can only do so by railroads."

Mr. Wickliffe rather overstated the difficulties attending these shipments by river and sea; indeed, that which he asserted could not be done was then being extensively done. Nevertheless his argument, in other respects, in behalf of the necessity of railways, was unanswerable, and has been verified by time and results. What he sought and expected by the road he was advocating, has been accomplished by other railroads. His paper is well worth study, even at this date; and he has anticipated almost every inducement which now attracts capital to the development, by means of railway construction, of the mineral regions of Southeastern Kentucky, and better commercial communication with the South Atlantic States. The project was long a favorite one; and in 1853 a convention was held at Richmond, Kentucky—attended by delegations from North Carolina, Virginia, Tennessee and Ohio—to promote the construction of a railroad from Lexington to Cumberland Gap, and thence to the Atlantic. Notwithstanding Mr. Wickliffe's unfavorable predictions, the commerce down the Mississippi continued to increase. In 1845, 1,585 steamboats and 394 flat and keel-boats, with an aggregate tonnage of 318,741 tons, passed through the Louisville and Portland canal; and a large part of this traffic was Louisville's. But the river

transportation, even with these dimensions, was no longer adequate to the needs of the commerce flowing through Louisville, Cincinnati, and other Ohio river ports, to the South. This fact becoming patent, together with the knowledge experience had by this time taught of the superior capacity of the railways, suggested the construction of the Louisville and Nashville Railroad. But, that I may follow the chronological order in which the more important roads were built as closely as is compatible with the commercial history of Kentucky, which I am trying to briefly present, I should call attention to the construction of the roads which constitute the system now known as the Kentucky Central Railway Company.

The Covington and Lexington Railroad Company was chartered February 28, 1849, and was opened between Covington and Lexington May 9, 1856, and the Maysville and Lexington Railroad February 10, 1859. These two roads were sold under foreclosure in 1865, and were subsequently organized by the purchasing bond-holders under the name of the Kentucky Central Association. The Kentucky Central Railroad Company was chartered March 20th, 1875, and took possession of the property in the following May. The Covington and Lexington and Maysville and Lexington Railroads were unquestionably originally intended more to serve the local business and interests of the region through which they were constructed than for any purpose of forming links in a line of through traffic. The wealthy counties of the Blue Grass country felt the need of rail connection with Cincinnati; and, doubtless, a reminiscence of the important traffic formerly conducted via Maysville, induced the desire to run a railroad over the old route. Be that as it may, the Kentucky Central has had no small share in the development of the region through which its roads have been constructed; has valuably supplemented the work done by other important lines with which it connects, and is destined to render efficient service in opening to commerce the rich and varied resources of Eastern Kentucky. During 1883 the Livingston Extension of the Kentucky Central was completed to Richmond, Ky. The Maysville and Lexington Railroad, Northern Division, is leased by the Kentucky Central in perpetuity. It also leased,

January 1st, 1884, for ninety-nine years, the Richmond Branch of the Louisville and Nashville R. R. Co., from Richmond, Ky., to Stanford, on the Lebanon and Knoxville Branch of the Louisville and Nashville. The Livingston Extension was formally opened for general business throughout its entire length August 9, 1884. The lines of the Kentucky Central consist of the main line from Covington to Livingston, 147.33 miles in length; the Maysville Branch, from Maysville to Paris, 49.33 miles; the Lexington Branch, from Paris to Lexington, 19.17 miles; and the Richmond Branch (operated under lease), 33.80 miles—making a total mileage of 249.93 miles, all in the State of Kentucky. It uses, also, under a trackage contract, 3.34 miles of the Lebanon and Knoxville Branch of the Louisville and Nashville Railroad from Livingston to Roundstone. The property was again sold under foreclosure, April 23, 1887, and the company reorganized in May, 1887, as the Kentucky Central Railway Company.

In 1849 and 1850 the idea of substituting the railway, in a large measure, for the water craft, or, at least, of largely supplementing the service rendered by the steamboat in the movement of merchandise, was at length seriously considered in Kentucky. The commercial activity all over the country, the growth of population and increase in production and traffic, called for additional facilities in the matter of transportation; and the success of the Eastern railways suggested the best and surest methods of satisfying the demand. The Southern trade, still the most valuable to Kentucky, first claimed the attention of those who were foremost in undertakings of this nature. Louisville had become a point of considerable commercial importance, and her trade, and that of Cincinnati, required speedier and more direct avenues to certain parts of Southern territory than the rivers could afford. In response to this feeling, the greatest railroad system, which has yet had its origin in Kentucky, was inaugurated. Its authors, perhaps, enterprising as they were, had faint premonition, at its inception, of what it has since become. The Louisville and Nashville Railroad Company was chartered in Kentucky, March 5, 1850, to be constructed from the city of Louisville to the State line of Kentucky and

Tennessee. But from the beginning it was intended that it should be constructed and operated as far as Nashville; and by an act of the General Assembly of Tennessee, passed December 4, 1851, its construction to the latter city was authorized. It also received legislative authority from Tennessee December 15, 1851, to construct from Memphis to the Kentucky and Tennessee State line. The main line to Nashville (185.23 miles in length) was opened November 5, 1859. That portion of the Memphis Branch which is in Kentucky —from Memphis Junction to the State line, a distance of 46 miles—was opened in 1860. Subsequently the company purchased the Memphis, Clarksville and Louisville Railroad, with a mileage of 82.50 miles, constructed under a Tennessee charter to Guthrie on the State line, to Paris, Tennessee. In the following year (October 9, 1877) the Memphis and Ohio Railroad, which the Louisville and Nashville had previously leased for ten years, was consolidated with the latter company. The Memphis and Ohio was constructed from Paris to Memphis under a Tennessee charter of 1852. This line, 131 miles in length, completed the Louisville and Nashville connection with Memphis and the lower Mississippi river. It is not necessary to the purpose of this paper to particularly describe the roads, outside of Kentucky, which are part of the Louisville and Nashville system, or to mention them, save in so far as such mention will serve to indicate the extent to which they have facilitated the trade of Kentucky and that of her commercial emporium, Louisville. The total length of the lines which the Louisville and Nashville Railroad Company owns, leases and operates at the present date, in and outside of the territory of Kentucky, is 2,061.14 miles. From this estimate is omitted the Richmond and Cecilian Branches—respectively from Richmond, Kentucky, to Stanford, Kentucky, and from Cecilia, Kentucky, to Louisville—having an aggregate mileage of 79.80 miles; inasmuch as these two roads, although owned by the Louisville and Nashville, are leased, the former to the Kentucky Central, and the latter to the Chesapeake, Ohio and South-western.

There are also under construction, and certainly to be completed within the year 1887, 155.60 additional miles of this

company, which will increase the total mileage operated by this company, as owner or under lease, to 2,216.14 miles.

But it is interested, as owner of the majority of stock and as joint lessee, in 1,581.00 miles more, making the total mileage included in or appertaining to its system 3,797.74. In order to correctly appreciate the value of such a system, and the commercial influence it exerts and the commercial wants it serves, it would be necessary not only to examine but to study closely the whole map of the vast region its lines penetrate, and observe the water routes and the various other railway systems with which it communicates; indeed, it would necessitate an examination of very nearly the whole chart of American traffic, and as the same may be said of all the other great railway groups and lines—as the ramifications and effects of these colossal instruments and servants of commerce are so wide and general—it may be perceived how difficult it is to confine the discussion of railway development within just limits.

The connections obtained by means of the Memphis Division of the Louisville and Nashville Railroad Company have already been indicated. The Nashville and Decatur Railroad, the Nashville and Florence Railroad, the South and North Alabama Railroad, the Mobile and New Orleans and the Pontchartrain Railroads, the Pensacola and Atlantic Railroad, and the Pensacola and Pensacola and Selma divisions, place all points on the Kentucky lines of this system in direct communication with the most fertile and flourishing regions of Tennessee and Alabama, and with the most important marts of the lower Mississippi Valley and the Gulf of Mexico. By means of the Nashville, Chattanooga and St. Louis Railway, and its interest therein, and its interest in the Georgia Railroad and dependencies, it secures to Kentucky commerce valuable connections with nearly all important points in Georgia and the Carolinas; while the Henderson Bridge and the Southeast and St. Louis Railway (its St. Louis division) connects its Kentucky lines with the great railway systems which centre at St. Louis, and with the upper Mississippi.

The lines of the Louisville and Nashville system in Kentucky—omitting, as I have previously stated should be done,

the Richmond and Cecilian Branches because operated by other companies—are that part of the main stem from Louisville to the State line, 139.69 miles; that part of the Memphis Division from the junction near Bowling Green to the State line, 46 miles; that part of the Henderson Division from Henderson to the State line, 98.09 miles; the Lebanon and Knoxville Branch, from Lebanon Junction on the main stem to Jellico on the State line, 170.80 miles; the Bardstown Branch, from Bardstown Junction on the main stem to Bardstown, 17.30 miles; the Cincinnati Division, from Louisville to Newport, 108.96 miles; the Lexington Branch, from junction near Lagrange to Lexington, 65.75 miles; the Providence Branch, from Madisonville to Providence, 16.20 miles; the Narrow-gauge Division, from Louisville to Prospect, 11.00 miles; the Northern Division of the Cumberland and Ohio (operated under lease), from Shelbyville to Bloomfield, 26.72 miles; the Southern Division of the Cumberland and Ohio Railroad (operated under lease), from Lebanon to Greensburg, 30.90; the Shelby Railroad (operated under lease), from Shelby Junction, on the Cincinnati Division, to Shelbyville, 19.10 miles; that portion of the Indiana, Alabama and Texas Railroad, from the State line to Cerulean Springs, Ky., 29.90 miles; the Louisville Railway Transfer, from L., C. & L. R. R. to main stem (operated under lease), 4.13 miles; the Glasgow Railroad (operated under lease), from Glasgow Junction, on main stem, to Glasgow, 10.50 miles; the Mammoth Cave Railroad (operated under lease), from Glasgow Junction, on main stem, to Mammoth Cave, 8.38 miles; the Elkton and Guthrie (operated under lease), from Elkton to Guthrie, 11.00 miles. These lines aggregate a length of 814.42, to which will be very soon added 66.60 miles of roads, nearly completed, viz: the extension of the Bardstown Branch to Springfield, 19.90 miles; the Princeton Branch of Indiana, Alabama and Texas Railway, from Clarksville to Princeton, having a length in Kentucky of 44.50 miles, of which fifteen are yet unfinished; and the Cumberland Valley Branch, from Corbin, on the Lebanon and Knoxville Branch, to Pineville, in the vicinity of Cumberland Gap, 31.70 miles.

This last-mentioned extension—the Cumberland Valley Branch—is, perhaps, more important and fuller of promise

of valuable results than any of the more recent additions—at least which have been made to the Louisville and Nashville system. When the steel and iron industries of the Cumberland Vallley are fairly inaugurated, and the coals of that and the adjacent regions—unsurpassed in quality and literally exhaustless in quantity—shall have been thrown open to the markets, this road, which will largely aid in this development, will immensely profit by it; and when it shall be extended still farther, to connect with the railway systems of Virginia and North Carolina, already completed or in process of construction, the commercial advantages hoped for by public-spirited Kentuckians fifty years ago from rail connection, in this direction, with the Atlantic, will not only be realized, but as greatly exceeded as the wealth, population and commerce of the present day are superior to such conditions existent half a century in the past.

The next in date of the great railway corporations whose lines have connected Kentucky with the South, was the Cincinnati Southern Railway. Although an Ohio corporation, constructed with capital furnished by the city of Cincinnati, and projected and built chiefly in the interest of Cincinnati, and to furnish that city with a southern connection which it should practically own and control, it has so enlarged the commerce of Kentucky, and so considerably aided in the development of a large part of the State, that it may properly be classed among the Kentucky railroads. This company was incorporated by act of the Legislature of Ohio May 4, 1869. Although the effort to obtain enabling legislation in Kentucky —which should permit its extension over her territory—was strenuously opposed, it was successful in the legislative session of 1871. Construction was begun in December, 1873, and the line was opened from Cincinnati to Somerset, a distance of 158.03 miles, July 21, 1877, and was completed the entire distance of 355.92 miles to Chattanooga, Tennessee, February 12, 1880. October 12, 1881, the road was leased for a period of twenty-five years to the Cincinnati, New Orleans and Texas Pacific Railway Company, a corporation organized under the laws of Ohio, October 8th, 1881, as lessee of the Cincinnati Southern. The length of the line in Kentucky, from the Ohio

river to the State line, is 197.09 miles. By means of the roads extending from Chattanooga, and through Alabama and Mississippi, of which the Cincinnati, New Orleans and Texas Pacific has obtained control, its territory in Kentucky is connected and placed in direct communication with all important points in the two States last mentioned, and the line reaches New Orleans.

For very many years, commencing at a date almost cotemporary with railroad projection in Kentucky, efforts had been made to provide for the construction of a railroad from Lexington to some point on the Big Sandy river. But notwithstanding the ability, intelligence and energy of those who advocated the scheme, and the liberal county and municipal subscriptions in its favor, it failed to materialize until the era of consolidation approached, and the assured success of the Chesapeake and Ohio in 1868–'9, and the certainty that, penetrating Kentucky from Virginia, this great line would connect the two States, made the construction of such a road, in a measure, a matter of necessity. But the attempt to construct under charters previously obtained was abandoned, and the Elizabethtown, Lexington and Big Sandy Railroad was chartered January 29, 1869. This road, to be constructed from Lexington, Ky., to Huntington, West Virginia, a distance of 139.42 miles, was opened from Lexington to Mount Sterling in 1872, and to the Big Sandy river in November, 1881. In February, 1886, having been previously operated in the same system with the Chesapeake and Ohio—forming with that road part of a great trans-continental route—the Elizabethtown, Lexington and Big Sandy was leased for two hundred and fifty years to the Newport News and Mississippi River Valley Company. By a trackage contract with the Louisville and Nashville, it connects over the Lexington Branch, and part of the Cincinnati Division of that system, with the Chesapeake, Ohio and Southwestern Railroad at Louisville. The total length of the Elizabethtown, Lexington and Big Sandy, in Kentucky, is 109.08 miles, and 21.46 miles of the Ashland Coal and Iron Railway is operated by it under lease. The Chesapeake, Ohio and South-western Railroad, the other Kentucky link in the chain of the Newport News and

Mississippi Valley Company, from Louisville to Memphis, a distance of 392.48 miles, was organized in Tennessee in 1877, under the general incorporation law of that State, and in Kentucky by a special act passed January 18, 1882, as successor to the Memphis, Paducah and Northern Railroad, which was purchased under foreclosure July 30, 1881, and by the last named act merged with the Paducah and Elizabethtown Railroad Company. The main line was opened September 6, 1872.

The extension from Cecilia into Louisville, 46.00 miles, completed September 1, 1874, was sold to the Louisville and Nashville Railroad Company January 19, 1877, and January 1, 1882, was leased in perpetuity by the Chesapeake, Ohio and South-western, and has since been operated as part of that road to Memphis. February 1, 1886, the Chesapeake, Ohio and South-western Railroad was leased for 50 years, to the Newport News and Mississippi Valley Company. The total length of this road in Kentucky, including the Branch six miles from Cecilia to Elizabethtown, is 276 miles. The lines of the Newport News and Mississippi Valley Company traverse the entire length of Kentucky from east to west, affording Louisville, and indeed all the commercial points of the State, access to the Atlantic coast by the shortest and most direct route, and furnishing additional connection with Memphis, the lower Mississippi region, and New Orleans. These lines also penetrate and open some of the best parts of both the Eastern and Western coal fields of Kentucky.

It will be remembered that about the years 1868 or 1869 the consolidation of shorter or inferior roads into great trunk lines, or railroad associations, began, and, once fairly inaugurated, went on with a rapidity which argued that the policy was as convenient and beneficial for the public and the shipping interests as for the carriers. Indeed, consolidation vastly cheapening the administration and operation of roads, by making possible the reduction of a multitude of expenses, immensely cheapened, while, also, incalculably simplifying and facilitating transportation. The facilities thus afforded through traffic, the close connection into which all sections

and parts of the continent were brought, stimulated exchanges in a wonderful degree.

Commodities and productions, which could not be sold at home, obtained cheap transportation to localities where they were wanted and were eagerly purchased, and yet, by reasons of the cheap transportation, the purchaser could obtain them at reasonable prices. The California redwood was shipped to and sold in the East; the yellow pine of the Southern States was sold in localities equally as remote from the region of its growth. Tennessee marble, not greatly valued at home on account of its abundance, obtained cheap transportation to the New England States, and found ready sale there, while the New England granite was carried and sold cheaply to customers in the South. Markets were furnished for every article of commerce, and purchasers procured, at prices extremely reasonable, commodities which had been previously practically unobtainable at the highest prices. Mr. M. H. H. Smith, in his argument of April 2, 1887, before the Inter-State Commerce Commission, in behalf of the Southern Railway and Steamship Association, very clearly described the causes and processes of this general railway consolidation. He said: "For nearly thirty years, from the beginning of the construction of railroads in the United States, no attempt was made at feration. Nearly all the railroads constructed during that period were local; and even where two or more companies constructed railroads that connected and together formed a continuous line, they continued to be operated as local railroads, each company issuing bills of lading to points on its own line at local rates only, both freight and passengers being transferred at termini.

For many years forwarding and commission merchants continued to transact business in the same manner as when the transportation of the country was by water—that is, a shipment from an interior point in Ohio, say Springfield, destined to a point South, say Bowling Green, Ky., was shipped locally to Cincinnati, consigned to a forwarding and commission merchant, who received the same, paid the freight, transferred the shipment through the city, and delivered it to the mail-line boats plying between Cincinnati and Louisville, shipped it to another forwarding and commission merchant at Louisville,

who, in turn, receipted for the property, paid charges accruing thereon up to that point, attended to the transfer to the depot at the Louisville and Nashville Railroad Company, and shipped the property to destination, collecting from the railroad company as advances the accrued charges, including a liberal compensation for receiving and forwarding, with a fair margin of profit in the item of drayage.

These conditions resulted in the formation of fast freight line organizations by enterprising persons who saw the necessity for through arrangements, by which shippers could forward property to distant points over the lines of a number of carriers under a contract for a through rate and continuous carriage. These fast freight lines entered into agreements with the different carriers, whereby, in consideration of assuming the responsibilities of through contracts, through carriage, and furnishing through cars, they secured reduced rates of transportation on car-load quantities, occupying the position of middle-men between the various carriers and the shippers. As this system developed, and the rates of transportation declined, the profits of the fast freight lines were found to be excessive; and as it became apparent that the carriers could, by combination, furnish facilities nearly or quite equal to those of the fast freight lines, complaint arose that such organizations were an unnecessary tax upon the revenue of the carriers.

In time it became apparent that the carriers could eliminate some of the charges imposed upon traffic under the methods just described, by agreeing to become parties to through arrangements, and, by one carrier receiving property from the shipper and consigning it directly to a connecting carrier to be carried to destination, or to be delivered to another connecting carrier, could perform the service theretofore performed by the forwarding and commission merchant or by the fast freight lines. This could be done with little or no increased expense that were necessary for the carrier to do business with the forwarding and commission merchants could be used in receiving property from and delivering it to connecting carriers. Even after these methods were to some extent adopted, carriers in many instances, while guaranteeing through rates

which were the sums of the locals, only receipted for property to the ends of their roads, and still continued to transfer property from car to car, or by drays at termini, each company receiving its local rates.

This, for a time, created a class of middle-men, which may be correctly described as "freight brokers." They were generally enterprising men, who familiarized themselves with the rates of the various carriers, and, by manipulating them, were able to contract with shippers at lower rates than the shippers, without the special knowledge of rates, could secure for themselves. By shipping at less rates they secured a margin that would remunerate them for their time and enterprise. As an illustration, a person such as we have described, located at Cincinnati, would contract with manufacturers in the interior of Ohio, guaranteeing a through rate from the manufactory to destination; have the property consigned to him at Cincinnati, pay charges, reship at rates he had secured, and collect from the carrier the difference between rates thus secured and the contract rate made between himself and the manufacturer. As the methods of the carrier rapidly improved, the class of middle-men soon became extinct. As two or more carriers entered into arrangements for continuous carriage over their various railroads, the joint business rendered frequent communication and personal conferences necessary. This developed traffic agents, who gave much or most of their time to what became known as "through traffic," in contradistinction to "local traffic, or traffic between stations on the line of a single carrier. As the system gradually extended, and the number of carriers, parties to through arrangements, increased, the necessity for some organization for the transaction of joint business was developed, and this resulted in the formation of associations." It can readily be perceived that the next natural and logical step, after association, would be consolidation.

Another notable feature of the multiplication of railroads and vast increase of railway service—bringing, as I have said, all sections of the country into communication—was the broad and general competition it induced, of a kind quite different, however, from the mere rivalry of the railroads themselves—

that is to say, the competition of product with product, of market with market. Certain territories and certain cities (markets) were served by particular roads or systems. Each road was compelled, in its own interest—in order to maintain itself and its business—to carry to market the products of its own territory as cheaply as other roads carried the products of the regions which they penetrated; otherwise the products could not be sold, would not be moved, and the road would lose business.

And in the same way, each railroad was under a certain compulsion to render reasonable service to the city on which it was largely dependent for traffic; so that, on the other hand, the commercial prosperity of the cities was finally not so much dependent on the competition or rivalry between one or more roads, of which they were the termini—although, of course, that was a matter of importance—as upon the extent and adequacy of the railway systems whose service they commanded.

Kentucky has been benefited by railway consolidation, not only, as has been shown, in the connections which certain great systems, so built up, have afforded her, but by connecting lines having been constructed across her territory by other powerful systems which were in operation north and south of her borders; and any history of railway development in this State would be incomplete without mention of these roads.

In 1852, the Mississippi Central Railroad Company was chartered by the States of Mississippi and Tennessee, opened from Canton, Mississippi, to Jackson, Tennessee, in 1860, and extended to the Ohio river in Kentucky, opposite Cairo, in 1873. This company was consolidated with the New Orleans, Jackson and Northern Railroad Company in 1877, the consolidated lines taking the name of the Chicago, St. Louis and New Orleans Railroad; on the 13th of June, 1882, it was leased to the Illinois Central Railroad Company, and it is now a part of that magnificent system. The length of line in Kentucky is 41.62 miles. The Mobile and Ohio Railroad Company was chartered in Alabama in 1848, and subquently in Mississippi, Tennessee and Kentucky. The main

line from Mobile to Columbus, Kentucky, was opened April 29th, 1861, the Cairo Extension, from Columbus to East Cairo. 21 miles, was opened December 1, 1881. Its total mileage in Kentucky is 41.00 miles.

The Owensboro and Nashville Railroad Company was chartered February 27, 1867, as the Owensboro and Russellville Railroad Company, and its name subsequently changed to the Evansville, Owensboro and Nashville Railroad Company. It was sold under foreclosure and reorganized May 29, 1876, under its present name. It was consolidated June 30, 1881, with the Tennessee and Kentucky Railroad Company. It was operated from 1879 to 1880 by the Nashville, Chattanooga and St. Louis Railway Company, and for a short time by the Louisville and Nashville. The road as projected is to extend from Owensboro, Kentucky, to Nashville, Tennessee—a distance of 125 miles; but it has only been completed as far as Adairville, Kentucky, 83.50 miles. It was opened to Adairville January 1, 1884. The branch of this road, from Penrod to Mud River Mines, is 4.49 miles long. The Louisville and Nashville Railroad Company owns a majority of the stock of the Owensboro and Nashville.

The Ashland Coal and Iron Railway Company was known as the Lexington and Big Sandy until 1865, and as the Lexington and Big Sandy Railroad, Eastern Division, until 1880. It was opened in 1856, nine miles, and in 1881 to its present terminus, Straight Junction of the E., L. & B. S. R. R. Its length is 22.06 miles, and, as has already been mentioned, is operated for the greater part of its length under lease by the E., L. & B. S. R. R.

The Chattaroi Railway Company was chartered March 11, 1873, and completed to Louisa, Ky., 31 miles, January 1, 1881; to Peach Orchard January 1, 1882, and to Richardson, its present southern terminus, May 1, 1885. Its length from Ashland, on the Ohio river, to Richardson, is 50 miles. It was originally intended to connect with the Norfolk and Western Railroad Company. On May 5, 1887, it was sold preparatory to reorganization as part of the line of the Charleston, Cincinnati and Chicago Railroad Company. It will probably be extended as part of the latter company's line to the State line, and will

materially assist in opening the coal and ore fields of South-eastern Kentucky.

The Eastern Kentucky Railroad Company from Riverton, on the Ohio river, to Willard, a distance of 35.13 miles, was chartered January, 1870, as successor of the Kentucky Improvement Company chartered in 1886.

The Kentucky and South Atlantic Railroad Company, from Mt. Sterling to Rothwills (gauge three feet), was chartered February 13, 1874, as the Mt. Sterling Railroad Company, was opened in 1876, and the present name adopted February, 1881. Its length is 19.8 miles, and it is controlled and operated by the Coal Road Construction Company, chartered February, 1878.

The Cincinnati and South-eastern Railway Company (gauge three feet) was chartered as Covington, Flemingsburg and Pound Gap Railway Company in 1871, with the intention of extending from Newport, Ky., to Pound Gap, a distance of 250 miles. Its name was changed to Licking Valley Railway Company in 1879, and its present title adopted in 1880. It is in operation from Johnson, Ky., to Hillsboro, Ky., 18.50 miles. The Cincinnati, Green River and Nashville Railroad Company (narrow-gauge), name since changed to Cincinnati and Green River Railway, extends from King's Mountain, on the Cincinnati Southern, to Yosemite, Ky., a distance of fifteen miles.

A number of short roads have been constructed for local traffic or to aid certain industries. The Breckinridge Coal Road from Cloverport, on the Ohio river, to the Breckinridge Cannel Coal mines, nine miles long; the South-western Railway, from Harrodsburg Junction, on the Cincinnati Southern, to Harrodsburg, five miles; the Versailles and Midway, from Midway, on the Lexington Branch of the Louisville and Nashville Railroad, to Versailles, 7.88 miles; the Kentucky Union, from Hedge's Station, on the Elizabethtown and Big Sandy, to Clay Village, 15 miles in length. This last-mentioned road will probably be constructed forty or fifty miles further, and will penetrate and assist in the development of a very important timber and mineral region. Another short road, but one which will be of very great convenience to the immediate

county and beneficial to local traffic, is the one constructed from Elizabethtown to Hodgenville, in Larue county. It is an extension of the Cecilian and Elizabethtown Branch of the Chesapeake, Ohio and South-western, and is twelve miles in length.

The most important roads now in process of construction, and partially completed, are the Maysville and Big Sandy, the Ohio Valley, the Louisville Southern, the Louisville, St. Louis and Texas, and the Chesapeake and Nashville. The Maysville and Big Sandy Road will be a very valuable addition to the Newport News and Mississippi Valley Railway system, and its importance to the commercial interests of Kentucky cannot be overestimated. It will be extended from Ashland, Kentucky, near the mouth of the Big Sandy river, to Covington, a distance of 140 miles. It will closely follow the course of the Ohio, crossing the Eastern Kentucky Railroad at Riverton, the Maysville Branch of the Kentucky Central at Maysville, connecting with the L. & N., the Cincinnati Southern, and the Kentucky Central at Covington, and, by the bridge in process of construction as part of the line, obtains access to Cincinnati. Thirteen miles of track are laid from Ashland south, and six miles north from Maysville. The entire road will probably be completed by March 1, 1888.

The Ohio Valley Railway Company was chartered under the name of the South Kentucky Railroad Company, March 15th, 1871, and its title changed to the present one, April 16, 1886. The main line from Henderson, Kentucky, to Jackson, Tennessee, will be, when completed, 200 miles long. It is already constructed from Henderson to Princeton, a distance of 88.70, which, with the Uniontown Branch, 7 miles long, make a total of 95.7 in operation. This road has been pushed with great energy and success, and there is good reason for expecting its extension as far as the State line —some forty miles farther than its present point of progress —by January 1, 1888. It penetrates the most flourishing and the finest region of Western Kentucky, both agricultural and mineral, and will furnish connections with the best portions of West Tennessee.

The Louisville, St. Louis and Texas Railway Company, chartered January 13, 1832, is projected from Louisville to Henderson, Kentucky, a distance of 138 miles.

The whole line is under contract, and the work is being rapidly pushed. One hundred and eleven miles—that part of the line from Louisville to Owensboro, Kentucky—is very nearly completed, and it may be confidently stated that it will be opened for traffic by January 1st, 1888. Within sixty days after that date it is expected that the entire line to Henderson will be opened and in operation.

By an amendment of the charter of the Cincinnati, Green River and Nashville Railroad Company, of May 12th, 1884, the name of that company, which had been chartered in 1882, was changed to the Chesapeake and Nashville Railway Company. By the act of 1884, and subsequent amendments, it was authorized to connect with the Chesapeake, Ohio and South-western, with the Kentucky Central, and to construct a branch to Louisville. It was consolidated March 15, 1885, with a company of the same name in Tennessee. Work has been done at various points along the line of this road in Kentucky. It is not possible to indicate exactly, at this date, the location of the line or its length in Kentucky.

The distance between Scottsville and Glasgow is 25 miles, and from Glasgow to the Danville Junction of the Cincinnati Southern, near which recent surveys would indicate the location of northern terminus of the line, is 100 miles. If completed, the branch from Glasgow to Louisville will be 100 miles long. About ten miles are completed and in operation in Kentucky.

The Louisville Southern Railroad Company is the successor of the Louisville, Harrodsburg and Virginia, chartered March 9th, 1868. By action of the stockholders March 11th, 1882, the name of the company was changed to its present one, which action received legislative ratification April 28, 1884. The line of the road is located from Louisville to Harrodsburg and Danville, through some of the most fertile and wealthy counties of Central Kentucky.

This company has purchased the South-western Railway, already mentioned, thus securing connection with the Cincin-

nati Southern in the immediate vicinity of Harrodsburg. The length of the line from Louisville to Harrodsburg will be 75 miles, and from Louisville to Danville, 84 miles. The work is being energetically pushed. The grading between Louisville and Harrodsburg is nearly completed, and preparations for track-laying made, which will enable the road to be opened for traffic, it is confidently expected, by March 1, 1888. The Louisville Southern will probably be ultimately extended through Richmond, Ky., to the Virginia line, when it will render very valuable service, not only to the mineral development, but to the general commercial interests of Kentucky.

Every point on the continent accessible to travel by rail, can be reached from every railroad station in Kentucky, and in a period which could have seemed amazingly brief to us only ten or fifteen years ago, and incredible to our fathers. I append a table showing the time now occupied in travel between Louisville and the more important, as well as some of the most remote points of railway connection:

Time.	Hours.
From Louisville to—	
New York City	28
Boston, Mass.	32
Quebec, Canada	47
Duluth, Minn.	34
Mackinac, Mich.	28
Newport News, Va.	27
New Orleans, La.	30
Savannah, Ga.	28
Jacksonville, Fla.	30
Tampa, Fla.	39
Punta Gorda, Fla.	45
San Antonio, Texas	54
San Diego, Cal.	127
San Francisco, Cal.	122
Los Angeles, Cal.	114
Portland, Oregon	121

Five magnificent railroad bridges, adequate to the conduct of an almost limitless traffic, already span the Ohio directly connecting all the lines of railway in Kentucky with the great systems of the East, North and North-west. These are the bridge at Henderson, Ky., already noticed as part of the Louisville and Nashville system; the Louisville bridge, and Ken-

tucky and Indiana bridge at Louisville, and the Cincinnati Southern, and Cincinnati and Newport bridges at Cincinnati; besides which two latter, a third is in process of construction and soon to be completed between Covington and Cincinnati, for the use, as has been mentioned, of the Maysville and Big Sandy Railway.

Freight may be shipped on through bills of lading from Louisville to any point on the entire railway system of the continent, and, indeed, virtually from any point in Kentucky which is touched by any of her railroads.

While, in a paper of this character, something ought to be said explanatory of the general legislative policy which the State has pursued in regard to railroad construction and regulation, it must necessarily be brief; nor do I desire to say any thing which shall be merely an expression of personal opinion.

It may be asserted, however, that the policy of Kentucky, in refusing State aid to railroad construction, has been wise and justified by the experience of other States which have acted differently in this respect.

In almost every instance, when such a policy has been pursued, no matter how inviting the prospective advantage, it has resulted in disappointment. and indebtedness has been incurred out of all proportion to the benefit obtained. Upon this subject Mr. Atkinson, in the pamphlet from which, I have already quoted, says: "While we have thus set up the State of Massachusetts as the standard of a State fairly served, it is by no means intended to cite her course in railway legislation as an example to be followed. * * * * * Enticed by the success in granting State aid to the Western Railroad by stock subscriptions, and the Norwich and Worcester by bond subscriptions, she has been betrayed into State undertakings fruitful of corruption and of little use. The two measures of aid above-named were granted before investments in railroads had become general, and it is not to be doubted that they hastened the connection of Massachusetts with the west by a few years; and had the State then given its full power and influence to the development and adequate use of its one great line to the west, the Boston and Albany Rail-

road, it might have secured the full share of the great commerce which it has since sought, with comparatively little success, at the cost of a State debt of about $20,000,000."

Examples of the disastrous effect of State aid, generally and largely given, might be multiplied. Our sister State of Tennessee has furnished one of the most pertinent. Kentucky, it is true, at the beginning of the railroad era, extended some small aid in a very guarded way, but soon ceased to do so, and resolutely refused subsidies of this nature. One reason of it, perhaps, was that she had expended large sums upon her navigable streams in slack-water improvements.

In 1851, legislative attempt was made to grant State aid to certain railroads, amounting to $2,300,000, but was defeated. In the session of 1868 a bill was introduced and passed in the House of Representatives of the Kentucky Legislature authorizing—if approved by a vote of the people—an issue of $10,000,000 of 6 per cent. State bonds in aid of railroad, river and turnpike improvements; but the bill was reconsidered and not again acted upon. County and municipal aid to railroads, however, have been as liberally voted in Kentucky as in any other State. The Auditor of the State reported February 18, 1871, that the indebtedness of counties, cities and towns in Kentucky, contracted on account of subsidies to railroad construction—deducting sums voted certain railroads which had been abandoned—amounted at that date to $13,783,983. Since then some of these debts have been discharged, while additional indebtedness has been contracted.

In some instances this aid has been wisely given, if the completion and successful operation of the roads may be accepted as a vindication of the wisdom of such a policy; on the other hand, in very many instances, it has been proven, by the same criterion, injudicious and disastrous; no beneficial result has been attained, oppressive debt has been incurred, and sometimes repudiation attempted and violence threatened.

Kentucky has probably been more prodigal in granting railroad charters than any other State. Indeed, there is reason to believe that the vast number of charters obtained have

done more to retard than to facilitate railroad construction. Since 1860 (not to mention any previously enacted) two hundred and ten charters have been granted—that is to say, that number of acts of incorporation of separate and distinct railroad companies have been passed and approved in Kentucky.

There were, before 1860, a considerable number of inutilized charters in existence. Out of one hundred and ninety-one charters granted between the 1st of January, 1860, and December 1st, 1885, only three of the roads so projected were under construction; and twenty-four roads were in operation in Kentucky under charters of all dates. There is not in the State an eligible railway route which is not provided with two or more charters; the whole ground is covered, but it is probable that more can be had if asked for. Many of them have been forgotten, and no record of them remains, save on the pages of the Session Acts. I have not essayed an accurate computation of what the railroad mileage of Kentucky would be if all the roads these charters provided for were completed to their entire projected lengths, but I am induced, from a rough estimate, to believe that it would be one linear mile of railroad for each one and three-fourths square mile of territory.

The railroad legislation of Kentucky has, as a rule, been conservative, and not unfriendly to the interests and growth of the corporations. That sort of legislation which virtually proposes to take the control of railway property and business out of the hands of the owners, or those selected by them to manage it, has never found favor here. Nor have our Legislatures been misled by prejudice, or induced by reasoning based on false analogies, to confer unnecessary power on special officials, to be used under the guise of regulation. They have, it is true, recognized the exceptional character of the railroad as a system of transportation, yet have not, on that account, been anxious and in haste to bind it with special laws. On the contrary, they have preferred to treat it as an anomaly, not fully understood. The law establishing the present Commission was passed in 1882. It was modeled on the one which has been the most successful of all yet attempted in the United States, viz: the Massachusetts Railroad

Commission. The Board has, generally, acted in accord with the careful and prudent legislation which created it.

The Commissioners, under this law, may collect statistical information in regard to the *status* and operation of the various railroads doing business in Kentucky, and it is made their duty to assess railroad property for taxation.

The total railroad mileage in Kentucky, completed and in operation at this date, as accurately as it can be computed, is 2,135.54 miles. In this estimate I have not included sidings, but only the main track of each road. There is good reason for believing that over 460 miles additional will be completed and in operation by January 1st, 1888.

The prospective railroad development of Kentucky is, of course, largely a matter of conjecture, except in so far as present enterprises enable it to be forecast. The purposes of the roads which I have enumerated as now under construction, and whose effect on the commercial, industrial, and agricultural interests and future of the State I have attempted briefly to indicate, furnish the best answer to the inquiry. It is quite probable that railroad construction in Kentucky will be confined, for many years in the future, principally to the building of branch lines to the roads which are already completed, or are now in process of construction; more especially to branches intended to penetrate and open to traffic the mineral regions—the 14,000 square miles of iron and coal fields—which constitute so great a portion of the undeveloped wealth of the State; but that itself will be a great and valuable work. I have mentioned only those roads which are completed and in operation, or those upon which work has been commenced, and, although only partially done, furnish such assurance of ultimate completion that they may be justly regarded as accomplished facts of the general system under consideration. There are other railroad enterprises in contemplation, and which have been, or are now being actively discussed and agitated, which will quite probably take tangible and successful shape. Many offer encouraging prospect.

But as it has been in the past, so it will be in the future, that many more railroads will be projected than built. The absolute necessity of rail transportation to the development

of every country, and to the proper conduct of its business, is manifest to all minds. But it is not so readily and generally realized that railroad construction may be overdone—that it may be pushed beyond the point of its relative importance to other material interests, and, therefore, beyond the domain of utility. It seems impossible to disabuse the popular mind of the impression that a railroad will, under all circumstances, and wherever located, be valuable. It does not seem to be generally understood that it is ever possible to construct, in any certain territory, a greater number of railroads than it really needs or can maintain. The successful operation of a railroad, and not simply its construction, is what the public interest requires. Very few people keep in mind the salient fact that the utility of a railroad—its benefit to the public—is measured by the amount of traffic its peculiar territory can originally furnish, plus that which it can itself create. If these conditions had no limit, there would be no limit to railroad construction. It is assuredly a sheer waste of capital to build additional lines in counties already provided with railroad facilities, fully or more than adequate to the service of their traffic. Nothing so stimulates agricultural, commercial and industrial progress and prosperity, and increased and varied production—up to a certain point—as the railroad. But when that point is reached, no multiplication of roads, or accumulation of transportational facilities, can give further benefit or added prosperity. Roads so projected are useless to the public, as well as ruinous to those who operate them.

I might, possibly—as might any one who would examine the map of Kentucky with that object in view—suggest new roads or extensions through fertile and eligible territory, now comparatively distant from existing lines, and in need of railroad facilities. But I do not understand that I was expected or desired, in the preparation of this paper, to offer mere suggestions, either of my own or of others; or even to recapitulate projects which have not yet been carried to any degree of practical material effort. I have, accordingly, avoided as carefully as possible the region of surmise, and kept closely within that of facts.

I should be strongly inclined to apologize for the tedious length of this paper, were I not painfully conscious that its crudity and imperfect rendition of the important subject assigned me, far more imperatively demand apology. Indeed, I may claim, with some reason, that by treating the subject at greater length I might have presented it more clearly and in a better form. The brief account and description I have been compelled to allot each road or railway system has scarcely sufficed to explain the character and importance of the services they either render now or promise in the future, to the commercial and general business interests of the State.

I trust that I have collated something which may be of use to future work of this kind, better conceived and more thoroughly done; and I am glad to believe, from all that we see at stir among us, that within another decade, or even earlier, a history of railroad development in Kentucky may be written which it will be gratifying to read.

THE KENTUCKY RIVER IN ITS RELATION TO THE DEVELOPMENT OF THE EASTERN KENTUCKY COAL FIELD.

By J. Stoddard Johnston.

There are two Coal Fields in Kentucky—the Western, comprising about 4,000 square miles, which lies about 70 miles south-west of Louisville, and is bisected by the Green river, which is navigable by slack-water throughout its limits. It is also penetrated by several railroads—the Huntington system, which traverses it from east to west, in its route from Louisville to Memphis, the Louisville & Nashville, which crosses it from north to south with two lines, one from Henderson and the other from Owensboro, the Ohio Valley Railro. from Henderson to Marion, in Crittenden county, and the Louisville, St. Louis and Texas, now in course of construction along the Ohio river, from the mouth of Salt river, looking to a connection with the Ohio Valley road at Henderson. The topography of the country which it embraces, not being mountainous, is favorable for the construction of railroads, and, with those already in operation or projected, it will soon, in conjunction with the navigation of Green river, when made free of tolls, have ample transportation for the development of its resources in coal, iron and timber. The coal of this field is chiefly a soft bituminous, good for grate and steam purposes, but as yet has not had satisfactory development for coking. There is also a limited area of cannel coal—a superior article known as the Breckinridge Cannel Coal, found in Breckinridge county, in a 28-inch stratum. It covers about two or three thousand acres, and a mine, situated eight miles from the Ohio river, at Cloverport, is worked by an English company, who have constructed a railroad by which the coal is conveyed to the river, and thence transported by water to New Orleans, whence it is shipped to Liverpool.

THE EASTERN COAL FIELD.

The other, or Eastern Coal Field, comprises more than 10,000 square miles, or one-fourth the area of the State. Its Eastern boundary is the Cumberland mountains—the bound-

ary between Kentucky and Virginia—and it runs transversely across the State from North-east South-westwardly, having an average breadth of seventy-five or eighty miles. It is part of the same coal field which passes northward into West Virginia, Ohio and Pennsylvania, embracing the New River and Connellsville Coking Districts, and which traverses Tennessee on the meridian of Chattanooga and Alabama, through Birmingham, widening in its northern course, and narrowing in its southern, until it ceases to exist a short distance south of Birmingham. That the eastern and western coal fields were once united, and that the intervening territory was denuded of coal by erosion, is patent to geologists, but foreign to the scope of this article to discuss.

The altitude of the Eastern Coal Field increases from west to east, the elevation, above sea level, of the hills in which coal is first found, on its western border, being about 1,000 feet, and the elevation of the Cumberland range, on the eastern border, being from 3,500 to 4,000 feet. On the other hand, the geologic dip of the coal and stratified rocks is to the east and south, being very gradual and uniform, until reaching the Cumberland uplift, when, for a breadth of about twenty miles, all the strata of coal which had passed successively below the surface, have been lifted above drainage. Underlying the coal is the subcarboniferous limestone, which bounds the western limit of the coal field, but disappears shortly after the first coal develops, and is not seen again until uplifted in the Cumberland range, finding its best development on the Virginia side of the Cumberland mountains.

Both borders of the coal field have also iron deposits of various merit; on the Eastern are hematites, and the Western limonites and carbonates—a superior quality of the latter being the well-known Red river car-wheel ore, which rests immediately upon the limestone, and of the former the Hocking Valley ore, which lies stratified above the conglomerate sandstone, which caps two workable strata of coal.

While the general features of the Eastern Coal Field conform to this description, I propose in this paper to speak more particularly of a section drawn through the coal field from west to east, from the Three Forks of the Kentucky river to

Big Stone Gap in south-west Virginia. This coal field is penetrated by the following rivers: The Big Sandy, which forms the boundary between Kentucky and West Virginia; the Licking, which enters the Ohio at Cincinnati; the Kentucky, the three branches of which, heading respectively in the direction of Pound, Big Stone and Cumberland Gaps, unite in Lee county near the western border of the coal field, and the Cumberland river, which, heading between the main Cumberland mountain and Pine mountain, parallel ranges, flows near the western base of the latter, and breaks through it at Pineville, in Bell county. The topography of the coal field is such that the ranges of the hills or mountains conform in direction with that of the rivers, so that the construction of railroads, while practical in the direction of the drainage, is almost impossible across drainage. As yet there has been but a partial penetration of the coal field; the Chesapeake and Ohio (Huntington's transcontinental system) passing through but two counties, Carter and Boyd, having coal in but a limited development. The Cincinnati Southern passes through but a similar strip of its southern border in the counties of Pulaski and Wayne, while, singularly enough, the Knoxville Branch of the Louisville and Nashville road skirts it, as it were, in but two more counties, Laurel and Whitley. A local road has been constructed from Mt. Sterling to the coal in Menifee, but has not proved a successful enterprise. The obstacle to building railroads through this field has been, that it would not pay to run a local road to the coal merely for this mineral, since the cheaper transportation from Pennsylvania and West Virginia by the Ohio river has forbidden competition, and the cost of a through route to connect with the eastern and south-eastern systems has heretofore been too great to be justified by the demand for such transportation. But, latterly, the awakened demand for iron and coal has led to the projection of several railroads, on both sides of the mountains, looking to a junction of the two systems. This movement has had its chief impetus in the discovery of rich magnetic and Bessemer iron ores in North Carolina, about seventy-five miles from the Kentucky coal field, and the demand for the coal for its reduction, there being no coal in North Carolina, or nearer than that in Ken-

tucky. A road is in course of construction from Bristol, Tennessee, to Big Stone Gap, and the Norfolk and Western has contracted with the Louisville and Nashville Railroad to meet it near the same point, by constructing an extension from the north-east of about eighty miles, for which the contract has been let. To meet this the Louisville and Nashville is now building an extension from a point on its Knoxville Branch to Pineville, in Bell county, Kentucky, which will be completed within the current year, and thence extended to meet the Norfolk and Western as stated above, giving a new and shorter route from Louisville to the seaboard. Other routes are projected from the Cranberry iron region in North Carolina to Cumberland or Big Stone Gap, and from Knoxville to Cumberland Gap, looking in the direction of Cincinnati. For the latter road the city of Knoxville has voted a subscription of half a million, and the work has been let to contract.

In all this region of South-western Virginia and South-eastern Kentucky, in view of this railroad development, actual and projected, a great deal of capital is being invested by eastern and English, as well as by Kentucky companies. The price of all land has, within the past twelve months, been advanced ten-fold, and a region which has been long dormant, and apparently without hope of development, is now quickened with a new energy. Immigration and capital are being directed toward it, and visible signs of improvement are apparent in the building of a better class of dwellings, the opening of new roads, greater interest in schools, a general increase of thrift, and the better observance of law. It is the prospective junction of the Louisville & Nashville Railroad with the system of roads lying east of the mountains which has wrought this change, the full import of which will not be realized until the connection has been made a year hence. When the practicability of the junction of the two systems has been demonstrated, and the roads projected on the eastern side of the mountains shall reach the gaps which make the gateways to the Eastern Coal Field of Kentucky, other roads from the western side will seek connection with them, and other routes be established across the coal field. Already the extension of the Chattaroi Railroad up the Big Sandy is announced as part

of a system from Chicago and Cincinnati to Charleston, South Carolina, while the Kentucky Eastern Railroad, which runs from Riverton, Greenup county, to Willard, Carter county, contemplates extension in the same direction. Huntington, who is building 140 miles of road from Ashland, Ky., to Cincinnati, has bought a local road running from Johnson's Station on the Maysville and Paris road to Hillsboro, Fleming county, and has been making surveys, indicating a purpose to extend it up the Licking Valley, through the rich cannel coal fields of Morgan and Magoffin, in the direction of Pound Gap.

The Paris, Frankfort and Georgetown road, for which subscriptions have been voted in Franklin, Scott and Bourbon, is also projected to run from Frankfort, through Georgetown and Paris, to the coal deposits of the Licking and Big Sandy. For the upper Kentucky river several roads are commanding attention. The Kentucky Union, which has thirteen miles constructed from the Chesapeake and Ohio, at Hedge's Station in Clark county, to Clay City, contemplates extension by way of the Three Forks to the cannel coals of Breathitt county, and thence up the North Fork to Pound or Big Stone Gap. The Louisville, Cincinnati and Virginia Railroad, from Winchester to the Three Forks, and thence up the Middle Fork to Big Stone Gap, and up the South Fork to Cumberland Gap, has been voted subscriptions from Clark, Estill and Lee counties, and within the past ten days has broken ground, thus holding out to Cincinnati the most direct route across the Eastern Coal Field. Still a third route from Richmond, in Madison, county, Ky., has been under consideration for six or eight years, the road to the Three Forks having at one time been located and let to contract, but suspended by the financial crash of 1884. Its importance to Louisville as a possible extension of the Louisville Southern, and as part of a trunk road to connect St. Louis and Chicago with the south-eastern system, renders it only a question of time when it also will be put under construction.

THE KENTUCKY RIVER.

But while it will doubtless be but a short time until all the rivers which penetrate the Eastern Coal Field will be utilized

as routes for the construction of railroads, the Kentucky river, from its central position, the number of its tributaries, and its availability as a means of transportation for a greater part of its course, presents the best advantages for the development of the Eastern Coal Field, and as a route for the construction of one or more railroads to connect the eastern and western railroad systems. It has three principal tributaries known as the North, Middle and South Forks; which, rising in the Cumberland mountains, come together, after traversing the heavily timbered coal field near Beattyville, in Lee county, at what is known as the Three Forks. From this point, which is near the western border of the coal field to its mouth at Carrollton, a distance of two hundred and fifty miles, it traverses one of the richest sections of the State, leaving the Carboniferous formation near the line of Estill and Lee, entering the Trenton limestone in Madison, and flowing through the counties of Clark, Garrard, Fayette, Mercer, Woodford, Anderson, Franklin, Henry, Owen and Carroll, to the Ohio, through the Lower and Upper Silurian. The project of its improvement by locks and dams was begun by the State fifty years ago, and in 1843 five locks and dams were completed at a cost of over four millions, giving navigation for steamers of 300 tons for a distance of about 100 miles from the mouth. The maintenance of the navigation became in time a burthen to the State, and, at the close of the war, the system was practically worthless. Various efforts were made looking to a restoration of the old works and the extension of navigation by additional locks and dams to the Three Forks as originally designed, but without result, until in 1879–'80 the Legislature of Kentucky ceded the locks and dams to the United States, upon condition that Congress would repair them, make navigation free, and extend the system to the Three Forks. Since then, by successive appropriations, aggregating more than half a million, the United States Government has repaired the works, restoring navigation for 100 miles, and has begun the construction of Lock No. 6, which, when completed, will make the river navigable to High Bridge, the crossing of the Cincinnati Southern Railroad, about 112 miles from its mouth.

The value of this improvement, and the restoration of navi-

gation to the region of country through which the river runs, can not be overestimated. In the single item of coal its cost has been more than saved to consumers, the price at Frankfort being reduced from twenty-five and thirty cents to ten and fifteen cents. So also as to freights of all kinds, the cheaper river transportation has led to corresponding reduction of rates by rail to Louisville and Cincinnati, the decrease being about fifty per cent. In like manner the value of lands lying along the river has been enhanced, the facility thus afforded for reaching market having stimulated the opening of new farms, and led to the restoration of many others which had gone to decay from the lack of means to utilize or sell their products. This improvement, affording free navigation, has been highly beneficial not only to the people who have had a market opened to them, but also to Louisville and Cincinnati, to which points the products of this rich section have been shipped, and whence the merchandise, groceries, coal, &c., have been distributed. The result of the past five years goes far to illustrate the vast benefit which would accrue upon the completion of slack-water navigation to the Three Forks, and should call for some more vigorous effort to induce Congress to hasten the progress of the work. Every remaining county to be embraced by the new works is as rich and abounding in products needing an outlet to market as those already supplied, and they are as much entitled to the improvement. On the score of economy, it would be better for Congress, instead of making appropriations by driblets, to set apart a sum sufficient to place all the remaining locks and dams under contract at once, and complete them in two or three years, instead of making a lock and dam every year or two, extending the time for the completion of the navigation ten or fifteen years, and suffering losses from floods, &c., from the incompleted state arising from lack of adequate appropriations.

The full value of the system will not be demonstrated until navigation is extended to the Three Forks and it can be utilized as are the Monongahela and Kanawha rivers, similarly improved by the United States government, for the transportation

of coal, iron, timber, and other products of the mountains. Pending this completion, and to facilitate this transportation meanwhile, Congress, some years since, made an appropriation of $125,000, or thereabouts, for the construction of a dam on the French system at the Three Forks. It was located at Beattyville, just below the confluence of the South Fork, and completed one year ago. No lock was provided, but in its stead provision was made for letting down about one-third of the dam so as to permit the passage of rafts, etc., through chutes or passes. But apart from the questionable policy of having any device which will permit the products of a country to leave it without providing for the return of commodities in exchange, the plan or construction of this work has proved so faulty as to require a change, involving its practical reconstruction with a lock instead of the chutes, and for reasons, into which our representation in Congress should inquire, the benefits expected from this dam in forming a pool into which coal could be loaded in boats to await tides, as in the Monongahela and Kanawha, and saw-logs handled for local milling, will be withheld from that neglected region for two years longer. This leads me to remark, incidentally, that if the average talent which represents Kentucky in Congress could, for a brief period, descend from the lofty pinnacle of tariff abstractions to the humbler but more practical perch of State advancement in material development, we should not be so far behind our sister States in these essential particulars. Even without the intermediate locks and dams, with a good dam at Beattyville, provided with means of descent and ascent for rafts and coal barges, the coal mines of that region could be utilized, where now the precarious means of shipping coal forbid the embarkation of capital. It would bear the same relation to the Kentucky river that the Monongahela dams do to the Ohio. The latter, as the Kentucky river, is navagable only a portion of the year, and from it coal in barges can be brought only upon the occurrence of tides created by rains. But the dams form pools and admit of the loading and safe-keeping of barges until such time as they can be brought down by tides. If this system is adopted at the Three Forks, the products of our mines will have greatly the advantage of those of Pennsyl-

vania, since while the Monongahela pools are about 800 miles from Louisville, the pool at Three Forks is but 300.

THE TIMBER.

Again, statistics gathered by the United States Engineers in charge of the dam at Three Forks, show that over fifty million feet of lumber in logs annually pass that point from the three tributaries of the Kentucky river, to be sawed at the several railroad crossings of the river below, into lumber, chiefly for the eastern market. About ten per cent. of this is walnut. The construction of this dam, so as to make a pool like that at Frankfort, eighteen miles in length, as contemplated, would, upon the building of a railroad to this point, make it one of the principal lumber centers in the west, as the number of logs referred to above would, if cut into lumber, make ten thousand car loads, saving the cost of transportation down the river, and equally near the ultimate market. As the timber upon neither of the tributaries has been appreciably cut off, the increase would be limited only by the demand, the supply being practically inexhaustible. The timber which covers these hills and valleys consists chiefly of poplar, white oak and several other varieties, walnut, chestnut, linn, hickory, together with all other varieties native to the temperate zone.

COAL AND IRON.

Proceeding eastward from the Three Forks upon the section heretofore indicated, we find for the first twenty-five miles from the western limit of the coal two workable strata of a very fine quality, 36 to 48 inches thick, which for more than half a century has been used by the towns upon the river below, and commanding several cents per bushel more than the best Pittsburgh coal. Its analysis, as given in the Geological Reports, shows a very low percentage of sulphur and ash, and a very high percentage of fixed carbon. It is known as a dry-burning coal, and from this fact is pronounced to be well adapted for use as fuel in smelting iron ore in its raw state, being the same quality used for the past fifteen years in the furnaces at Ashland, Kentucky, where fifty thousand tons are consumed annually.

The first stratum lies about fifty feet above the Subcarboniferous limestone, which caps the hills near the line of Estill and Lee, with a dip eastward and southward corresponding to that of the coal and other stratifications. It is chiefly an oolitic stone, superior for building, making a pure lime and an excellent flux. It passes beneath the river just below the Three Forks. and is not seen again until it appears in the Cumberland uplift nearly one hundred miles eastwardly. Lying immediately upon this limestone, and more or less imbedded in it, is a fine carbonate of iron ore known as the Red river or car-wheel ore, which is exposed in good workable position in the eastern portion of Estill and the western part of Lee counties, where it has been in years past smelted in considerable quantities. Latterly, however, the production has been limited, owing to the lack of transportation and the general reduction in the price of iron. The second workable stratum of coal is about 75 feet above the first, from which it is separated by a thick sandstone, and is in turn capped by a heavy conglomerate sandstone, which gives the name and defines the position of the two families of coals in the Eastern Coal Field lying above or below it. Above this conglomerate sandstone, in the region about the Three Forks, is another iron ore, a stratified limonite, known as the Hocking Valley ore. It is abundant and easily gotten out, being near the tops of the hills in beds four or five feet thick, and is an excellent cheap ore for mixing with other ores. All of these formations disappear as we go eastward, passing with the dip beneath the surface, and being succeeded as we approach the line of Breathitt county by cannel and coking coals of which there are many strata, sometimes exclusively of one kind and sometimes composite, a vein of cannel coal being not unfrequently found superimposed upon a vein of coking coal, and *vice versa*, the succession continuing until we reach the Cumberland uplift, where all the strata which have been encountered in the passage from west to east and successively passed beneath the surface, have been again raised above drainage. The cannel coal, which is found also in the valleys of the Licking and Big Sandy, embracing eight or ten counties, is the

largest field of coal of that variety in Europe or America, and compares favorably with, if indeed it does not excel, the best foreign or native cannel coals. One of the best displays of it is to be seen in Breathitt county, near Jackson, from the mines near which Frankfort and points along the Kentucky river have had a limited supply by water transportation, its freedom from popping making it very desirable for use in grates. Generally it may be said of all these coals that they are very valuable, not only for fuel, but, being particularly rich in volatile combustible matter and low in moisture, they will be in great demand as a material for enriching coal gas whenever transportation is available.

The coking coal is more persistent, and covers a much larger area, as well as being found in thicker stratification, the extreme limit of the thickness of cannel coal being rarely higher than four feet, while the strata of the coking coals range much higher. Prof. Procter, our State Geologist, to whom Kentucky is indebted for the identification of this coal, and defining its area, says of it: "This coal has been traced by the Geological Survey over an extended area, carrying its excellent quality with respect to high fixed carbon and low sulphur and ash, and remarkable for its uniform thickness."

The following analyses are given by him of two samples; No. 1 from a face of 103 inches, and No. 2 from a face of 96 inches:

	No. 1.	No. 2.
Volatile combustible matter	29.30	34.10
Fixed carbor	67.40	61.80
Ash	1.64	2 40
Sulphur	0.670	0.412

The following analyses of the celebrated Connellsville coal, are taken from the Chemical Report of the Pennsylvania Geological Survey:

	No. 1.	No. 2.
Volatile matter	30.107	29.662
Fixed carbon	59.616	55.901
Ash	8.233	11.556
Sulphur	0 784	1.931

Actual tests of the physical properties of the coke made from this Kentucky coal show a strong, tenacious coke, free from impurities, and yielding most satisfactory results.

Thus it will be seen that a section drawn through the heart of this coal field from the Three Forks of the Kentucky river to the Virginia line, through any of the gaps in the Cumberland mountains, discloses the fact that there are two cheap iron ores on its western boundary, and that through its entire course it abounds in workable strata of coal of high commercial value.

THE UPPER WATERS OF THE KENTUCKY RIVER.

I have shown the value of the Kentucky river from the Three Forks to its mouth as a factor in the development of the mountain region of Kentucky, when it shall be locked and dammed throughout its entire course, giving free and uninterrupted transportation at all seasons for the products of its mines, forests and fields. I propose now to show the value of the tributaries of this remarkable stream as a further factor in the development of this great coal field. While the natural fall of the streams is gradual and not too great to preclude the possibility of continuing the system of slack-water upon each of the tributaries, it is doubtful whether the water supply in either is abundant or constant enough to make it pracictal. But nature has so formed the topography of this portion of the State that railroads projected across the coal field can not go across the drainage, but must follow the general course of the rivers. That the time is ripe or fast approaching for the construction of one or more lines converging at the Three Forks, and forming the shortest connection between the Eastern and Western systems, it is only necessary to examine into the causes which demand it.

If a line be drawn from Cumberland Gap east to the Atlantic, and south from the same point to the Gulf, we shall have inclosed the quadrant of a circle embracing more than 250,000 square miles of territory, including the States of North Carolina, South Carolina, Georgia and Florida, together with portions of East Tennessee and Virginia, in which there is not a pound of coal, but a vast body of val-

uable iron and other minerals lying idle and undeveloped for the want of fuel.

Notable among these deposits is the newly-explored Cranberry iron ore field of North Carolina, where, within seventy-five miles from this Kentucky coal field has been exposed to view a face of magnetic iron ore 400 feet broad and 100 feet high, of which Gen. J. T. Wilder, in a letter to the Manufacturers' Record, says there was in sight 40,000,000 tons, now being shipped by circuitous routes to Allentown, Pa., Chattanooga and Birmingham. Intelligent iron men, both from Europe and this country, have visited this wonderful formation, and recognize the fact that it is ridiculous to send this ore to such remote points for reduction—Chattanooga, the nearest, being 248 miles—when within less than one hundred miles are these coking coals of Kentucky, lying in juxtaposition to cheaper ores and to limestone for flux. They have, therefore, set on foot means for the transportation of this ore looking to the erection of furnaces along the border of Kentucky and Virginia, at such points as Cumberland, Pennington and Big Stone Gaps. But, while this would be a great advance upon the present facilities, and while capital is pouring into that region. which the late Prof. W. B. Rogers, Geologist of Virginia, many years ago predicted would be the center of iron and steel manufacture in the United States, a careful study of the map will show that these furnaces, if the natural laws of transportation and distribution are regarded, should be located not in Virginia upon the eastern, but in Kentucky upon the western border of the coal field.

The reasons for this conclusion are briefly these: The distance from the Cranberry ore field to the eastern border is about 75 miles, and, by liberal calculation, from thence to the western border at the Three Forks of the Kentucky river is 100 miles, making a total of 175 miles. Here would be found in the same hill limestone, coal for smelting, which would not need coking, and two kinds of iron ore, the car-wheel carbonate and the Hocking Valley limonite, for mixing with the richer ores of North Carolina and the hematites, the Clinton and Bessemer ores of south-west Virginia. It will be readily admitted,

that with a railroad connecting these points, sound policy would suggest that the North Carolina ores, when once loaded on cars, should rather be unloaded at the Three Forks of the Kentucky river than the Virginia line, if the conditions for reduction were only equal, since the further transportation would be in the direct route to a market for the manufactured product. But when the conditions are altogether more favorable for the Three Forks, the argument is unanswerable. What are these?

First. The locality which I recommend for the reduction furnaces is within 175 miles of the center of population of the United States, as shown by the census of 1880—a few miles south-west of Cincinnati, and about half way between the North Carolina ore field and both Cincinnati and Louisville, being, therefore, one hundred miles nearer than the Virginia border to these centers of distribution, and to St. Louis, Chicago, and the great West.

Second. It is at the head of what will be the permanent slack-water navigation of the Kentucky river, which, when the works now being prosecuted by the United States government are completed, as they will be in a short time, if the voice of Kentucky is heard at Washington as it should be, will give uninterrupted navigation to both Louisville and Cincinnati.

Third. Should it be deemed desirable or necessary to use the coking coals, the haul to this point, from the Cumberland range and intermediate points, would be down grade. Besides, as a distributing point for coke, it would be the nearest place of supply to the furnaces of the west and north-west, and the same advantages of proximity to market and cheapness of raw material and fuel would enable the product of the furnaces and mines to be produced and sold at a correspondingly less rate than the products of Birmingham, Chattanooga, or points on the Virginia border.

These considerations at once force upon our attention the importance of a railroad through the heart of this coal field to which I have previously referred. The problem of the connection of the North-western and South-eastern systems of railroads by more direct lines of communication, is one

which has long engaged the study of engineers and capitalists, but until this new demand sprung up the obstacles have seemed too great to warrant the expense. With, however, the transportation of the North Carolina ores for reduction in Kentucky furnaces as the prime object, other collateral interests are presented which, upon reflection, will demonstrate that such road or roads as indicated by me, will not only serve the original purpose of its projectors, but both from the traffic in coal, coke and lumber, become at once a paying investment as developing local freights. It would also assume importance as a link in the shortest line connecting the two systems, giving new outlets from the West to the East, and making the closest connection between Chicago and the Atlantic ocean at Charleston, as the distance would be shorter than from Chicago to New York. For all such purposes it would have the advantage of all other roads which could cross this coal field; since while they would describe and follow the arc, it would follow the chord.

A new era will be opened in Kentucky when once this great coal field shall be penetrated by such a road or roads. Although I have shown that twenty or thirty counties are, from their relations to the Kentucky river, directly interested in its improvement, and the construction of railroads up its tributaries, the advantageous results will not be limited to that section of the State, but will be felt by every portion of it. Louisville will be benefited almost beyond calculation, for into her lap will be poured the wealth derived from mine and forest. The product of the ores reduced at the Three Forks will be brought here for manufacture, and she will become, even more than she now is, the distributing point of the South-west, and her manufactures multiplied by the increased abundance of iron and lumber. A great demand will spring up at once for capital and labor, and a new field for enterprise opened for the energetic young men who now, for the want of such home demand, annually seek homes in the West or elsewhere, to the impoverishment of Kentucky. By promoting such an opening we shall make a place for them to migrate to without leaving the State, and thus the annual surplus of population, represented by the young men attain-

ing their majority in the agricultural districts, will find ample field in the mountains for that energy and thrift which have done so much to develop the newer States. Not only this, but it will bring back to us thousands of Kentuckians who, having emigrated to other States for lack of employment here, will gladly return to invest or labor in a field so full of promise, and richer in possible results than even the fabled wealth of California. The dawn of this era is upon us, and the best omen lies in the great interest taken in our material development by our own people. That it may be fraught with the best results for the whole State should be the aim of every Kentuckian who has pride in his State, and wishes to see her maintain her proper position in the great march of progress which marks this period of our country's history.