EASTERN KENTUCKY.

In as brief a review of my observations, explorations, and notes on the resources and developments of this section of the State as the short allotment of time will allow me to make, it is impossible to do my subject that justice which its importance should demand.

I can only recite what so far has been done in the way of opening to the markets of the world the treasures stored away in our mountains, to hint at what further should be done, and to speak of the opportunities here offering to the investment of capital and to immigration.

THE VALLEY OF THE BIG SANDY,

Or, as the Indians used to call it, the "*Chattarawha*" Valley, lies in the rocks of the carboniferous age, the underlying sub-carboniferous measures coming to the surface in only few places, thus admitting an almost unparalleled full development of the lower coal measures, or those lying within nine hundred feet from the top of the carboniferous limestone. Properly spoken, the Big Sandy Valley coal beds are but a Western continuation of those of the Kanawha Valley, whose importonce as fuel, and for manufacturing purposes, is known all through the West and Eastern States

There are twelve distinctly different veins of coal, whose average thickness is shown by the following table computed by A. R. Crandall:

	Minimum.	Maximum.
Coal No. 1	3 feet 0 inches.	5 feet 0 inches.
" " 2	2 " 0 "	3 " 8 "
" " 3	2 " 6 "	6 " 6 "
" " 4	2 " 0 "	4 " 6 "
" " 5	3 " 6 "	9 " 0 "
" " 6	3 " 0 "	4 " 0 "
" " 7	3 " 0 "	6 " 0 "
" " 8	2 " 6 "	8 " 0 "
" " 9	2 " 6 "	2 " 6 "
" " 10	. . . . .	3 " 6 "
" " 11	2 " 0 "	2 " 6 "
" " 12	Not opened.	

So far the opening of coal veins in this valley has been principally confined to benching and short entries, so that it may be correct to sug-

gest that, further driven into the hill, all these veins will show a much larger thickness than even that of the above maximum measures.

All these veins, where opened, are above highest water level, so that in the pursuit of mining operations they can all be reached by drifting, thus discharging the mine water without expense; nor requiring the costly process of hoisting.

The following table, taken from the State Geological Report, gives the analysis of samples taken from the whole thickness of beds as mined, and will be useful for future reference:

	No. 1.	No. 2.	No 3.	No. 4.	No. 5	No. 6.	No. 7.	No. 8.
	Graham Bank.	Kibby's Bank.	Peach Orchard.	Camel Hunnewell.	Buena Vista.	Keye's Creek.	Coalton.	Head of Nat's Creek.
Specific gravity . . .	1.267	1.289	1.317	1.306	1.360	1.279	1.320	1.367
Moisture	2.50	4.10	3.26	1.50	3.20	2 94	5.00	3.50
Volatile com. mat . . .	36.00	34.60	34.22	52.20	32.30	32 50	34 50	31.90
Fixed carbon	57.30	55.25	55.36	40.60	53.00	56.76	55.40	52.06
Ash.	2.90	4.77	7.16	5.70	11.50	7.74	5.10	12.50
Sulphur	1.148	1.414	0.901	0.782	1.999	1.972	1.285	0.873

IRON ORES.

But little is so far known of the iron ores interlying the sections of coal referred to. There being no demand for them in the valley, no developments have been made in that direction and only where the little mountain streams have washed their surface bare, or where a road on a hill side cuts into an ore vein, is their existence revealed.

However, that, with proper prospecting, the iron ores in these coal measures will be found as profuse as they are in the further western outcrop of the Big Sandy Valley coal belt, where their existence has created the Kentucky portion of the famous Hanging Rock Iron Region, may be correctly suggested. Five miles above Louisa a thirty-inch vein of black band iron ore has been found extending over a large territory, containing, by analysis, 36.96 per cent. of metallic iron, or ½ per cent. more than that from Scotland, and 11.33 per cent. more than that found in Perry county, Ohio.

DEVELOPMENTS.

Cincinnati, and others of Ohio's river-bound cities, owe, in no small measure, their prosperity and growth to the mercantile trade they have been and are still drawing from Kentucky.

But it is also true that Ohio has, to a large degree, contributed to advance in our State those interests which will elevate us from the old-times slave-curse ruts, which steadily keep us decades behind our more advanced sister States. One of these contributions is the Cincinnati Southern Railroad; another, which affects this part of our State more closely, is the Chattaroi Railway now building from Ashland up the Big Sandy Valley to Peach Orchard, and destined finally, by connecting with the railroad system of Virginia at the Salt Works, to open up the whole valley of the Big Sandy river to the world, to improvement, to immigration, and to unmeasurable prosperity.

It may be justly suggested that these advances of Cincinnati or her citizens are urged by motives of self interest; yet nobody can deny that they are bringing about what our own citizens lack the spunk and means to undertake and accomplish.

What do we care about the motives? The result is what we are in need of; and heartily do we welcome any other corporation which will open our country and its immense intrinsic treasures to the marts of the world.

BIG SANDY COAL MINING COMPANY.

The first enterprise started by Cincinnati's citizens was the coal mining at Industry, near the mouth of Hurricane creek, close to the borders of Floyd and Pike counties, in 1847, which were kept in operation for a few years; but which, owing to the drawbacks, later to be referred to, were finally abandoned, and nothing now remains of these works at Industry but the black waste banks and a few decaying houses and improvements. About the same time Mr. Wm. P. Mellen, another Cincinnatian of remarkable enterprise, opened a coal mine near Prestonsburg (also to supply Cincinnati), and continued successfully (realizing, it is reported, $15,000 net profit) in this business till 1850, when he, on the 3d of September, purchased fourteen acres of land at what is now known as Peach Orchard, for a mill-site, and the privilege of obtaining coal from adjoining lands of Mr. Archibald Borders, a highly respected and wealthy farmer, who is now widely known as Judge Borders to all familiar with the valley. A Mr. Campbell, also of Cincinnati, soon afterwards became a partner of Mellen, and these two built a mill, opened a coal mine, and pushed work with such energy that they were able to make their first shipment of coal to Cincinnati in the winter of 1850. This partnership did not continue longer than a year, when a joint stock company, now known as the "Great Western Mining and

Manufacturing Company," consisting of the late Mr. Carlisle, Boler, Shoenberger, Longworth, and others of Cincinnati, and leading men from Pittsburgh, was formed, Mellen continuing in charge. The operations of this company extended over ten years, till 1861, when the breaking out of the civil war rendered this section so unsafe, exposed as it was to the marauding parties of both sides, that business came to a stand still. During this time extensive improvements were made, which rendered this village a very garden spot in the wilds of the mountains.

TRANSPORTATION, ETC.

The barges in which the coal was shipped held from 12,000 to 14,000 bushels, as many as fourteen of which could be accommodated at one time in the pool at the foot of the incline. They were run down to Cincinnati by hand, and there sold with the coal or after being unloaded. Costing at an average of $300 per barge at Peach Orchard, where they were made, and hardly ever selling for more than $50, the consequent loss of $250 per 12,000 bushel barge was equal to over two cents per bushel. Another drawback caused by the long droughts, when no shipments could be made owing to the low stage of the river, was the expense of pumping barges, which not seldom had to be done for six months uninterruptedly. One hundred and forty barges were shipped during these ten years, twenty of which were totally wrecked on their way down; so that another 13 per cent would have to be added to the total cost of the coal to cover this loss. Yet, in spite of all these contingencies, not to mention the enormous expense of hauling supplies out to the mines per axle during the summer's suspense of navigation, the company made a profit on their operations, though unnecessary extravagances on the part of the management finally consumed more than a possible dividend. The miners received ninety cents per ton for mining, realizing often $4 per day. The manner of mining was that known as "undermining" and "shooting down."

PEACH ORCHARD VEIN.

The principal mine was located on a ridge dividing two branches (Bird's Trace and Miller's Branch) of Nat's Creek, which flows into Big Sandy about 1½ miles above Peach Orchard, and was reached from the river by means of three tunnels, 900, 700, and 800 feet in length. Those three gangways were run on the Peach Orchard coal vein, which at the river tunnel mouth measures but thirty inches, but which in the mine, on Bird's Trace and Miller's Branch, increases to a total of seven-

ty-three inches of coal; the following being the cross-section of the vein:

Slate roof.
6 inches coal.
7 " slate.
14 " coal.
1 " shale.
12 " coal.
3 " shale (runs out).
23 " coal.
5 " slate.
18 " coal.
Fire-clay.

The slate separates very easily, and the miners used to prefer this mine to any other; while the coal always found as ready a market in Cincinnati as the famous Youghiogheny coal. About three fourth miles due east from this point, on Bear Creek, where the same vein has been opened, it shows the same thickness, while on Grassy Creek (three miles southeast) and on Little Laurel (two and a half miles east) it consists of 84 inches of workable coal.

There are about seventy miners' houses on the company's property, which embraces 6,000 acres of land, as well as a mill, superintendent's and manager's residences, store, etc., all of which, as well as the mines, could be put in repair and running order at no very great expense.

MAMMOTH VEIN.

Of immense value as this—the Peach Orchard coal (geologically known as No. 3 coal vein)—has proven itself to be, and sufficient as it is to render the Peach Orchard property one of the most remunerative ones of our State, another coal vein, lately opened on a 900-acre tract, purchased by Mr. G. S. Richardson, the company's manager, surpasses the No. 3 vein, both as to size and quality, and has only too justly been called the Mammoth vein. It is about 180 feet above the uniform bench, which, running along the hills in this section, always indicates the Peach Orchard vein; and, provided the latter is the No. 3 vein, the Mammoth vein may be considered the equivalent of the cannel coal vein of Greenup county. At Wolfpen Fork of Nat's Creek, where this vein has been opened, it shows a solid all-coal face of eight feet. It is true its upper eleven inches are as yet somewhat rotten, owing to the fact that the opening has not been driven into the hill any distance. When further in, this condition will cease, and these eleven inches will turn as solid as the rest.

Throughout the center of the vein runs a streak of snarly coal, about six inches in thickness, which burns down to as light an ash as the rest of the vein, and will not prove a drawback when mined.

The appearance of the vein is that of splint, and it shows strong indications to form into blocks. It has been coked in a rather rude manner in an open air pit, and unskillfully, yet the result was quite a fair specimen of coke, especially from coal taken out of the upper part of the vein. At this point the covering above the vein is two hundred feet perpendicularly.

On Nat's Creek, two miles due south from this opening, the same vein shows a total thickness of eight feet two inches; and three miles further south from this opening, on Chestnut Creek, it even increases to nine feet solid coal.

Returning to the year 1861, when the last coal was shipped by the G. W. C. M. and M. Co., we find that for the four succeeding years of civil war no work was carried on at all. In 1864, Mr. G. S. Richardson, of Rhode Island, took a lease of the whole property, with a view of boring for oil. A well was sunk as low as seven hundred feet, resulting in nothing but weak salt water; striking, however, at a depth of eighty feet, a four-foot coal vein. The bore-hole is still open, and pours out of a two-inch pipe a steady never-ceasing stream of pure water. In 1865, Mr. Richardson built seven 12,000-bushel barges and a new incline, and resumed mining. However, he only made this one shipment, though it proved quite profitable to him. Yet, a long eight months' drouth following immediately afterwards, he decided that further operations could effectively and successfully be carried on, only, by a slack-watering of Sandy river or the construction of a railroad up its course, and to these problems, especially the latter, he has ever since devoted his time.

CHATTAROI RAILWAY.

Mr. John Carlisle, of Cincinnati, one of the leading stockholders, not only aided Mr. Richardson in this respect, but he devoted much of his time and attention to this object. And it is due to his efforts principally that the Chattaroi Railroad is now pushing its way up the valley. It is a narrow-gauge road of three feet width. The following are its present distances: Ashland to Catlettsburg, 5 miles; Catlettsburg to Louisa, 25 miles; Louisa to Peach Orchard, 15 miles; Peach Orchard to the Virginia Salt Works, 125 miles. This last figure is not exact, as no survey has been made to that point at this writing. Yet orders have been issued for a survey from Peach Orchard to Piketon, to be completed by

spring. If the citizens along the upper part of this route will aid the project as liberally with donations and rights of way as the people between Ashland and Peach Orchard, who have presented over $100,000 to the road, have done, the time will not be far distant when Piketon may be reached from Ashland in three or four hours' travel, instead of that many days, as at present. Nearly all the construction work has been completed between Ashland and Louisa; yet it is not probable that the iron will be laid before spring, and that the road will be opened to travel as far as Peach Orchard before July next.

The Chief Engineer, Col. Forbes, has evidenced decided talent in locating the road; and it will be, when completed, a handsome monument to his skill and ability. The Ohio river terminus at Ashland, which is correctly considered the extreme head of low-water navigation, embracing a tract of valuable land, will be above the Norton Iron Works. At this place, also, will be located the machine and repair shops of the company; while union passenger depots will answer the demands of this and the Lexington and Big Sandy road, both at this place and at Catlettsburg. The heaviest grade down (excepting at Flat Gap, where it is much heavier) will be 52 8-10; the heaviest grade up will be 80 feet per mile; the sharpest curve does not exceed 15 degrees.

SHIPPING AND MINING.

That the shipping of coal down this road to the river, and thence to the lower markets, will prove remunerative, is the readier apparent as Ashland is 335 miles below Pittsburgh, and always accessible at times when the latter is entirely cut off from the lower markets by our frequent river droughts. Considering further that nearly 6,000,000 tons of coal annually pass down the Ohio river, of coal of *all* qualities, it is evident that as superior a character of coal as that of the Peach Orchard and Mammoth veins will find quite a prominent place in the lower markets.

There is no doubt but that the coal can be mined at 50 cents; add to this for contingencies, entries, mule feed, superintending, dead work, etc., 25 cents; railroad freight, 40 cents; loading and pumping of barges, 25 cents, which makes the total cost $1 40 per ton of lump coal, and 65 cents per ton of nut or slack coal. This undoubtedly leaves quite a margin for profit. Coal openings have been made all along the river, principally to furnish the passing steamboats with fuel. Prominent among these is the entry of Daniel Wheeler, near Paintsville, Johnson county, which shows a remarkable increase in size as it is

being driven into the hill, the vein measuring but 42 inches at the outcrop, while only 300 feet in it rises to 5 feet solid coal of excellent quality. The same vein can also be seen, well developed, near Laynesville, Floyd county, of even greater thickness. An 8-foot vein of coal has also been opened at the mouth of Mud, in Pike county, thus showing a continuous increase in the size of the vein.

Unproductive as most of the coal lands on both sides of the valley, and extending many miles beyond, at present are, their value is not great, and they may readily be purchased at from $5 to $15 per acre, to be worth one hundred times that much whenever transportation facilities will have reached them. Another source of much profit, in the not far future, will be the coal oil and salt resources of this and adjacent valleys.

At present salt water is only utilized at Warfield, on the Tug Fork, while bore-holes for coal oil are being sunk on the Paint head waters in Johnson county.

Lack of space forecloses a more minute reference to these interests, as well as to the numerous mineral waters which are found in several parts of all this region, and which will prove of no small value to the owners of these springs whenever the country will have been more thoroughly settled and opened to transportation.

RIVER NAVIGATION.

Owing to the fact that the main exports from the Big Sandy Valley are and will be of a bulky nature, requiring the very cheapest manner of transportation for any remunerative purposes, ways and means to slack-water this river will ere long be found.

The Federal Government, indeed, is giving this matter its consideration, and it is not improbable that the present session of Congress will make sufficient appropriations to commence this important and much needed work.

At present boats drawing from 20 to 30 inches navigate this river as far as Louisa during eight months, and as far as Piketon during five months, the traffic of the valley being carried on by push-boats during the remainder of the year. Both these classes of craft combined carry about 30,000 people and 30,000 tons of freight up and down the river; the total value of all the present exports of the valley, consisting of saw-logs, staves, tan-bark, timber, fruit, grain, live stock and farm produce, aggregate about $1,500,000, as nearly correct as can be estimated. Considering the fact that the locking and damming of this river would render possible the mining of coal, and its delivery by all water trans-

portation at Cincinnati and the lower markets at prices much less than what it costs the Pittsburgh shippers, renders the *slack-watering* of Big Sandy river a pre-eminently important project to all the interests of the Ohio River Valley. Big Sandy river is formed by the confluence of the Louisa and the Tug Forks, 26 miles from its mouth, opposite the town of Louisa, Lawrence county, Ky., and is the dividing line between the States of Kentucky and West Virginia. It flows in a northwesterly direction, through a narrow valley, confined between rocky hills, from 600 to 2,300 feet apart, and empties into the Ohio at Catlettsburg, Kentucky.

The bordering hills are broken nearly every mile by streams which have their sources from two to fifty miles distant. The average width of this part of the river is 300 feet. It is to a great extent shallow; but in many places deep pools with rocky bottoms are found.

The bottom lands, varying in width, are about 50 feet above low water-mark, and not subject to inundations except in extreme cases. The banks are in many places clear of trees, and except where the rocky hills immediately border the river, they are composed of sand so fine and uniform in composition as to be easily washed away by the currents. The erosive action of this river during floods washes the sand from the roots of the trees to such an extent that they often become so inclined as to obstruct navigation.

An examination was made a few years ago by boring into the river bed, and rock from 8 to 20 feet below the surface of low water was found throughout the entire length of the river except at its mouth. The natural bed of this stream is covered with sand, a deposit due, no doubt, to the large quantities of this material constantly being carried by the small rills into the various tributaries; thence it is brought into the river, and eventually it finds its way to the Ohio. The numerous bars found at the mouths of the branches are constantly being carried from place to place by the successive rises in the river. This stream is crooked like other mountain rivers, and its average fall is 1.05 feet per mile.

LOUISA FORK.

The Louisa Fork is the principal branch of the Big Sandy river, and it rises beyond the Cumberland Mountains in the table lands of the southwestern part of Virginia, at a distance of 1,500 feet above tide water. It flows, like the main river, in a northwesterly direction through a narrow valley.

The fountain head being so far south gives the river an advantage over northern streams in having but little ice, a feature of considerable importance to those interested in navigation. In ascending the river the hills increase in height. In some places the banks are composed of rock; in others, of sand and clay. Where they are of the latter material, the slopes are uniform. The bottom lands, like those of the main river, are above ordinary high water-mark. There are many large bowlders in the river which have rolled from the bordering hills, and are obstructions which ought to be removed. The peculiar feature of this fork is the great number of rock bars, which are doubtless due to the fact that its steep slopes cause a velocity in the current so great as to prevent the sand from lodging. These rock bars have only a few inches of water on them during low stages, while at the head and foot are pools varying in depth from 6 to 12 feet. The average fall from Piketon to Louisa, Ky., is 1.49 feet per mile, and the average width is 200 feet.

TUG FORK.

The Tug Fork rises in the mountains of McDowell county, West Virginia, and flows in a northwesterly direction, forming, with the Louisa Fork, the Big Sandy river.

It has the same general features as the Louisa Fork. The hills come nearer to the river, and consequently the bottom lands are not so wide. This fork, as far up as the Falls of Tug, is shallow, crooked, and narrow—so shallow during low water as to render navigation impossible; but above the falls its character changes, and it becomes a succession of pools separated by rock bars.

The hills are very steep, exposing the rocky materials of which they are mostly composed. The banks are alternately of rock and of sand; but, when formed of the latter material, they have been but slightly cut away by the river, on account of the protection afforded by the trees and plants. The average width of this fork is 180 feet, and the average fall from Louisa to Warfield, Kentucky, is 1.75 per mile. The Big Sandy proper is 26 miles in length from Catlettsburg, at its mouth, to Louisa, at the junction of its two forks; and Piketon, on the Louisa Fork, is 86½ miles above Louisa, or 112½ miles above Catlettsburg, and Warfield, on the Tug Fork, is 35 miles above Louisa, and 61 miles above Catlettsburg.

The fall of the river is distributed as follows: Piketon to Louisa, via Louisa Fork, 129,719 feet; Warfield to Louisa, via Tug Fork, 61,184 feet; Louisa to Catlettsburg, via Big Sandy river, 27,479 feet.

It is evident that the only feasible way of procuring a sufficient supply of water for navigation, and especially for a navigation by coal barges, is to canalize the river by means of locks and dams. In doing this, we at once have our choice of two methods—the French method, recently invented, of movable dams, and the method in use on the Monongahela, Muskingum, Kentucky, and other rivers, of permanent dams. The first method is decidedly the better of the two, where the natural navigation lasts for several months continuously; but its greater cost of establishment and of maintenance naturally causes the selection of the second method for rivers on which the total amount of navigation is not great. Assuming a lift of 10 feet, which experience on the Monongahela has shown to be the most serviceable lift for river locks and dams, we obtain the following table:

	Distance.	Rise.	Locks and dams required.
	Miles	Feet.	
Catlettsburg to Louisa	26.0	27,479	3
Louisa to Piketon	86.5	129.719	13
Catlettsburg to Piketon	112.5	157,198	16
Catlettsburg to Louisa	26.0	27,479	3
Louisa to Warfield	35.0	61,184	6
Catlettsburg to Warfield	61.0	88,663	9

In the following estimate of a Government survey no account is taken of coffer-dams, as it is believed that by building in low water this expense would be trifling. The size of the lock has been fixed at forty-five feet in width and two hundred feet in available length, as it is thought that a larger lock would be out of proportion to the available supply in low water. By available length is meant the distance between the chord of the upper meter wail and the upper ends of the recesses of the lower gates. This is the full length that is available for the use of boats. The average length of a dam will be two hundred and fifty feet, the average height will be fifteen feet, and the width of base forty-five feet. The up-stream slope will be one and a half, and the down-stream slope one on three. The crib work will be filled with rip-rap, and its upper slope will be sheathed with 4-inch planking, and its lower slope with 8-inch timbers.

GENERAL ESTIMATE.

The total number of locks required in order to improve the main river and both forks will be as follows: Catlettsburg to Piketon, 16; Louisa

to Warfield, 6; total 22. Assuming that one third of these will be on gravel. we have the following general estimate:

7 locks on gravel, at $78,049	$546,343
7 dams on gravel, at $25,449	178,143
15 locks on rock, at $60,401	906,015
15 dams on rock, at $19,469	292,035
Total for 22 locks and dams	$1,922,536
Average for 1 lock and dam	$87,388

The track of a narrow-gauge coal railroad taps the Ohio river three miles below the pretty city of Catlettsburg, at the mouth of Big Sandy river, leading to the Keyes Creek coal mines, which years ago, when the panic struck the iron interests of the Union, laid low the hopes of that property, and its realty finally reverted to its original owners, the most prominent one of whom is the Hon. E. F. Dulin, of Greenup, Kentucky. The coal found on the property, the No. 6 vein, is of good, strong, and pure character, and its final development will yet result in profit to parties taking hold of it.

Two miles further down the course of the Ohio river lies

ASHLAND,

a highly prosperous manufacturing city of some 4,000 inhabitants.

When, years ago, the Lexington and Big Sandy Railroad enterprise collapsed, leaving nothing to tell the tale of its short yet hopeful existence but a large stock of various county bonds, contractors' debts, the graded road-bed from Lexington to Mt. Sterling, and about 12 miles of completed track leading from the Ohio river to some coal lands in Boyd county, this "Eastern Division" was secured by a company of gentlemen who, through their coal mines at Coalton, have immortalized Ashland, the road's terminus, built it up, and made it a manufacturing center of no little importance.

In the earlier years of their mining operations, this L. & B. S. R. R., E. D. Co., did not seem to realize much profit; but when in 1867 the old *Greenup*, or present *Hunnewell* Furnace, in Greenup county, had demonstrated that Kentucky's stone-coal, in the raw state, and native iron ores would produce good pig iron, the *Ashland* Furnace was built at Ashland the following year, and owing to its success, combined with a careful management of their coal mines, the L & B. S., E. D. Co., officered by John Means, President, W. F. Gaylord, Treasurer, and Robert Peebles, Secretary, have been prospering ever since.

ASHLAND FURNACE,

under the management of Col. Putnam, is 60 feet high, with a 15-foot 8-inch bosh, and 7 feet at the top. It has a water-hoist, 4 batteries of each 2 boilers (46 feet by 44 inches), a 36 inch by 7-foot engine, a 7 by 7-foot blowing tub, 3 Whitwell hot-blast ovens, 50 feet high and 16 feet in diameter, and a 118 feet high smoke-stack.

Some mill cinder and Iron Mountain iron ore is used with the native iron ore, supplied from Coalton, near the present terminus of the rail-road. The mixture of the Iron Mountain iron ore improves the quality of pig-iron greatly, producing a superior grade of neutral foundry pig, of which an average of 45 tons is daily produced on *only raw stone-coal.*

This coal is famous for its adaptability to the reducing of iron ores in its raw state, similar to anthracite coal, while all the other veins of bituminous coal (excepting the No. 1 vein) can only be used in the iron furnace after having been previously coked. The mining village, some 12 miles distant, where this coal vein was first opened and mined, was christened Coalton, and thus it came about that the No. 7 vein is now generally known among coal miners and iron men as the Coalton coal.

The entries in the immediate vicinity of Coalton have been exhausted, and mining operations are now being carried on three miles further south, where the villages of Rush, Geigersville, and Trace are the homes of some four hundred miners and laborers. One of the most interesting improvements is an endless wire-rope, which runs through the main mine entry, one and a half miles in length, and by means of which a stationary engine pulls all the loaded cars to day-light and the empty ones back, mules being only used inside of the mine to establish communication between the main entry and the miners at work. This improvement saves the company the use of fifty mules and fifteen drivers—a most wonderful saving. The Coalton coal consists of three layers, measuring here in all six feet.

The upper third section, however, contains so much sulphur that the miners have to leave this in the rooms, while in the cross entries they have to take out the full face of the vein. Their mode of mining mostly consists of bearing in on the lower section and then shooting down from below the third.

The present capacity of the mines is over 15,000 bushels per day, and, as the company has over four thousand yards of cross-entries ready for the turning of rooms on hand, representing not less than 12,000,000 bushels minable coal, in addition to the entries now being worked, they

are in a position, on short notice, to more than double their present out-put.

The coal territory owned by this company embraces many thousand acres. The coal not used by their Ashland furnace is readily sold to other furnaces in Ohio, in the Cincinnati market, and to steamboats and local supply at Ashland, where two inclines connect with the river to load the coal into the seventy barges owned by the company.

It was also owing to the existence of the Coalton vein, in Boyd and Carter counties, contiguous to the Ashland Railroad, which, in 1873, induced a corporation of wealthy capitalists, headed by Col. Norton, of Ironton, Ohio, to locate the

NORTON IRON WORKS

(officered by John Russell, President; Hugh Means, Treasurer, and A. B. Fennacy, Secretary) at Ashland, after having previously purchased the Star lands, near Coalton, for obtaining coal, and the *Old Steam* and *Caroline* tracts, a total area of 18,000 acres, for their iron ore supplies.

The plant of the company's extensive works covers ten acres of land in the upper part of Ashland, connected with the Ashland Railroad track, consisting of three distinct departments—a blast furnace, a rolling-mill, and a nail mill.

THE FURNACE

is a 67 feet stack, lately supplied with all modern and most approved improvements, embracing four Whitwell ovens, etc. Sixty-five tons of fine pig iron are the average daily out-put, native ore, with a mixture of Iron Mountain ore and mill cinder being used, with mostly only raw Coalton coal.

THE ROLLING-MILL

consists of two trains, one for muck, the other for nail plate, both of which are run by a 36 by 40-inch engine. Twenty puddling and three heating ovens are placed on both sides of the two trains.

Nail plates only are here produced, and these are conveyed to the adjacent

NAIL-WORKS,

which embrace 80 nailing machines and 30 grindstones, having a weekly capacity, at single turn, of 5,000 kegs of nails of all sizes, and of a highly prized quality.

THE STAR DEPARTMENT

of these works furnishes the coal supply. The mines at this place are located south of the dividing ridge between the waters of Mile and

Rachel's branch of Williams creek, and are reputed for their excellent economical arrangements, the quality of the coal being about the same as of the coal mined on the adjacent Coalton property.

The immense importance of all these works to Ashland, and of that place itself, will the readier be understood by the fact that not less than $40,000 in cash are paid out to laborers, in Ashland alone, every month.

Another valuable furnace tract and furnace; owned by Means & Culbertson, lying adjacent to the Ashland Railroad, is the *Princes* Furnace, a lately built stone-coal furnace, supplied with all the latest improvements.

Three miles west of Ashland lies the Bellefonte charcoal furnace, owned by Means, Russell & Means, which makes some 3,000 tons of very superior foundry pig-iron per year.

Twelve miles further down the Ohio river, the track of the Wurtland coal mines, owned by Maysville parties, and managed by the Ryan Brothers, strikes the river. The mines are about three miles back of the river, and produce a little over 3,000 bushels of Coalton (No. 7), Cannel (No. 4), and Turkey Lick (No. 3) coal. This is a valuable property.

EASTERN KENTUCKY RAILWAY COMPANY.

Fifteen miles below Ashland, on the Ohio river, lies Riverton, and adjacent to it Greenup. Riverton is the shipping place and northern terminus of the Eastern Kentucky Railway, H. W. Bates, vice president and manager, whose road at present extends thirty-five miles due south, intersecting Greenup and Carter counties, and tapping Lawrence county at Willard, a mining village.

This company is chiefly composed of Boston capitalists, who have been most faithful and enterprising in their efforts to promote the development of Eastern Kentucky.

Their line is the shipping medium for the charcoal furnaces at Pennsylvania, Hunnewell, Buffalo, Laurel, Iron Hills, and Mt. Savage, whose joint annual capacity may be placed at 18,000 tons of charcoal pig-iron. The first two named furnaces are owned and operated by this company, and it is well in this connection to remark that Hunnewell justly is considered the champion charcoal furnace of the West.

Large quantities of lumber, staves, iron ore, coal, and country produce are likewise handled and partly transported to market by this company.

The future aim of this company undoubtedly lies in the direction of Pound Gap.

Following the survey of the Portsmouth and Pound Gap road, located some five years ago by Dr. Fulton, of Portsmouth, and others, with a

view of reaching Saltville, Virginia, seventy miles beyond Pound Gap (which latter point is one hundred and thirteen miles beyond Willard by this survey), there to connect with the Virginia Central Railroad, and finally to reach Port Royal, South Carolina—one of the best harbors of the Atlantic. This survey reports a continuous increase in the size of coal and iron ore veins, all the way to Clinch river, where one vein of seventeen feet of coal, a three hundred foot vein of iron ore, and extensive gypsum (plaster of Paris) deposits are reported.

Leaving Willard, about two miles south of the present terminus of the Eastern Kentucky Railroad, it crosses from the Dry Fork to the Little Fork of Little Sandy, thence into the Newcomb tributary of that stream, and up to its head, whence it crosses into the Elk Fork of Licking river, passes West Liberty and Salyersville on to the head of Licking river, thence into Salt Lick creek, reaching Beaver creek at Neil's store, following up this stream to its head, crossing a light "divide" into Mill Creek, Rocky Fork, and finally up the North Fork of the Kentucky river to Pound Gap; a total distance, as stated, of one hundred and thirteen miles. The primeval forests, the rich farming lands, and the valuable and extensive veins of coal and iron above Salyersville, on Beaver, and thence up to the Cumberland mountains, do not require much allusion at present. Beaver is justly considered the richest mineral tributary of Big Sandy.

In these statements reference shall only be made to the country between Willard and Salyersville and the Licking river cannel coal field.

It seems that the soil, and consequently the timber growth of upper Little Fork, Newcomb, and the Licking river tributaries, are of more than average richness; and, owing to the fact that a majority of streams intersecting these forest lands are too small to admit of rafting, and the country being sparsely settled, a nearly virgin growth of the best grades of timber surrounds the traveler for miles and miles, interrupted only by sparse small farm improvements.

The building of a railroad would therefore create all along its line a manufacture of wood, both in the plain and finished varieties, which could defy competition for many years to come.

It is natural that, no demand having been created for them, iron ore veins noticed by the traveler as cropping out in numerous places, especially where the road takes up the point or the side of a hill, or where small brooks have washed them bare, have not been opened sufficiently to enable an exact description. Specimens of excellent limestone iron ore and the bloom of kidney and block iron ores are seen in numerous places, and several 30-inch iron ore veins have been

found in several localities. However, while there is here a large and promising field for the manufacture of lumber, wooden-ware, and charcoal iron, as well as for the profitable shipment of iron ore, the main dependence of this region is its

CANNEL COAL.

Cannel coal is the best remunerative railroad traffic, having a higher intrinsic value than bituminous coal, and therefore bearing a higher rate of freight charges, and, owing to its greater hardness, not being liable to be broken or mashed by the jar of railroad transportation. Cannel coal is first found, in reasonable thickness, about 12 miles southwest of Willard, and thence it seems to increase in size and quality the further it is traced in that direction; on the Newcomb and Middle Forks of Little Sandy, it appears of a thickness of 20 to 30 inches, and on Dr. Fulton's 5,000-acre tract the size of the whole vein, consisting of cannel and bituminous coal, is stated at almost 5 feet.

This cannel coal field here commencing is intersected longitudinally by Licking river, which divides it into an eastern and western field, both of which jointly represent an area of nearly 750 square miles, not disconnected, but continuous, not only in one vein, but in many places in two and three, one above the other. It is locally mined at all the different places to be enumerated, and reliably traced all over the scope of country referred to. It occurs mostly in two different horizons, about 200 feet apart, the lower one consisting of nearly all cannel coal, while the upper one embraces both cannel and bituminous coal. The cannel part of the upper one averages about 20 inches, the lower one 4 feet and more. Cannel coal can be very profitably mined and shipped if of no less thickness than 15 inches, so that both veins would prove highly remunerative. The most striking appearance of the eastern field is on the Rush branch of the Elk Fork of Licking river, in Morgan county, about 28 miles (or less) southeast of Willard. Here it has been opened at 20 different places, mostly on the eastern drains of Rush branch. There is not much difference in the size of all these. The mention of one of them will, therefore, suffice, that on Mr. John C. Fannin's land, which, located one mile above the mouth of Rush branch, appears as follows:

Bituminous shale, 3 inches.
Cannel coal, 9 inches.
Fire clay, 3 inches.
Cannel coal, 47 inches.
Cannel coal slate, 1 inch.
Bluish-grey soap-stone rock.

Making a total of 56 inches of cannel coal, which, at a point further in the hill, in a distance of 80 feet, increases to 58 inches of excellent cannel coal of a satin luster, with the small peacock sparks so characteristic of the best qualities of this species of coal. Further down Elk Fork, on its Mordecai branch, the coal had been opened in a number of places when the late State Geologist Owens inspected it (in 1856), representing 28 inches of solid cannel coal.

These openings have since caved in, and can therefore not be examined at present.

On the next branch two entries are opened and operated by E. B. Perry, representing the following cross-section:

Bluish-grey slate roof.
Splint coal, 6 inches.
Blue-black slate, 3 inches.
Cannel coal, 20 inches.
Cannel coal slate, 5 inches.
Bituminous coal, 15 inches.

About one and a half miles above the mouth of Cox branch of Elk Fork (on the north of Elk Fork), Wm. Mynheir's coal mine is located, which has been run in about eighty feet, showing a continual rise in the thickness of the vein, with the following section:

Bluish-grey slate roof.
Bituminous coal, 6 inches.
Shaly clay, 2 inches.
Cannel coal, 21 inches.
Cannel coal slate, 4 inches.
Soap-stone, 1 inch.
Bituminous coal, 6 inches.
Bluish-grey soap-stone rock.

About fifteen miles due southeast from this coal mine is located the Colvin coal-bank, on the Buck branch of Licking river, where there are two entries, one 50 the other 25 feet in the hill, with the following cross-section:

Black slate roof.
Soft slate and bituminous coal, 6 inches.
Cannel coal, 32 inches.
Cannel coal slate, 4 inches
Grey slate.

This coal, as well as the other mentioned, has a fine reputation along the Licking river, to whose towns it is conveyed in 800 or 1,200 bushel

barges, and on timber rafts, selling there at from 25 to 35 cents per bushel. It is generally delivered on the river bank by the miners at 10 to 12½ cents per bushel, leaving the shippers a nice and healthy margin for freight and profit.

Of course all these openings are primitive, and on a small scale. Others could be mentioned, but one will suffice to finish off this eastern cannel coal field, as its location indicates the extent of the same. It is the mine of William Adams, at Salyersville, 7 miles due south of Colvin's bank, which is driven in about 200 feet, showing the following section:

Slate roof.
Bituminous coal, 18 inches.
Slate, 2 inches.
Cannel coal, 13 inches.

The bituminous coal here is of such solidity that it is safe to say that it will assume the character of cannel coal further in the hill.

The Western Licking Cannel Coal field, extending from the mouth of Johnson's Fork, and along nearly its whole length, including White Oak, Caney, and Grassy creeks, terminates in the dividing ridge between the tributaries of Blackwater and Beaver creeks In a southern course it extends over to the territory drained by Red river and other streams.

The Cox mine is located immediately opposite West Liberty, where an entry over 200 feet into the hill gives the following section:

Grey rock roof.
Soft bituminous coal shale, 4 inches.
Cannel coal, 15 inches.
Fire-clay, 7 inches
Bituminous coal, 9 inches.
Bluish-grey soap-stone rock.

Val. Pieratt and others have openings nearly exhibiting the same section.

On Blackwater about 25,000 bushels of cannel coal have been obtained, during the last few years, by benching, and hauled by teams to Flemingsburg and Mt. Sterling, and also shipped on rafts down the Licking river.

Near Judge Lykins', on Caney, three distinct veins of cannel coal appear, one above the other, in a hill which is about two hundred and

seventy-five feet high. The lowest stratum, closely resembling the Fannin Rush branch cannel coal, has the following section:

Bituminous coal, 11 inches.
Cannel coal, 54 inches.
Bituminous coal, 4 inches.

It is not necessary to make detailed reference to the merely bituminous coal veins of this section, quite a number of which, of excellent quality and paying thickness, occur.

The Eastern Kentucky Railway's extension in the above direction is nothing but suggestive conjecture as yet. That it would render the company's interests incalculably valuable needs no further commendation than a summing up of the foregoing statements. Such an extension, indeed, would render Riverton one of the most promising manufacturing centers of the State, unsurpassed by any of the other growing cities of the Hanging Rock Iron Region. But even without it, the future of

RIVERTON

is very promising indeed, being the terminus of a road which leads out into the most valuable coal and iron ore districts of the State, whose ready, cheap accessibility is destined to build up furnaces and iron-works at this point before long.

Owing to the fact that the steel-works of Ironton and Portsmouth always seek the pig-iron manufactured by the furnaces lying along the Eastern Kentucky Railway, and also owing to the fact that some of the iron ores of Carter county contain a very large proportion of manganese, it is evident that, connected with the various other facilities here offering, Riverton is a most desirable location for the establishment of steel-works. The bringing in of large quantities of tan-bark upon the road would also render this a well adapted location for tanneries on a large scale, which could readily be supplied with hides from all the country opened by the railroad. The manufacture of all kinds of wooden-ware, ax and tool handles, hubs and spokes, etc., would also thrive here, owing to the natural resources of that class of timber accessible to and by the railroad.

Of the other iron furnaces of Greenup county, Kenton and Raccoon should not be overlooked, the latter especially being a valuable property, consisting of 11,000 acres of iron ore and timber lands.

The pig iron of this furnace, built in 1833, enjoys a fine reputation in the market. The property is of especial value, from the fact that the celebrated Jackson stone-coal (No. 1) is found on it in sufficient quantities for furnace purposes.

Much greater profit and advancement than from any other source will be those which the long projected, and now, at last, being completed,

LEXINGTON AND BIG SANDY RAILROAD

is about to confer, not only on its eastern portion, but, in fact, on the whole State of Kentucky. Owned and directed, as this enterprise is, by the Chesapeake and Ohio road, it will be but a link in an all-rail line between Louisville and tide-water, near Richmond, Virginia, of six hundred and thirty six miles—by over a hundred miles the shortest connection between the Atlantic and Louisville, and thence to the South, North, and West. Only some eighty-nine miles, or that part lying between Mt. Sterling and Huntington, now remains to be completed; the road running from the latter point to the mouth of Big Sandy river at Catlettsburg, where it intersects the Chattaroi narrow-gauge road; thence to Ashland; thence following the track of the Coalton road to Rush; thence past Mt. Savage Furnace to Vincent's Station, where it intersects the Eastern Kentucky road; thence by Olive Hill and Morehead to the mouth of Triplett's creek, where connection is to be had with the Licking Valley road; thence to Mt. Sterling, where it connects with the Mt Sterling Coal Road, and thence via Winchester to Lexington: thus opening to the world a comparatively unsettled region, whose intrinsic treasures will be developed by the various named branch roads, all of which will be feeders to the main stem; and this road has a great future, especially as it will enable the producers of farm stock and farm crops to ship them to eastern markets at little expense, supplying at the same time cheap fuel and building material to the Blue-grass counties.

Considering first the coal supply, it may be correct to assume that the immediate source would be from the beds which are mined near Coalton and those approached at the crossing of this proposed road with the Eastern Kentucky Railway near the mouth of Straight creek; at that point along its immediate line, or that of the intersected road which becomes its feeder, there is an abundant supply. The ten miles square of road about that point can supply Central Kentucky for generations to come. Other sources of coal supply, especially of cannel coal, can be found by the Licking river road, where, in a few miles, the borders of the admirable cannel coal field of the Upper Licking, elsewhere alluded to, would be reached. The coals of workable size in the area tapped by this road aggregate more than twenty feet in thickness, and are hardly surpassed in their average value by

those of any other area in the United States. Besides the demand for general use in the region to the west, there are some coals which will always be in demand for eastern shipment.

The Coalton coal will always bring a price to warrant its carriage to the Ohio, to be used for smelting purposes, and the Licking cannels may hope for a shipping price by way of this road to the Ohio river and the seaboard. The distance of these coals from the Ohio, by way of the Big Sandy and a Licking river branch, will not exceed ninety miles, which will not cost over $1 20 per ton at the highest rate now charged in Kentucky for the carriage of coal. The great thickness of the Upper Licking cannel coal would make it possible to sell it at Riverton at less than eight cents per bushel. By far the most important business of this road will probably be the carriage of iron ores to the existing furnaces or those which it will create in the Eastern Kentucky iron region. All along the road extensive deposits of the lower ores of the carboniferous system may be sought to advantage, and will give a large and profitable business to the road.

Limestone and charcoal will also furnish valuable elements to its trade. Probably the most important source of supply will be found in the ore from the Preston ore bank, in Bath county. This magnificent deposit of ore, though covering only about 100 acres, has a depth of over 12 feet, and can furnish 50,000 tons a year for a century to come. This ore can be mined and loaded on the cars for 50 cents a ton, and will, when mixed with other ores, tend to reduce the cost of manufacturing iron in the Greenup district; it will moreover help to furnish return freights for coal cars which have delivered their loads in the Lexington district. Another source of supply will be the iron ore from the *main limestone* or *Red River bed*, which can be brought as return freight to the Greenup district.

The opinions of experts coincide that this ore exists all over the subcarboniferous limestone area east of Slate creek, and drained by its waters. The distances from these ores to the Greenup district furnaces is only about from 40 to 90 miles, so that the cost of transportation would not bar the use of these ores as return freights for coal cars which have delivered their loads in Central Kentucky. It is difficult to exaggerate the importance these return freights may have both to the railway or to the industries which depend on coal and iron.

From this point of view it is evident that the Mt. Sterling Coal road is likely to aid rather than damage the interests of the Lexington and Big Sandy road. There will be no difficulty in furnishing annually

100,000 tons of ore from the Preston bank and from the ore beds along the first 20 miles of the Mt. Sterling Coal road. And nearly a like quantity of superior iron ore will be furnished by the Olive Hill region, where the famous "Red River" limestone iron ore is found of larger thickness than at the very Red River Iron-works. In this connection mention should be made of the lands of the *Tygart Valley Iron Company*, situate immediately on the L. & B. S. R. R. survey, comprising some 13,000 acres of the choicest iron ore lands of the region, and lying partly near Olive Hill, partly on the head waters of Sinking Creek, Carter county.

The Olive Hill tract lies immediately on the line of the projected Lexington and Big Sandy Railroad, which, when completed, will enable the iron manufacturer at Olive Hill to reach Louisville by 170 miles, Huntington by 45 miles, and Riverton by 42 miles continuous, all rail transportation.

Situate on the head waters of tributaries of Tygart's creek, this, the larger tract, abounds with those subcarboniferous limestone ores which have given such a fair name to the well-known brands of Red River iron. The developments have not been very extensive However, the following cross-section of the "Garvin Hill," which forms a part of this estate, will be found to represent truly its mineral deposits:

	Feet.	Ore.
Shale and sandstone	37½ feet.	
Top hill ore		2 feet.
Shale and sandstone	38 feet.	
Small ore		2 inches.
Shale and sandstone	24¾ feet.	
Block ore.		2 feet.
Shale and sandstone	61½ feet.	
Small ore		2 inches.
Shale and sandstone	16¾ feet.	
Blue kidney ore		1 foot 6 inches.
Shale and sandstone	7¾ feet.	
Limestone ore		3 feet 1 inch.
Limestone	77½ feet.	
Freestone	135 feet.	
Total	398 feet.	8 feet 11 inches.

The *block ore* appears similar to the Lambert vein, which, at Charlotte Furnace (15 miles northeast), increases from 4 to 18 feet in thickness, and has there been successfully worked for several years.

The *Blue Kidney ore* has been analyzed at Essen, Prussia, yielding 53 9-10 *per cent. of metallic iron, and one and a half per cent. of manganese*, whereby it becomes of the very greatest value for the making of spiegel and other grades of iron, required in the manufacture of steel. What

is stated regarding the *limestone ore* on the Sinking estate, fully refers to that class of iron ore on this tract.

The Sinking Tract, on the waters of *Little Sinking* and *Barrett's* creeks (tributaries of Little Sandy river) lies six miles west of the Eastern Kentucky Railway line, and is immediately intersected by the survey of the Lexington and Big Sandy Railroad. A proposed "furnace site" centrally located on this tract, is but thirty-two miles from Riverton on the Ohio river, or thirty-eight miles from Huntington, and one hundred and seventy-seven miles from Louisville via the projected Lexington and Big Sandy Railroad.

The main value of this tract is due to its *geological situation*, comprising both the sub-carboniferous and the carboniferous formations; the former cropping out in the lower valleys, the latter extending in the hill-tops to the Little Block, and, in instances, even to the Yellow Kidney ore; all these ore veins being found of superior quality and in more than common thickness.

Thus, it abounds with *limestone ores*, so well adapted for the manufacture of car-wheel iron, and with the overlying stratification of *Block and Kidney ores*, which yield a metal highly prized for foundry purposes; while both varieties mixed would produce, on the spot, an original *neutral* grade of pig-iron.

The development and openings have not been very extensive, yet the following cross-section may be considered approximately correct:

	Ore.	Coal.	Shales, etc.
Baker Bank ore	18 inches.		
Intermediate sandstone			25 feet.
Kidney ore	4 inches.		
Intermediate sandstone			25 feet.
Cannel coal		35 inches.	
Intermediate sandstone			25 feet.
Kidney ore	3 inches.		
Intermediate sandstone			25 feet.
Block ore	10 inches.		
Intermediate sandstone			3 feet.
Bituminous coal		30 inches.	
Intermediate sandstone			30 feet.
Kidney ore	10 inches.		
Intermediate sandstone			22 feet.
Block ore	10 inches.		
Intermediate shale			8 feet.
Splint coal		28 inches.	
Conglomerate rock.			
Limestone kidney ore	10 inches.		
Rock.			
Limestone ore	18 inches.		
Total	6 feet 11 inches ore.	7 feet 9 inches coal.	

At the present scale of wages, all these iron ores can be dug and delivered on the cars, whenever the railroad track shall have been extended to this place, at $1 25 per ton; and from analysis and practical working (these ores have been largely tried at Hunnewell furnace), it will not require more than from 2½ to 2¾ tons of the "green" ore to produce one ton of pig-iron.

Charcoal will not exceed four cents per bushel, so that the cost of manufacturing pig-iron at this locality would be amply paid for at $13 per ton, including all expenses. Adding to this amount $3 for railroad freight, would deliver iron at Riverton, on the Ohio river, at a total cost of not more than $16 per ton. As indicated by the foregoing cross-section, the *coal resources* of the Sinking estate are not less important; the openings have not been put in far enough to develop them in their full thickness; the sizes given are minimum measurements; and from entries made into the same veins on other estates, it is but justifiable to presume that, if driven further, they will turn out much better than above stated.

The quality of the *cannel coal* is fully equal to the well known *Hunnewell* cannel coal, which vein is, even at the present, being profitably dug in places where it does not exceed ten inches in thickness.

The second *bituminous vein* is also of great value for its purity from sulphur; but the *splint coal* is considered the most important coal vein of the three. The State Geologist has decided that this is the No. 1 or Jackson coal vein; a vein which, from its adaptability to reduce iron ores without having previously been coked, has given Jackson, Ohio, so famous a reputation.

The lumber traffic on this road will be great. At the Licking it will get the command of the admirable lumber resources of that stream, and afford a very cheap source of supply to the Lexington market. All along the road there is good hard wood in great variety. For this Central Kentucky affords a large market. The pine forests of the Upper Licking would furnish lumber that is now brought from Michigan; while the magnificent forest of the Tygart Creek Valley cannot be excelled, having for miles never been touched by the woodman's ax, and abounding with both the varieties of timber which are so desirable for building material and for the manufacture of charcoal. Another advantage to be derived from the construction of the L. and B. S. R. R. will be an impulse to immigration, resulting in the speedy and satisfactory settlement of the unmeasured waste lands of the mountain counties.

IMMIGRATION AND AGRICULTURE.

So far but few efforts have been made to accomplish this desirable end; in fact, only one company, the Eastern Kentucky Railway Company, heretofore alluded to, has made a departure in this respect.

A pamphlet lately published by it gives quite an exhaustive review of the agricultural possibilities of Greenup county; and as the condition of Greenup county in this respect is equal to most all the other counties of Eastern Kentucky, a closing paragraph of this treatise on our resources cannot be fitter made than by a few quotations from the pamphlet alluded to:

The emigration from the Eastern States and Europe, which has of late years populated, and in fact created the Western States of the Union, has, in its western transit, passed by the borders of Kentucky without crossing its threshold, because its administration has made no effort to bring to the notice of the world at large the fertility of its soil and its other valuable resources.

This neglect, however, in connection with the lamentable consequences of former slavery, have so retarded the development of, especially, the northeast portion of Kentucky, that to it is reserved a comparatively much greater measure of advancement than that now possible in any of the Western or Northern States.

Now that the building of new railroads is opening this section to the trade and traffic of the world, the time will soon come when real estate on this side of the Ohio river will be worth as much as it is over in Ohio, instead of bringing only one fourth as much as it does at present.

This alone is an object of much speculative interest to settlers, and more so, since our lands are prominently superior in quality, productiveness, and natural resources to those of Ohio.

What a scope of territory, never yet having been in cultivation, remains unproductive in this portion of our State, and what advantages are, therefore, offered here to those seeking a new home, will be readily understood from the following table of the average acreage to the inhabitant of those States especially interested in emigration:

ACRES TO EACH INHABITANT.		ACRES TO EACH INHABITANT.	
England has	1¾	New Jersey has	5¾
Wales has	4¾	New York has	6 4-5
Scotland has	6½	Pennsylvania has	8⅓
Ireland has	3 1-5	Ohio has	9½
France has	3¼	Kentucky has	18 1-5
Germany has	3½	Greenup county has	31 2-5
Massachusetts has	3½	Eastern Kentucky has *	95
Connecticut has	5⅔		

* Comprising the Ninth and Tenth Congressional Districts.

Greenup county is intersected from north to south by the Eastern Kentucky Railroad, which owns some valuable and extensive tracts of virgin lands now offered to industrious settlers at moderate prices and on easy terms, for the purpose of promoting the development of this part of the State by the introduction of an industrious and progressive influx of population.

Along the courses of Tygart's creek and Little Sandy river, the two principal streams of the county, and their tributaries, as well as on the navigable Ohio river, which bounds this county on the north, there are level bottom lands, which, with fair cultivation, yield excellent crops. So do the adjacent hill lands, all of which are well watered and supplied with necessary fencing timber, and (where no stone-coal is handy) with sufficient fire-wood.

CLIMATE.

Kentucky, being one of the belt of the Middle States, her climate is mild and equable, being free from the long and excessively cold winters of the North, and the long and oppressively hot summers of the South. The ground is usually in condition for planting garden vegetables and sowing oats in the latter part of March, and late vegetables, such as cabbage and potatoes, are often left growing in the gardens and fields until the middle of November. Much of the Indian corn, in favorable seasons, is planted in the month of April.

Pasturage is good from April until November, and in sheltered woodlands often much later.

Severe and long-continued cold weather only occurs in long intervals of years.

The winters generally are open, and often as mild as spring-time. Thousands of cattle, horses, hogs, mules, and sheep are kept during winter in the open fields and woodlands without shelter of any kind, and are often in good condition in the spring. Many of them are allowed to run at large in the forests and left to provide for themselves, except during spells of unusually cold weather.

All kinds of out-door farm work can be carried on for the greater part of our short winters.

Long-continued very hot weather is of very rare occurrence in this latitude.

HEALTH.

Some foreign traveler has called Eastern Kentucky the "Switzerland" of America.

This was doubtless on account of the beauty and grandeur of the mountain scenery, the purity and health-giving qualities of her air and water, and the splendid physical development of the people.

Diseases of a local character are almost unknown, and contagious diseases are equally rare.

There are no swamps, but little stagnant water, consequently malarial fevers and chills and fever do not prevail to any extent.

WATER.

There is no scarcity of good, pure, and wholesome water anywhere. Springs of cold water, which never fail, are abundant in many sections; and wherever it is necessary to dig wells, pure water can generally be found at the depth of but a few feet.

The water in some of the mountain streams is so pure and translucent that fishes can be seen swimming at the depth of several feet.

Water-power, of great value for manufacturing purposes, which has never yet been sufficiently utilized, can be had upon many of these streams.

TIMBER.

The vast quantities of valuable timber, with which hundreds of thousands of acres of lands are covered in Eastern Kentucky, is almost inexhaustible.

Hundreds of thousands of logs, and millions of staves, headings, hoop-poles, railroad ties, and fencing posts, with immense quantities of tan-bark and sawed lumber, are yearly shipped to the Cincinnati, Louisville, and Eastern markets; and some of the most rare and valuable timber to Europe. The varieties of timber most in demand are black walnut, yellow poplar, white and yellow pine, white oak, chestnut oak, locust, white and red cedar, sycamore, gum, beech, sugar-tree, hickory, ash, and maple. Most of these varieties are to be found in nearly all parts of the country, and nearly all of them are abundant. There is also an abundance of other kinds of timber of less value—such as the white poplar, buckeye, red and white oak, linn, &c.

GRASSES.

The valley lands and the rich hill-sides produce large crops of all the varieties of grasses grown in the country.

Timothy, red-top, clover, blue-grass, and millet, are the kinds usually grown, and to the growth of each of these the soil and climate are well adapted.

Although our farmers have not heretofore grown grasses very extensively, yet of late years they have seeded a very considerably increased quantity of land in grasses. A good demand always exists for hay at remunerative prices.

VINES, VINEYARDS, AND WINE-MAKING.

The soil and climate of Greenup county, and all Eastern Kentucky, are pre eminently adapted to grape-growing and wine-making. Grape-vines are here found growing in the forests in great numbers, and often attain to a very large size. Tree tops are found in the woods frequently black with large bunches of delicious grapes.

Many of the old settlers in this part of the State have made good articles of wine and brandy from the wild grape. To persons of experience in grape culture and wine-making, this country holds out very many and superior inducements. Here are cheap and suitable lands; plenty of good timber for stakes, wine casks and vats, and the greatest abundance of the finest building stone for the construction of wine cellars.

FRUITS AND FRUIT-GROWING.

There is no part of the United States in which the soil and climate are more favorable to fruit growing than in Eastern Kentucky. And it may also be said that there are but few other parts of the country in which so little attention has been given and so little capital invested in this important and profitable industry.

Here can be found everything that the fruit-grower can ask. The rich hill-sides and the sheltered valleys afford valuable sites for extensive orchards of apples, peaches, pears, plums, and quinces, and for the profitable culture of small fruits; all of which yield large crops with but little care, and they mature and ripen in the greatest perfection.

By the convenient and cheap transportation of the Ohio river, the markets of the whole country are accessible.

APPLES.

The apple tree flourishes and is healthy to a wonderful extent; all the known varieties do well, ripening from June till November. Some of the trees planted at the early settlement of the county are still standing, of large size, and yet bearing fruit. The apple crop does not fail oftener here than in other parts of the country, if so often.

During the season of 1879, Mr. Nat. Collins, living near the town of Greenup, harvested from a small hill-side orchard of thirty-five acres, six hundred and seventy five barrels of apples. This was done without any special care or attention being given to the orchard.

PEACHES.

The peach tree comes into bearing in this climate at a very early age, is generally healthy, and flourishes remarkably well, especially on the rich hill-sides near the water-courses. All the known varieties grow here.

It is believed that Greenup county, and Eastern Kentucky generally are equally as well adapted, both as to soil and climate, to the production of peaches as the far famed peach lands of New Jersey, Maryland, and Delaware; and there appears to be no reason why peach-growing, as a business, should not yield as much profit here as there. Crates and boxes for transporting the fruit to market can be made as cheaply here as elsewhere.

Canning and drying the fruit can be done with as much profit as it can be at any other point.

PEARS.

Pears have never been grown in Greenup county for shipment, but are grown to some extent for home consumption. They have done well wherever tried, producing bountiful crops of large and finely flavored fruit, and the trees have been but little affected with the blight. Pears can without doubt be profitably grown in this country.

PLUMS.

Some varieties of this fruit are grown here for home consumption, and but little for market.

All the kinds grown have succeeded admirably, and the fruit grown has been of fine size and flavor.

That the climate and soil here are favorable to the growth of this fruit, is proven by the fact that both yellow and red plums, of fair size and flavor, are found growing wild throughout the country.

THE QUINCE.

This fruit is grown by many for domestic use, but scarcely ever for market. It grows and yields an abundance of the finest fruit with but little care and cultivation. This fruit is easily handled, keeps well, and will bear transportation to distant markets, and is always in demand at good prices, and could be grown in this country at a large profit.

SMALL FRUITS.

No country is better adapted to the growth of raspberries, strawberries, and currants, and nowhere can they be more abundantly and cheaply grown. Raspberries and strawberries are found growing wild in the fields and forests.

OATS.

The land here produces oats in great abundance, but the crop is not extensively grown. The crop is sown in the spring; none of the winter varieties have been tried. The demand for all the surplus of this crop is always good, both for home consumption and for shipment.

BARLEY AND RYE.

These grains are grown to a limited extent, and good crops are raised. The growth of each might be largely and profitably extended. All that is raised is quickly sold at good prices.

INDIAN CORN.

Indian corn has heretofore been, and probably will continue to be, the leading grain crop of the country. The rich soils of the Ohio River, Little Sandy, Tygart Creek Valleys and of their various tributaries, and of the hill-sides adjacent thereto, produce very large crops. With more skillful cultivation than has heretofore been applied to these lands, this crop might and could be increased fifty per cent. at least.

A large amount of the corn produced is used for fattening stock for market; the surplus finds a ready market at fair prices. On lands suitable for growing corn, with fair cultivation, the average yield is about thirty-five bushels per acre.

WHEAT.

The wheat crop of this country is secondary in importance to corn. The soil throughout the entire county possesses all the essential elements for the production of wheat. When proper care and cultivation has been given to it, the yield has been good. But few farmers have given the proper attention to preparing the ground in a proper manner for seeding, very few applying manure of any kind, and but few using the seed drill. Better preparation and cultivation would very largely increase the yield. Winter wheat is the only kind now grown here, and the red and white varieties are generally sown. There are hundreds of acres of land in this county which have never yet been touched by the ploughshare, which are capable of yielding large crops of wheat. The surplus wheat raised here is shipped to Cincinnati and other markets on the Ohio river. The average production of this crop is about twenty bushels per acre.

SORGHUM.

Sorghum is raised to a considerable extent, and the yield is good and the business profitable. The syrup always finds a ready sale, and it is an acknowledged fact that dealers are paying higher prices for Eastern Kentucky sorghum than for any other grade.

SHEEP-RAISING AND WOOL-GROWING.

Sheep-raising and wool-growing has never as yet been engaged in as a special business. The few sheep raised in the county are mostly of the common and inferior stock. Sheep thrive well, and are generally free from the diseases prevalent in many other sections of the country. The high, rolling lands in some parts of the county, with the mild climate and abundance of clear water, the capacity of the soil for the growth of all kinds of grasses, makes this indeed the sheep husbandman's paradise.

CATTLE, HOGS, HORSES, AND MULES.

The facilities for raising cattle, hogs, horses, and mules for market are unsurpassed in any other part of the country. Traders are here almost constantly buying up, for the purposes of feeding and shipment, all the surplus stock of the county, paying therefor good prices in cash. In a large portion of the country stock is allowed to roam at large over the many hundreds of acres of unfenced lands for from six to nine months in the year, living and thriving upon the wild pea-vines and grasses found in great abundance upon the hills and in the valleys, and the hogs and cattle often growing fat upon the great abundance of acorns and nuts afforded by the forest trees Stock-raising as an exclusive business is not followed by any of our farmers. By the proper preparation of the farms for the business and the introduction of new and improved breeds, and the proper management of experienced men, stock-raising would soon become the leading industry of the county.

TOBACCO GROWING.

Tobacco has never been grown to any considerable extent. None of the farmers have ever relied upon it as a paying crop, and but few, if any, of them have any practical knowledge of the business. There are thousands of acres of land which are well adapted to the successful growing of all the various grades of tobacco, from the lightest to the heaviest.

From some portions of these lands much of the timber has been removed, but generally a sufficient quantity has been left for domestic purposes. These lands can be easily and cheaply prepared for the successful growing of tobacco. There are tracts of land in different parts of the country from which the timber has been taken for the purpose of making charcoal, which could be cleared and put into cultivation at such a small expense that one crop of tobacco would almost pay for the land. This is notably so as to large bodies of lands lying on Little Sandy, the East Fork and their tributaries, in the neighborhood of Hunnewell and Pennsylvania furnaces. Professor Shaler, of the Kentucky Geological Survey, after a careful and thorough analysis of the soils in different parts of Eastern Kentucky, says that the soils here contain the elements essential to the production of tobacco in as great a degree as the soils of any country with which he is acquainted. The experienced tobacco raiser will find here every inducement to engage in the culture of that staple.

Cheap lands, suitable soil, plenty of timber and water, excellent facilities for transportation, and good markets at the great headquarters of

the tobacco trade—Cincinnati and Louisville, both easily accessible—with plenty of labor to be had, a mild and healthy climate, with school and churches in every neighborhood, what more can be asked for?

From an examination of the State Auditor's report for the year 1878 we find that in forty counties in Central, Southern, and Western Kentucky, there was produced in that year nine millions twenty-four thousand and seven hundred and sixty-nine pounds of tobacco. Henderson county alone produced one million thirty-two thousand and six hundred pounds. The increase of production in many of these counties in many instances, doubled, and in some trebled the production of the previous year. The Auditor's report does not show the acreage grown.

The soil and climate of many of the counties referred to are similar and in many respects identical, with that of the counties of Eastern Kentucky.

The growth and manufacture of tobacco in Kentucky is now an important branch of industry, and it can be largely and profitably extended.

No tobacco stands higher in the markets, at home and abroad, than tobacco grown in Kentucky. We find from the report of the census taken by the United States Government in 1870, that in that year there were sixty-four thousand six hundred and fifty-five acres of land in Kentucky cultivated in tobacco, producing forty-five millions of pounds valued at $3,690,000. This was a larger amount than was grown in any other State. Virginia was the next highest and produced forty-three millions seven hundred and sixty one pounds on fifty-nine thousand two hundred and sixteen acres of land, the crop being valued at $3.194.553. The average value per acre of the Kentucky tobacco crop is given in the census report for 1870 at $57,07 per acre, and that of Virginia at $53 94 per acre.

The report of the United States Commissioner of Agriculture for 1878 shows that Kentucky, in that year, produced one hundred and twenty-three million four hundred and fifty three thousand nine hundred pounds of tobacco upon one hundred and seventy thousand seven hundred acres of land, and that the same was valued at $6,172,695.

From all the foregoing statements, it must be evident that Eastern Kentucky is the land for industrious settlers, for remunerative investments in enterprises aiming at the development of this corner of the State, and for the location of manufactures of nearly every variety. All needed, it seems, is to announce to the outside world what treasures and advantages we are possessed of—to extend guarantees to new-comers by liberal spirited legislative acts, of a fair and equable administration of the laws—and the existence of good schools and churches.