23d Congress, 1st Session. [Doc. No. 483.] Ho. of Reps.

VIRGINIA—INHABITANTS OF.

[To accompany bill H. R. No. 502.]

May 19, 1834.—Referred to the Committee on Roads and Canals.
May 31, 1834.—Printed by order of the House of Representatives.

To the Senate and House of Representatives of the United States:

The memorial of sundry citizens of the portion of the State of Virginia bordering on the James and Kenhawa rivers:

Respectfully represents:

That during the last summer one of the State engineers, in searching for a route for a railroad from James river, in Botetourt county, to the Tennessee line, on the Holston, discovered a point on the Upper Kenhawa (New river) in Montgomery county, where that stream can be turned into the north fork of Roanoke, by a tunnel of "probably much less than seven miles," and at a sufficient elevation to throw the water over the dividing ridge between the Roanoke and James rivers; and that consequently the James and Kenhawa rivers can be united by a canal from that point; that the distance from said point to Pattonsburg, on James river, is something upwards of sixty miles, and to Lynchburg perhaps less than one hundred miles; that scarcely a doubt can be entertained of an abundant supply of water for a canal from the said point on Upper Kenhawa to either of the points mentioned on James river; that the report of this survey was not made till towards the close of our late Legislature; that perhaps the discovery here mentioned did not attract their attention. Be that as it may, no steps were taken for a further survey the present season.

It seems to your memorialists that a survey and an estimate of the cost of a canal from the point alluded to, in Montgomery county, to the points mentioned on James river, might be very useful, that they may be brought into comparison with each other, as well as with other routes and other modes of improvement proposed for the connexion of the James and Kenhawa rivers.

A law passed our Legislature in March, 1832, incorporating a company to connect the James and Kenhawa rivers, either by a railroad, or part canal and part railroad. It is generally supposed that the improvement will be made by canal as high up the James river as Pattonsburg, and by railroad from that place to the great falls of Kenhawa, and that the route will pass by Covington, cross the mountain to Greenbrier river, and down the same to its entrance into the Kenhawa, thence down the same to the great falls. But others suppose it will ascend a western branch of the Greenbrier, and cross over to one of the branches of the Gauley, and descend that stream to its entrance into the Kenawha, just above the great

[Gales & Seaton, print.]

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falls. The stock of this company is not yet all subscribed. Our late Legislature extended the time of keeping open the subscription books to the 31st of December, of the present year, (1834,) so that it is probable that if a survey could be obtained the present season, and that if either of the new routes should turn out to be preferable to the routes at present contemplated, the further action of our Legislature can be had on the subject before the company is organized, or, if it should be organized sooner, that it might put it in the power of your memorialists to procure its adoption by the company.

The proposed tunnel will be 1,670 feet above tide water. The dividing ridge between the Roanoke and James river, at Pattonsburg, is about 1,400 feet, and the Blue ridge at Buford's gap is about 1,300 feet above the same level, so that the engineer will have a play of about 270 feet for varying, to the best advantage, the elevations of his line to one point, and about 370 to the other.

It is probable that either of the new routes will be shorter than the route contemplated by Covington. It is believed that about 10 miles will be saved if the improvement leave James river at Pattonsburg, and upwards of 20 if it leave it at Lynchburg.

In a report made by the Secretary of War to the House of Representatives, on the 24th March, 1828, (Doc. No. 216,) it will be seen that the United States engineers have shown that the James and Kenhawa rivers can be united by a canal by way of the Covington and Greenbrier route; it requires a tunnel of more than 2½ miles through the Alleghany for the canal, and another of more than 5 miles through one of its spurs for a feeder, and the feeder itself more than 31 miles long, and a dam of about 50 feet high across the Greenbrier, to throw the water into the feeder, besides another short feeder to supply the summit level. It will also have 524 feet of lockage more than the route now proposed. It will also be seen in the same report that a branch of the Upper Kenhawa can be thrown across the Alleghany mountain, without a tunnel, into the south fork of Roanoke. But this line will be about 30 miles longer than the one now proposed by the north fork, and will also require about eight hundred feet more of lockage; and, moreover, the valley of Roanoke interposes, across which it would be impossible, even if the supply of water were undoubtedly sufficient, to sustain a level sufficiently elevated to pass the water over the dividing ridge to James river; consequently only the Roanoke and Kenhawa can be united by this line, while, by the route now proposed, both the Roanoke and James can be united to the Kenhawa, and nearer for each than any other route yet proposed.

A material advantage in the line now proposed, over either of the others heretofore contemplated, is, that one uniform mode of improvement may be more readily adopted on it, so that a boat taking in freight at tide water may proceed the whole length of the work, and deliver it on board of the Ohio steamboat without any intermediate expense of transhipment. It is confidently believed that the Kenhawa may easily be so improved as to admit Ohio steamboats as high up as the great falls.

This line, it is believed, will open the best outlet which can be adopted, not only for the Upper Kenhawa and its branches, but for the interlocking branches of the Holston. A turnpike road is about to be constructed from the Kentucky line at Cumberland gap to Price's turnpike, in Botetourt county. It is to approach the Kenhawa by the valley of Wolf creek or East river, and to cross it above the mouth of Greenbrier. This road, it

is said, passes through a fine country, capable of various agricultural productions, besides being supposed to abound in minerals, and, though at present almost excluded from intercourse with the rest of the world, has a considerable and increasing population. "This road," says the engineer who surveyed it, "will be the only outlet for the people of the" counties of "Lee, Scott, Russell, Tazewell, Giles, and part of Botetourt, to our Eastern markets," and no doubt a part of Tennessee and Kentucky may be included if the line now proposed be adopted for the James river and Kenhawa improvement. Above this road there are several other valleys of some length, which open on the Kenhawa, which, with their interlocking valleys from the Holston, will doubtless furnish considerable productions, agricultural and mineral.

There is then the road from Knoxville by way of Abingdon, which must be a considerable feeder to the line; it at present crosses about fifteen miles above the proposed tunnel.

There is then the stream of New river (Kenhawa) itself, which, it is said, may easily be made navigable for more than a hundred miles above the Horse-shoe bend, the place of the proposed tunnel. This will bring on it the trade of Floyd, Grayson, and Wythe counties, in our own State, besides the trade of a portion of North Carolina, in which State the stream rises.

The immense quantities of iron situated in Botetourt, Wythe, and other counties near the mountain, on each side, may, by this line, be easily sent not only to the East, but to the markets down the Kenhawa, to Pittsburg, Cincinnati, Louisville, to the Mississippi, and its other branches, should markets require it, and also to the lakes. The abundance of coal in its vicinity will ensure its manufacture on the best of terms. The lead mines of Wythe will receive a like benefit from the improvement. Plaster in abundance is also no very great distance from the line. The salt works of Kenhawa and Washington will, no doubt, receive great benefit from it. The Holston and James rivers are brought sixty miles nearer together by this line than by either of the others which have been proposed. It is thought by some that they may be united by a canal; there can be no doubt that they may by a railway, much shorter than any which has been hitherto proposed.

The above advantages are chiefly such as will be derived to the line by adopting the route now proposed, instead of either of the others heretofore contemplated, and the adoption of it will not lessen the advantages to it from other sections, for the James and Jackson's rivers will doubtless be improved to Covington, and perhaps higher up, and make a valuable branch to the work. The upper part of the valley of Greenbrier will have easy access to Covington, as the lower part will to the main line. But should the main line pass along Greenbrier, it is obvious that the Kenhawa above the junction of the improvement cannot be made a useful branch to the work, for produce intended for the Eastern markets, to reach the improvement by it, must set out in an opposite direction to that of its destination: for instance, produce arriving by the Knoxville and Abingdon road, which crosses the Kenhawa at English's ferry, would there be within 250 miles of Richmond, by way of Lynchburg and James river. Is it likely that it would be there unloaded, to descend the Kenhawa more than eighty miles, to get on this improvement at the mouth of Greenbrier, which is 338½ miles from Richmond, making together 418½ miles instead of 250, an

increase of 168½ miles in the distance? The facility of connecting the work with the works on the Potomac will not be lessened by it, for, whatever line may be adopted for this work, it is believed that the best point for that connexion will be at the mouth of the North river, just above the Blue ridge.

Your memorialists are aware that not much experience is yet had in this country in the construction of tunnels, and that few are to be found elsewhere so long as the one now proposed. If the length of this improvement be compared with the length of several works in England having tunnels, it will be found that the proportion will be less here than it is there.

The Bridgewater canal in England is 70 miles long, and has more than 18 miles of tunnel.

The Cromford canal, 18 miles long, one tunnel, 2,966 yards.

The Chesterfield canal, 46 miles long, two tunnels, 3,003 yards.

The Dudley canal, 13 miles long, three tunnels, 7,325 yards.

The Grand Junction canal, 90 miles long, two tunnels, 5,125 yards.

The Huddersfield canal, 19 miles long, two tunnels, 5,280 yards.

The Hereford canal, 35½ miles long, three tunnels, 3,952 yards.

The Leominster canal, 46 miles long, two tunnels, 5,100 yards.

The Thames and Severn canal, 30 miles long, one tunnel, 4,300 yards.

The Trent and Mersey canal, 93 miles long, five tunnels, 5,181 yards.

The Tavistock canal, 4½ miles long, one tunnel, 2,500 yards.

The Worcester and Birmingham canal, 29 miles long, fifteen tunnels, 3,830 yards.

Supposing the James river and Kenhawa improvement to be 396 miles long, and the tunnel 7 miles, (the engineer thinks it will probably be much less,) the tunnelling will be about 31 yards to the mile, but little more than half the lowest average in the cases above stated, so that, even if as much more should be deemed advisable in the progress of the work, the proportion cannot be considered very great.

The cost of tunnelling in England appears to have been a little irregular; one case is stated of £15 per yard run being paid extra in consequence of passing through quicksand; another, of the entire cost of a part of a tunnel passing through loose stuff, subject to tumble in, being £24 per yard run.

Bridgewater tunnels, cut chiefly through solid rock, cost about £9,386 13 4 per mile. The longest tunnel in the Cromford canal cost £7 per yard run. The longest on the Trent and Mersey is said to have cost £3 10 8 per yard run. The tunnel at Blisworth, on the Grand Junction, after some preparatory expenses paid by the company, was contracted for and completed at £15 13 per yard run. It is probable that some of the variation in the cost in these cases might be owing to the difference in the dimensions of the tunnels, which are not given in the account from which the above facts are taken, except the Blisworth tunnel, which is 16½ feet wide and 18 feet high. The tunnel under the city of Liverpool for the Liverpool and Manchester railway, is 16 feet in height and 22 feet wide. It cost £15 9 4 per yard run, a portion of it loose stuff, which tumbled in from the top. Another tunnel connected with this work, 15 feet wide and 12 feet high, cost £8 11 4 per yard run. It may not be amiss here to remark, that tunnelling is not the most expensive operation in works of this kind. In the Liverpool and Manchester railway, for instance, the large

tunnel of 2,250 yards in length cost £34,791 4 9, while the Saukey viaduct on the same work, of 9 arches of 50 feet span each, cost £45,208 18 6, and the aqueduct on the Lancaster canal across the river Lune, of 5 arches of 70 feet span each, cost about the same sum. But no correct calculation can be made of the cost of such works till a scientific examination of the ground shall take place. Your memorialists, therefore, believing that such a work will be admitted to be of great national advantage in affording a cheap, convenient, and safe intercourse at all times, between the Chesapeake bay, and particularly the port of Norfolk, and any military posts which may be on the Mississippi or its branches, or on the lakes, beg leave respectfully to ask that your honorable bodies will take the subject into your serious consideration, and cause the surveys above indicated to be made, and an estimate of the probable cost of the work, together with an estimate of such part of the line heretofore surveyed under the authority of the Secretary of War, and before referred to, as may be necessary to extend the line from the proposed tunnel to the great falls of Kenhawa, to the end that your memorialists may be enabled to lay the subject adequately before the people of the district more immediately interested, to induce them to adopt measures to raise the necessary funds for the accomplishment of the work; and your memorialists will, as in duty bound, ever pray, &c.

Colin Buckner	J. Broocks
Jesse L. Perry	J. H. Echols
William J. Holcombe	John C. Reid
John O. Leftwich	Maurice Laughome, jr.
William Cobbe	Lo. Newell
Pleasant Labby	William Steen
Albon McDaniel	James F. Stevens, M. D.
Paul Jones	A. F. Bigger
Thomas Love	Wm. B. Brown
John Riveley	W. L. Saunders
G. L. Leckie	Patrick H. Cabell
A. Winston	William D. Swinney
Hugh Montgomerie	Jno S. S. Tyree
William L. Lancaster	Saml. M. Scott
Lancaster and Marsh	D. Lernerdurf
Jesse T. Burton	Andrew C. Elliott
Matt. Morris Kerr	H. B. Richards
Andrew Kinnier	J. C. Shackleford
R. H. Gray	Nowlin Hunt & Co.
Henry H. Booker	Benj. Hunt
Rob. Morris	David Kyle
Henry Latham	W. B. Jones
Thomas Reeder	James F. Johnson
M. C. Newhall	Nelson Lowery
John McKinney	Samuel Miller
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Henry Davis	John Hollins
J. M. Warwick	Seth Halsey
James Warwick	Jonathan Johnson
D. J. Warwick	Nicholas Guthrie
A. D. Tyree	Henry Dunnington

Chris. Winfull
John Johnson
Alexander Tompkins
Seth Ward
John S. Blair
F. Sydnor
Jno. McOley
Wm. B. Averett
Moses H. Preston
Richardson Curr
David W. Burton
Archd. B. Duke
Robert Adams
Reuben Burch
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Geo. E. Roberts
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C. Roberts
David R. Lyman
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John J. Purvis
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Thomas R. Terry
R. Robinson
E. Jones
Robert H. Burks
James Boal
P. Mathews
D. S. C. Peters
William Gough
John Victor
John Williams
Thos McKinney
Hill McCraw
F. S. Miller
E. H. Bogwell
Jas. H. Perkins
Dolphin Drew
Robt. M. Ewing
William White
Mayo Davies
W. A. Clark
Lewis Brown
Samuel Nowlin
Timothy Fletcher
Timothy Evans
S. S. Taylor
Wm. Morgan
Wm. Digges
Wm. M. Burwell
John G. Meen
R. W. Wilson
G. W. Harrison
Peleg Seabury
Geo. Bagley
Benj. E. Scraggs
Joseph B. Breedlove
J. Wills
J. H. Monman
Robt. S. Payne
Thos. A. Holcombe
M. W. Davenport
Wm. T. Isbell
James T. Royall
Jos. E. Royall
James Newhall
John T. Mason
N. B. Thurman
Henry O. Schoolfield
J. Walney
Geo. Percival
Richd. S. Tilden
Henry Sumpter
William Sumpter
Wm. A. Bennett
—— Caswell, jr.
John Rees
Jno. Tompkins
Wm. S. Reid
Saml. McCorkle
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James Bullock
Jas. S. Clayton
Gerard Banks, jr.
Jos. B. Nowlin
Nelson Tinsby
S. E. White
H. Leftwich
J. E. Martin
A. H. Moore
Ammon Hancock
Geo. W. Turner
John W. Young
F. W. Risque
N. H. Thornton
Thos. Franklin
Clag and Thornton
James McCobbs
R. Q. Tompkins
S. W. Lewis
Howell Lewis
Joseph D. Evans
John P. Wilson
Jeremiah Kyle
Robert Kyle
Wm. C. Frazer
Charles Phelps
D. B. Phelps
John T. Hunt
John A. Hatcher
Michl. Hart
John R. D. Payne
Aug. Leftwich
Ryland Roberts
Robert W. Collins
Peter E. Booker
Isaac Adam, jr.
J. Rumbough
Isaac Kesear
Peter Dudley

Extracts from Mr. Herron's Report.

No. 1, page 4, a note.—While engaged in my examinations of the Alleghany, in the neighborhood of Blacksburg, I was struck with a remarkable fact, which does not appear to have been noticed by the eminent engineers who had previously surveyed the ground, that a tunnel of about $7\frac{45}{100}$ miles would draw the water out of New river, or Upper Kenhawa, at the "Horse-shoe" bend, and empty it on the eastern side of the Alleghany, at an elevation of 245 feet above the north fork of Roanoke, at Evans's mill, which would consequently save 818 feet of eastern and western lockage, or deep cutting, the feeder and feeder tunnel, &c.

On the ridge above, rests Smithfield, the estate of Col. James P. Preston, which is limestone land, and on or near it I observed "out crop" of some strata of coal, that appeared to me to be anthracite. The general surface is only about 200 or 300 feet above the crest of the ridge, which is on the eastern side, being only 470 feet above the surface of New river.

New river at the "Horse-shoe" is upwards of 200 yards wide, and more than two feet deep on the ripples and fords.

Though this tunnel would not cost near as much as the canal over the top of the mountain, (which latter would require a feeder tunnel of a mile and eight chains, as well as a very long feeder canal along the span and deep ravines of the mountain,) and would at the same time afford much greater facilities to commerce than this or any other canal uniting the Eastern and Western waters, yet it is my opinion that before the works could be brought down to Salem, and united with the James, their cost would construct a railroad from Pattonsburg to Tennessee.

No. 2, pages 10 & 11.—But should it be preferred to unite the James and Kenhawa by a canal, still the above route through Montgomery would not only be the best plan of effecting it in Virginia, but it can be much better effected here than elsewhere in the United States : for the important

fact discovered by me, i. e. that there is a point on the eastern side of the Alleghany, situated on the north fork of Roanoke, which is on the same level with the surface of New river, at the "Horse-shoe" bend, and distant from it in a straight line through the mountain only $7\frac{45}{100}$ miles; consequently it is entirely practicable to turn the whole of the Upper Kenhawa down the Roanoke, if desired, and thence to conduct it across to the James at Pattonsburg. The tunnel required for this purpose would probably be much less than seven miles, as the measurements from which it was discovered were not made with a view to a tunnel, and the above distance is between two points now on the same level. There is a bottom on the New river side, and the valley of Watts's run is above, the point on New river being near Watts's, or where the road from Blacksburg to Pepper's ferry descends the hill to the river bottoms.

On the eastern side the point is in Miller's gap, about $1\frac{5}{8}$ miles west of Evans's mill, all of which distance is a broad area of cultivated land, affording ample room for the necessary locks and basins. I have previously stated in a note that the level of this point is 1,670 feet above tide. The level of the bottom of the tunnel of the Chesapeake and Ohio canal is 1,972 feet above tide, (Doc. No. 18, 22d Congress, p. 114.) Hence they will have 604 feet of eastern and western lockage more than would be required here, which at $1,100 the foot lift (about the average cost of their locks) would be $664,400; and if we now add the cost of their feeders and large reservoirs, which they are obliged to construct, to obtain a doubtful supply of water, I have no doubt the sum would be quite sufficient to tunnel the Alleghany in Montgomery: this too is entirely exclusive of the cost of constructing the tunnel of the Chesapeake and Ohio canal, which, together with the deep cuts at the ends, is $5\frac{50}{100}$ miles in length; but as the top of the mountain is still 955 feet above their tunnel, (p. 108,) whereas, with us, it is less than half that elevation at the highest point, or only 470 feet, but generally less than from two to three hundred feet above, the increased cost of their working and air shafts, and hoisting the excavated materials to double the height, would compensate for double the horizontal distance.