

REPORT  
BY THE  
MARYLAND  
COMMISS-  
IONERS  
ON A  
PROPOSED  
CANAL FROM  
BALTIMORE  
TO  
CONEWAGO

Md.  
XTC  
624  
.M3  
A4



REFERENCE BOOK

THE ENOCH PRATT FREE LIBRARY  
OF  
BALTIMORE MARYLAND

Md.  
XTC624  
.M3A4

825066

479-2-72-50M

ENOCH PRATT FREE LIBRARY  
BALTIMORE'S PUBLIC LIBRARY

BOUND BY  
Charles L. Elliott  
1901 Rosedale St.  
AT NORTH AVE.  
BALTIMORE

May

North  
a line  
30

J. H. Cope

REPORT

BY THE

MARYLAND COMMISSIONERS

ON

A PROPOSED CANAL

FROM

BALTIMORE TO CONEWAGO.

---

Necesse est facere sumptum, qui quaerit lucrum.....PLAUTUS.

---

**Baltimore:**

PUBLISHED BY FIELDING LUCAS, JUN.

JOHN D. TOY, PRINTER.

1823.



From John Cotton  
to J. H. Barker

From John Patterson Esq  
to J. H. Locke

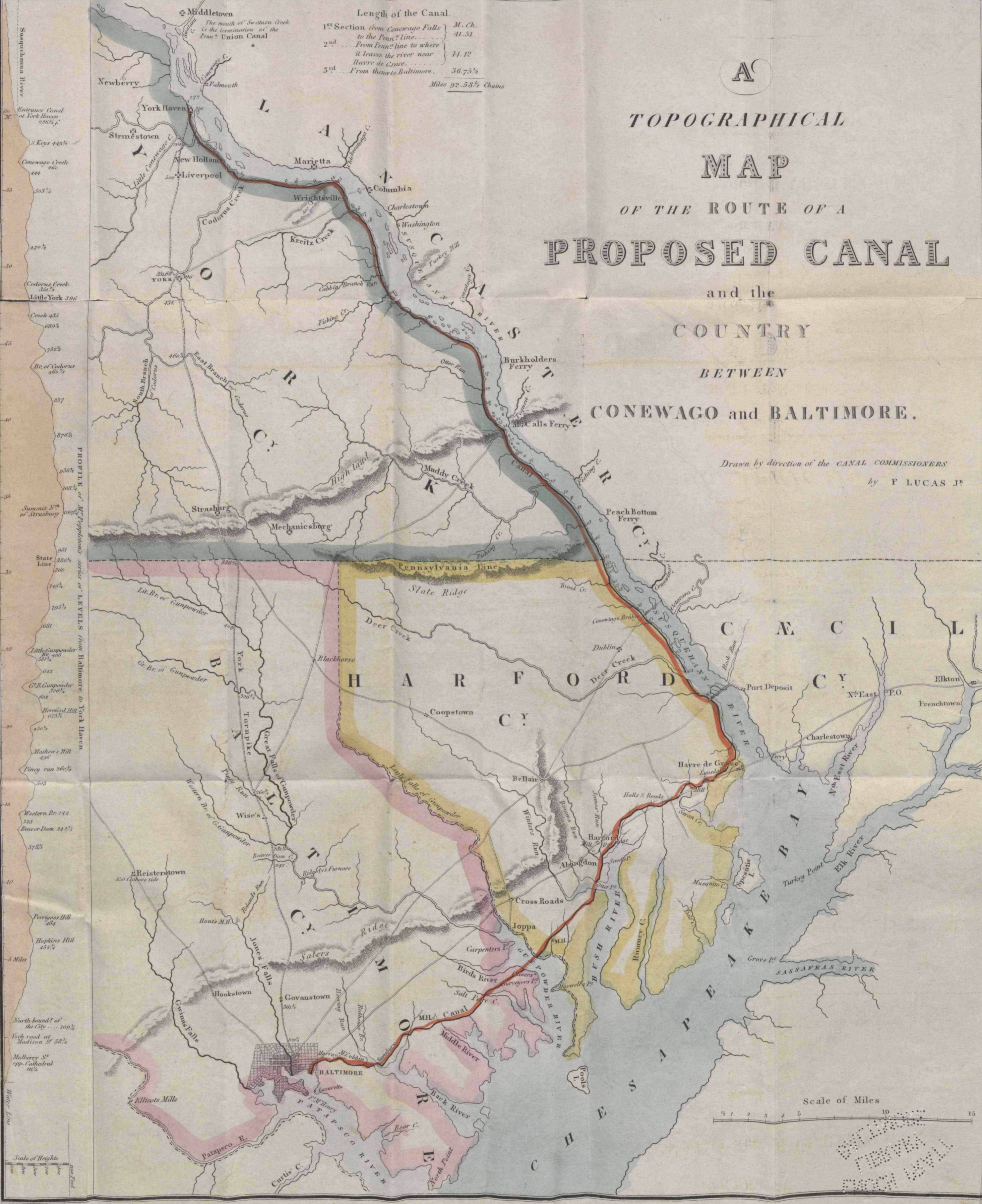


TOPOGRAPHICAL  
MAP  
OF THE ROUTE OF A  
PROPOSED CANAL  
and the  
COUNTRY  
BETWEEN  
CONEWAGO and BALTIMORE.

Drawn by direction of the CANAL COMMISSIONERS  
by F. LUCAS J<sup>r</sup>

Length of the Canal.

1 <sup>st</sup> Section from Conewago Falls to the Penn <sup>a</sup> line.	M. Ch. 41.51
2 <sup>nd</sup> From Penn <sup>a</sup> line to where it leaves the river near Havre de Grace.	14.12
3 <sup>rd</sup> From there to Baltimore.	36.75 $\frac{1}{2}$
Miles 92.58 $\frac{1}{2}$ Chains	



PROFILE of Mr. Poppleton's series of LEVELS from Baltimore to YORK HAVEN

Summit N<sup>th</sup> of Strasburg 1009 $\frac{1}{2}$

State Line 880 $\frac{1}{2}$

Little Gunpowder 581 $\frac{1}{2}$ , 465

C.B. Gunpowder 350 $\frac{1}{2}$

Beverly Hill 673 $\frac{1}{2}$

Mathew's Hill 496

Piney run 260 $\frac{1}{2}$

505

Western Br. 242

323

Beaver Dam 242 $\frac{1}{2}$

378 $\frac{1}{2}$

Ferrigo's Hill 784

Hopkins Hill 451 $\frac{1}{2}$

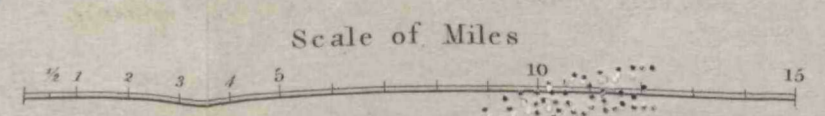
3 Miles

North bound<sup>s</sup> of the City 109 $\frac{1}{2}$

York road at Madison St 58 $\frac{1}{2}$

Mulberry St opp. Cathedral 11 $\frac{1}{2}$

Scale of Heights



*For W. McKimham Esq.*  
*from*

REPORT

*W. Patterson*

BY THE

MARYLAND COMMISSIONERS..

ON

# A PROPOSED CANAL

FROM

BALTIMORE TO CONEWAGO.

*Maryland. Susquehanna canal*  
*Commissioners*

Necesse est facere sumptum, qui querit lucrum.....PLAUTUS.

**Baltimore:**

PUBLISHED BY FIELDING LUCAS, JUN.

JOHN D. TOY, PRINTER.

1823.



Md collection

~~##Md~~

~~OC 34~~

~~ME~~

Md.

XTC 624

.M3A4

825066  
APR 6 1929

MAY 17 1932

# REPORT.

---

TO THE GENERAL ASSEMBLY OF MARYLAND.

**T**HE Commissioners appointed in pursuance of a Resolution passed at December Session, 1822, by which they, or a majority of them, were "*directed to lay out, and survey a route for a Canal, which will connect the waters of the Susquehanna with the city of Baltimore, beginning at the Conewago falls, or on a point of said river which the commissioners may deem the most practicable; and shall also be directed to lay out, and survey a route for a Canal from the same point, on the Susquehanna, or Conewago falls, to the head of tide water, on the Susquehanna; and report upon the practicability, the expense, and other necessary circumstances attending the same to the next General Assembly;*" most respectfully

## REPORT:

**T**HAT, in the month of May last, their appointment was officially communicated to them by the executive; immediately after which they met, took the subject into consideration, and at once determined to accept the appointment, and endeavour fully to comply with the trust reposed in them. The vast importance of the

subject: the great improvement which it contemplated; and the very extensive trade which the proposed canals, when completed, were calculated to lay open to the whole state, and to its chief city and great seat of commerce, were so self-evident, that it was immediately resolved, that no pains should be spared in furnishing themselves with all the information and aid which could be procured under existing circumstances, and within the time allowed for the performance of the task assigned them. Under these impressions, it was deemed advisable to visit the state of New-York, for the purpose of obtaining practical information on the subject of canals, as well by viewing the Grand Canal of that state, as by conversing with the commissioners and engineers who superintended and laid it out; and by receiving explanations from them, relative to the manner of its construction, upon the great work itself. It was also determined, that, if possible, an engineer of known and approved skill, who had been employed in that work, should be engaged to aid, advise, and direct in all their investigations. And on taking a glance at the vast extent of the country, over which the river Susquehanna extends itself, the obstructions in the navigation of which river were to be overcome by the proposed canals, it seemed, that the magnitude of the subject, which had been submitted to their investigation, would be very imperfectly understood, and appreciated at a rate infinitely below its real merits, unless the extent, nature, and facilities of the navigation of that great river, beyond the upper termination of the proposed canals, were inquired into and explained. It was, therefore, determined, that they should descend the Susquehanna from one of its

upper branches, noting as they moved downward the nature of the navigation, and gathering all the information to be had respecting it from those by whom it seemed to be best understood.

Accordingly, they sat out in June last; and, on arriving at the city of New-York, they obtained an interview with Mr. De Witt Clinton, the great founder and advocate of the canal policy in the state of New-York, from whom they obtained many useful suggestions, and a general introduction to those engineers who were likely to be found on such portions of the great Erie Canal as they proposed to visit. From Albany, they passed along the canal line, on which the workmen were then engaged, as far as Schenectady; and thence proceeded up to where the canal was then filled with water, where they embarked in a passage boat on it, and proceeded one hundred and forty miles further up to Montezuma; whence, ascending the Cayuga lake, in a steam boat, to Ithaca, they passed over a distance of twenty-nine miles, by land, to Owego, on the Susquehanna, where they procured an open, flat bottomed boat, in which they descended the river to Harrisburg, and thence to Baltimore by land. While at Syracuse, in New-York, they obtained an interview with Mr. James Geddes, one of the principal engineers of that state; and were so fortunate as to engage him as the director of their operations and investigations, and received from him directions for taking some levels, for the purpose of obtaining a correct idea of the topographical outline of the country over which the route of the contemplated canals might probably pass. For this purpose Mr. Poppleton, an accurate and skilful leveller was engaged and directed to take a series of

levels, beginning at the tide in the basin of Baltimore, thence up the York turnpike-road to York in Pennsylvania; thence by York-haven to the head of the Conewago falls; and thence up the river to Harrisburg.

But as no part of the country, between the city of Baltimore and the head of the Conewago falls, had ever been explored, or, in any manner whatever, examined with a view to the construction of a canal over it; and, it seemed probable, from the tardiness with which the delicate operation of levelling must be conducted, that, without further assistance, it would be impossible, in due time, to obtain all the information required, in order to enable Mr. Geddes to decide upon the most suitable route for the proposed canals, they made application to the President of the United States for the assistance of one or two officers from the corps of topographical engineers. The President expressed his best wishes for the success of the undertaking, and immediately ordered to their assistance four officers from that corps; captain Hartman Bache, and lieutenants Eakin, Graham, and Boyce. These engineers, who appeared to be exceedingly well skilled in their profession, and who executed the operations assigned to them with great precision and exactness, so soon as the necessary attendants could be procured, commenced operations at the head of the Conewago falls, and proceeded with a series of levels down, along the margin of the river, to tide, with occasional offsets, for the purpose of ascertaining the height of the water courses at given distances, and some adjacent elevations of the land.

Soon after the series of levels along the river side had been commenced, Mr. Geddes arrived, and imme-

diately took a view of what had been done and gone over, and from thence forward bestowed the most constant attention to all the operations, which have been carried on for the purpose of ascertaining the best route for the proposed canals.

After it had been satisfactorily ascertained, that a canal could pass along no other route from the head of Conewago falls to tide, than by the margin of the river, the country lying between, and near the heads of the small inlets and creeks emptying into the Chesapeake, between Baltimore and Havre-de-grace, was viewed, and its appearances being favourable, it was determined, that it should be explored and surveyed. Accordingly, for this purpose, Mr. Bridges, a skilful leveller, and Mr. Jehu Bouldin, the surveyor of the city of Baltimore, were engaged, and directed to make the survey, under the superintendance of Mr. Geddes, which eventuated in shewing, that it was perfectly practicable to extend the proposed canal from the Susquehanna to the city of Baltimore.

The canal policy has been, of late, so often the subject of consideration and discussion, in every part of our country; and, has become so generally and well understood, that it cannot be necessary, again to gather up and array in all their irresistible force, the arguments by which it may be sustained. It has been already so frequently done, that there is now no open antagonist of the canal policy left in our country. No intelligent man, having a due regard to the best interests of his country, can be hostile to the construction of canals, wherever they can be made, within any reasonable bounds of expense; and which when made, are calculated to facilitate the intercourse between the dif-

ferent portions of our country. It is by domestic commerce, that the inhabitants of the same country are bound together by a community of interests and reciprocity of benefits. To all nations an easy internal communication is of great value; but, in our country, when considered in relation to our political institutions, internal commerce, and the facilities of domestic intercourse, appear to be the chief bonds of our union, the principal ties by which the states are held together. And of all the modes of internal communication, that of internal navigation is most decidedly the first and best. The great advantages of canal navigation are no longer a matter of speculation and theory; it has long since, and to a vast extent, and under every variety of circumstances, been reduced to practice; and unerring experience has every where furnished the same unequivocal evidence in its favour. These advantages are most important in many points of view; *first*, in cheapness, the expense of transportation on a canal amounts to no more than one cent a ton per mile or one dollar for a ton for every hundred miles, the cost of transportation by land conveyance is thirty-two dollars for the same distance, this difference is more than thirty to one in favour of the canal; *secondly*, in speed, a loaded boat can be towed by one or two horses at the rate of thirty miles a day; *thirdly*, in certainty, a vessel on a canal is independent of winds, tides and currents, and is not exposed to the delays attending conveyances by land; and *lastly*, in point of the safety, the advantages are no less obvious and decided, the injuries to which merchandize is exposed when transported by land, or by natural navigation are innumerable; but, in a canal boat they are little more exposed

to damage than in a warehouse. A canal, in a commercial point of view, may be considered as a great labour-saving machine; and, politically considered, its influence and consequences are of the most incalculable importance, in binding us together as one great people, in harmonizing the discordant sectional feelings, and reconciling the apparently clashing interests of the several states, and thus tending to perpetuate the happy constitution and frame of government under which we live. But, since it cannot be necessary to advance arguments in favour of the general nature of a policy which is now so universally approved, we shall confine our remarks to an exposition of the course, practicability, and probable advantages of that canal, the route for which, we have been directed to survey and designate.

The resolution, which has assigned us our duties, seems to have taken it for granted, that there was a choice of routes in which a canal might be conducted from the head of the Conewago falls to tide; the one, in a course over the country from the head of those falls to the city of Baltimore; and the other, from the same point to the tide of the Susquehanna. If this was the opinion of its authors, we now feel satisfied, that it was founded on a very erroneous notion of the shape, elevations, and general topography of the whole country between the tide waters of the Chesapeake and the head of the Conewago falls on the Susquehanna. But we are not at all surprised, that such an erroneous notion should have been indicated in the resolution, since we have found it to have been the prevailing opinion through the country, when we commenced our operations; and one, which seems to have



taken so strong a hold on the minds of the great majority of the most intelligent inhabitants, in whose information we, for a long time, placed much confidence, that it was not until after a most laborious investigation we abandoned all hope of finding a route for a canal, over the country at any distance from the margin of the river.

If a line be drawn due south from the mouth of Swatara creek, which empties into the Susquehanna near Middletown in Pennsylvania, until it strikes the main branch of the Patapsco, thence down that river to the Chesapeake, thence up the bay to the Susquehanna, thence up that river to the Swatara, a triangular space of country will be described; within which the proposed canal must pass from the head of the Conewago falls to reach the tide at the city of Baltimore, or at any other point on the Chesapeake. In order, that the nature and shape of this triangular space of country may be more clearly understood, we beg leave to ask an attentive inspection of the annexed topographical map of it, on which we have caused to be laid down, the results of our actual surveys, with sundry observations derived from such information as we felt we might place the most implicit confidence.

The stream called Gwinn's falls, which is precipitated into the tide, a mile or two to the westward of the basin of Baltimore, between the tide and its sources, near Reisterstown, affords a fall of water for no less than twenty-six mills in succession; the sum total of the fall of all which gives an elevation at Reisterstown, only sixteen miles from the city of Baltimore, of between five and six hundred feet above tide. Retir-

ing more within the triangle, we may follow up Jones' falls from the basin of Baltimore to Hunt's meeting house, and thence up Roland's run, a principal branch of it, to the vicinity of the thirteenth mile-stone on the York turnpike, where the ground was found, by Mr. Poppleton's levels, to be about two hundred and fifty feet above the tide. But, we also know from the same series of levels, that, between the city and that point, there is an intervening ridge, of about four hundred and eighty feet of elevation above tide. It is in this ridge, that the sources of Herring run, and all the other streams which pour into the head of Back river are found. This elevated swell of land, called *Sater's ridge*, is observed to extend from Ellicott's mills, on the Patapsco, in a north-westerly direction, passing immediately north of Baltimore, and spreading out into the high-lands of Harford county from Abington to Belle-air, and so northerly. It is the precipitous narrow breaches through Sater's ridge, made by several streams tumbling through rocky beds, that has given to them such singular names as *Gwinn's falls*, *Jones' falls*, and *Gunpowder falls*.

But Sater's ridge might easily be passed by a canal along the ravines of either of those streams, or of the Patapsco river; provided the canal could be brought into the depression of land, lying along the northern base of it, with an elevation of not less than two hundred and fifty feet. But we know, that the sources of Gwinn's falls, and Jones' falls are found but a very short distance beyond Sater's ridge; that the sources of the great falls of Gunpowder, and of Deer creek are found near the Pennsylvania line; whence they rush downward with the most headlong speed; thus

furnishing, by the rapidity of their currents, the most unequivocal evidence of the great elevation in which they originate. But, proceeding a short distance northwardly, from the sources of those streams we find those of the Codorus, the waters of which are noticed to be hurrying along with no less tumbling haste, in an opposite direction, into the valley of York, and thence into the Susquehanna. Between the Codorus and Deer creek, is Muddy creek, a stream of inferior magnitude and length, but of similar character, the sources of which are found near the same summit level. From the rapid and precipitous character of these streams alone, it is very clearly and strongly to be inferred, that they are separated by a broad and highly elevated ridge of land, which, from the best information we could obtain, and according to the direction of the water courses and mountains laid down on the most authentic maps, extends, without any depression of more than half its height where the York turnpike crosses it, from beyond the Monocacy, in a direction a little to the northward of east, to the Susquehanna at M·Call's ferry, where it presents itself, for a short distance, in a narrow ridge, and then spreads out in Lancaster county. Muddy creek, which pours itself into the Susquehanna a short distance below M·Call's ferry, seems to have split this great swell of land into two distinct ridges, before it reaches the river; for below that creek, and about a mile below Peachbottom ferry, Slate ridge presents itself, on the river, in a high craggy bluff. This ridge is seen, from the high lands about Dublin in Harford county, extending itself east and west near the boundary of this state, like a low straight ridge of mountains.

It is true, that some of the head springs of the Codorus, Deer creek, and Gunpowder are found within less than a quarter of a mile of each other; but in the summer season, it is believed, there would be a deficiency of water even at the mouth of Codorus, and in Gunpowder at Ridgeley's furnace to supply a canal forty feet wide and four feet deep, which is likely to be as much used as the proposed canal. To look for, or expect, therefore, to find a sufficiency of water from those streams with which to pass over this vastly elevated summit, which, on an inspection of the profile of Mr. Poppleton's series of levels, that crossed it at right angles, it will be seen, is, in breadth, more than eighteen miles, and mounts to an elevation in some places of more than one thousand feet, and every where, in that width, more than four hundred feet above tide, must be admitted to be altogether out of the question; and has been pronounced to be so by Mr. Geddes, as will be seen in his communication hereto annexed; and, indeed, was a matter about which there was not the least shadow of doubt, or difference of opinion in the mind of any one engaged in the survey. But even suppose there might be a sufficiency of water, if those streams were wholly and exclusively applied to the canal, it will only be necessary to run the eye along them, and take a cursory view of the immense amount of mills and manufactories upon them, every one of which must be bought out and suppressed, to be satisfied that it would be impossible from *pecuniary considerations alone*, so to monopolize and use them, even if it were in any way practicable to surmount the great physical difficulties.

The difficulties of finding a route for a canal over this great elevation, with the feeding to be derived from either, or all of those streams, *for there are none other with which it can be approached*, would be to a careful observer, even from a mere eye view, altogether disheartening; but the levels actually taken have dissipated every hope of being lifted up over it by any contrivance or management of them whatever. The Gunpowder, where the York turnpike-road crosses it, near the twenty-fifth mile-stone, was found by Mr. Poppleton to be four hundred and eight feet above the tide; thence the surface of the ground gradually rises until it reaches the prodigious elevation, between the thirty-fifth and thirty-sixth mile stones, of one thousand and eleven feet above tide; thence descending to where the same road crosses the Codorus, near the forty-fourth mile-stone, it is found to be four hundred and sixty feet above tide; thus making a swell of land between those waters of more than eighteen miles in breadth, and upwards of six hundred feet in height above *them*. The ground on which the town of York stands was found to be three hundred and ninety-six feet above tide; and the Codorus at the same place, and only about twelve miles from the Susquehanna, to be three hundred and fifty-one feet. Following the road from York to York-haven, the village of Liverpool was found to be on a ridge of about five hundred feet elevation; the Conewago creek, where the road crosses it, to be two hundred and sixty feet; and, the upper end of the canal, near the head of the Conewago falls, was ascertained by the same series of levels, to be two hundred and fifty-six feet above the tide.

Captain Bache commenced his series of levels at the head of the Conewago falls, and a short distance above the termination of the canal, and descended along the rugged margin of the river to tide, at Port Deposit bridge; where the operations of Captain Bache and his officers terminated. By this series of levels it was found, that the head of the Conewago falls was two hundred and seventy-two feet above tide; which differs some few feet from the result of Mr. Poppleton's operations; but it corresponds more nearly with the result of a series of levels taken some time ago in the state of Pennsylvania. As Captain Bache's levels were pursued downward, offsets were made to ascertain the elevations at every place, where the least probability presented itself of finding a practicable route out into the country, and away from the river; but, at no place was it found, that the level of the whole elevation, of two hundred and seventy-two feet, if preserved undiminished from the head of the Conewago falls, could be followed, any where below the mouth of the Codorus, more than a mile or two from the river. The Conewago level was extended up the ravine of the Codorus, and was found to terminate in the high ground at not more than three miles from the river. Opposite to Marietta a knob of the marginal ridge, immediately overlooking the river, is said to rise about five hundred feet above the water at that place; and, that, on a clear day, the towns of York and Lancaster may be distinctly seen from it.

On casting our eyes along the rocky and broken hill sides of the right bank of the river, for a short distance below Conewago falls, we, for sometime, flattered ourselves, that the canal might, perhaps, be more

advantageously carried down on the left bank of the river, and brought over, somewhere near or below M·Call's ferry, on an aqueduct; whence it might proceed over the country to Baltimore; but we had not proceeded far in this exploration before we found that nothing was to be gained by it; and it was, therefore, abandoned. For it is very remarkable, that every where, below the mouth of Chickaselunga creek, the rugged, rocky, and unmanageable nature of the shore is much worse on the left, than on the right bank of the river. At Chickaselunga, on the right bank, there is much steep and broken rock, and a short point of a perpendicular mass to encounter; but, on the opposite side, there is a long space of highly elevated, solid rock, rising perpendicularly from out of the rapid current of the river itself. Below Columbia the channel of the river passes along near the left bank; and from Turkey hill rushes down, with the speed of a torrent, for a considerable distance, at the foot of a solid mass of high perpendicular rock; but, on the right shore, the hill sides are steep, rocky, and broken, but manageable. The relative character of the two sides of the river is the same the whole way to Havre-de-grace. *Upon the whole, therefore, we feel satisfied, that there can be found no other practicable route for a canal from the head of Conewago falls to tide, than that which we have surveyed along the right margin of the river.*

But the resolution contemplates a canal from the head of the Conewago falls to the city of Baltimore, as well as to tide. The next inquiry, therefore, after we had completed our survey downward, as far as the tide at Port Deposit bridge, was, whether it were

practicable in any way, and in what direction to continue, and extend the route from that point to the city of Baltimore. A straight line, from Port Deposit to Baltimore, would pass over the very crown of the high, dry elevations of Sater's ridge, where, according to the description we have already given of it, there could not be the least expectation of finding water enough for a canal of the very smallest capacity; and, on looking more northwardly the lands were perceived to rise still higher. *There was, then, no hope of finding a practicable route for a canal in any other direction than over the river flats below all the projecting spurs of Sater's ridge.* This route has been accordingly explored, levelled, and surveyed, and has been found to be not only entirely practicable, but much shorter and better than we had at first any reason to expect.

This whole route, from the head of the Conewago falls to the city of Baltimore, will require a canal of ninety-two miles and three quarters in length; which, for the more perspicuous consideration of the subject, we have divided into three sections; *first*, that extending from the head of the Conewago falls to the Pennsylvania line; *secondly*, that which is within this state, and passes along the margin of the river down to a point about a mile above Havre-de-grace, where the route departs from the river, and takes a direction over the low lands toward Baltimore; and *lastly*, that which extends from the vicinity of Havre-de-grace to Baltimore. The first section, which is forty-one miles and fifty-one chains in length, is wholly within the state of Pennsylvania; and, in general, passes over a most uncommonly difficult, rocky, and uneven surface.



In this section, if there are spaces where there will probably be found easy and cheap excavation; yet, there are others, where all the skill of an experienced and practical engineer must be called forth. For the whole of this section every allowance has been made in the estimates, for excavation, and the removal of all obstacles, that are in any manner apparent; and, that the aggregate amount of the estimate might be made as nearly accurate as possible, it has been divided into parts, according to the apparent character of each of them; and for every one of the several parts, a separate estimate made, taking into consideration the peculiar nature of each. Some portions of this section have been estimated as high as at the rate of eighty thousand dollars a mile; which, it is believed, is as much as ever was allowed for any canal whatever passing over the surface, except the short distance where the great Erie canal of New-York passes through solid limestone rock at Lockport. It is proposed, that in this section there should be a communication with the river by a lock at Wrightsville, immediately opposite to Columbia, so as to enable boats to pass through the canal to and from Columbia. The whole cost of this section has been estimated at one million, two hundred and twenty thousand, two hundred and sixty-five dollars.

The second, or middle section, is fourteen miles and twelve chains in length, and is altogether so entirely analogous in its nature to the first, that the same remarks will apply to it throughout. The cost of this section has been estimated at five hundred and sixty-four thousand, four hundred and seventy-one dollars. The last and lower section passes over an alluvial soil,

$$\begin{array}{r}
 40 \overline{) 1220000} \quad (305 \\
 \underline{120} \phantom{00} \\
 200 \\
 \underline{200} \\
 0
 \end{array}$$

$$\begin{array}{r}
 14 \overline{) 564470} \quad (403 \\
 \underline{56} \phantom{00} \\
 44 \\
 \underline{42} \\
 27 \\
 \underline{26} \\
 1
 \end{array}$$

and is, therefore, expected to be every where very easy of excavation. In its whole length, of thirty-six miles and seventy-five chains and an half, it will pass, by aqueducts, at an elevation of twenty feet above the tide, over four rivers; that is, over a branch of Bush river, from the land of Doctor Davidge to that of Mr. Sewell; over another branch of the same river at Otter point; over Gunpowder, from the land of Mr. Caldwell to that of Mr. Oliver; and from General Stansbury's land over the principal branch of Back river. The cost, nature, and extent of these aqueducts have been carefully considered and estimated; they have all of them been deemed perfectly practicable; and the wooden frames, according to the experience on the Middlesex canal of Massachusetts, and the calculations on the canals of New-York, may be accounted to last from fifteen to twenty years; when, if it shall be deemed advisable, the wooden structures may be replaced by iron, made after that manner which has been found, in Europe, to be comparatively cheap, safe, and practicable. It is proposed to open a communication, by locks, with this section and the tide near Havre-de-grace, for the purpose of admitting the arks, boats, and rafts, which may have descended the natural bed of the river, to enter and pursue their way in safety to Baltimore, without delay or transshipment; and also, that the trade of Havre-de-grace, and the head of the Chesapeake bay, may have a ready access through the canal, either to the Susquehanna country above, or to the city of Baltimore. The whole cost of this lower section has been estimated at eight hundred and forty-one thousand, two hundred and sixty-three dollars. The three sections making together an

aggregate amount of two millions, six hundred and twenty-six thousand dollars for the cost of the whole canal from the head of the Conewago falls, of ninety-two miles and three quarters in length, into the basin, at the city of Baltimore.

For a more particular and detailed account of the nature of the obstructions; the manner of construction; the feeders and supply of water; the cost of each portion, and of the whole; and the incidental charges, we must beg leave to refer to the report, maps and drawings of our engineer Mr. James Geddes, which accompany this; and which, we feel satisfied, will make the whole subject perfectly clear and comprehensible to the understanding of every one. And, for further and more minute explanations of the series of levels, that have been taken, and the surveys that have been made, we will also ask leave to refer to the books, plats, and drawings of Captain Bache, Mr. Poppleton, Mr. Bridges, and Mr. Bouldin, all of which accompany this.

As the proposed canal, when complete, will open a direct and easy communication with the Susquehanna, it will be necessary to specify, and explain the manner and extent to which, that great river, and its branches are, at present, navigated. The waters of the Susquehanna, above Conewago, in the summer season, when the river is low, do not, perhaps, on an average proceed at a pace exceeding two miles an hour, in any of its navigable branches; and, when it is full, they do not move faster than at the rate of four miles in the hour; but from the head of the Conewago falls to tide, if we count the distance by the meanders of the channel, which is usually estimated at sixty or seventy

miles, we shall have reason to believe, from the time in which boats descend, that the average speed of the water, when the river is low, cannot be less than six miles in the hour; and, when it is full, its average velocity is equal to ten miles an hour. The annual freshets of the river, suitable for ark navigation, usually take place in the months of February, March, April and May. There are but two descriptions of vessels used in navigating this river; the ark, which is a rudely constructed vessel, drawing from twenty inches to two feet of water, and calculated to bear a cargo of from twenty to seventy tons down to tide, where the vessel itself is sold as timber; and the Durham boat, which is fashioned like a flat-bottomed keel boat, very long in proportion to its breadth; with a draft of from twelve to twenty-four inches of water, and of from twenty to forty tons burthen. These boats are used altogether for ascending the river; and few or any other description of vessels are used either way on the Juniata.

The principal branch of the Susquehanna heads in Otsego lake, at a distance, along the sinuosities of the stream, of about four hundred miles above the Conewago falls. And, from the lake Otsego itself, the river is navigable downward for arks and boats when but moderately raised, by a freshet, above its lowest summer level. As a proof of the facility of its descending navigation, it may be recollected, that during our revolutionary war, in the summer of 1779, General Clinton, at the head of a thousand men, in order to join General Sullivan in the expedition that was directed against the north-western Indians, passed over land to Otsego, where, finding the Susquehanna too low to

float the boats on which he intended to embark, he made a dam across the outlet of the lake, which soon raised its waters to the height of the dam; when, his boats being ready, and the men and baggage embarked, the dam was broken, which so raised the river, that they were floated down to Tioga, and soon joined the main body under General Sullivan. Since then the facility with which it may be descended, on the happening of a freshet, has been fully understood; and the annual floods of the river, for the last twenty years have seldom failed to bear along a considerable amount of the productions of the country from Otsego to tide.

We descended this principal branch, from Owego in New-York to Harrisburg in Pennsylvania, in the month of June last; when the stream was perfectly pellucid, and its bottom almost every where distinctly visible. From Owego to Nanticoke falls, eight miles below Wilkesbarré, there is no dashing on the surface or ripple, its waters glide smoothly along, often quite sluggishly, and sometimes with a rapidly accelerated motion over a gravelly, stony, or rocky bottom; but no where tumbling like a torrent. Nanticoke falls is a single straight sluice, into which the whole stream is collected, and shoots down about five feet in a distance of little less than four hundred yards. This fall is never considered dangerous. The Nescopeck, or Berwick falls, about twenty miles lower down, are similar in their general outline; the sluice here descends a fall of about six feet in a distance of not quite three hundred yards. The difficulty of going up these falls is greatest in low water, which lessens in proportion to the rising of the river, and in high water they are ascended with ease. M'Kee's half-falls, nineteen miles

below Northumberland, makes a short rapid; the original difficulties in which having been principally removed, it is now considered easy and safe. Nine miles below M'Kee's, begin those ripples called Barger's, Berry's, and Gurty's notch, which continue for nine miles. These ripples are formed by solid reefs of rock extending quite across the river; but, with moderate caution, there is no difficulty, or danger in passing them, either up or down. Seven miles farther down, Foster's falls commence; and, six miles lower, are Hunter's falls; but neither of them present any thing like a broken pitch of water. The stream is, however, much accelerated and the channel, which passes among large masses of rock, that lift their heads above the stream, or approach near to the surface, is crooked, and has not, as yet, been cleared out in so direct a line as it should be, so as to present a straight, fair sluice for the descent of arks and boats. But the few losses which happen here arise not so much from the great difficulty of the passage, as from careless, or unskilful pilotage. The descent of the few ripples from Hunter's falls to Conewago are calculated to give additional speed to the waters; but their passage is, in either way, attended with no danger, or difficulty. Such is the nature of the navigation of the principal branch of the Susquehanna from Otsego lake to Conewago. And for a more full illustration of this branch from Owego to Harrisburg, we beg leave to refer to the map of the river, upon an enlarged scale, drawn by Mr. William Small, who accompanied us down it.

From every information we have been able to obtain, the navigation of the Tioga branch, from Bath, and of the western branch, for a distance of one hundred and

sixty miles above Northumberland, is equally good and very similar in its general character. The Juniata, from Frankstown, on the north branch; and from Bedford, on the Raystown branch, is reported to be much better, and less broken by falls and ripples. Taking all the several navigable branches of the Susquehanna together, we consider ourselves as perfectly within bounds, when we affirm, that this great stream affords a good and safe *descending* river navigation to an extent of more than eight hundred miles above the Conewago falls.

The *ascending* navigation may be reckoned as not far short in extent of that of the *descending*. From Conewago, boats can ascend, with ease, up the main branch to Bath, and to Oquago in New-York; up the western branch to Clearfield; and up the Juniata to Bedford, and to Frankstown. The ascending navigation is best when the river is a little raised, but not too full. A Durham boat, drawing about fifteen or twenty inches of water, bearing a cargo of from fifteen to twenty tons, manned at the rate of a ton and a half per man, may be propelled up the stream, at the rate of fifteen to twenty miles a day. It is said to be, now, not more than twenty-five or thirty years since the *first ark* passed down from below Northumberland to *tide*; since then the commercial uses of this great river have been regularly and constantly increasing. The importance of this vast extent of river navigation will be most readily understood from a concise account of the country over which it extends, the population within that space, and the cost and perils of transportation on the river to and from tide under existing circumstances.

A canal, as we have before observed, may be considered as a labour-saving machine, used in commerce for the transportation of merchandise. And its uses and advantages have been found to expand, on each side, in a geometrical proportion, as it recedes from its termination at the port, or market. Thus, at the distance of twenty miles from Baltimore, the farmer, who may be situated five miles from the canal, would find it cheaper to wagon his wheat to the canal, and to send it thence twenty miles by water to Baltimore, than to convey it to Baltimore only twenty miles by land; at fifty miles distance, the proportion, in favour of the canal, would be still greater; the farmer would find it cheaper, at that distance, to send fifteen or twenty miles to the canal, and thence fifty miles by it further to market, than to send his produce directly on to market over a distance of only fifty miles land carriage; and so on, in proportion as the distance increased. But, as an illustration of this position, we will suppose an example. From the Susquehanna, at Columbia, to Philadelphia, is a distance of seventy-four miles, and a good turnpike-road the whole way; the whole cost of transportation on this road, including toll, is estimated at ten dollars a ton; but the aggregate cost for transportation on the canal, from Columbia to Baltimore, which is about eighty miles, would not exceed two dollars a ton; consequently, the farmers, from the whole, or a greater part of Lancaster county, would find it cheaper and better to wagon their produce to Columbia, and send it thence, by the canal to market, at Baltimore, than to send it by land the whole distance to Philadelphia. These principles apply, with similar, though not with equal force, to good river, as



well as to canal navigation. And in proof of this position, it is a well known fact, that no produce is sent down to market, *by land*, from any part of the country accessible to any of the navigable branches of the Susquehanna; nor is there any merchandise ever sent up the country, bordering on that river, and within reach of its ascending navigation. All merchandise intended for that country, is sent from the sea port, chiefly Philadelphia, *by land*, to Columbia and Harrisburg, and thence upward, in Durham boats; in short, *for all the purposes of commercial intercourse with the Susquehanna country, so far as the waters of that river can be navigated, the whole moves along the river as well upward as downward.*

According to these principles; then, relative to the extent and influence of canal and river navigation, we will proceed to designate the boundaries of that tract of country, the commercial intercourse with which is now, in the *descending* line; and, when the proposed canal is complete, must be in the *ascending* line; and, in every way, wholly and exclusively connected with the port of Baltimore. We will begin to trace this boundary from Mechanicsburg, near the line between Pennsylvania and this state; thence westwardly, including Shippensburg; thence to the Alleghany mountain, beyond Bedford and Frankstown; thence northwardly, including Clearfield and Potter counties, in Pennsylvania; thence, including Steuben and Tompkins, through Courtland, Chenango, Otsego, and Delaware counties, in New-York; thence, including Susquehanna and Luzerne, and through Schuylkill, Lebanon, and Lancaster counties, in Pennsylvania, to the Maryland boundary. Within the line thus drawn round the navigable

waters of the Susquehanna; and, which is evidently no more than barely of sufficient extent to embrace all the country from which produce is, at present, sent to market down the Susquehanna, and which must always be dependent on that great river for all its commercial intercourse with any sea-port whatever, there is included more than half the territory of the state of Pennsylvania, and a great portion of that of the state of New-York.

It has been computed, that the whole state of Pennsylvania embraces an extent of twenty-four thousand, five hundred square miles, or twenty-seven millions, two hundred thousand acres of land. The half of which, on an inspection of the annexed map of the Susquehanna country, and its practicable canal routes, on which we have laid down these boundaries just designated, it will be seen, is embraced within them; to which, it will also be seen, there must be added a portion of the state of New-York, equal to six or seven counties of that state. Hence, it will appear, that according to a fair and impartial computation, the whole extent of the Susquehanna country cannot be estimated as containing less than about sixteen millions of acres; which is not far short of being three times greater than the whole state of Maryland together; which is computed at no more than six millions, nine hundred and twelve thousand acres. To those who have visited, or are well informed as to the general character of the Susquehanna country, it will be unnecessary to say any thing; and, to others, it will be sufficient to observe, in general, that this vast region, in point of fertility and excellence for all the purposes of agriculture, in fine climate, pure mountain air, and capacity

to sustain a great and dense population, is equalled by few portions of this union, and surpassed by none. A very great portion of it is, as yet, but very thinly settled, owing no doubt, in part, to the vast tracts of vacant land in every direction, within our union, on which our people have been induced, by the various circumstances of advantage, fashion, or caprice, to plant themselves; but, as it has been justly observed, by a set of commissioners, appointed by the state of Pennsylvania, in their report of January, 1790, "*the great obstruction and bar to the wealth and population of this western country, has been the impassable falls in the river from Conewago to the tide.*" This country is yet in a great degree to be filled with population; the extent and nature of its resources are yet to be explored; and the amount and value of its commercial intercourse with the sea-port, with which it is, by nature, so strongly connected, have been only begun to be developed within the last twenty years; and cannot, therefore, as yet, be fully appreciated. But some idea of the immense amount to which the value of that intercourse would be, almost immediately swelled, on the opening of the proposed canal, may be formed, by adverting to the very great amount of the commodities which has of late been annually committed to all the imminent dangers of the river, in its present condition, and submitted to be dashed down from Conewago to tide, a distance of about seventy miles, in less than seven hours, by one of the most furious, perilous, and ungovernable torrents in the world.

By adverting to the last census of the United States, it will be seen, that there was, at that time, seated within this great range of the Susquehanna country,

as extended through the state of Pennsylvania into the state of New-York, a population of not less than five hundred and two thousand, six hundred souls; composed, almost altogether, of free whites, and principally of industrious agriculturalists; and that the whole population of the state of Maryland, including all descriptions, according to the same census, amounted to no more than four hundred and seven thousand, three hundred and fifty. The Susquehanna country being nearly one-fifth stronger, even in a numerical point of view, than the whole state of Maryland together. But the population, at present, seated within the Susquehanna country may be considered as among the most active, vigorous, and productive of any within our union; and, therefore, when we recollect the rapidity of the increase of population in every direction over the United States, where both soil and climate are friendly to human existence, it may be confidently predicted, that, at the end of twenty-five years from the date of the last census, there will be found within those limits, which we have designated as the Susquehanna country, a population of at least one million of souls; the great mass of whose exports and imports, to and from all foreign nations, can only be effected by means of the Susquehanna river, through that sea-port which shall be rendered most cheaply and easily accessible to its navigable waters; and, that access can only be effected, as we conceive, through the proposed canal from the port of Baltimore.

It may startle the apprehensions of some to find that we have approached, with the northern boundary of that which we designate as the Susquehanna country, so near to the grand Erie canal of New-York, as to

include the upper ends of the Seneca and Cayuga lakes, which have been generally considered by the citizens of New-York as forming properly a part of their great work. And this, in some respects, is true. But it is a first principle in all commercial operations, that all commodities will always be sent to market along that route over which they can be transported soonest and cheapest. It is a fact then, that the transportation down the river is accessible so much sooner, and is so much cheaper, than down the lake and the grand Erie canal, that, from twelve and a half to twenty-five cents more per bushel is given for wheat at the navigable points of Owego, Bath, &c. on the Susquehanna, to be sent down that river to Baltimore, than can be afforded for it any where on the lakes, to be sent to the tide. In consequence of which great quantities of wheat, and other commodities are annually sent across from those lakes, to the Susquehanna, and thence down to Baltimore.

The costs and charges of navigating an ark of forty tons burthen, which is the average tonnage of those vessels, from Owego to Conewago, a distance of two hundred and fifty miles, is about fifty dollars, and somewhat proportionally more or less, from any point higher up or lower down the river. But from Conewago, or Columbia, a distance, at farthest, of not more than sixty or seventy miles, by the river channel, to tide; the expense of navigating a similar ark down the torrent, (and with a burthen of more than fifty tons, no one will venture to descend,) is, from fifty to seventy dollars. Thus constituting more than one half of the whole expense of navigating the river from any of its highest points; independent of the insurance, which to

Conewago is nothing, or not more than one half per cent, but which from Conewago to tide is worth from seven to ten per cent on the value of the cargo; but on the proposed canal, from Conewago to Baltimore, the whole expense of transportation through, would not exceed half that amount. The proposed canal, then, would be the means of saving, in the descending navigation, one fourth in the expense of transportation from the most remote point, and all the premiums for insurance.

The Conewago falls being a straight, and comparatively easy sluice of nineteen feet descent, in a distance of about one quarter of a mile, the descending arks usually shoot down it without any additional preparation, and proceed on to Columbia, where they always stop to take in a pilot, and prepare for the further descent; and when prepared, they always leave Columbia in the morning, and in five or six hours after having been committed to this mad torrent they are either dashed to pieces against the rocks, or safely moored, at a computed distance, along the sinuosities of the channel, of sixty miles below, on the placid tide. Many projects and contrivances have been suggested for clearing the rugged bed of this monstrous rapid, and of controlling, and regulating the fury of its speed; but, as yet, although immense sums have been expended, the comparative little chippings and notchings in the huge masses of rock over which it foams, whirls, and rushes along, have scarcely in any sensible degree mitigated or diminished the perils of the *descending* navigation. But, as to *ascending*, the roused up, mighty river, as it pours along, charged with the drainage of its millions of acres, resistless, roaring, dreadful, tumbling down through rocks abrupt, seems

to hold in scorn all human efforts and contrivances to ride on its bosom, and run counter to its thundering course.

It is said, however, that a loaded boat has been forced up from the tide, all the way, to the head of the Conewago falls; but the description of the manner and the season in which it was done are sufficient to satisfy any one that the ascent of these falls may be pronounced altogether, and physically impracticable for all commercial purposes whatever. The boat is said to have set out in the summer season, when the waters were clear, and the stream low; to have had on board only about eight or ten tons; to have been very strongly manned; to have been forced along in some places by poles alone, and in others warped up, by sending out a strong rope ahead which was fastened to a rock in the water, up to which the boat was hauled, and then another rope again sent ahead and made fast, up to which she was, in like manner, hauled, and so on. The proposed canal, from the port of Baltimore, would enable all vessels, capable of navigating the river, where it was navigable, to pass by this tremendous barrier, by which they are now, at all times, so effectually excluded, with great ease and in perfect safety from the basin of Baltimore to the head of the Conewago falls; where they would enter upon the navigable portions of the great river, and might proceed upwards for many hundreds of miles without encountering any serious perils or difficulties.

But, it has been asked with some degree of surprise, by many intelligent citizens; wherefore proceed farther with the canal after you have passed the great river obstruction, and reached such good tide navigation as

that from Port Deposit and Havre-de-grace to Baltimore? This surprise seems to have been excited, and the inquiry to have been made from not adverting to the nature and object of canal navigation. The great object of all canals has been to open a communication, by which bulky and heavy commodities can be *cheaply* and *readily water borne* from the place of production to the market or place of sale. And, it is quite obvious, that in attaining this object, every break in the continuity of the voyage of the canal vessel, every interruption in the passage, and every trans-shipment of the commodity must be attended with delay and expense; and, consequently, produce an addition to the price of transportation. It is from these considerations, as will be seen, on an inspection of the maps of the canal routes of all European countries, that all canals have been continued to a great market, sea-port, or place of sale and consumption. The same principles have governed in directing the route, and continuation of all the canals, that have been made in our own country; or where they have been disregarded or overlooked, the evil has been loudly complained of when it was too late to remedy the defect, but at a very great expense. The Middlesex canal in Massachusetts, instead of stopping at the head of tide, where the navigation is as good as could possibly be desired, of its kind, is carried along side of it four miles further into the harbour of Boston. The great Erie canal of New-York is no where connected with the navigation of the river, by the side of which it passes, although it is in many places exceedingly good, and, for some distance above Albany, the canal passes just along side of the tide navigation. In speaking of the Potomac canal,



Mr. Gallatin observes, that “the legislative impartiality which has required the canal to enter the river *at the very head of tide*, in order that Virginia may have an equal chance of becoming the depot of its commerce with Maryland, has very much injured its utility to the country at large.” And, speaking of the James river canal, he observes, that one of its principal faults consisted in its not being continued down into the port itself, instead of being stopped at the upper end of the city of Richmond. The market for the produce brought down the Santee river is Charleston in South Carolina; and the river boats were obliged, at the mouth of the river, to enter the sea, and to reach that port by a navigation along the sea shore, for which they were not calculated. To remedy that inconvenience, and to insure a permanent navigation, a canal was opened, uniting the Santee with Cooper river, which empties into the harbour of Charleston. Thus it appears, as well from general principles as from experience, in our own country and in others, that a canal, in order to produce all the benefits expected from such navigation, must be continued down actually into the market or sea-port.

But there never was a case, perhaps, in which the propriety of continuing the canal down into the very port could be sustained by more cogent and incontrovertible reasons and proofs, than that of the instance now under consideration. It is perfectly obvious to every one, at all conversant with the nature of tide navigation, that the arks and boats by which any of our interior streams are navigated, are utterly unfit to contend with the winds and waves on the exposed deep waters of the tide, any where along the sea-board; and, therefore, as we have seen, it has never been attempted

where it could possibly be avoided. It is true, that for several years after the trade down the Susquehanna began to open, the bold enterprise of the boatmen of that river tempted them to put out upon the Chesapeake in their rude frail barks, with a determination, if practicable, to pursue their way to market; but the accidents, disappointments and losses, were soon found to be so very great, that all ideas of such perilous voyages were abandoned; and they are now never thought of or attempted. The cargoes of the Susquehanna river-boats are now always trans-shipped, at Port Deposit, into bay craft, and sent thence, round by the Chesapeake, to Baltimore. The proposed canal then, from the basin of Baltimore to a point opposite Port Deposit, may be considered as intended to continue, expedite, and facilitate the transportation of any commodities from the Susquehanna country, instead of stopping them at the head of tide, and sending them, thence, round by the Chesapeake. A fair estimate, therefore, of the conveniences and inconveniences of each, of the canal, and of the bay route, in some of the most important particulars, will place their comparative merits in the clearest point of view, and enable every one, at once, understandingly to decide which of them deserves the preference.

The average tonnage of the arks, that descend the Susquehanna is, as has already been observed, about forty tons each. We will take the case of such an ark, and suppose her cargo to consist of one or other of the three most important productions of the Susquehanna country; that is, of coal, of grain, or of flour. By the way of the proposed canal, her cargo would reach Baltimore in a distance of forty miles; but, by the way of

the Chesapeake bay, it would have to travel seventy miles. Allowing for every possible delay, any way incident to the mode of transportation, and the passage by the canal to Baltimore could be effected in two days; but, at Port Deposit there would, on an average, be a delay of five days for getting a bay craft into which to trans-ship the cargo; and when that was done, the passage to Baltimore, on an average, could not be made in less than three days more; the delay and passage by the way of the Chesapeake would, then, be eight days. We will suppose the toll to be, as in New-York, graduated on the several commodities, passing on the canal, according to their respective natures, in bulk, weight, quantity, and value. Let us then set down the average of the three commodities of coal, grain, and flour, at one cent a ton per mile; that will be forty cents a ton, or sixteen dollars for the whole cargo through to Baltimore. The freight on a canal has never been reckoned at more than a cent a ton per mile; which would amount to just sixteen dollars more; but in this instance, such an allowance for freight would be entirely too much; because the only additional cost to the ark, when moving on the canal, instead of laying still until sold, would be the hire of the towing horses and attendants, which could not exceed five dollars. The toll and freight of either of those commodities would not, then, exceed twenty-one dollars by the way of the canal; but, by the way of the Chesapeake, the freight on coal is one dollar per ton; on grain, it is one dollar seventeen cents per ton, or three cents per bushel of fifty-eight pounds, or what is called running measure; on flour, it is eight cents a barrel, or eighty-two cents a ton, averaging the barrels at two

hundred and eighteen pounds each. To which must be added the cost of trans-shipping the cargo of an ark of forty tons, which is estimated at five dollars more; so that every forty tons of coal is charged with an expense, by the way of the Chesapeake, of forty-five dollars, every forty tons of grain with an expense of fifty-two dollars, and every forty tons of flour with thirty-eight dollars. We say nothing of waste, and deterioration by trans-shipping, of perils, &c. which might make these differences still greater. This comparative view of the relative advantages of the two routes from Port Deposit to Baltimore, will stand thus:

<i>Canal.</i>	<i>The Chesapeake.</i>
Distance, - - - 40 miles.	Distance, - - - 70 miles.
Delay and passage, - 2 days.	Delay, trans-shipping and passage, - - 8 days.
Freight and toll on forty tons of coal, grain, or flour, 21 dolls.	Freight, &c. on forty tons coal, - - - 45 dolls. Freight, &c. on forty tons grain, - - 52 dolls. Freight, &c. on forty tons flour, - - 38 dolls.

These advantages are perfectly obvious and decisive. And from this statement it is also clear, that with this continuation of the proposed canal from Port Deposit, no other market whatever can, with any thing like the same advantages, come in competition with that of Baltimore; because, to reach any other sea-port would require trans-shipment at Port Deposit, additional tolls, exposures, delays, and the travelling a much greater distance by canal and natural navigation. But, if the proposed canal were to end at Port Deposit, or to have no locks, or communication, near that, with the river,

by which it could be entered, all commodities brought down to the tide, at that place, over the bed of the river, must necessarily be trans-shipped, and might be taken to other markets which they might reach as conveniently, as soon, and at as little expense as the city of Baltimore, by the way of the Chesapeake. It is believed that, taking advantage of the most favourable floods, for some time after the proposed canal may have been completed, a considerable portion of commodities will continue to be taken down the bed of the river to tide; to all such, the locks at Havre-de-grace, and the canal thence to Baltimore, would open and afford a most inviting, convenient, and safe mode of being transported directly, and expeditiously, to the city of Baltimore; one from which it is confidently believed no river vessel would willingly turn away, and send the commodities with which she was freighted to any other market whatever.

The price of the transportation of wheat on the river from Owego, Bath, or any other point on the Susquehanna, in the state of New-York, is about twenty-five cents a bushel, down, and round to Baltimore; or, at the average rate of about one hundred dollars for every forty tons of all articles down to tide only; more than half of which is paid for the transportation on the river from Conewago to tide; independent of the risk, which is estimated as equal to from seven to ten per cent. But on the canal, the commodity would be exposed to no risk, little delay, and comparatively a small expense. Let us now extend the comparative view we have before exhibited, to the whole of the two routes from the head of the Conewago falls to Baltimore. Let us say, that each of the three articles of

coal, of grain, and of flour, is charged with a toll through of one dollar a ton; and, that the freight of each ark would amount to ten dollars through; and, that the delay and passage would amount to four days on the canal. From Conewago to tide, by the river, the delay and passage may be set down at two days, and the freight and pilotage at fifty dollars for each ark of forty tons. The contrast between the expense of transportation on the two routes from Conewago to Baltimore, (apart from insurance) will stand thus:

<i>By the Canal.</i>		<i>River and Bay Navigation.</i>	
Distance, - - -	93 miles.	Distance, - - -	130 miles.
Delay and Passage,	4 days.	Delay and passage, -	10 days.
Toll and freight		Freight, &c. on coal,	95 dolls.
through for an ark		Freight, &c. on grain	102 dolls.
of forty tons, -	50 dolls.	Freight, &c. on flour,	88 dolls.

Thus the proposed canal, when completed, would be the means of saving full one half of the present price of transportation from Conewago to Baltimore, on every forty tons of commodities brought down the river, from any point beyond the head of the falls: and would, therefore, be, in effect, offering a bounty to that amount for all commodities exported from the Susquehanna country, as an encouragement for their increase.

As we have before remarked, some opinion may be formed of the kind and amount of the commodities which may be expected to be brought down the river, and through the proposed canal to Baltimore, by that which is now brought down to tide under every inconvenience, and at all hazards. Mr. George W. Lightner has published a rough general account, or register

of the number of arks, rafts, &c. which arrived at Port Deposit at the foot of the falls, in the months of March, April, July, and November of the year 1822. It would be difficult, from the manner in which this register appears to have been kept, to deduce from it, with any degree of precision, the number of tons weight that came down within that time; but it is stated, that five hundred and thirty-seven arks, five hundred and fourteen board and timber rafts, and five hundred and twenty-six thousand shingles had arrived; and that the aggregate amount of commodities, of all descriptions, was computed to be of the value of one million, three hundred and thirty-seven thousand, nine hundred and twenty-five dollars; of which twelve thousand dollars worth was stove and lost in the Susquehanna. The nature of the commodities thus brought down the river, in that year, are specified; and it appears, that they consisted of the productions of agriculture, and the modifications of them; as wheat, rye, corn, buckwheat, potatoes, tobacco, flax-seed, clover-seed, and apples; flour, whiskey, flax, and linseed oil: of provisions, as pork, beef, bacon, butter, lard, tallow; of lumber or the productions of the forest, as plank, scantling, boards, shingles, tanner's bark, staves, hoop-poles, and raft logs or untrimmed timber; of some of the most valuable minerals, as iron, coal, and slate; and of some other articles, as leather, pot-ash, hats, bees-wax, &c.

The productions of agriculture, and provisions have, hitherto, formed the chief part of the whole amount; which has annually increased very much, under every disadvantage, since the trade down the river was first opened; and it is evident must continue to

grow with the growth of the population of the Susquehanna country to an immense amount. All such articles, from their great bulk and weight, in proportion to their value, as well as from their perishable nature, require a safe, cheap, and rapid mode of conveyance to market: none of them can bear the cost, and delay of transportation *by land*, for any great distance. But we have been assured, that wheat can be raised on the borders of the Seneca and Cayuga lakes, in the state of New-York, brought down the river Susquehanna in its present condition, and sold in the city of Baltimore, at the prices current there, so as to leave a reasonable profit to the farmer. The boards, rafts, and timber brought down the Susquehanna will not only be increased in amount; but the importance of the productions of the extensive forests of the north-west must also be greatly enhanced in value to the people of the sea-board, in proportion as their own forests are diminished.

The mineral productions of the Susquehanna country, so far as it has yet been explored, are found to be very abundant and of the greatest value. There have been discovered, in no part of the union, it is believed, a greater number of rich veins of iron ore than in the middle and western parts of Pennsylvania; most, or all of which are readily accessible to some one or other of the navigable branches of the Susquehanna. And, as iron cannot be extracted from the ore, or manufactured into any shape, without a great consumption of fuel, there is much reason to believe that the iron of Pennsylvania may, ere long, be brought to us, and in the greatest abundance, cheaper than from any other part of the world; for, in no



other part of our country are iron mines so conveniently situated in the midst of such inexhaustible stores of fuel. In addition to the extensive districts of mountain forest, suitable for charcoal; immense strata of mineral coal are found at a short distance from the main branch of the Susquehanna, and on the Juniata, whence the furnaces, forges, and iron works, may be easily furnished with the greatest abundance of fuel, and at the cheapest rate. The United States have hitherto, notwithstanding the great number of mines wrought within their own territory, been importers of iron. One of the causes of which appears to have been the cost of transporting that heavy, and necessary, but comparatively cheap article, to any great distance *over-land* from those parts of the interior of the union, where it is most abundantly found and made, to where it is wanted. The proposed canal is, therefore, calculated, in a very eminent degree, to remove this evil; and will, no doubt, in time, become one of the means of contributing largely towards rendering us independent of foreign nations for all the iron necessary for our own use.

The coal mines of the Susquehanna are immense, and altogether inexhaustible. They have, as yet, been very imperfectly explored; and the coal from them has been as yet, but very partially brought into use over a very limited extent of our country. The coal of the Susquehanna is of two distinct characters. That which is found on the waters of the Juniata is exceedingly bituminous in its nature, is easily ignited, and burns freely, with much flame, smoke, and soot. This coal is similar in its nature to the coal of Liverpool, Richmond, and Pittsburg; indeed it is said to belong to the same widely extended stratum of coal, of that found at

Pittsburg. It is not liked, or much used, on account of its smoke and smut, for family, or culinary purposes; but, by some, it is reckoned to be of the very best species for air furnaces and several kinds of iron works, and smithery.

The coal of the Wyoming valley, called by mineralogists anthracite, differs from every other kind of coal that has been hitherto found in the United States. We shall abstract a concise description of the extent of its beds and of its nature, from that given by Mr. Zachariah Cist, of Wilkesbarré. The coal formation on this branch of the Susquehanna, he tells us, extends in a south, south westerly direction, from its commencement at the upper part of the Lackawana creek, near the Wayne county line, down the course of that creek to its junction with the Susquehanna, keeping chiefly the east side; leaving the river about eight miles below Wilkesbarré, it passes in a southward course on to some branches of the Lehigh, a branch of the Delaware river, and also on to the head waters of the Schuylkill; and thence, after crossing three main branches of the Schuylkill, becomes lost, a small seam of it only appearing at Peter's mountain, a few miles above Harrisburg. Making in all an extensive range of many miles in breadth, and above one hundred miles in length. On the height of land, the veins of coal are more level than in the Wyoming valley, where the strata dip from the height of five hundred feet, at an angle of from ten to thirty five degrees towards the river on both sides, inducing a belief, that the valley has been formed by the sinking of the surface. On each side of the valley of Wyoming, in the centre of which Wilkesbarré is situated, the land rises very abruptly to the height of a thousand feet

above the level of the river, and, keeping nearly that height, extends to the east about thirty miles before it again descends. The coal alternates with schist, argillite, micacious slate, and micacious sand-stone; which last is in strata from five to one hundred feet thick, the coal itself forming veins of from thirty to forty feet deep, though the general thickness is from twelve to fifteen feet.

This coal, when pure, affords the most intense heat of any of the carbonaceous minerals. In a properly constructed wind furnace of the cubic dimensions of ten or twelve inches, cast iron readily melts, and the most refractory clays either become glazed, melt, or lose their form. The importance and value of this coal for manufacturing, as well as for domestic purposes is not generally known; but it is rapidly extending, it having been found equal, if not preferable to other fuel for most of the purposes to which it has been applied. For nailing, for the rolling and slitting of iron, malting, distilling, evaporation of salts; for steam engines, where the furnace is properly constructed; for all these purposes it is entitled to a decided preference. It produces a regular, steady heat, without smoke, or unpleasant smell, and makes a most durable fire. Producing no soot, the pipe of the chimney can never become foul, or be in danger of taking fire. Neither will the misery of a smoky chimney ever be endured where this fuel is used. About two thousand tons are now annually consumed along the Susquehanna from Wilkesbarré to tide. The quantity sent to market from the Lehigh and Schuylkill mines, may be estimated from one thousand to fifteen hundred tons.

The coal at Wilkesbarré is valued at fifty cents per ton in the mine; costs about fifty more to raise it, and twelve and a half to sixty cents, according to the distance from the bed, to deliver it at the river. It is transported in arks carrying from forty to seventy tons to Harrisburg, Columbia, and other points down the the river. At Conewago it may be estimated as worth about three dollars per ton; at Baltimore it sells, at the present time, for thirty-three cents per bushel, twenty-eight of which make a ton, or for nine dollars a ton; but if the proposed canal were open, we might safely calculate on its being delivered there at five dollars a ton; or about eighteen cents a bushel. The natural consequence of the use of coal for fuel, in the country bordering on the tide waters of the Chesapeake, where it could be had so cheap; and of the immense quantities of timber brought down the river, would be, that the farmers would have no need of retaining so large a part of their farms in woodland; the quantity of their arable land might be increased without any additional purchases, and the superfluous wood sold to advantage; and those farms which are at present destitute of timber, and fuel, (and there are not a few of them,) might by means of the Susquehanna timber and fuel, be effectually fenced in anew, and restored to their original value and usefulness.

The contemplated canal line, at the butt end of Slate ridge near Peach-bottom, passes through a quarry of as fine slate as any in the world, near which, on both sides of the river, there are many other and abundant quarries of this valuable article. The value of slate as a covering for houses is very well understood every where; in cities, it is the only kind of roofing that

should be allowed. Latterly there have been no more than about six or seven hundred tons of this slate sent to market at Baltimore. The quarrying and dressing at the quarry, costs about eight or nine dollars the ton. From the quarries, on the left bank of the river, it is sent down, through the present canal on that side, to tide for one dollar and twenty-five cents a ton; and, from the quarries on the right bank, that are two miles from the river, it costs two dollars twenty-five cents to send it down the river to tide, and five dollars if sent all the way by land; and thence to Baltimore the freight is one dollar and twenty-five cents per ton. In Baltimore, it sells for about twenty-two dollars per ton, which will cover two hundred and twenty-five square feet. When the proposed canal shall be completed, this fine slate may be sent, water-borne, from the very mouth of the quarry to all the towns and cities along the sea-board, and up our rivers and canals over three-fourths of the union beside. The slate quarries of the Susquehanna have been but recently opened, and the inconvenience, and cost of getting the slate to market, has been the chief cause of their not being more generally known and valued.

Thus far we have taken a cursory view of the amount of the *descending* commodities only; but the opening of the canal would give to Baltimore the whole of the *ascending* trade to that vast region of Susquehanna country, which has, hitherto, been closed against it, and of which it has, hitherto, known nothing, and participated in, to the amount of not one single dollar. All, or almost the whole amount of those commodities, which, according to Mr. Lightner's register, in the year 1822, amounted to upwards of one

million, three hundred thousand dollars, were sold and paid for at the city of Baltimore, in *money*; no merchandise of any description was delivered, in Baltimore, in exchange for any part of that great amount of country produce. And such must continue to be the course of trade under the existing state of things. But, if the canal were opened, so as to admit of boats passing in safety up the river, the whole of this Susquehanna trade would concentrate in Baltimore; and, through it spread its advantages over the whole state of Maryland. It is admitted, on all hands, that the upward trade, although less in *tonnage*, would always keep pace in value with the aggregate amount of the descending commodities. It has, however, been supposed, that the imports would bear a proportion in weight or tonnage to the exports of not more than one tenth. All articles of foreign growth or manufacture that might be wanted for consumption in the Susquehanna country, would be transported through the canal, from Baltimore, up the river, in exchange for the commodities which had been brought down; because, it is evident, they could be had better and cheaper in that way than in any other.

But there are some articles which the state of Maryland could furnish to that country better, cheaper, and more abundantly, than from any other quarter. The herring and shad fisheries of the Chesapeake are perhaps superior to any in the world. There are now from fifty to sixty thousand barrels annually passed at the inspection of Baltimore, besides what are taken immediately from the fisheries and consumed in the country. In the proper season, these fish are taken in such quantities, that, near many of the fisheries, not

finding a market for them, they are hauled out of the water merely for the purpose of being spread upon the land as manure. But this cheap and bulky article of human food will not bear the cost of transportation *by land*, but a very short distance into the country. It is believed, that no herrings or shad caught in the tide waters are carried further up the country than York and Lancaster counties in Pennsylvania; but, if the proposed canal were completed, the salted herrings and shad of the Chesapeake would find a good market as high up as Owego and Bath, in the state of New-York.

When we contemplate the vast extent of that territory, dependent chiefly, or altogether on the Susquehanna river for its intercourse with the sea-board; the multitudes of active, enterprising freemen now seated on it; the great value and variety of its productions, as already ascertained; its fine climate and fertility of soil, we cannot but feel strongly impressed with an opinion, that the removal of that torrent barrier, which now interrupts the intercourse between it and the city of Baltimore, must be of infinite importance to both; and, that the tonnage and the value of the commodities which would annually pass between them, must be far greater in amount than any one, at a cursory glance, could be induced to believe was within the bounds of credibility. Mr. Gallatin, in his report on roads and canals, in the year 1808, speaking of the amount of transportation between the cities of Philadelphia and Baltimore, by means of the then proposed canal from the Chesapeake to the Delaware bay, says, that "The coal wanted for Philadelphia, and which, if brought down from the sources of the Susquehanna and Poto-

mac, but principally from the vicinity of Richmond, would naturally pass through the canal, have been alone estimated at more than one hundred thousand tons a year. The annual carriage of all articles may, in the present state of population, be fairly estimated at *one hundred and fifty thousand tons.*" This estimate appears to be founded on good data; and yet the exchanges, which it was calculated would be thus effected, between those two cities, does not seem to have been computed as an amount that would be required for the accommodation of more than one-fourth of the population, which is, at present, seated within the extent of the Susquehanna country; nor does it appear, except in the single article of coal, that the amount of tonnage, thus estimated to be likely to pass between those two cities, would be composed of any thing like the quantity of ponderous articles, that must, from the nature of things, pass between Baltimore and the Susquehanna country.

It has been said, that the annual consumption of coal, at present, in the city of New-York amounts to one hundred and fifty thousand tons; and that this supply may be derived from the Susquehanna stratum bordering upon the Lehigh, by means of a canal across the state of New-Jersey. From the best information we have been able to procure, from the most respectable dealers in coal, it appears, that there is, at this time, brought to and consumed in the city of Baltimore and its vicinity between nine and ten thousand tons of coal annually. And this annual consumption, it is evident, as well from the reduced price of the coal, after the completion of the proposed canal, as from the increased price of wood fuel, must for some time con-



tinue to increase very much. But this is not all, for, it is very clear, that, when the contemplated canal shall have been completed, the Susquehanna coal can be sold in Baltimore at a price so much lower than coal at any other sea-port, that all the cities along our seaboard, particularly those to the eastward, will be induced to draw that article of fuel from that port; and Baltimore instead of being, as heretofore, an importer and consumer only, will become a great exporter of coal.

If, therefore, Mr. Gallatin was correct in stating the amount of the annual carriage of all articles, between the two cities of Philadelphia and Baltimore, at one hundred and fifty thousand tons; it would appear to be very far indeed below his computation to assert, that there would be an annual transportation through the proposed canal, between Baltimore and the Susquehanna country, of at least twice that amount, or three hundred thousand tons; but, lest we should be charged with a disposition to flatter or exaggerate, let us reduce it, and suppose, that there will be no more than two hundred and fifty thousand tons annually pass on the proposed canal from Conewago; and, that it was charged with no more than one dollar per ton through. The canal would then yield a revenue of two hundred and fifty thousand dollars. The legal interest, on the whole estimated cost of the canal, is something less than one hundred and fifty-eight thousand dollars; which would leave a surplus of ninety-two thousand dollars to defray all charges of repairs, superintendants, lock-keepers, &c. and would be more than sufficient for all such purposes.

But let us place this estimate in another aspect. The canal commissioners of the state of New-York, at

a meeting held on the third of March last, fixed the rate of tolls on the Erie and Champlain canals, as follows: "On salt, per mile, five mills, gypsum per ton, per mile, five mills; flour, meal, and all kinds of grain, salted provisions, pot, and pearl ashes, one cent and five mills per ton, per mile; merchandise, per ton, per mile, three cents; timber, squared or round, per hundred solid feet, per ton, per mile, one cent; boards, plank and scantling, reduced to inch measure, and all siding, lath and other sawed stuff, less than one inch thick, per thousand feet, per mile, one cent, if conveyed in boats; the same, if conveyed in rafts, two cents; shingles, per thousand, per mile, two mills, if conveyed in boats; the same, if conveyed in rafts, four mills; bricks, sand, lime, iron ore, and stone, wrought or unwrought, per ton, per mile, five mills; posts and rails for fencing, per thousand, per mile, three cents, if conveyed in boats; the same, if conveyed in rafts, six cents; wood or fuel, (excepting such as shall be intended to be used in the manufacture of salt, which shall pass free,) one cent per cord per mile; boats made and used chiefly for the transportation of property of fifteen tons burthen, and upwards, per mile, two cents; boats of this description of less than fifteen tons burthen, and all skiffs, and other light craft one cent and five mills, per mile; boats made and chiefly used for the carriage of persons, six cents per mile; staves and heading; pipe, per thousand, per mile, one cent; hogshead, seven mills; barrel and others, five mills; all iron castings, per ton, per mile, one cent; articles not enumerated, one cent per ton, per mile."—Now if, we were to apply these rates of toll to the commodities which are now usually brought down the Susquehanna,

as well as to all others, which would pass through the canal upward, from Baltimore to Conewago, we should find that the average rate of tolls might be estimated at about one dollar and a half through; and still the whole cost of transportation, by the canal, would be much below that by the natural navigation. Then let us suppose, that only two hundred thousand tons passed the canal annually, the tolls would yield a revenue of three hundred thousand dollars; which would, not only be sufficient to pay the legal interest, with all incidental charges, but would redeem a part of the principal.

But, when the many decided advantages of the canal are considered, there can be no doubt, that, if the toll on it were nearly or quite equal to the whole amount of the mere cost of transportation by the natural navigation, still it would be preferred, for the carriage of all descending commodities; because, by the canal, the article would certainly reach Baltimore on the fourth day from Conewago, in perfect safety; but, by the natural navigation its passage could not be reckoned at less than ten days, nor its risk at less than ten per cent. It surely could not be said, that we were led astray by over ardent imaginations, or that we had deviated from the dictates of the soberest judgment, if we were to assert, that the time was now fast approaching; and, indeed, would be seen by most of those now living, when three times three hundred thousand tons would be passed through the proposed canal from Conewago, if it were just now finished. Is it possible, that any intelligent, and reflecting man, who will take into consideration the coal mines, the iron mines; the fertile, productive soil, &c. &c. of the Susquehanna

country; and say, that when more than a million of freemen shall be settled within it, they will not require an intercourse, and exchanges, *with their natural, and only sea-port*, equal to nine hundred thousand tons annually? The thing is not only probable but seems to be absolutely certain; and before that time shall arrive the whole cost of the canal will have been reimbursed, and it will be the most profitable property the state could possibly hold.

In designating that extent of territory, which we have called the Susquehanna country, we have had no reference whatever to mere hopes and expectations, to possibilities, or even probabilities. Our intention was, in the first place, by circumscribing our views within those boundaries, to confine our considerations to matters of present reality; to things as they now exist; and to that direction and course of trade, which having at present a direction and determination down and up the river, must be more fully explored and increased by every addition to the population; by every improvement in cultivation; and by every facility in navigating the river Susquehanna to and from the nearest sea-port. And looking altogether, in the first instance, to that country, and to that country exclusively, we have undertaken to affirm, that there might be found within it, alone, an ample sufficiency of trade to justify the great expenditures likely to be incurred in the making of the proposed canal; by which it would be opened to and intimately connected with the port of Baltimore; and in fact, that such a revenue may be collected from the tolls of that canal, as will not only pay the legal interest on the sum expended in its construction, and all incidental charges, but which would in a very short

period of time, reimburse the principal also. And our considerations have also been limited within the confines of that country; because we were anxious, in the views we should exhibit, of this highly interesting and important subject, that as little as possible should be left to chance, fancy or guess; we wished, that all the certainties should be first gathered together, so that every doubt should be removed, and all causes of cavil silenced before we ventured to make a single speculation upon what might be expected from any extension of the Susquehanna navigation in any direction whatever, with either the western, or the northern waters. But we will now venture to offer some opinions as to the practicability and consequences of elongating this navigation from the city of Baltimore, by the canal and the river Susquehanna, founded on the best information we have been able to collect.

Before we proceed to describe the routes by which the waters of the Susquehanna may be connected with those of the Ohio river, it may be well to furnish some general outline of the value of that trade to Pittsburg and the west, which would be the inducement for effecting a canal communication between those waters. The town of Pittsburg, owing to the great advantages of its situation, near the highest navigable point of one of the principal rivers of the west, has long been considered as the principal depot of all the western commerce. In the year 1820, no less than fifteen hundred tons of merchandise were sent from the sea-board to the country beyond the Mississippi, through the towns of Pittsburg and Louisville, on the Ohio river. During the years 1817, 1818, and 1819, the expenses of transportation from Philadelphia, over land, to Pittsburg,

amounted to one million, five hundred and sixty thousand dollars, each year, making four millions, six hundred and eighty thousand dollars for the transportation of merchandise distributed from a single depot in the western country, in three years. It has been estimated, that in the year, there were, on an average, two thousand, five hundred and fifty-five wagons employed in the transportation of merchandise from Philadelphia to Pittsburg; that they carried eighty-nine thousand, four hundred and twenty-five hundred weight, which were valued at seventeen millions, eight hundred and eighty-five thousand dollars. And we have it from the most intelligent and respectable authority, that, even within the last year, there has been sent from the city of Baltimore, by land, to Pittsburg, and the Ohio river, merchandise to the value of twelve millions of dollars. These few facts do, in the most satisfactory manner, shew the immense value of the western trade, resting on, or distributed along the great western waters from the town of Pittsburg. The trade between it and the sea-board has, hitherto, been conducted altogether over land.

Much has been said and written about the facility with which a communication, by canal and river navigation, with this great inland depot, from some one or other of our Atlantic sea-ports, might be made. Communications of this kind have been traced out, and said to be exceedingly feasible, and easy of being effected, at a very moderate expense, as well to the north as to the south of the City of Baltimore. But owing to causes, of which it may not now be necessary to say any thing, that great and beautiful river, the Susquehanna, has held on the even tenor of its way, amidst the fertile

mountain valleys of the north-west, with few advocates, and seldom more than now and then a passing plaudit; and yet, as Mr. Gallatin has justly observed, "it is the only Atlantic river whose sources approach both the western waters and those of the St. Lawrence." Let us then trace out the canal and river Susquehanna communication from Baltimore, its natural sea-port, to the town of Pittsburg.

Two routes have been explored, and both of them have been pronounced to be practicable, by very intelligent men, who were specially charged with an examination of the nature of the navigation of the western waters of Pennsylvania, by the government of that state. The first of these routes may be traced from Baltimore up the Conewago canal, thence up the Susquehanna to the Juniata; thence up that river to the Raystown branch; thence up that branch to Dunning's creek, a mile below Bedford. Thus far the ascending navigation is admitted, by every one, to be good. And as to the navigation from thence upward, towards the waters of the Allegany, Messrs. Findley and Smith, the two commissioners who were appointed by the Governor of Pennsylvania, to view and explore the waters of the Juniata and Connemaugh, in their report dated the fifth of March, 1793, say, "In our view of Dunning's creek, which, from the Big-fork to its mouth is about fourteen miles by the stream, and about ten miles in a straight course, we found to be a beautiful river for navigation. Its descent or fall, in that distance, (as well as it could be ascertained without a level,) does not exceed two feet in a mile, and in many places not one. A log of a foot diameter lodged across the stream, will, in many places, deaden and deepen

its slow current for a mile back. It waters a valley of the richest land in the county, and is kept nearly at an uniform height of from fourteen to twenty inches, in the driest season, by never failing lime-stone springs, and some of them very large, and rising near its banks. There are but one or two ripples in the whole distance, and scarcely a rock or stone to be seen. Nothing is wanted in the channel but the removal of fallen timber and drift wood, with the bars of gravel occasioned by their lodgment.

These obstructions remain only in five or six places, and although they are at present a stoppage to canoes or boats that might be used on the stream, yet wherever they are found they make a deep pond of still water above them. At present the removal of those obstructions and clearing the channel in some gravelly places, collected by brushwood lodged in the channel, is all the improvement contemplated; and this may be well effected for less than forty shillings per mile, or about twenty-five pounds for the whole distance between the Big fork and the mouth. In this estimate we have not considered Wisecarver's mill which is the only mill on that part of the river or creek. By the dam, the navigation is improved and deepened for two miles above, but that advantage would be lost by throwing down the dam, nor is there any obligation upon the owner to give his consent, nor any provision for maintaining a lock either by him or the public. By dams of this kind at every seven or eight feet descent, with water works or mills and a lock at each dam, this creek could not only be improved into a permanent navigation and beneficial mill-works up to the Big fork, *but in its main branches double the dis-*



*tance almost to the foot of the mountain, through which or from the top of which some of the branches come, so as to be capable of being connected with the waters of Stoney creek and Little Connemaugh. We mention this circumstance, by the bye, to shew how happy the state of Pennsylvania is in a variety of sources and means of extending her commerce, by joining the eastern and western waters."* Down to Conne-  
maugh, thence into the Kiskiminitas into the Alle-  
gany, and so to Pittsburg, the navigation is known to be safe and good, or susceptible of being made perfectly so, the whole way. Let it then be supposed, that to effect a communication between the navigable waters of the Juniata and the Allegany, along the route which has been thus described and said to be practicable, would require a canal of fifty miles in length; then it appears that a good boat navigation may be completely laid open, the whole way from Baltimore to Pittsburg, by means of no more than one hundred and forty-three miles of canal in a distance of about four hundred miles.

But, there is another route, by which it is no less practicable to unite the waters of the Susquehanna and Ohio, the whole length of which is much shorter than that we have just described. We will trace it through by courses and distances. From Baltimore along the proposed canal to Conewago is ninety-three miles; thence up the Susquehanna to the Juniata, twenty-four miles; thence up that river to Huntingdon eighty-six miles; thence up to Frankstown, forty-two miles; thence by a canal to the Connemaugh, sixteen miles; thence down to Stoney Creek, eighteen miles; thence down to the Allegany river, sixty-nine miles;

and thence down to Pittsburg, twenty-nine miles; making, throughout the whole, a good boat navigation of only three hundred and seventy-seven miles, with no more than one hundred and nine miles of canal. The practicability of opening a canal between the Frankstown branch of the Juniata and the Connemaugh, a branch of the Allegany river, is thus spoken of by the same Pennsylvania commissioners, in their report of 1793.—“The mouth of Stony creek,” say they, “at its junction with Little Connemaugh, is about twenty-nine miles distant from the Beaver dam branch of Juniata at Frankstown, by the state road now opening; and the said road, (besides its main object of being the shortest and easiest communication for land carriage between Pittsburg and Frankstown, and the whole country extending from thence through the counties of Huntingdon, Mifflin, and Northumberland, on the waters of Juniata and Susquehanna,) furnishes also the shortest and most practicable portage between the Juniata, (where the navigation terminates by the present contracts for opening the same,) and the Connemaugh at the mouth of Stony creek, where the western navigation to Pittsburg, on the Ohio, and Presque isle, on lake Erie, commences. *This portage, by the appropriations reserved by the legislature for a canal and lock navigation of the Poplar run branch of the Juniata, and the Little Connemaugh, may be reduced to a distance not exceeding five or six miles, or possibly removed altogether by locking the waters of Poplar run, Bob’s creek, and Little Connemaugh into each other, by means of a reservoir near the summit of the Allegany hill, where the state road, or present port-*

*age from Frankstown to the mouth of Stony creek and thence to Pittsburg, crosses the same."* And in corroboration of what is here said, as to the practicability of connecting those waters by means of a canal, we would observe, that it may be seen, by an inspection of Melish's map of Pennsylvania, that the waters of those two rivers approach each other very near; and, that, in the interval, a *cedar swamp* is designated. From what is said, then, by the Pennsylvania commissioners, and from all other circumstances, it may be fairly concluded, that the obstacles, in the way of opening a canal, are by no means insurmountable, or even very difficult. Let us, however, allow a much greater extent to this connecting canal, than the Pennsylvania commissioners intimate would be necessary; and say, that it would be thirty-seven miles in length; if so, the whole length of canal necessary, between Baltimore and Pittsburg, would not exceed one hundred and thirty miles in the whole distance of three hundred and seventy-seven miles. Thus making the whole route nearly or quite as short as by any other; and in that distance, not half the length of canal, which, is said to be necessary to pass, by the way of any other water course whatever. This route is, therefore, the nearest, cheapest, and most practicable of any that has ever yet been traced out from any of the Atlantic ports, to Pittsburg, and the waters of the west. The distance from Baltimore *by land* to Pittsburg is two hundred and twenty-nine miles, and from Philadelphia it is two hundred and ninety-four miles.

The invention and use of steam-boats, which can so easily stem the current of the great rivers in the south

and west, and which has brought with it so many conveniences, improvements, and blessings to the union at large, has, however, fallen with an unequal effect upon the city of Baltimore. The use of steam-boats, on those great rivers, has been the means of diverting from Baltimore a great portion of that highly valuable trade to the south-west, from which she had profited so long and so much. Steam-boat navigation, up the rivers Mississippi and Ohio, has enabled, and apparently invited that trade to expand itself into a much larger circle; and yet, to have its operations conducted as rapidly, and at a less expense, than when it was confined within much narrower limits, but carried on altogether or chiefly by *land* transportation. The commerce of the south-west, which formerly circulated through Baltimore, now revolves round by New-York, Boston, and New-Orleans. It has been principally or chiefly owing to the economy, safety, and cheapness of the water transportation up those great rivers, that it has been spread out, and carried round by those points. Hence, we may confidently calculate on a very great proportion of that large amount of commerce being very soon brought back to Baltimore, by the opening of the canal and river navigation, between it and Pittsburg; because, when the canal shall have been completed, it is self-evident, that merchandize can be transported to the west much cheaper than from Boston or New-York to New-Orleans, and thence, in steam-boats, up the Mississippi and Ohio rivers, or indeed in any other way, or along any other route.

Turning from these extensions of the navigation of the Susquehanna, in a *westerly* direction; let us now

direct our attention to the *northward*. The practicability of a safe and easy canal and river navigation, between the city of Baltimore and the great lakes, is no longer a matter of hope and speculation; actual surveys and levellings, by an engineer in whom the most entire confidence may be placed, have pointed out the means and ascertained the route beyond all doubt. Mr. Geddes, our engineer, in the year 1812, actually surveyed the route from Newtown, on the Tioga branch of the Susquehanna, across to the head of Seneca lake; and found, that a canal, with a most abundant supply of water, may easily be opened, so as to connect the river Susquehanna with the Seneca lake; and, that the whole line is no more than eighteen miles in length. If we advert to the very strong inducements which the state of New-York has to lay open a canal, along this route; through which to facilitate the transportation of salt, from her works at Salina, over the state of Pennsylvania; and to procure through it coal, which, it is said, is found on the Tioga branch, as fuel for the use of her salt works, as wood becomes scarce and dear, we cannot doubt, that so soon as that enlightened state shall have completed her great lines of canal, this lateral section will be attended to and accomplished in a very short time. This proposed canal has already been considered, in that state, as presenting an improvement, that imports weighty consequences to the states of New-York and Pennsylvania; as likely to give rise, at once, to a very profitable trade in the articles of salt, gypsum, coal, and iron. Let us then count up the whole distance to lake Erie along this route. From Baltimore to Conewago ninety-three miles; thence up the Susque-

hanna to Northumberland seventy-five miles; thence up to Tioga point one hundred and fifty miles; thence to Newtown fifteen miles; thence to Seneca lake eighteen miles; thence to the New-York Erie canal, at Montezuma, forty miles; thence along that canal, to lake Erie, at Buffalo, one hundred and sixty-three miles: Making in the whole a distance of only five hundred and fifty-four miles from the city of Baltimore to Buffalo on Lake Erie. From the city of New-York it is one hundred and sixty miles to Albany; thence by the canal three hundred and sixty-three miles to Buffalo. Hence, it appears, that the navigable route from the city of Baltimore to lake Erie would be only thirty miles farther than from the city of New-York to the same point on the lake.

This route of intercourse with the great lakes, has, as yet, never been travelled from the city of Baltimore; the benefits and advantages to be derived from it, therefore, are yet to be explored and made known. Time alone can develop them, after the canals shall have been opened. But the soberest judgment and the tamest advocate of the canal policy must admit, that the opening of such a channel of intercourse must be attended with the most serious and important advantages. In whatever light the subject may be considered, whether in a civil or military point of view; whether for the purposes of commerce, or for conducting war-like operations, it certainly must be allowed to be a matter of the very first importance to have a track cleared, along which a bulk of thirty tons can be water-borne, cheaply and expeditiously, from the tide of the Chesapeake, in perfect safety, the whole way through

the heart of the union, on to the bosom of the great north-western lakes.

We shall here close our exposition of the subject, the consideration and examination of which was committed to us. But, before we pass it from us, we would beg permission, with the greatest deference and respect to the superior wisdom and judgment of the representatives of the good people of Maryland, to offer our most humble suggestions as to the manner in which the great contemplated canal, if at all, should be undertaken. We have seen, that, in the state of New-York, a canal, of greater length than any other in the known world, has been executed with a rapidity and economy, when compared with similar projects in Europe, that would appear to be almost incredible; we have seen that great work, of that state, extending itself from one end of the state towards the other; and every where, as it was extended, spreading out its benefits and its blessings; every where becoming the delight and the pride of the people. But all this was to have been expected; for, that great undertaking progressed under the direction, and has been the work of a free people. It has been the business of all, and is now the property of the state, of the whole people, with all its consequent benefits and honours. It was foreseen that such a work, so conducted, could not fail to succeed; and it has succeeded, beyond the most sanguine expectations of its advocates. Let Maryland conduct her proposed work in a like spirit, and in a like manner, and its failure may be pronounced to be impossible. But, if by any misdirected notions, the grand work of opening a canal from Baltimore to

Conewago, should be fashioned into the shape of a joint stock company, and thrown into the market, among money dealers and speculators, to be gambled for, by having its vast merits noised and bruited abroad, until immense sums had been filched from some, and squandered by others, and all without effect; we should calculate on beholding the effort terminate in an abortion, and then on its dropping into oblivion; or of its being recollected only to embarrass the authorities of the state, for the purpose of drawing large sums of money from the treasury, as a compensation for what would be gravely called a most sacred chartered right, which could not be meddled with, even for the public good of the whole nation. We would, therefore, offer our humble supplication, that this great work should not be committed to the hands of a chartered, or joint stock company; that the state would hold it exclusively in its own hands, and guarantee the payment of the interest of the sum necessary for its execution, and for the payment of that interest, a certain fund should be inviolably set apart.

We cannot close what we have to say without paying a tribute, justly due, to the skill, correctness, and ability of our engineer. Mr. James Geddes, who superintended and directed all our operations, and made all the estimates of the cost of the proposed work from actual observation, has been for many years engaged in the service of the state of New-York as a civil engineer. He explored and laid out a great portion of the route of the great Erie canal, and the whole of that of the Champlain canal in that state; and has been engaged by the government of the state of Ohio; and made for it sev-



eral important, and long surveys of canal routes through that state. The canal commissioners of the state of New-York, after many years of his service, and their having the most ample opportunity of knowing and appreciating his skill and integrity, speak of him in their report of 1821, in the following high terms. "In the selection of all the persons, who are now employed by us, under this character (engineers) we have been eminently fortunate. But to the Hon. Benjamin Wright and JAMES GEDDES, the state is most indebted. Possessing much local information, competent science, long experience in many kinds of business bearing some analogy to canal operations, and well established characters for industry and fidelity, these gentlemen have rendered the most essential services, in all the duties of their department. They were first appointed engineers: they have unceasingly, and with improving fitness, devoted their best faculties to the great cause in which they were engaged. And they have hitherto been found equal to the high trusts confided to them." And as a further evidence of their continued high opinion of him, they tell us, in their report of 1822, that Mr. White, one of their engineers, on a re-examination of that portion of the Erie canal, between Schenectady and the Cohoe's falls, had recommended an alteration in its route. But the alteration was of such importance, that they directed Benjamin Wright and JAMES GEDDES, Esquires, the two senior engineers, carefully to survey the lines on both sides of the river, in company with Mr. White, and to report thereon. And on their favourable report the alteration was unanimously adopted and has since been carried into exe-

cution. To which we take great pleasure in adding, that in our opinion Mr. Geddes, does most justly, merit the high reputation he has attained; and that as a civil engineer in surveying, laying out, and constructing canals, there is no one, in whom more entire and implicit confidence may be reposed.

We have thus far endeavoured to explain and exhibit a clear and condensed view of the great subject committed to us. We have been exposed in the execution of our task, for some months to a most unhealthy region of country; but have, nevertheless, spared no pains or labour ourselves, in endeavouring to have all our operations conducted economically, expeditiously, and faithfully. And yet, the expense of the whole work, including our own travelling expenses, while actually engaged on the business of the survey, (for we had none, nor do we expect any pecuniary compensation whatever,) has been swelled to an amount, as will be seen by an inspection of our account, with its accompanying exhibits, and vouchers, somewhat beyond those limits, within which we at first flattered ourselves it might have been confined. But it must be recollected, that we were charged to explore canal routes over a country never before viewed by the eye of an engineer for that purpose; and, of the shape and topography of which, there was absolutely nothing accurately known; and, that through such a country, we have explored and ascertained a canal line of little less than *ninety-three* miles in length. On looking over the accounts of the expenditures of the New-York canal commissioners, rendered to the legislature of that state

in the year 1817, we find the item, "For exploring and levelling a route for the northern canal \$5237.83," besides incidental charges and the expenses of the commissioners. The length of this northern canal is only *sixty-one* miles. So that upon the whole, when the cost of all our operations is compared with that which has been incurred elsewhere, for similar services, we indulge the strongest confidence, that our expenditures will be deemed perfectly reasonable and satisfactory.

All which is most respectfully submitted.

<p>THEODORICK BLAND,          GEORGE WINCHESTER,          JOHN PATTERSON,</p>	}	<p><i>Commissioners of Sus-          quehanna Canal.</i></p>
---	---	--

BALTIMORE, 25th November, 1823.

TO THE HONORABLE THEODORICK BLAND, GEORGE  
WINCHESTER, AND JOHN PATTERSON, ESQUIRES,  
COMMISSIONERS, &c.

*Gentlemen,*

AN account of the examinations for a Canal "from the Conewago falls to the head of tide water, on the Susquehanna," and thence to Baltimore, made in pursuance of your directions, is presented in the following

### REPORT.

Contrary to the expectations of many, it is now ascertained, by the application of instruments, that a canal conducted on the level of the surface of the river, from the head of Conewago falls, will not leave the valley of the Susquehanna until it arrives at the valley of Deer creek, within less than two miles of the tide water. The above level, beginning at the head of Conewago falls, will be designated the *Conewago level*. When led along the river valley, this line of level will run out into the several lateral valleys a short distance, and still be brought back again to the faces or brows of the hills between them. After entering Maryland, the Broad creek valley would allow said level to be carried many miles, out from the river, but the high land, separating Broad creek from Deer creek, would

bring it again back to the stony steep hill, the base of which is the river shore, along the brow of which hill it must follow to the valley of Deer creek. The only method of conducting a canal, from York-haven, southward, must be by following the valley of the river, locking down occasionally, as has been done in the Mohawk valley, in the state of New-York.

It has been surmised, that the united waters of the Conewago and Codorus, might be used for the purpose of locking *up* from the river to a higher level, from which elevation a canal might be conducted, in a pretty direct line, across the country to Baltimore. No inquiry need be made into the capacity of these streams, for such a purpose, as the levelling along the road, from Baltimore, *via*. York, to York-haven, shows this country to be so immensely elevated, and uneven, as to set aside such a project at once. The high land, which bounds the valley of the Codorus on the south, extends, with undiminished height, to the Susquehanna river; and forms that lofty eminence, which overlooks Marietta, and from which may be seen Lancaster, and many other distant places; so that the said proposed *summit level* formed in the valley of the Codorus, must, on its way to Baltimore, pass near Marietta, along the face of the above height; and thence, over a succession of high hills and deep valleys, compelled to a course so serpentine, that the *length* would exceed the river route, to say nothing of the increased lockage.

In following the valley of the Susquehanna, much of the whole distance, from the mouth of Codorus to tide, may be pronounced very difficult to conduct a canal along; although there are neither *deep cuttings* nor high *embankments*. The difficulties are, that upon

any level or levels that may be taken, the line of canal will run so great a proportion of the way on the slope (and generally a very steep slope too) of a mountain, composed, to all appearance, almost entirely of rocks; and still worse, the earth to line it, in much of the distance, cannot be obtained, but with great difficulty. The nearest earth lies generally on the top of these rocky eminences, two or three hundred feet, and often more, above the level of the canal line. A case is presented here, which never occurred on the New-York canals; to wit, the great expense of getting earth for lining the canal. The cost of bringing earth down the face of such high, rough, and steep mountains, would, in many situations, probably, exceed the cost of carting it a mile along the level bottom of the canal. From a short distance, below the mouth of Codorus, to near Marietta, would be the longest stretch on which little or no earth would be found on the canal line. The most difficult place to obtain it, would be along the high promontory over against Marietta, to a point opposite the mouth of Chickey's creek.

Few mountains which are, to appearance, composed entirely of rocks, have such a covering of timber, as those forming the western bank of the Susquehanna; so that, persons passing swiftly down on arks or rafts, may be readily led to suppose those timbered steps not very unfavourable to the conducting a canal along their faces. But, to the *formation*, consisting of scarce any thing else than rocks, must be added the consideration of the *steepness* of the slope, very often exceeding forty-five degrees, and seldom under the angle given to canal banks, requiring the supporting with *masonry*,

the lower side of the canal, in almost every place, where it would run along the face of these rocky mountains.

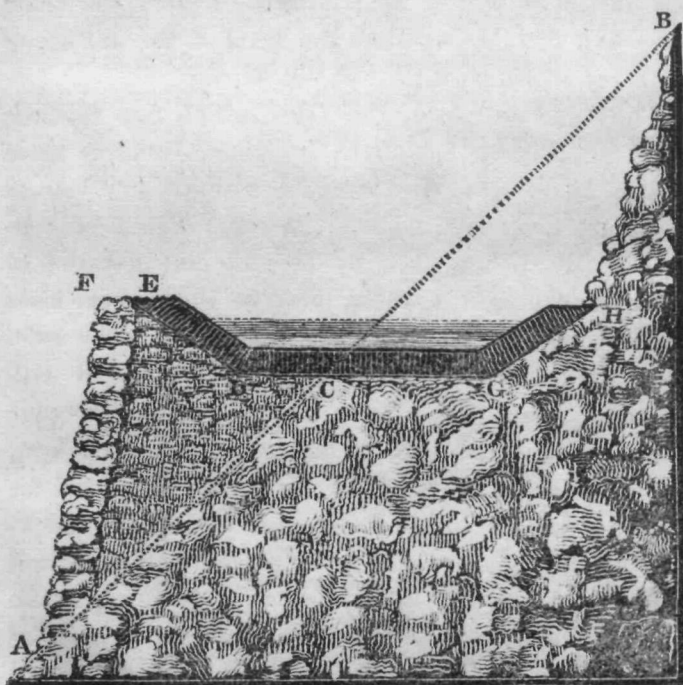
From a view of the annexed diagram, it will appear that on the face of a slope rising forty-five degrees from the horizon, there will be required, the removal of seventy-two cubic yards, per yard run, of rocks or earth, (if any earth shall be found so near the surface,) to form a space for the reception of the lining, &c. of the canal, and that the rude wall to support the work, will be on the outside forty-five feet high. But, in few instances, will it be required to carry the canal forty-five feet higher than the level of the surface of the river adjoining it.

The rocks composing the sides, which face towards the river, of these mountains, are generally large loose masses, lying in the most irregular manner, as if "dropt in nature's careless haste." A canal would be constructed, in such a place, by forming an excavation or trough to contain the water: first, of these great loose stones, supported by a rude *dry wall* on the lower side. Over the bottom, and up both sides, then faced with pounded stones, made finer than on a good turnpike road. Next, coated with the best gravel, coarse at first, but very fine on the surface. It is now prepared for the last lining of earth, which would vary in the thickness, as it might happen to be porous or water-tight stuff; water to give this earth a partial puddling, would in most places be collected from little streams out of the hills, and, in some places, would have to be pumped from the river below. These mica, or talcose rocks, which compose these mountains, would be easily pounded, and might be brought down to a fine gravel with

### EXPLANATION.

A, B, shows the face of a hill rising in an angle of forty-five degrees from the horizon.

A, C, D, E, F, is the section formed of what is taken from the space C, G, H, B, each equal to seventy-two yards superficial measure, making seventy-two cubic yards for each yard measured along the canal.



Angle 45 degrees, scale 24 feet to an inch.





less expense, perhaps, than gravel could be procured otherwise, in many of the situations.

A canal, thus made, would not only, be exposed to evaporation from the surface of the water, but the air would pass among the large loose stones, under it, and on both sides of it, carrying away the ooziings, which in a common canal, are received into the rain-soaked earth. The loss sustained from *soukage* and *evaporation*, on such a canal; would surely be great; although the work should be done in the most faithful manner; but the many streams which enter the west side of the river, would probably be sufficient to supply the great waste of water to which such a canal would be exposed, without resorting to any expedients for drawing water from the river. The most doubtful place would be above the mouth of Muddy creek.

From calculations of the expense of moving these rocks, building rude walls, pounding stones, bringing earth from a distance for lining, puddling, &c. it results, that some portions of the proposed canal will cost, (excavation and lining complete for the reception of the water,) at the rate of \$80,000 per mile. An approximation towards the cost of a canal, from above Yorkhaven to near Havre-de-grace, is attempted by dividing the whole distance, into portions of like kind; portions which will cost about, at the same rate, per mile, and affixing the valuation to each portion. The several portions are shewn, on the map of the river, by numbers corresponding with the following.\*

\* These numbers will be found on the annexed topographical map.—*Cont.*

*From ninety chains above York-haven to near  
Havre-de-grace.*

	Chains.	Dolls.
1. Place of beginning.		
2. Level rocky grounds, widening and deepening an old canal, - - - -	90	6,000
3. Steep and rocky, but the hill not high; sand- stone fit for culverts, - -	100	19,360
4. A gentle slope, and, in places, bottom land,	70	3,500
5. Rocks to the water-edge; steep but not high, and at 5 chains a mass of pudding stone,	63	6,498
6. The like rocky shore, but limestone, -	66	6,098
7. Pretty favourable ground, some rocky spots,	152	8,356
8. A stony flat at the bottom of a high rocky hill,	20	1,452
9. A rocky mountain to the water edge—angle of the slope 30°, - - - -	188	117,500
10. A gentle slope and good earth, - - -	47	2,274
11. Steep rocky hill; last half mile a narrow flat and earth, - - - -	85	38,000
12. A space between the mountain and river—wide enough, but little earth, - -	52	13,000
13. Precipitous rocks to the water's edge,	20	15,000
14. Space for a canal, but little earth, -	50	12,500
15. A rocky promontory to the edge of the water,	16	12,000
16. Little difficulty presents in this distance,	197	11,000
17. Generally near 30 feet between the river and the mountain, - - - -	53	13,000
18. An average of from 10 to 15 feet of flat; moun- tain high and rocky, - - -	84	40,000
19. Space between the river and mountain just wide enough - - - -	244	11,000
20. A rocky hill to the water's edge, -	23	15,000
21. Generally room enough between the mountain and the river, - - - -	74	8,000
22. Rocks to the water's edge, - - -	27	15,000
23. Generally room enough between the mountain and the river, - - - -	62	4,500
24. A rocky hill to the river's edge, and not very steep,	102	57,375

	Chains	Dolls.
25. A space of 10, 20, and 30 feet between the mountain and river, - -	124	60,000
26. Very rocky mountain to the water's edge,	83	60,000
27. River flat at the foot of a steep stony hill,	82	10,000
28. A narrow flat at the foot of a rocky steep,	20	8,000
29. Very feasible throughout this distance, -	29	1,430
30. Loose, large rocks, but not steep near the river,	43	3,000
31. Level, low bottom, joining a cultivated hill,	91	5,600
32. Pretty steep and rocky, - - -	28	14,000
33. A rocky steep mountain to the water's edge,	28	17,500
34. A mass of high rocks, very large, -	42	35,000
35. Good ground, except some great rocks,	131	8,000
36. A gentle slope from the mountain to river, but quite rocky, - - - -	39	2,904
37. Pretty feasible; cultivated ground most of the way, - - - - -	120	5,808
38. Good level land, wide enough between mountain and river, - - - -	64	2,904
39. Very rocky and steep to the water's edge,	42	30,000
40. Broad flat, not alluvial—some loose rocks,	73	6,000
41. Very steep rocky mountain to the river's edge,	42	30,000
42. Cornfield on a slope, some part meadow flats,	57	9,100
43. Mouth of Peach-bottom, cr. 44. Bottom not too low, 72 chs. - - 59 = - - - -	131	
45. A road but 15 feet wide at the foot of a high, steep, rocky mountain, - - -	45	25,000
46. Room and earth sufficient, - - -	33	1,600
47. Granite—road but 15 feet wide between the mountain and river, - -	14	10,500
48. Space just wide enough, and sufficient earth,	20	1,000
49. Space of 10 or 15 feet between the mountain and the river, - - -	12	6,000
50. Mountain's foot to the river's edge, -	17	12,800
51. Average 15 feet between the mountain and river,	15	7,500
52. Steep and rocky into the water, - - -	5	3,700
53. Pretty feasible, - - - -	55	2,660
54. A rocky mountain hanging over deep water,	24	24,000
55. Cleared land up a steep hill, - - -	15	730

	Chains.	Dolls.
56. All steep rocky shore, - - -	35	26,000
57. Flats of broad valley; surface above the floods, 31	31	1,500
58. Very rocky hill to the water's edge, but not very steep, - - - -	21	12,500
59. Some of the best, - - - -	90	4,376
60. Large rocks, but the mountain not steep,	51	25,500
61. Rocky mountain down to the very shore,	29	22,500
62. Wide flats nearly all the distance, -	154	9,317
63. Stony hill to the water, but not steep,	37	15,000
64. High, rocky, granite hill; steep near the river,	98	73,500
65. Very good, except the crossing Deer creek,	140	6,776
66. Rock shore, but not steep, - - -	27	11,000
From Port Deposit bridge to the lower end of the rocky shore above Havre-de-grace, is 4 miles	20	206,500
Excavation of the whole distance, - 55m. 62c.		\$1,256,188
Conewago dam and 5 aqueducts, - - -		10,600
Lock opposite Columbia, for a communication be- tween the river and canal, - - -		10,000
Guard locks and feeders, - - - -		25,000
Culverts 61, at \$200 each, - - - -		12,200
Waste weirs 50, of 50 feet each, \$200 each, -		10,000
Bridges 50, at \$80 each, - - - -		4,000
Fencing, where there are no walls or precipices,		21,500
Lockage for 272 feet, - - - -		272,000
Sum total on the river, -		<u>\$1,622,488</u>

*Between Havre-de-grace and the City of Baltimore.*

The country lying between Havre-de-grace and Baltimore, is of a character very different from that on the river Susquehanna. Not a rock to be seen, except in a small spot, where the post road crosses Church creek, nor are there indications of any to be found below the surface. The earth, in every part, save the spot above mentioned, is amongst the easiest kinds to be moved; yet a canal along this route, will be an expensive one. The long *aqueducts* required to

pass the many bays, and the *deep cuttings*, through the necks of land between said bays, will swell the cost of this to a large sum; notwithstanding the very trifling lockage needed for a canal so long.

Piers to support wooden aqueducts, over these bays, are proposed to be masonry, built on a foundation of piles, cut off and floored at the surface of the lowest tide.

Allowing the surface of the water in the aqueducts to be twenty feet wide, and twenty feet higher than the surface of the lowest tide in the bays, and the length, from centre to centre of each pier, to be twenty-four feet, the calculation is made as follows.

*Calculation for a Pier in the average Depths of the several Bays.*

<i>Foundation.</i> —28 piles at \$1.20 each is	-	\$33 60
Driving them at \$1.50 each,	-	42 00
Cap pieces and capping,	-	10 00
Flooring, plank, and nails,	-	8 00
		<hr/> \$93 60
<i>Stone Structure.</i> —Wall 16 feet average height, 33 feet long, and 5 average width, equals 106 perches, at \$1.50 per perch,	-	159 00
<i>Wooden Superstructure.</i> —Pine timber,	-	30 40
Oak timber,	-	13 00
Pine plank,	-	15 00
Carpenter's bill,	-	28 00
		<hr/> 86 40
Whole cost of a length 24 feet long, and the towing path, is	-	<hr/> <hr/> \$339 00

In the carpenter's bill, calculation is made for fitting the plank together with grooves, and strips dipped in paint or pitch, such a length of aqueduct requiring to

be secured in the most effectual manner against leakage.

A MAP of the country, from Baltimore to the Susquehanna, to which this refers, is on twelve sheets, numbered from Baltimore eastward. The profiles on each number shew the depth of the excavation, &c.

The distance of the canal line, from the measurements made, in some places on the line, and in places at some distance from it, is thirty-six miles, seventy-five and a half chains. The parts requiring aqueducts, are

On No. 3. Back river, - - - - -	width, 143 yards.
No. 6. Gunpowder river, - - - - -	1782
No. 8. Otter Point creek, - - - - -	476
No. 9. Bush river, - - - - -	401
	2802 yards,

which divided by 8, the length calculated for a pier, gives 350 $\frac{1}{2}$  lengths, at \$339 each, is \$118,735 for aqueducts.

*The Deep Cuttings, with the Cubic Yards required to be moved in each, and the price per Cubic Yard.*

		Cu. Yards.	Cts.	Dolls.	
On No. 2,	1	659,065	a 22	144,994	
	3	28,280	12 $\frac{1}{2}$	3,535	
	1	2,717	8	217	
				217	\$148,746
No. 3,	1	52,822	20		10,564
No. 4,	1	267,475	20	53,495	
	1	25,710	12 $\frac{1}{2}$	3,212	
	1	58,552	19	11,124	
	1	7,722	8	617	
				617	68,448
No. 5,	1	21,363	10	2,136	
	1	5,038	9	453	
	1	54,164	15	8,124	
				8,124	10,713

		Cu. Yards.	Cts.	Dolls.	
No. 6,	1	20,735	8		\$1,658
No. 7,	2	165,109	20	30,021	
	1	101,826	15	15,273	
	1	3,540	16	5,665	
				<hr/>	50,959
No. 8,	1	40,142	15	6,021	
	1	100,452	18	18,081	
				<hr/>	24,102
No. 9,	1	114,773	20	22,954	
	1	8,250	9	742	
				<hr/>	23,696
No. 10,	1	53,220	16	8,515	
	1	9,119	9	829	
	1	27,753	12½	3,469	
				<hr/>	12,813
No. 11,	3	32,168	10		3,216
No. 12,	1	6,600	10		660
					<hr/> <hr/>
					\$355,575

*Embankments, and their Value per Cubic Yard.*

		Cu. Yards.	Cts.	Dolls.	
On No. 1,	4	30,000	a 10		\$3,000
No. 2,	2	5,000	10		500
No. 3,	5	6,000	10	600	
	1	2,400	12½	300	
	3	4,000	10	400	
	1	13,000	14	1,820	
	2	9,000	12½	1,125	
	1	21,000	14	2,940	
				<hr/>	7,185
No. 4,	2	9,000	14		1,260
No. 5,	3	16,000	12½		2,000
No. 6,	2	6,600	10	660	
	1	4,000	12½	500	
				<hr/>	1,160
No. 7,	1	9,000	12½		1,125
No. 8,	2	26,000	12½	3,250	
	1	6,000	10	600	
				<hr/>	3,850



		Cu. Yards.	Cts.	Dolls.	
No. 9,	3	16,000	10	1,600	
	1	58,000	14	8,120	
	1	5,500	12½	687	
	1	2,600	10	260	
				<hr/>	\$10,667
No. 10,	1	20,000	14	2,800	
	1	7,700	12½	1,962	
	1	10,000	14	1,400	
	1	22,000	14	3,080	
	1	6,400	10	640	
				<hr/>	8,882
No. 11,	1	4,000	10	400	
	1	20,000	12½	2,500	
				<hr/>	2,900
No. 12,	1	15,000	12½	1,875	
	1	6,400	10	640	
	1	15,000	12½	1,875	
				<hr/>	4,390
				<hr/>	<u>\$46,919</u>

The embankments being of little account, when compared with the deep cuttings, were not measured with such precision, and the contents are set down in round numbers coming near the truth.

From the whole distance between Baltimore and the Susquehanna, to wit, 36 miles, 75½ chains.

Deduct the length of the deep cuttings and the aqueducts already calculated, equal to 11 miles, 47¼ chains.

And there is remaining 25 miles, 28¼ chains.

This 25 -- miles of common excavation, having neither deep cuttings nor embankments in it, \$3,000 per mile may be considered ample for the excavation of such earth, making the item excavation of this remainder \$75,106.

## RECAPITULATION.

Aqueducts,	- - - - -	\$118,735		
Deep cuttings,	- - - - -	355,575		
Embankments,	- - - - -	46,919		
Excavation,	- - - - -	73,106		
Add,	{	Culverts 85, at \$250 each,	- - - - -	21,250
		Bridges,	- - - - -	9,360
		Waste weirs 23, at \$220 each,	- - - - -	4,840
		Fencing both sides, 73 miles,	- - - - -	65,000
		A feeder from Gunpowder,	- - - - -	5,000
	{	Lockage 63 feet,	- - - - -	63,000
From Baltimore to Susquehanna,	- - - - -	\$764,785		
From near Havre-de grace to the head of Conewago falls,	- - - - -	\$1,622,488		
	Total,	- - - - -	<u>\$2,387,273</u>	
Add for unforeseen contingencies, superintendance and pay of engineers, 10 per cent,	- - - - -	238,727		
	In all,	- - - - -	<u>\$2,626,000</u>	

If the above sum be divided into the part, within Pennsylvania, the part remaining on the river, and the part between the river and Baltimore, it will be as follows.

*On the River in Pennsylvania.*

For guard lock and feeders,	- - - - -	\$ 5,000
Excavation of 41 miles 51 chains,	- - - - -	818,232
Waste weirs, aqueducts, bridges, and culverts,	- - - - -	29,100
Lock opposite Columbia,	- - - - -	10,000
Guard lock and feeder at Rowland's point,	- - - - -	20,000
Fencing,	- - - - -	18,000
Lockage of 209 feet,	- - - - -	209,000
		<u>\$1,109,332</u>
Ten per cent,	- - - - -	110,933
Whole sum,	- - - - -	<u>\$1,220,265</u>

92 / 2626 / 20 000  
 2242  
 386  
 368

*On the River in Maryland.*

For excavation of 14 miles and 12 chains, -	\$437,950
Waste weirs, aqueducts, bridges, and culverts, -	8,690
Fencing, - - - - -	3,516
Lockage 63 feet, - - - - -	63,000
	<u>\$513,156</u>
Ten per cent, - - - - -	51,315.6
Whole sum, -	<u><u>\$564,471.6</u></u>

*Between the River and Baltimore.*

For excavation, &c. of 36 miles and 75½ chains,	\$764,785
Ten per cent, - - - - -	76,478.5
Whole sum, -	<u><u>\$841,263.5</u></u>
Total in Maryland	<u><u>\$1,405,735.</u></u>

The highest land, between the Susquehanna and Church creek, cannot be passed over with a lower level than sixty-three feet above the level of low tide. This elevation must, necessarily, be carried from a point, sufficiently high up the Susquehanna, to supply the canal, on the way towards Baltimore, with water from the river. This plan makes it necessary to have locks to the amount of sixty-three feet between the canal and river, at Havre de-grace. So that the whole lockage required, will be  $272 - 63 = 335$  feet, Forty three feet is fallen by four locks in the valley of Church creek, and one near Bush river, and the remaining twenty feet, by three locks at the basin of Baltimore.

To secure an ample supply of lockage water at the three locks into the basin of Baltimore, a feeder from Gunpowder has been taken into the calculation.

All which is submitted with great respect by your humble servant.

J. GEDDES, *Engineer.*

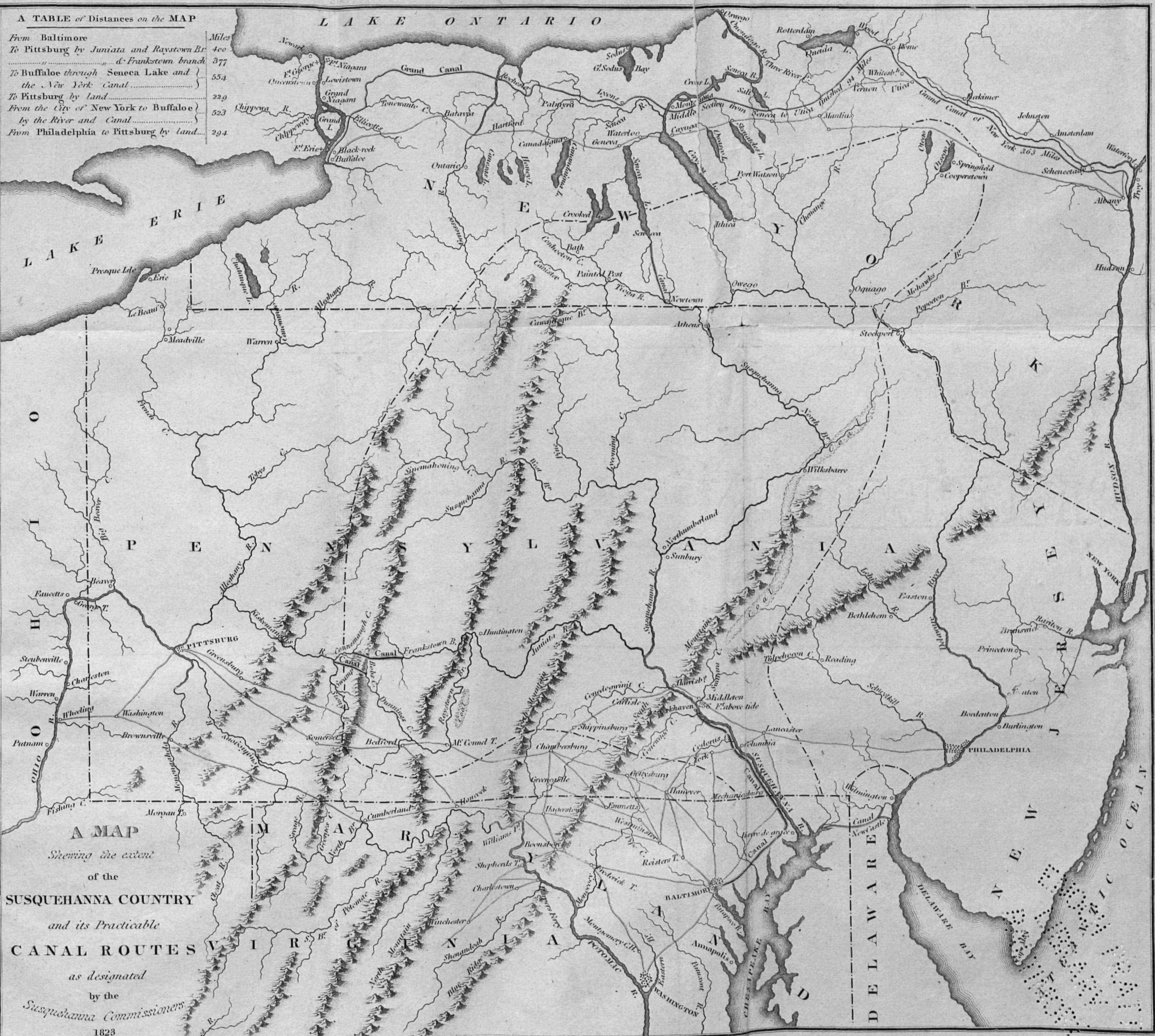
BALTIMORE, *November 7, 1823.*

*Note.*—The TOPOGRAPHICAL MAP of the river mentioned in the Commissioners' Report, has been since extended, and now exhibits an accurate view of the Susquehanna, from Owego, in New York, to tide; and thence to Baltimore. Its execution does great credit to the talents and industry of Mr. W. F. Small, assistant engineer.

*Com'rs.*

**A TABLE of Distances on the MAP**

From Baltimore	Miles
To Pittsburg by Juniata and Raystown Br.	400
To Pittsburg by Frankstown branch	377
To Buffalo through Seneca Lake and the New York Canal	554
To Pittsburg by land	229
From the City of New York to Buffalo by the River and Canal	523
From Philadelphia to Pittsburg by land	294



**A MAP**  
 Showing the extent  
 of the  
**SUSQUEHANNA COUNTRY**  
 and its Practicable  
**CANAL ROUTES**  
 as designated  
 by the  
*Susquehanna Commissioners*  
 1823

$$\begin{array}{r}
 41 \quad 1220265 \\
 14 \quad 564470 \\
 \hline
 55 \mid 1784735 \quad (32448) \\
 \underline{165} \\
 134 \\
 \underline{110} \\
 247 \\
 \underline{220} \\
 273 \\
 \underline{220} \\
 585 \\
 \underline{495}
 \end{array}$$

$$\begin{array}{r}
 36 \mid 841263 \quad (23368) \\
 \underline{72} \\
 121 \\
 \underline{108} \\
 132 \\
 \underline{108} \\
 246 \\
 \underline{216} \\
 303 \\
 \underline{288}
 \end{array}$$



# NEW Universal Cabinet Atlas.

F. LUCAS, JR.

PROPOSES TO PUBLISH BY SUBSCRIPTION A NEW AND BEAUTIFUL

## UNIVERSAL CABINET ATLAS,

COMPRISED IN

ONE HUNDRED AND FOUR SHEETS;

ARRANGED AS FOLLOWS:

- |                                   |                           |                           |
|-----------------------------------|---------------------------|---------------------------|
| 1. Mountains to have the title.   | 55. ASIA.                 | 71. Indiana.              |
| 2. Title.                         | 56. Turkey in Asia.       | 72. Illinois.             |
| 3. Table of Contents.             | 57. Hindoostan.           | 73. Missouri.             |
| 4. Mountains Outline.             | 58. China.                | 74. Arkansas Territory.   |
| 5. Description of Mountains.      | 59. Tartary.              | 75. North West and Michi- |
| 6. Rivers.                        | 60. Persia.               | gan Territory.            |
| 7. ORBS VETERIBUS NOTIS.          | 42. AFRICA.               | 75. Florida.              |
| 8. — Romani Pars Occidentalis.    | 43. Egypt.                | 77. Mexico.               |
| 9. — Romani Pars Orientalis.      | 44. Madeira Islands.      | 78. WEST INDIES.          |
| 10. Græciæ Antiqua.               | 45. Canary Islands.       | 79. Bermuda.              |
| 11. Palestina.                    | 46. Capô de Verd Islands. | 80. Bahama.               |
| 12. Alexandria Magni Imperii.     | 47. NORTH AMERICA.        | 81. Cuba.                 |
| 13. Egyptus Antiqua.              | 48. Canada.               | 82. Jamaica.              |
| 14. WESTERN HEMISPHERE.           | 49. UNITED STATES.        | 83. St. Domingo.          |
| 15. EASTERN HEMISPHERE.           | 50. Maine.                | 84. Porto Rico.           |
| 16. WORLD, Mercator's Projection. | 51. New Hampshire.        | 85. Virgin Islands.       |
| 17. EUROPE.                       | 52. Massachusetts.        | 86. St. Christopher.      |
| 18. England and Wales.            | 53. Vermont.              | 87. Nevis.                |
| 19. Scotland.                     | 54. Rhode Island.         | 88. Antigua.              |
| 20. Ireland.                      | 55. Connecticut.          | 89. Caudaloupe.           |
| 21. Sweden and Norway.            | 56. New York.             | 90. Dominica.             |
| 22. Denmark.                      | 57. New Jersey.           | 91. Martinico.            |
| 23. Russian Empire.               | 58. Pennsylvania.         | 92. St. Lucia.            |
| 24. Poland.                       | 59. Delaware.             | 93. St. Vincent.          |
| 25. Holland.                      | 60. Maryland.             | 94. Barbadoes.            |
| 26. Netherlands.                  | 61. Virginia.             | 95. Grenada.              |
| 27. Prussia.                      | 62. North Carolina.       | 96. Tobago.               |
| 28. Switzerland.                  | 63. South Carolina.       | 97. Trinidad.             |
| 29. Germany.                      | 64. Georgia.              | 98. Curaçoa.              |
| 30. Hungary and Transylvania.     | 65. Ohio.                 | 99. SOUTH AMERICA.        |
| 31. Russia.                       | 66. Kentucky.             | 100. Colombia.            |
| 32. Spain and Portugal.           | 67. Tennessee.            | 101. Brazil.              |
| 33. Italy.                        | 68. Mississippi.          | 102. Peru.                |
| 34. Turkey in Europe.             | 69. Alabama.              | 103. United Provinces.    |
| 35. Azores, or Western Islands.   | 70. Louisiana.            | 104. Chili.               |

### TERMS OF SUBSCRIPTION.

For the complete set of Maps, engraved in handsome style, and printed on paper of the best quality, elegantly coloured in the most appropriate manner, half bound in Russia, calf, or morocco, backs and corners, and delivered to subscribers at *Twenty-five Dollars* per copy.

The same without colouring, at *Twenty Dollars* per copy.

This work which has been the labour of a number of years, the publisher offers to his fellow citizens for their patronage, with a confidence, that there has not been an Atlas published in this country, that conveys so much useful geographical information, both ancient and modern, as the present one; the size of which is very convenient, and the price moderate.

Persons desirous of subscribing, may see specimens of the work, bound, &c. by calling at the store of the publisher, No. 138 Market street.

IN PREPARATION, and will be published early in January next, a MAP of the COUNTRY through which a CANAL is proposed to pass, to connect the waters of the CHESAPEAKE BAY and OHIO RIVER. By JAMES SHRYVER.





REFERENCE BOOK

THE  
ENOCH PRATT FREE LIBRARY  
OF  
BALTIMORE · MARYLAND

ENOCH PRATT FREE LIBRARY

3 4170 02820 5657

