REPORTS

OF SURVEYS MADE FOR ASCERTAINING THE PRACTICABILITY OF MAKING A LAND-COMMUNICATION BY A TUNNEL UNDER THE RIVER FORTH,

AT OR NEAR QUEENSFERRY.

1806.

REPORTS OF SURVEYS, &c.

SIR,

I have received your letter of this date, deſiring me to ſay, whether a Tunnel could be driven under the Frith of Forth from Roſyth Caſtle, in the county of Fife, to the oppoſite ſhore in Weſt Lothian, a diſtance of about two miles.

I have no difficulty of ſaying that the thing is very practicable.

At Borrowſtownneſs, they have carried their coal workings under the ſame Frith for a mile, without experiencing any inconvenience.

At Whitehaven, they now work coal for about the ſame diſtance under the Iriſh ſea; and, at both places, leſs water is met with in the workings under the ſea, than in workings under land. The depth of the workings under the ſea at Borrowſtownneſs, were from 20 to 80 perpendicular fathoms below high-water mark. At Whitehaven they are from 80 to 150 fathoms.

The deepeſt part of the Frith of Forth between Roſyth and the oppoſite ſhore is ſaid to be about 12 fathoms: Of courſe the propoſed Tunnel muſt go deeper than 12 fathoms; and how much deeper muſt be aſcertained by probing the ground at that deepeſt part with boring rods let down from the ſurface of the water. Probably the greateſt depth of the Tunnel would not need to be more than 20 perpendicular fathoms below high-water mark.

The

Mundell, Doig, and Stevenſon, printers.

At Whitehaven men and horſes go from the earth's ſurface into the colliery every morning, and return every evening. This, conſidering the great depth as well as the length of it, is a far harder journey than croſſing and recroſſing by the Tunnel at Roſyth would be; and yet that journey the men and horſes at Whitehaven perform daily, beſides performing their uſual day's work.

The metals between Roſyth and the oppoſite ſhore are likely to be chiefly free-ſtone, and what the miners call paſſable metals.

I am, &c.

(Signed) JOHN GRIEVE.

Ramſay-Gardens, Edinburgh, 4th November 1805.

P. S. The ſlope road by which the Whitehaven people go into their colliery deſcends 1 in 6. There would be no neceſſity for making the Tunnel at Roſyth ſo ſteep as that.

WILLIAM VAZIE, Eſq.

GENTLEMEN,

GENTLEMEN,

Mr. Vazie having handed your letter to me, I have accordingly examined both ſides of the Frith of Forth, with a view to point out the moſt ſuitable place for making a Tunnel under it, to communicate the one ſide of it with the other by an eaſy carriage road.

At firſt one is led, in this inveſtigation, to Queensferry, where, according to the lateſt chart of the Frith, publiſhed by Lawrie and Whittle, 12th May 1794, the breadth is only one mile. But we are obliged ſoon to abandon this place; for the metals there are whinſtone for more than half way over, which could not be mined through but at an enormous expence. Beſides, the depth of the tide between the ferries is, according to the ſaid chart, no leſs than 36 fathoms; and a Tunnel here to make an equally eaſy road through it would be longer than at other places of leſs depth of water.

The weſt ſide of this whinſtone ground reaches to within half a mile of Roſyth caſtle on the north ſhore, and to Springfield, Mr. Morriſon's houſe, on the eaſt bank of the Linn-mill burn on the ſouth ſhore, and in a line between theſe points is the rock in the ſea called Beamer, which is alſo whin-rock.

Immediately to the weſtward of Roſyth caſtle, comes in the lime-rock, which is alſo to be traced acroſs the Frith. This lime-ſtone is worked at Duddingſtone, on the ſouth ſide of the Frith, and at the Mains of Roſyth on the north ſide. The rock in the ſea called the Dove craig, is in the line between theſe points, and this rock is alſo lime-ſtone. Miners chooſe to avoid lime-ſtone almoſt as much as whinſtone. But there is an additional reaſon for avoiding this limeſtone; it happens to be only good in parts, and what is bad or baſtard of it is as hard to work as whin, and equally good for nothing when it is wrought. To go to the weſtward of this lime-rock would be carrying the road out of its courſe, or farther from Edinburgh; beſides, the Frith widens very much to the weſtward for 10 or 12 miles, and the expence of tunnelling under it anywhere there would be greater.

The diſtance between the whin-rock on the eaſt hand and the lime-rock on the weſt hand is little more than half a mile. The metals, in this diſtance conſiſt of free-ſtone, and what the miners call paſſable metals: theſe are the deſirable metals for cutting the Tunnel in. The preſent

preſent quarry at Roſyth, which ſupplies free-ſtone to the wet docks at Leith, is in the middle of this diſtance. Roſyth caſtle, to which the northern roads come eaſier than to any other point, is about 400 yards to the weſtward of the quarry; and about 50 yards to the northward of the caſtle, there is an old free-ſtone quarry, where the Tunnel may enter the ground, and be carried eaſtward parallel to the ſhore with ſuch a declivity, that by the time it enters the wet-dock quarry, it may have cover enough over it for proceeding to ſea with.

This neceſſary cover will be aſcertained by the borings to be previouſly made at that point, and all along the intended line of the Tunnel.

In like manner, on the ſouth ſide of the Frith the Tunnel may enter the ground immediately on the weſt ſide of the Linn-mill burn, and proceed weſtwards parallel to the ſhore, till, by its declivity, it has taken on a cover proper for proceeding to ſea with.

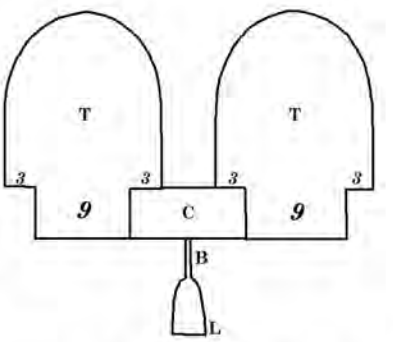
Theſe covers will not need to be very thick, for there is a ſleech upon each ſhore which of itſelf ſupports water, while the metals below the ſleech are of the ſame kind with the metals at Whitehaven, which ſupport water without having any ſleech upon them. The diſtance between Roſyth and the oppoſite ſhore is, both by Mr. Ainſlie's map of Fife, and by the chart above mentioned, called 2 miles, but call it 1800 fathoms.

The greateſt depth of water in the middle of the Frith there, is ſtated in the chart to be 11 fathoms beneath high water-mark, and 9 fathoms more will probably be found to be cover enough for the Tunnel. Suppoſe the Tunnel 15 feet wide, and 15 feet high arched, with a foot path on each ſide of three feet broad, to keep carriages in the middle breadth of 9 feet.

Suppoſe the parallel entries to the ſhores to be each 250 fathoms long, and to deſcend 1 in 25, ſo as the Tunnel may have a cover of 10 fathoms above its ſole, or $7\frac{1}{2}$ fathoms above its top, before it proceeds to ſea. Then its deſcent to the middle of the Frith, or for 900 fathoms on each ſide, will only be 1 in 72. Even ſuppoſing the depth from high water to the ſole of the Tunnel in the middle of the fair way to the 30 fathoms, the deſcent would only be 1 in 45. By the chart, the tide ſeems to ebb half a mile from each ſhore, and the fair way at low water is a mile broad. If a moated pit was ſunk at low water on each ſide, and the Tunnel carried on from north to ſouth, as well as from ſouth to north, it could be finiſhed in $4\frac{1}{2}$ years; or the fair way, for longeſt part of it being 900 fathoms, two fathoms of each end of this could be done weekly. The expence of making the Tunnel would probably be about 160,000l. or 170,000l., viz.

Previous ſoundings and borings, -		L.1000	0 0
For the ſake of expedition, a fire engine would have to be placed on each ſide of the Frith, though when their levels were communicated, only one of theſe engines would be uſed for draining the Tunnel; two ſmall engines at 1200l. each, -	L.2400 0 0		
As much for pumps and for erecting them, - - -	2400 0 0		
		4800	0 0
Two moated engine pits at low-water mark 30 fathoms deep, 60 fathom at 30l. a fathom, -		1800	0 0
Two pits at high water-mark, each 10 fathoms deep, 20 fathoms at 20l., including horſe gins, to be put on theſe, - -		400	0 0
500 fathoms of entry Tunnel.			
1800 fathoms of ditto acroſs the Frith.			
2300 fathoms at 30l. a-fathom, -		69000	0 0
900 fathoms of engine level, 7 feet high, 4 feet wide, at 20l. - - - - -		18000	0 0
		95000	0 0
But to make the paſſage complete, there ſhould be two Tunnels, one for comers, the other for goers. The other Tunnel would coſt - - -		69000	0 0
		164000	0 0

The following is the ſection of the Tunnels and engine levels in the middle of the fair way.



T T, The Tunnels,
3 3, Foot paths,
9, Carriage-road.
L, engine level.

At every communication between the Tunnels for air, C a bore, B may be put down to the engine level to drain the Tunnels.

I am, &c.

(Signed) JOHN GRIEVE.

ROBERT HILL, Eſq.

Edinburgh, 14th November 1805.

GENTLEMEN, *Edinburgh, 6th June* 1806.

IN compliance with your requeſt, accompanied by Mr. Grieve, a few days ago, we ſurveyed and inſpected the ſhores of the Forth, at and near Queensferry, with a view to examine the practicability of opening a more ready communication betwixt the ſouth and north ſhores, by a Tunnel under the water.

We proceeded firſt to the north ſhore, where, for a conſiderable way, both below and above the Ferry, we found it covered with a continued maſs of whinſtone. To the weſtward, in a little bay oppoſite the Toll-bar, the original ſtratification begins to appear, conſiſting of argillaceous, or free-ſtone beds; and a little further weſt, the whinſtone (for ſome time only inland), terminates altogether; and an almoſt continued maſs of free-ſtone lines the ſhore for a great way, paſſing for a conſiderable ſpace to the weſtward of Roſyth caſtle. This maſs of free-ſtone exhibits a number of irregularities in its poſition, dipping more or leſs ſouth and eaſterly, but at the ſame time preſerving a regularity in its general direction of a line, ſomething parallel to the trending of the ſhore to the eaſtward.

Returning to the ſouth ſide, we find the free-ſtone beds begin as far down as the ferry; the harbour at Halls being formed upon a part of them. They continue to the weſtward, paſſing the town of Queensferry, till they reach and paſs Linn-mill burn, and the gate into the Earl of Hopeton's policies.

Theſe beds to the eaſtward exhibit different poſitions of dip and riſe, and certainly ſhew more ſigns of irregularity than they do to the weſtward, where they aſſume a more regular form, and preſerve an eaſterly dip. Upon the whole, theſe beds on the ſouth are ſo ſituated in the general line of direction of thoſe upon the north ſhore, that there is every reaſon to draw the concluſion, that they are the ſame, and continuous of one another. To the additional proof of the lime-ſtone bed croſſing the Frith to the weſtward of Roſyth, reported by Mr. Grieve, we cannot ſpeak, not having examined that circumſtance, but have no doubt that he has informed himſelf correctly on that part of the ſubject. The known direction of the ſtrata, higher up the Frith, is indeed corroborative of it.

Of the practicability, therefore, of the execution of ſuch a work, we have no doubt whatever; and we coincide with Mr. Grieve, that

that the irregularities on both ſides, with the depth of the water at the Ferry, in the line of the paſſage near Inch Garvie, are obſtructing cauſes to the fixing upon that ſituation. We further coincide with Mr. Grieve, that the place, and direction he has pointed out, is the moſt eligible and practicable of any, viz. by entering upon the north ſide, oppoſite the Caſtle of Roſyth, proceeding eaſterly towards the quarry, till a ſufficient cover be acquired, and then proceeding to ſea, in a direction to be hereafter aſcertained by more accurate information.

On the ſouth ſide, as we underſtand objections are made by the Earl of Hopeton to the place marked out for the entrance, we are of opinion, that his Lordſhip's objections may be obviated, by removing the entrance nearer to the town of Queensferry, to the old Millſtone quarry, or even nearer the town; and Mr. Grieve, on conſidering the matter again, agrees with us upon this ſubject. The cauſe which determined him upon entering more to the weſtward, is the intervention of a bed of lava upon the land ſide, which he wiſhed to get over before entering under cover. It does not appear, however, that this whinſtone preſerves its magnitude within tide mark; and we are all of opinion, that it ſhould form no obſtruction to the plan of the work.

This alteration will improve the line of the Tunnel, and though it ſhould add to the expence a little, we do not think the gentlemen, in the direction of this buſineſs, ſhould heſitate to accommodate objections made from ſo reſpectable a quarter.

By the annexed plan, copied from Mr. Ainſlie's map, you will obſerve the direction propoſed, was by the doted lines a b c, and by this alteration, on the ſouth, it takes the direction b d. Indeed, if the inveſtigations to be made will permit, it may be brought much nearer to the Beamer rock, which will improve the line ſtill more; as by the line d e f.

Theſe whinſtone rocks certainly afford a preſumption of connection; and, therefore, point out the propriety of keeping to the weſtward of them. At the ſame time, as there is great reaſon to believe that the rock, upon the ſouth ſide, is ſuperincumbent more than interjected betwixt the ſtrata, it may form little obſtruction, and ſhould not, therefore, be an obſtacle.

They all, however, do afford reaſon to expect whin dykes in the courſe of the work; but which ſeldom exceeding a few yards, or, at moſt, a few fathoms, can in no caſe be calculated upon as formidable.

The

The extenſive dimenſions of the free ſtone, on both ſides, certainly admit of great latitude for the execution of this great work. Towards this purpoſe, the firſt ſtep would appear to be, to take accurate ſoundings in that part of the river where the work is propoſed to be executed. As there is reaſon to ſuſpect that the chart of the Frith, publiſhed ſome time ago, is not ſufficiently accurate, actual ſoundings will be neceſſary for the expreſs purpoſe.

The next ſtep ſhould be experiments, by boring, to aſcertain more correctly the relative poſition and connection of theſe maſſes of ſandſtone, upon the oppoſite ſhores. Bores, to low-water mark, will be eaſily managed: whether boring, in the deep water, can be as eaſily managed, remains to be aſcertained.

The information, acquired from theſe inveſtigations, will finally determine the poſition, and calculation of the expence, of the Tunnel.

If the boring ſhould, in any manner of way, leave the inveſtigation incomplete, which can only happen in the deep part of the river, it may become neceſſary to advance in the work with caution. This may be done by putting down pits, at low-water mark, upon each ſide, to the neceſſary depth, and cutting a communication by a level betwixt them. This meaſure accompliſhed, would afford complete and ſatisfactory information, and determine every point relative to the great work. Such a level will at all events be neceſſary, as a drain upon which the engines for drawing the water from the Tunnel muſt be placed; but whether it will be neceſſary to execute it previouſly, or at the ſame time with the Tunnel itſelf, remains yet to be determined. If previouſly, the only drawback upon it will be the conſumption of time, which will be conſiderable.

With regard to the expence of executing this work, the preliminary ſteps of ſounding and boring would be moderate; and would, perhaps, reach from 400l. or 500. to 1000l. or more, according to circumſtances.

The further ſtep of putting down pits at low water mark, and cutting a level betwixt them, will be a concern of more magnitude. It will require to have placed upon it the engines neceſſary for the great work. It creates, however, no new or additional expence, as every thing to be done in the one, will be neceſſary for the other. Suppoſing the pits to be nearly one mile diſtant, (from low-water on one ſide, to low water on the other), an expenditure would be incurred, including engines, from 12 to 15000l. leſs or more, as the diſtance might fall ſhort of, or exceed the mile.

In applying machinery to the progreſs, and afterwards to the draining

ing of this work, the ſteam engine is that which moſt naturally occurs; and that which is included in the above calculation. To the application, however, of this, on the ſouth ſide, we have heard objections will be made, as the ſmoke will be conſidered a nuiſance to the Earl of Hopeton. To this we anſwer, that a late improvement, made in the furnaces of ſteam engines, which burns or conſumes the ſmoke, remedies that evil, and renders the ſteam engine a much leſs obnoxious neighbour than formerly. At any rate, a ſteam engine upon the ſouth ſide would be but temporary, whilſt the work is executing; for afterwards, the whole drainage would be carried on from the north ſide. Doubting not that all the gentlemen intereſted in this concern would be equally anxious to avoid any thing which could be conſidered offenſive, to any place in the neighbourhood, and particularly to ſo fine a place as Hopeton houſe; if the ſteam engine ſhould be deemed inadmiſſible, other machinery can be ſubſtituted, although with ſome diſadvantage, to which theſe objections will not apply.

With regard to the execution of the great work itſelf, two modes of conſtruction preſent themſelves to our view: 1ſt. Two parallel Tunnels to form ſeparate paſſages, the one for paſſengers to go, and the other to come. 2dly, One Tunnel to form a paſſage of ſufficient dimenſions, to allow carriages to paſs and repaſs without interruption. In the firſt, each would require to be about 15 feet high, and 12 feet wide, to admit of a carriage road and foot path. In the ſecond, the height may be the ſame, but the width could require to be 22, or perhaps 24 feet. In this, to avoid confuſion, the foot path would require to be placed in the middle; raiſed to a proper height; and railed upon both ſides. This latter is certainly the preferable plan: but in the event of the ſtone, to be cut through, becoming full of joints or cutters, it may be neceſſary to adopt the firſt; and, of courſe, both plans may occaſionally be adopted, as circumſtances may require. In the firſt, the price of work would coſt nearly 20,000l. per mile each, which together would make 40,000l. per mile. In the ſecond, it would coſt nearly 35,000l. per mile.

Fig. 1. Fig. 2.

Fig. 1.

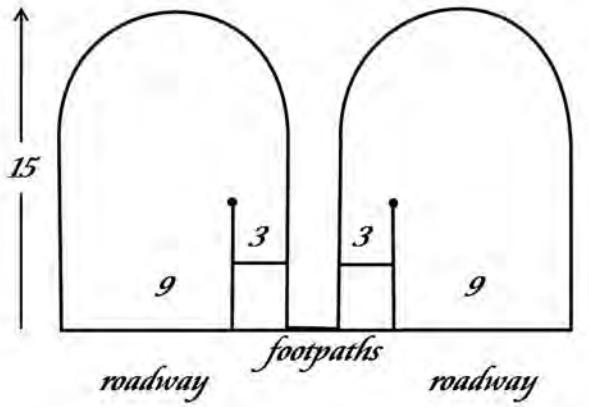
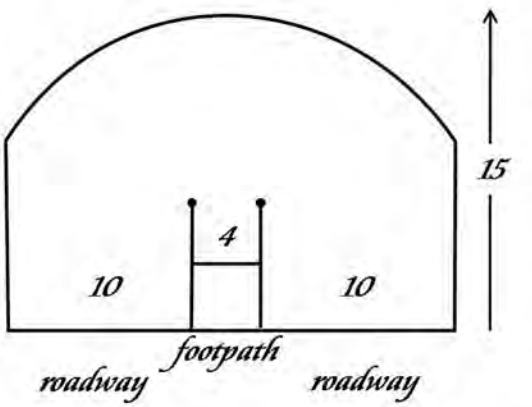


Fig. 2.



By the chart of the Frith, and Mr. Ainſlie's map, the diſtance betwixt the ſhores at this place is nearly two miles. The direction of the Tunnel will lengthen it conſiderably, and it may be reckoned $2\frac{1}{2}$ miles; or perhaps, if their obſervations are not correct, it may be neceſſary, in this ſtage of the buſineſs, to ſtate 3 miles. In which caſe, the amount of the expenditure of the excavation, upon the one, would be 120,000l., and upon the other 105,000l. To this, would be to add maſon work, in fitting up the entrances, which might perhaps reach to a thouſand or two more. To theſe ſums alſo would be required to be added the ſum neceſſary to reimburſe the proprietors of the Ferry, for the loſs they would ſuſtain; the charges of management; and other incidental charges.

Upon the whole, therefore, it would require a capital of nearly 150,000l. to accompliſh this grand and magnificent undertaking; or as the work will be ſeveral years in executing, (four at leaſt), perhaps it might be judged proper to enlarge the capital, as much more as would afford intereſt to be paid for the money, till the ſcheme would bring returns.

In making out eſtimates of this kind, it is cuſtomary to ſtate ſo many per centages upon the whole ſum, to cover incidental and unforeſeen

foreſeen expences. In the preſent caſe, this is unneceſſary. The work itſelf will ſupply an ample fund. There is, indeed, an article of incidental expence, not provided for, which may come to be very conſiderable; that is, if argillaceous or ſoft beds occur, they will be to ſupport by maſon work. Of this, however, there is no great proſpect; on the contrary, if good building ſtone is met with, which there is every reaſon to expect throughout the whole courſe, the produce of the ſtones will be very conſiderable; even ſo much, that they may reduce the whole expenditure perhaps one fourth.

For the accommodations of this work, on the ſouth ſide, no buildings will be neceſſary, a toll-houſe perhaps excepted, the town o Queensferry being ſufficiently near for every purpoſe, as the entrance will be within two or three hundred yards of it. On the north ſides buildings will be in ſome degree neceſſary. As it is beſt ſituated for a ſtage from Edinburgh, a good inn muſt be built, which the truſtees of the ſcheme muſt perform, if no other perſon will undertake it. The ſituation here is indeed well calculated for building; and a little encouragement, with the advantage of a harbour, which might be commodiouſly made, at an eaſy expence, in the bottom of the quarry, might ſoon produce a buſy little town. A neat town at Roſyth, with the caſtle in its boſom, would not detract from the ſcenery of Hopeton houſe: but if the Noble Earl thinks otherwiſe, he has that in his own power.

With regard to the utility of this ſpeculation, the gentlemen intereſted in it muſt be as good judges as we can be. That a more eaſy and uninterrupted communication betwixt every part of a country increaſes the intercourſe of commerce, arts, and agriculture, they muſt know. When we look back to the ruder ages of our anceſtors, when roads were almoſt as little thought of as Tunnels in the preſent day, we find little trade, and little intercourſe, except perhaps in the art of war. Roads began to be made, and with them the arts of peace, and agriculture began to advance. Rivers were ſtill a bar in the way; and commercial intercourſe might be ſaid to be confined to ſummer. Bridges were erected; and trade received new vigour. Canals followed; and commerce, the arts, and agriculture, now flouriſh beyond all calculation. We are living witneſſes of the beneficial effects of theſe wiſe improvements of our fathers. We are alſo witneſſes, however, of this ſyſtem of improving the internal commerce and intercourſe of the country being ſtill defective. Ferries are ſtill, and often, a very formidable bar in the road. Of theſe, in this country, the one under review, at Queensferry, is perhaps the moſt conſpicuous. It is in fact the connecting

necting point betwixt the north and ſouth of Scotland; and, indeed, of the realm: and, in this point of view, the improvement of it muſt be conſidered as a national object. In a military point of view, it becomes intereſting to the legiſlature. In a local view, connecting the north of the kingdom with the metropolis, is no inconſiderable object.

A modern invention, for improving ferries of this kind, is by cutting a paſſage under the water, ſuch as here deſcribed.

What may be the returns, from this ſpeculation, becomes a queſtion of ſome importance, and of ſome difficulty. Examples are few. The Duke of Bridgewater's canal, (if admiſſible), is a powerful one. It certainly correſponds ſo far, as having created an unlimited intercourſe where it was very limited before.

The bridge at Sunderland is perhaps the example moſt in point. The ferries of the Wear were purchaſed, as a preparatory ſtep to the erection of the Iron bridge. The revenues of both have progreſſively advanced, till now it is nearly ſeven times what it was in 1793, the year in which the bridge began to be erected. But the ſtate of that adventure will be beſt illuſtrated by a letter upon the ſubject, lately received from Mr. Burdon, of which the following is a copy.

'DEAR SIR,—In anſwer to yours, Nov. 7, I annex a ſtatement of the tolls of Wearmouth bridge, and of the antient ferry. The increaſe has been far beyond the moſt ſanguine expectation:

'In 1793,	Biſhop's ferry,	L. 250 p^{r} annum.
	'Pan ferry, -	80
	'Southwick, -	80
		L. 410

'The two latter ferries have ceaſed. The other ferry is in the hands of the truſtees of the bridge. The tolls of the bridge are let for three years from this Martinmas, at the rent of 2030l. per annum, the Biſhop's ferry is let for the ſame term for 660l. per annum, reſerving the tolls of the market, let hitherto with the boats, and valued at not leſs than 30l. a year. I have reaſon to believe, that the old tenant, who has retaken the bridge, would have gone farther by 300l. per annum, in bidding for the bridge, rather than have relinquiſhed it. The tolls are the ſame as thoſe of the ferry, only we allow hack poſt-chaiſes to return gratis, and alſo the poſt to paſs gratis in a ſingle horſe chaiſe. Yours, &c.

William Vazie, Eſq. 'R. BURDON.'

Theſe progreſſive advances have taken place in the following order.

	Bridge.	*Ferry.*
1796-97 (the firſt year of the bridge)	L.1380	400
97-98 - - - -	1380	398
98-99 - - - -	1422	356
99-1802 - - - -	1405	386
1802-1805 - - - -	1645	532
1805-1808 - - - -	2030	660

This aſtoniſhing increaſe of intercourſe is imputed ſolely, and juſtly, to the bridge. It is plain, it has created an intercourſe unknown before, which even increaſes the revenue of the Ferry.

The rent of Queensferry, we are informed, at preſent is about 400l. per annum. The expence of boatmen we cannot calculate under 2000l.; which ſums, with the expences of boats, and profits of leſſees, ſhould make the receipts of the Ferry exceed 3000l. per annum. If an increaſe ſhould follow, any way proportioned to that of Sunderland bridge, the returns from this adventure would be ample. Why they ſhould not we cannot ſee, as moſt undoubtedly there are few ſituations can occur, more adapted for increaſing the intercourſe of a commercial, trading, and agricultural people. Different ſources of increaſe are indeed viſible. The poſt chaiſes kept upon both ſides, which are well employed, and none of which paſs the ferry, would all paſs the Tunnels; and would bear a very conſiderable proportion to the preſent receipts. Travellers alſo upon horſeback, who generally are obliged to ſtop, and are often long detained, and muſt ſpend money at the inns upon both ſides, would willingly pay a higher fare to be delivered from this evil. The ſame rule will apply to cattle; and the increaſed number of them it would be impoſſible to calculate. An increaſed intercourſe with all the towns north of the Forth would be a ſure conſequence. Every town, to the ſouth, has long enjoyed a regular communication with the capital by ſtage coaches, or other conveyances; whereas, the mail-coach excepted, nothing of the kind croſſes the Forth. This accommodation would then be afforded to theſe populous and numerous northern towns; and would form no inconſiderable ſource of revenue. An agricultural intercourſe, altogether new, betwixt that rich diſtrict in the weſt of Fife and the city of Edinburgh, equally beneficial to both, and beneficial alſo to the Tunnel, would follow. The more ready acceſs to the city opened up to the noblemen and gentlemen and their families, reſident north of the

river, would alſo increaſe their intercourſe and prove beneficial. A proportion of travellers by Stirling bridge; and a proportion, perhaps not ſmall, of both paſſengers and carriage, by the Ferry at Kinghorn, would accrue to the Tunnel. The Legiſlature alſo, in the military arrangements, would have frequent recourſe to the Tunnel, and would afford an emolument by no means trifling. In ſhort, the increaſe of every ſpecies of intercourſe is certain, and as certainly affords the proſpect of a fair return for the capital ſunk in the adventure.

To conclude, conſidering this ſpeculation as a national object, the undertaking is magnificent. It will do honour to the country, and place the public ſpirit of the noblemen and gentlemen, who patronize it, as high in the ſcale as thoſe of our wealthier neighbours of the ſouth.

We are, Gentlemen,

Your moſt obedient humble ſervants,

(Signed) JAMES TAYLOR.

WILLIAM VAZIE.

To the Gentlemen of the Committee, &c.

GENTLEMEN,

GENTLEMEN,

We have conſidered the ſeparate reports of Meſſrs. John Grieve, James Taylor, and William Vazie, of date 6th June, (which you have laid before us), relative to making a Tunnel under the river Forth at or near Roſyth Caſtle.

And we have alſo your letter of the 27th inſt. requeſting us to inſpect the metals on each ſide the river there, and to form our ideas from the whole, ſo far as to enable us to ſay, whether or not it is practicable to execute ſuch a deſign at or near that place, and whether or not, the probable appearances are ſufficiently favourable to warrant the making of ſoundings and borings, as a preparatory ſtep towards a further inveſtigation for executing ſuch a work, and for making the neceſſary calculations thereon.

In compliance with ſaid requiſition, we have inſpected the metals at the above places, and are of opinion, that it is not only practicable to execute a Tunnel there, but alſo that appearances are ſufficiently favourable to warrant the making of ſoundings and borings, as a preparatory ſtep towards a further inveſtigation of the great deſign you mention. We are,

SIR, your moſt obedient Servants,

(Signed) JOHN ALLINSON.
FRA. BEAUMONT.
JAMES LANDERS.
ROBT. BEAUMONT.
ROBT. BALD.

North Queenſferry, 30th June 1806.

ADVERTISEMENT.

A number of Noblemen and Gentlemen of the firſt reſpectability and ſcientific character having conſidered the ſubject of theſe Reports, have agreed to organize themſelves into a regular body for the purpoſe of carrying the object of them into effect. They propoſe that the Fund ſhall be raiſed by Subſcription, in Shares of 100l. each: and they are of opinion, that the trials recommended in the Reports ſhould be accompliſhed as ſoon as convenient, and have agreed to ſuperintend the execution of them. They propoſe to raiſe the Fund for theſe trials alſo by Subſcription, at the rate of one per cent. upon each ſhare, to be afterwards ſubſcribed for: that is to ſay, every preſent Subſcriber to be entitled to come forward hereafter, to the extent of one ſhare for each pound now ſubſcribed; but at ſame time, not to be bound to come forward unleſs he chooſes, and to the extent he chooſes. If more money ſhall be raiſed by this ſubſcription than may be found neceſſary for the accompliſhment of theſe trials, the ſurplus will be added to the general fund hereafter, if the ſcheme ſhall be found practicable; if otherwiſe, the ſurplus will be returned to the Subſcribers, according to their proportional ſhares.

Subſcriptions will be received by CRAWFURD TAIT and ROBERT HILL, Eſquires, who have been appointed Treaſurers to the Scheme.

Edinburgh, July 28. 1806.

Meadowend
Backside
Lackerston
E.Gillot
Pittrivie
Knows
Black hall
W.Gillot
Bellhills
Primrose
Broomhall
Backmarsh
Bellknows
Gilloway town
Hilltown
Brankhin
N.Newbigging
Lime Kilns
Clayrikes
Little Rosyth
Bruce-haven
Rosyth Kirk in ruins
INVERKEITHING
Mickle Rosyth
C.Newbigging
Hill
Orchard head
Cove
Rosyth Quarry
Rosyth Castle in ruins
Old Toll
Toll Barr
Dove Craig
RIVER FORTH
North Ferry
10 Fathoms below low water mark
Beamer
Inch Garvie
Hopeton House
Earl of Hopeton
Springfield
QUEENS FERRY
Newton
Dundas Esqr.
Scale of Miles
Furlongs