

Add Mss 37359, Whitworth Papers

Captain Perry surveyed two Russian canals to link the Volga and Neva Rivers to provide a route from Moscow to the new capital, St Petersburg. Perry preferred to one which was eventually built as the Marinskii System c1810, with the route through Vishny Volochek being completed circa 1710, becoming the main route for grain and flour from southern and central Russia to St Petersburg. There were only two very short canals at Vishny Volochek, and the boats generally only travelled in one direction, being cut up for fire wood when they reached St Peterburg.

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Here follows two Surveys of the Rivers and Lands for cutting a new Communication between the Volga and the Ladoga Sea, taken by Captain Perry in the year 1710. To which I had adjoined his letter to me of the 21st June 1711, when he sent me the said account of his own Case.

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To His Highness Kneaz General Field Marshal [Lord Kneaz Borice Allexyavitz Galliczin], Caveileer, Alexander Danielich Mensicoff, Survey of Rivers between the Bieloseva & Onega Lakes.

A Report of a survey made by His Czarish Maj,^{ty} at your Highness's especial Order; and an Estimate of ye number of men, & labour required for ye making of a Communication between ye Biello Ossera, & ye Onnega, for a Passage for Vessels of four foot draught of water (which is as much as in ye summer season can Pass ye shallow places coming up ye Rivers Wallgo & Shacksno) according to ye Draught herewith Presented to Your Highness viz: from ye mouth of ye River Koefshea up to ye Head of ye River Sarichsa, & over a neck of land to ye nearest place yt falls into ye River Sheim: and from thence down to ye mouth of ye River Whytygor; which is faithfully as follows.

From ye mouth of ye River Koefshea, all ye way up to ye fall noted in mt Draught, ye River is fair and deep with very little stream, & not above a foot descent; and from ye s^d fall to ye Head of ye River Sarichsa but thirty two foot more, and ye highth of ye neck of Land between yt & ye River Sheim, but a foot and a half. So yt if the aforesaid fall can be cleaned, or ye Hill (in case of no extraordinary difficulty) can be dugg deep enough, then only one, but however at most two sluces will be sufficient on that side.

But from ye Lowermost fall on ye River Whytygor up to ye nearest place abovesaid, yt falls on ye River Sheim, there is two hundred & ninety seven foot descent, besides twenty five foot, ye Highth from ye Sheim side, to ye topp of ye Hill or neck of Land aforesaid: part of which Highth will still remain after a cannal is dugg, so that was ye ground also good & commodious for placing of Sluces on that side, yet there would be required near twenty more.

But ye great & only doubt that remains against ye whole work, & which I think myself in truth & Indispensible duty bound to represent to your Highness, is on the River Whytygor & Sheim ye great rocks & sollid Bedds of stone, with a continued fall in some Places for a great way together; as perticularly from ye Bridge a little above ye Derevna Vellickee door, down to a little below ye Derevna Lonska, written in my Draught, there is one continued descent of sixty eight foot, & ye whole way ye bottom of ye River all great hard stone, & no place between where ye ground is good for Daming up ye River & placing of Sluces. Again from No.1 to No.2 in my Draught, there's a continued Descent of thirty foot, and from No.3 to No.4 another...(continued)

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continued descent of fourty five foot, besides many other Lesser falls: but these are ye very worst places, where there's no good ground to be had, & yet notwithstanding, Sluces must be set up in these very places, & ye River at each Sluce must be damed, or there is no possibility of a Communication to be made.

Which whether in ye said Places ye needfull Piles can be drove to make tight fasten & bind down ye Sluces so yt ye foundation does not rise & blow up when the weight of water comes to ly against them:

and whether ye River can be securly damd, yt ye water finds no passage underneath when ye Sluces are filled, & tare all away, I say whether such a work in such stony places can be perform'd without such unhappy accidents, is what I am not able to determine. But if it be His Czarish Maj^{ty} & your Highness's pleasure, to have such a work taken in Hand, there may be many experiments put in Practice to effect it: besides yt in such case where the ground does not permit sufficiently to secure ye foundation, for one sluice to bear ye due Proportion of weight of water, then two or three perhaps may possibly be placed in ye room of one.

As for example one sluice well design'd & firmly placed (besides ye draight of water allow'd for ye passage of vessels) is able to raise & gain up Hill near twenty foot highth: & where a sluice by reason of bad ground cannot be so well secured, then to be placed to lift half as much less or more as ye ground will admit.

There are (as aforesaid) many other large falls, but there is better ground generally comes between them, & for ye most part they are not so great but one sluice well placed may overcome them, thereby as much as possible where it can be done, to avoid the charge of a greater number.

And next as to ye Labour of Digging, besides what will be required about ye Sluces, a Cannal is Proposed to be dugg according to ye pricked Lines in my Draught, ten fatham broad, & above on ye Hill, two fatham and a half deep: but down on ye River Saricha & short of the River Sherm wearing off to nothing, which together with ye cleansing of the several Rivers, & Cuting through ye crooked places where it is needful, as also the digging of ye Places for setting up of ye Sluces, & raising ye Banks where there is occassion, will in all I reckon amount to one hundred & fifty thousand cubical fathams of earth to be dugg; and allowing extraordinary for strong ground, and other unforeseen accidents, equivalent Labour to fifty thousand fathams more, in all two hundred thousand fathams, & let it be supposed ten men or eight men and two Horses with whipcarts (made on purpose) can digg & carry off but one cubical... (fatham)

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fatham a day (russ measure) then ten thousand men will digg and carry off one thousand fathams a day, without being heavy Laden; for where the ground is good, there eight men with two Horses can easily digg & carry off two fathams per day.

So That a sufficient number of whipcarts & other necessary matirials being first got ready, and fifteen thousand men supposed to be sent to ye Place: two or three thousand whereof to be employ'd always on ye several needfull occassions with ye carpenters &c about ye sluice work; and (allowing for deserters, absent, sick &c) but full ten thousand of ye said number, one day with another, actually Employ'd on ye digging work: and considering ye long winter yt ye ground is frozen, & allowing for badd weather, Sundays & other great Hollydays; Let them be soposed to work but a hundred days in ye year; with no want of Provisions, & all due care taken i ye rightly employing of them: ye whole digging work may be performed in two years, or with half ye number of men in four years.

So that tis my humble oppinion ye Business would not stick here, it is ye Slucework only that is to be doubted would prove tedious & heavy in Hand; first on account of ye Stony places aforesaid, and next on account of ye great number of Artificers, Engines, Instruments & matirials that will be required to do it.

For by reason of ye stony places aforesaid, I believe there will for the whole work be required at least four & twenty Sluces, if not more; so that besides a sufficient number of Russ Carpenters, Smith &c, if there are fifteen forreign Master workmen sopposed to be provided, yet allowing for accidents of Death & sickness &c, unless they are good & diligent men in their Business they'll scarce perform more than twelve Sluces in two years, so that I doubt all ye Slucework would hardly be completed in four years. Not but that whoever is Engineer, & has ye Guidance & direction of such a work might be able to go through with it in half ye time; but I have found it by experience in his Czarish Maj^{ty} service that ye hindrance is not for want of Labouring People, but the needful matirials, & Master workmen, & that ye Performance & dispatch of Business depends principally on ye number & dilligence of ye Forreign

master workmen & assistance, as well as on ye truth of ye Russ Naradshicks.

Thus may it please Yr Highness according to your Command, I have faithfully related my Judgment & oppinion of ye whole, & humbly remain.

Your Highnesses most truly obedient &c

St Petterburgh, September ye 26th 1710.

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Also in Case the above Proposed Work is order'd to be perform'd, twill be necessary for Proper sailing vessels to be built for ye Lakes and to have some small Business done on ye River Swire & Shacksna that vessels may pass those Rivers with greater Ease and Expedition, as perticularly there is one fall or place on ye River Swire where the stream runs with such a strong force that vessels Bound up being not willing to be at ye charge of hiring men to track up dayly slopes, ly sometimes three or four weeks, till they get not only a fair but Strong Gale of wind to carry them up ye stream, whereas a help may be made with a small charge, that all vessels as soon as they arrive may Pass ye said strong stream without any hinderance or delay: which together with some other small helps in some other respects, is presumed might be a means that vessels might be able to make three voyages where now (from ye Whitygor to St Petterburgh) they make but two; if there's thought any occassion for it.

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An Abstract of the Difference of Level, feet ascent or descent, of the Severall under written Rivers, Reckoning from the Lodiga Sea on the one Side, and from the Mouth of the River Shacksno on the Other Side, according to a Survey made the present year 1710, of also the distance or lenth in Versts, measured by the Banks of the Several Rivers.

<i>Names of Rivers</i>	<i>Difference of Level</i>	<i>Ascent or descent</i>	<i>Distance Verst</i>	<i>and Fathoms</i>
Safs	83	Ascent	76	290
Tiffin	135	Ascent	48	120
Radan	618	Ascent	45	260
Overland	61	Ascent	3	236
Chacedoshe	407	Descent	240	200
Mollogo	50	Descent	140	60
Wolgo	5	Descent	29	140
Shacksno	110	Ascent	347	320
Koefshea/Sarichsa	33	Ascent	78	140
Overland	23 1/-(?)	Descent	3	50
Shein & Whitegor	302	Descent	75	360

The under written Rivers are not measured, but the Difference of Level Calculated from the height of the above written Rivers that are Measured and which one being known, gives the true highth of the other.

Swire	160	Descent	200
Volkoff	70	Ascent	200
Msta	480	Ascent	350
Twer Wollgo	210	Descent	700

According to the above Calculations from the Loddiga Sea to the head of the River Sarichsa, there is difference of Level 485 foot, of which there requires 320 foot to be made...

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navygable by the placing of Sluces and Cutting of a Cannal, and from the head of the Sarichsa to the

mouth of the Shacksno, difference in level but 143 foot, very little of which highth requires to be made navigable, by the help of a Cannal aforesaid and a Sluce or two at the Most (as sett forth in my writinge to his highness Prince Mensicoff September last) and which haveing been very Careful in taking my Observations as Exact as possible on that side Enables me to make a Good Judgment of the highth of the falls and number of Sluces that will be required on the River Msta; and the reasons on which I ground my Judgment and Calculation are as follows —

According to the Best Enquirey that I could make from Rubna over against the mouth of the River Shacksno to Vishnea Vollochok, is by water reckoned Seavern hundred verst, and that above on the Rivers Wolgo and Twer there are many shallow places, where the stream runs Quick and but very little draught of water, which Interupts & makes the passage tedious, Especially in a dry Season, for that tho' I have not surveyd the same yet according to report and the Observations I have made by the runing of Every hundred Verst, there is (reckoning one place with another) a descent of at least thirty foot, for that the whole difference of Level from the mouth of the River Shacksno to Vishnea Volochok, is then in all 210 foot if not more, and consequently the Level of the River by Vishnea Volochok is Horrizantly higher then the Level of the head of ther Saricksa 67 foot, and higher then the Level of the Ladiga Sea 552 foot, near 400 whereof...

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I believe cant possibly be made navigable when you come to the Great falls, any other way but by Placeing of Sluces; for lett it be suposed that these Great falls where they now are, could be Easily be made twenty foot deeper yet whilst the river is for many hundred foot higher then the Sea the falls would Immediatly appear in Some other Places; and the Evill be still the Same, for that no Cleansing such falls can ever be Effectuall for of the River to be Comodious for the Passge of Vessels with out the placeing of Sluces.

And it is therefore in my humble Oppinion that the Charge of placeing of Sluces and Labour, difficulty & time, will be required to make this river compleatly navigable will be much greater than what I have propos'd by the River Whittigor; and the reasons for my Oppinion are as follows —

First the floods in the Spring of the year & the drift of Ice on this river is more than four times Greater then that of the river Whittigor and therefore the passage for the discharge of the Floods at Every Sluce will require to be made soe much larger & stronger and the whole by more lyable to accidents & danger.

Secondly amongst the Great falls, which is where the Sluces will require to be placed, ye Ground is bad & Stony here as well as on the River Whittigor and the Msta being much broader will require soo many times more Labour & Charge for making & securing the Dams of Every Sluce.

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Thirdly tho' there be reckoned more then double ye digging work required for making a Communication by the way of the Whittigor, yet it is Labour that if many hands are put to it, may soon be perform'd and the digging work for a Cannal &c, when once done it is done for Ever, where the Ground is Good, but Sluces (as humbly shewn in my aforesaid writting to the Prince) must first have many matterials and master workmen& then have due time to build them, and afterwards will still be a Charge to maintaine & keep them in repair when they are built: & much the Greater number of Sluces & to be built & maintained against the Greatest floods & drift of ice, will be required on the Msta; besides that over the Lodiga falls there is but little watter in the Summer Season.

I might allso say something touching the Nearness and Commodiousness by ye Whittigor for the passage of Vessels of a Greater draught of watter and which way the Voyage can always be perform'd in the shortest time to the Ease of the people & saving of his Czarish Majesty's Treasure but this I presume will be better considered without me —

Writen in St Peterburgh December ye 30th 1710