



## XIV. On canals

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XIV. *On Canals.* By THOMAS TELFORD, Esq.\*

**I**NLAND navigation has now been so long and extensively practised in Great Britain, that the benefits arising from it are generally felt and acknowledged; and it is difficult to say, whether the improvements in agriculture, manufactures, or commerce, are most indebted to the numerous canals which now intersect the country in all directions, or to other causes.

It is not my intention at present to trace the rise and progress of this great national improvement, nor to enter deeply into the general principles of it: what I chiefly aim at in this slight sketch is, to draw the attention of the people who are concerned in laying out new canals, to some circumstances which appear to me to be very material to the interests of canal companies and to the country at large.

In considering the subject, I shall beg leave to state, that canals are chiefly for the purpose of,

1st, Carrying fuel and raw materials to some manufacturing towns or districts, and for exporting manufactured goods.

2dly, Carrying fuel for domestic purposes; manure for the purposes of agriculture; transporting the produce of the districts through which the canal passes to the different markets; and promoting agricultural purposes in general.

3dly, Carrying the produce of mines to the sea-shores.

These appear to be the leading points by which our views ought to be guided in planning new canals. The supplying the district through which the canal passes with groceries and merchant goods is a very secondary consideration; experience has taught this lesson to the persons who are concerned in the canals already made; and it is proper this source of disappointment should be made generally known, in order to prevent future misapplication of talents and capital.

In planning a new canal, it should be carefully considered under which of the foregoing heads the uses of the canal ought to be classed. Cases will sometimes, no doubt, occur, where the several purposes above mentioned will in some measure be combined; but they will rarely be so equally balanced, as to create a difficulty in discovering the predominant features. The general purposes of the canal being judiciously determined, all the following steps should be taken with a view to promote the principal end.

If the canal is for the purpose of carrying fuel and raw materials to some manufacturing town or district, and export-

\* Communicated by the Author.

ing the manufactured goods from thence, or for carrying the produce of mines to the sea-shores,—the line of canal should be made in as short a direction as the nature of the country will admit of, even if this line should be attended with some extraordinary expence; and that mode of conveyance should be adopted which is least liable to be interrupted, because in those cases much depends upon a constant and regular supply.

If the canal is chiefly for the purposes of agriculture, those lines are to be sought for which will accommodate the country most perfectly at the least possible expence. This will not, in general, be effected by short and direct, but, on the contrary, by circuitous and level lines, such as will visit many parts of the country, carry fuel and manure into every quarter, and take off the produce of the land for back carriage. Merchandize, although a very inferior consideration, will, by the same means, be extensively and equally distributed. When the carriage of those heavy but necessary articles is rendered cheap, and the supply convenient, the consumption will increase. The very use of lime as a manure is in general sufficient to create a considerable revenue upon a canal, when the coal and limestone can be carried along the canal at a moderate expence. As improvements in agriculture must increase the wealth of the inhabitants, more articles are required to supply their multiplied wants; the possession of capital prompts them to enter upon new employments, and the demands of all create an addition of business upon the canal.

Many other advantages attend circuitous and level canals. If there are upland countries above the level of the canal, some cheap and convenient situations may be selected where the waste water of the uplands can be collected into reservoirs to be formed for this purpose. From those reservoirs the water may be taken into the canals. At various points of the canal, where there are falls immediately on the lower side, mills may be erected for grinding corn, or for the purposes of manufactures: in many parts, two or three overshot wheels, of sufficient diameter, may be placed below each other: when the water has performed those useful offices, it will fall into the brooks, and prove a plentiful and regular supply to other works in the course of each stream.

Improvements in agriculture may also be greatly promoted by using a part of the waste water for the purpose of irrigation. For a canal carried over a country upon a high level would prove an extensive top drain. Not only the land adjoining the banks of the canal, but all which lies below the level, may enjoy the use of the water for irrigation; and the brooks and rivers will be the tail drains of the country.

Collecting

Collecting the waste water in winter, and in heavy rains, will prove advantageous in every respect: it will be the means of preventing high and rapid floods; it will be converting to useful purposes that which flows off to idle waste, and, not unfrequently, to positive mischief.

The useful purposes to which brooks and rivers are now applied, will not be injured, but improved; as there will be a more plentiful supply in summer, and a better regulated one during the winter months.

Parliament would not hesitate to grant canal companies the power of making reservoirs, and receiving a reasonable recompense for the water supplied from the canal for the purposes of agriculture and manufactures, because it would injure no person, and accommodate all: it will be furnishing additional powers to British industry, and creating permanent wealth to the nation.

I understand that this mode of managing water has long been practised in Italy, especially in the Milanese, where a considerable revenue is derived by the waste water of canals; and the regulations respecting it have long engaged the attention of the legislature of that country.

If I am right in the foregoing statements, it will be easy to apply them to different districts of country, and, by a careful and impartial judgment, to decide upon the character of each canal.

It is probably not sufficiently known what quantity of rain water falls in the course of a year in various parts of the kingdom; it therefore may not be improper to add the following statement, which will be some guide with regard to this subject; and if along with this we take the accounts of persons accustomed to make observations, a tolerably correct estimate may be formed of the average quantity of water which can be collected in each district: it will, in general, be found to exceed the expectations of persons who have not paid attention to this important subject.

Rain falls—At London, being the average of the following					
Years: 1774, 5, 6, 7, 8, 9, 1780; 1789, 90, 91, 92	Inch.	21	$\frac{1}{4}$		
Upminster, in Essex, average of 1700, 1, 2, 3, 4, 5		19	$\frac{1}{2}$		
Lincolnshire, in medium season	-	-	-	18	
Ditto extreme wet	-	-	-	24	
Liverpool	-	-	-	34	$\frac{1}{2}$
Townley, in Lancashire	-	-	-	42	$\frac{1}{2}$
Kendal, in Westmoreland	-	-	-	61	$\frac{1}{2}$
Dumfries, in Scotland	-	-	-	36	$\frac{1}{2}$
Glasgow, ditto	-	-	-	31	