

SCHEMES FOR THE RECLAMATION OF LAND FROM THE SEA IN NORTH LANCASHIRE DURING THE EIGHTEENTH AND NINETEENTH CENTURIES

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SOME of the earliest schemes for the reclamation of land from the sea in North Lancashire were implemented by the monks of Furness Abbey in the thirteenth century. In the fervour of Cistercian colonisation and agricultural reclamation, several areas on Walney Island were reclaimed by the construction of embankments or dykes of beach pebbles. There is some evidence to suggest that several of these dykes were constructed on both the west and east coasts of the island, but only the great Biggar Dyke on the east coast remains today, the west coast embankments having been destroyed by marine erosion. Extending for almost a mile north-west of the village of Biggar, the dyke protected part of the east coast of Walney and prevented inundation of low-lying ground during spring tides. During the medieval period it was maintained and repaired by the monastic tenants in Furness, but after the dissolution of the abbey in 1537 the responsibility was assumed by the Crown, and in 1564 by the inhabitants of Walney.

In spite of such an early and promising beginning, the progress of land reclamation and agricultural development was retarded after the dissolution, and it was not until the eighteenth century and the period of the Agricultural Revolution that interest was again aroused. Under the stimulus of a rapidly growing urban market and a rise in the price of grain during the Napoleonic wars, the period between the mid-eighteenth and early nineteenth centuries was one of agricultural expansion and improvement. The effect on the landscape was twofold: the enclosure of the remaining open fields, and the reclamation and drainage of marshland. Dr. M. Williams⁽¹⁾ has recently drawn attention to lowland areas which were improved in this way, areas such as the Fens, the Isle of Axholme, the Hull valley, and, on the west coast, the Somerset Levels. In the north west

⁽¹⁾ Williams, M., "The Draining and Reclamation of the Somerset Levels, 1770-1833", in *Trans. Institute of British Geographers*, No. 33 (1963).

of England, John Wilkinson, the ironmaster, "a gentleman of fortune, patriotism, and universal knowledge"⁽²⁾ experimented successfully with the reclamation and drainage of mossland on his estate at Castlehead, near Lindale. He had originally acquired the moss with the intention of using the peat in the manufacture of pig iron at the Backbarrow furnace, but the scheme met with failure and was abandoned; he turned instead to the agricultural improvement of the land, and succeeded in reclaiming over a thousand acres of the moss.

In addition to Wilkinson's mossland improvements, there were also schemes for the reclamation of land from the sea. Suggestions for the reclamation of extensive tracts of the northern part of Morecambe Bay were advanced by John Jenkinson, of Yealand, in the late eighteenth century.⁽³⁾ The plan envisaged the reclamation of some 32,500 acres of land from the Lancaster Sands, 1,600 acres from the Ulverston Sands, and 4,600 acres from the Duddon Sands, at a total cost of £200,000 (Appendix A). Although the original idea seems to have been Jenkinson's, it was not until John Wilkinson fostered the project that it aroused the interest and support of the national improvement societies. With the experience at Castlehead behind him, Wilkinson enthusiastically adopted Jenkinson's scheme and offered to contribute £50,000 if other interested parties would advance a further £100,000. The *Gentleman's Magazine* for 1786 announced that

"... the business is to be carried forward by a company formed by subscribers united and incorporated on this great and laudable occasion. When the subscription amounts to £15,000 they will, of course, proceed to embank and recover from the sea as much of the sands as can with probability of success be maintained and preserved; by which, among many other advantages, the passage from Whitehaven to Lancaster will be much more secure and commodious."⁽⁴⁾

Unlike many of the later schemes for reclamation, Jenkinson's plan did not involve the construction of a major embankment to keep out the sea, but rather depended in essence upon the channelling in artificial courses of the various rivers which flowed into the bay. By this means it was hoped to prevent the rivers meandering across the sands at low water, and it was supposed that successive high tides would deposit sand and mud, thereby raising the level of the land above mean sea level, and that "when the sea had nearly embanked itself, it might be found convenient to raise sand banks to a few feet high in order to keep off the high spring tides".⁽⁵⁾ The main river to be

⁽²⁾ Holt, J., *A General View of the Agriculture of Lancashire* (1795), p. 89.

⁽³⁾ *Ibid.*

⁽⁴⁾ *Gentleman's Magazine*, 1786 Supplement, Vol. 56, 11, p. 1140.

⁽⁵⁾ Holt, J., *op. cit.*, p. 91.

controlled in this way was the Kent, for which it was proposed to excavate a new channel. Holt⁽⁶⁾ suggested the construction of a retaining embankment extending from Dallam Tower, near Milnthorpe in Westmorland, from the end of which the new Kent channel was to be cut to the River Lune, a distance of some twelve miles. Similarly, the scheme to reclaim 1,600 acres of the Ulverston Sands involved the construction of a retaining bank which would confine the Leven to the shore, and a new channel was to have been excavated through Plumpton Moss to meet the sea at Plumpton Hall, or at the mouth of the Ulverston canal, where "it might be of service to the shipping by opening the channel".⁽⁷⁾ Finally, the project included a scheme whereby 4,600 acres of the Duddon Sands would be reclaimed, following the channelling of the Duddon along the Cumberland side of the estuary, and of Kirkby Pool along the Furness shore.

Soon after the Jenkinson-Wilkinson scheme was put forward, a Major Gilpin advanced a similar proposal for the reclamation of 9,000 acres of the Duddon Sands at an estimated cost of £20,000.⁽⁸⁾ The plan involved the canalisation of the River Duddon from a point north of Duddon Bridge, through Millom Marsh, to Haverigg Pool, a distance of some six miles. The canal was to have been equipped for the importation of coal and lime to Broughton, and for the exportation of slate, and of iron from the Duddon furnace. It was suggested that an attempt should be made to reclaim the Duddon Sands before embarking on the plan to reclaim the larger area of the Lancaster Sands.⁽⁹⁾ In fact, however, none of the schemes was attempted. Holt maintained that opposition from the proprietors of "some trifling fisheries" and from the lords of the manors, who refused to relinquish their rights to the reclaimed territory, made it necessary to postpone the scheme; but it appears that there was opposition from other quarters. Some doubt was cast on the efficacy of such schemes, and it was argued that most of the rivers flowing into the bay contained insufficient alluvial material for the formation of fertile soil. Marshall, in his review of Holt's report on the agriculture of Lancashire, claimed that it was "... a public duty to endeavour to prevent a circumstance so mischievous, not only in its immediate effect, but also in its consequences, from taking place";⁽¹⁰⁾ he believed that a

⁽⁶⁾ *Ibid.*, p. 90.

⁽⁷⁾ *Ibid.*, p. 92. Holt, writing in 1795, refers to the *new* Ulverston Canal; in fact, the canal was opened in December 1796.

⁽⁸⁾ Beatson, R., "Observations on Embankments", in *Communications to the Board of Agriculture* (1808), p. 242.

⁽⁹⁾ *Ibid.*, p. 243.

⁽¹⁰⁾ Marshall, W., *A Review of the Reports to the Board of Agriculture* (1808), p. 272.

“ruinous miscarriage” would have the effect of suppressing further improvement schemes. Beatson, while less vehement in his condemnation, suggested that there was insufficient proof of the hypothesis that the action of the sea would lead to the reclamation of the land by natural silting, without the use of embankments.⁽¹¹⁾

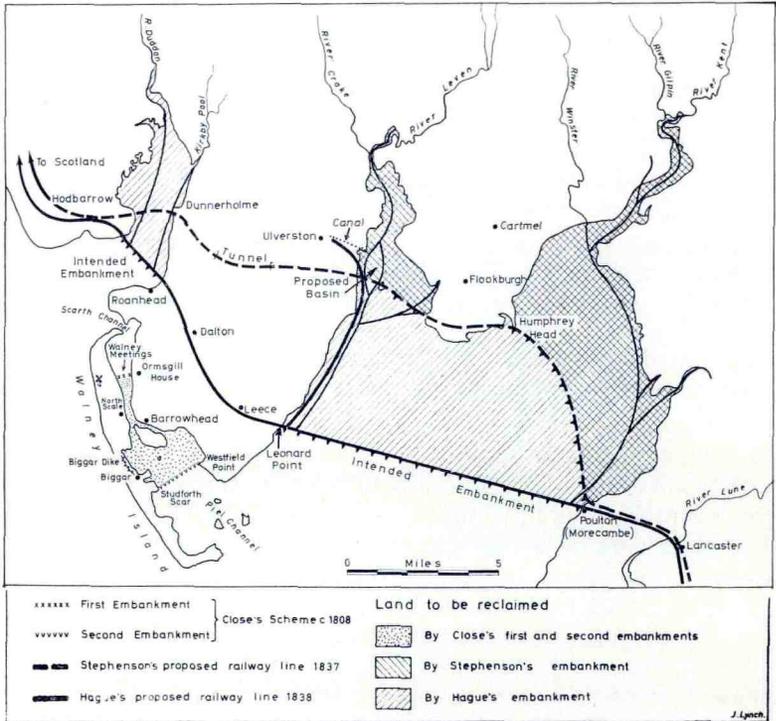


Figure 9.

RECLAMATION SCHEMES OF CLOSE, STEPHENSON AND HAGUE

In 1808 W. Close of Dalton-in-Furness proposed the reclamation of Walney Channel:⁽¹²⁾ an embankment to be built at Walney Meetings (see Fig. 9), half a mile long, 13½ feet high, and costing £2,965, was to prevent the tidal scour in the channel,

(11) Beatson, R., *op. cit.*, p. 241.

(12) Close, W., *An Itinerary of Furness and the Environs, c. 1808*, (transcript by T. A. Beck, 1835), Manchester Central Reference Library. A report of Close's scheme was printed by R. W. Dickson in *The Agriculture of Lancashire* (1815), p. 524.

and consequently the whole of the channel "from the Pile of Fouldrey [Piel] to Sandscale Haws . . . would in the course of a few years be converted into a level plain of sand and marsh, as there are no material streams of fresh water to waste or disturb the accumulation of the sands by variable channels". Close estimated that of 5,760 acres of sand and marsh which he reckoned would result from the building of the embankment, 3,000 acres would be reclaimed for agricultural purposes. A second embankment some $1\frac{3}{4}$ miles in length was to be built from Westfield Point on the Furness mainland to Studforth Scar on Walney Island, thus preventing high tides from inundating the reclaimed land. Close maintained that, as well as affording a tract of fertile, sheltered land, the northern embankment would serve as a roadway connecting Walney with Furness. The scheme failed to find support in Low Furness, and it was abandoned; but it is interesting to reflect that, if it had been successfully carried out, there could have been no harbour or docks at Barrow, and the hamlet would probably have remained a small agricultural community.

Reclamation from the sea on a more modest scale, however, proceeded in the Cartmel peninsula during the late eighteenth and early nineteenth centuries. On the Holker estate the first Lord George Cavendish constructed small sea embankments in 1781 at Grisepool Marsh, Old Park, Park Head, Frith, Maenhouse and Ladysike. Before these embankments were built, the sea had covered most of these areas twice every 24 hours, and at spring tides flowed up the Grisepool Beck (Black Water) to within 400 yards of Holker Hall.⁽¹³⁾ However, it was not until the Cartmel Enclosure Act of 1796 that Winder Moor, south of Flookburgh, was reclaimed from the sea; work began on the enclosing embankment in March 1797, and within a few years the banks on Winder Moor and Wyke Marsh enclosed fertile arable land. Under the terms of the Cartmel Enclosure Act large areas of salt marsh on Low Moor, south of Winder Moor, were sold in 1798; the marsh remained in its natural state until 1807, when the two owners constructed a sea embankment some three miles in length from Cowpren Point almost to Humphrey Head. The embankment enclosed 600 acres of land, which was laid out in two estates, the West Plain and the East Plain estates.⁽¹⁴⁾ The West Plain estate, however, was inundated when the embankment on Winder Low Marsh was breached

⁽¹³⁾ Stockdale, J., *Annals of Cartmel* (1872), p. 397.

⁽¹⁴⁾ Both farms were very fertile; Stockdale (*op. cit.*) claimed that in 1828 the produce of the West Plain farm was "300 loads of wheat of 280 pounds each, with oats and barley in proportion".

TO LABOURERS.

WANTED,
A Number of

MEN,

To WORK at an Embankment
On Windermoor,

In the Parish of Cautmel, near Ulverston, in the County
of Lancaster.

Where good Workmen make 5s. Per Day.

Cottages to be Let to them, ready
Furnished.

Apply to Mr. HARRISON, at *Flookburgh.*

May 27th, 1807.

J. SOUTER, Printer, Ulverston.

Plate 11. HANDBILL ADVERTISING FOR LABOURERS

The embankment referred to reclaimed Winder Low Marsh in 1807.

in October 1828. The damage was not a result of marine action, but of undercutting by the River Leven, which in 1827 moved its channel from the Furness side of the estuary to the Cartmel shore. The Leven was liable to change its course across the estuary in this way. When the Ulverston Canal was completed in 1796 the river flowed past the entrance to the canal; eight years later, in 1804, the channel had moved away from the canal, making access difficult; by 1828 the river had moved across to the Cartmel side, and in October of that year the Winder Moor embankment was undermined and 200 acres of arable land were destroyed. The East Plain estate was saved by the erection of an embankment across the Low Marsh⁽¹⁵⁾ (see Fig. 10).

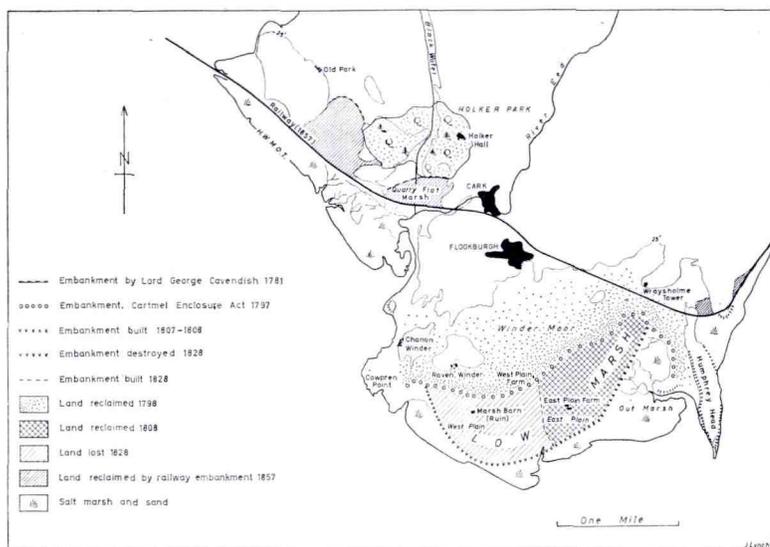


Figure 10.

RECLAMATION OF LAND IN CARTMEL PENINSULA, 1781-1857

Whereas the late eighteenth- and early nineteenth-century schemes had been mainly concerned with the reclamation of land from the sea for agricultural purposes, the later nineteenth-century plans were concerned with attempts to construct a railway line from Lancaster to Scotland via Furness and the West Cumberland coast. In 1836, as a result of the building of

⁽¹⁵⁾ Stockdale, J., *op. cit.*, p. 539.

the Maryport and Carlisle Railway, the construction of the "Grand Caledonian Junction Railway" was proposed; the line was to run along the Cumberland coast to Furness and across the bay to Lancaster. In 1837 George Stephenson advanced a bold, imaginative and practicable scheme for an embankment and a railway line sweeping in a wide arc from Lancaster to Humphrey Head, at the southern tip of the Cartmel peninsula, and thence to Chapel Island, off the Furness coast, through the uplands of the Furness peninsula by tunnel, across the Duddon estuary from Dunnerholme, and so along the Cumberland coastal plain to Scotland.⁽¹⁶⁾ The land on the eastern side of the Morecambe Bay embankment was to have been reclaimed, an area similar in size to that of the Jenkinson-Wilkinson scheme.

In the following year John Hague, a distinguished engineer, submitted alternative plans for the crossing of Lancaster Sands. Hague had previously reclaimed parts of the Lincolnshire coast, and his scheme included the reclamation of part of Morecambe Bay, but his plans were more ambitious than those of Stephenson or Wilkinson. His report to the committee of the Caledonian, West Cumberland and Furness Railway in 1838⁽¹⁷⁾ envisaged the construction of an embankment some ten miles long from Poulton (Morecambe) direct across the sands to Leonard Point on the Furness coast; the line was to continue through Furness south of Dendron and Dalton, and cross the Duddon estuary by a second embankment from Roanhead to Hodbarrow Point, in south Cumberland (see Fig. 9).

After the construction of the embankments had been completed, the tidal inflow into the enclosed bay was to have been regulated by a series of sluice gates; by this method it was supposed that the incoming tidal waters would deposit silt and mud, thereby raising the general level of the land. The Leven was to have been canalised from the outlet at Leonard Point to a deep water basin close to the entrance of the Ulverston Canal, thus permitting access to the town by water. It was proposed that ships should be towed along the canal by locomotives using an adjacent line to Ulverston (see Fig. 9). Similarly, the river Kent was to have been channelled along the eastern shores of the bay, and in the Duddon estuary the rivers Duddon and Kirkby Pool were to have been diverted to the Cumberland and Lancashire shores respectively.

⁽¹⁶⁾ Melville, J., & Hobbs, J. L., *Early Railway History in Furness (Cumberland and Westmorland Antiquarian and Archaeological Society Tract Series, XIII, 1951)*, p. 2.

⁽¹⁷⁾ Hague, J., *Report on the Practicability of Embanking the Estuaries of Morecambe and the Duddon (1838)*.

It was hoped that the Morecambe Bay embankment would reclaim some 46,300 acres and the Duddon embankment some 5,700 acres, at a total cost of £434,131 9s. 4d. Hague estimated that the value of the reclaimed land would be £23 per acre, and, if sold, would realise some £1,196,000 towards the total cost of the line from Lancaster to Maryport (Appendix B).

The interest aroused by the proposals of Stephenson and Hague to reclaim Morecambe Bay further stimulated interest in the fertility and agricultural potential of such reclaimed areas. James Stockdale, who had owned the West Plain estate on Winder Low Moor before it was destroyed in 1828, carried out a series of experiments to show the fertility of the sands; the results of his work were published in letters to the editor of the *Lancaster Guardian*. The following letter gives an indication of the nature of the experiments:

"Carke, November 29, 1838.

Sir,

About two months ago, I caused the soil to be taken off the surface of two pieces of ground in my garden, (say to the depth of 14 or 15 inches,) the sides and bottoms of each pit being lined with slates to cut off all communication with the adjoining soil. Both the excavated parts were then filled with sea sand, taken out of Morecambe Bay. The first pit was filled with sea sand obtained about 300 yards from the Cartmel Shore, near Sand Gate; the second pit was filled with sea sand (there being actually live cockles in it!) obtained close to the side of the Ulverston Channel, about one mile below Chapel Island. Both were then immediately sown, say the very day on which the sand was carted up from the Bay, with common hay seeds, very thickly, and are now equally covered with a green and healthy herbage about 1 inch in height, showing practically what few persons could have expected—that the amount of saline matter in the sea sand is not such as will prevent the growth of vegetation; but that, on the contrary, so soon as the sea shall have been effectively excluded from the bay, the 52,000 acres of recovered land may, at once, by sowing hay seeds, be clothed with a green and beautiful vegetable surface—an oasis then, where now there is a desert."⁽¹⁸⁾

From the evidence presented by Stockdale, the West Cumberland Railway Committee drew three conclusions: first, that the area could be brought under cultivation as soon as the sea was excluded; secondly, that the soil would not deteriorate more than that of other cultivated lands; and, finally, that the enclosure of this inherently fertile land could not fail to yield a great profit for the shareholders of the company. However, this was not to be; Hague's scheme was accepted by the railway committee in preference to Stephenson's more moderate plan: it was presented to Parliament but was rejected for financial reasons, though some doubts were also expressed about the

⁽¹⁸⁾ Stockdale's letters to the *Lancaster Guardian* were published in pamphlet form by the Committee of the West Cumberland Railway; Stockdale himself was a member of this committee.

effectiveness of the embankment against the force of the sea.⁽¹⁹⁾ The increasing efficiency of locomotives on steeper gradients made it possible to build the line over Shap Fell in 1846, and with this the idea of a main coastal line to Scotland faded.

In spite of the rejection of both Stephenson's and Hague's schemes, the idea of reclaiming Morecambe Bay and the Duddon Sands was not abandoned, and it continued to attract the attention of engineers and landowners. The 1840's were years of railway speculation in Furness; between 1840 and 1841 efforts were made to lay a tramway from the iron ore mines at Lindal to the loading piers at Barrow,⁽²⁰⁾ but without success. Nevertheless, interest in railways had been aroused, and in 1841 the earl of Burlington, owner of the great slate quarries at Kirkby, commissioned an engineer, James Walker, to examine various railway schemes, to investigate the possibilities of improving the shipment of slate from Angerton, and at the same time to formulate plans for the reclamation of land in the Duddon estuary. Walker's report,⁽²¹⁾ submitted in 1842, advanced three different plans by which the estuary could be reclaimed. The first involved the construction of an embankment from Sandscale Haws to Hodbarrow Point, which, although the best route for a railway line to Scotland, would have proved expensive to build and maintain; therefore Walker summarily dismissed the idea. The second plan required the construction of an embankment from Dunnerholme, in Furness, to Crab Marsh Point, in South Cumberland, a distance of 2,112 yards; the Duddon was to find its own way to the sea through sluice gates or a new channel, some three quarters of a mile long and 30-40 feet deep, through the Hodbarrow promontory (see Fig. 11). The third scheme involved the channelling of the river in the centre of the estuary by means of retaining walls,

⁽¹⁹⁾ Although Stephenson's original project for a cross-bay embankment was rejected in favour of Hague's scheme, he did not abandon the idea. In 1844-5 he advanced further plans for the construction across the bay of a railway embankment which was to join the Whitehaven and Furness Junction Railway with the Lancaster-Carlisle line. The scheme for an embankment from Poulton to Humphrey Head was retained, but some modification of the 1837 plan was made. The Whitehaven and Furness Junction Railway joined the Furness Railway at Broughton in 1850 but the crossing of the bay was not attempted. Stephenson's plans for the 1845 scheme are preserved in the Lancaster Public Library.

⁽²⁰⁾ Schneider, H. W., "The Haematite Iron Ore Mines of Low Furness", in *Cumberland and Westmorland Association for the Advancement of Science and Literature*, Vol. 10 (1884-5), p. 105.

⁽²¹⁾ Walker, J., *Report on the Projected Embankments at the Head of Morecambe Bay*. See also *Report on the Estuary of the Duddon and the Embanking of the same*. (Transcript by W. B. Kendall, Barrow-in-Furness Public Library, Ms. Z.K. 37).

and dispensing with the sluice gates. Walker estimated the area to be reclaimed at 4,000 acres, half in Cumberland and half in Lancashire, and he supposed that the total cost of the project would be £50,000. As the report was written in the interests of three important landowners,⁽²²⁾ Walker made provision for a divergence of opinion. He suggested that, if the

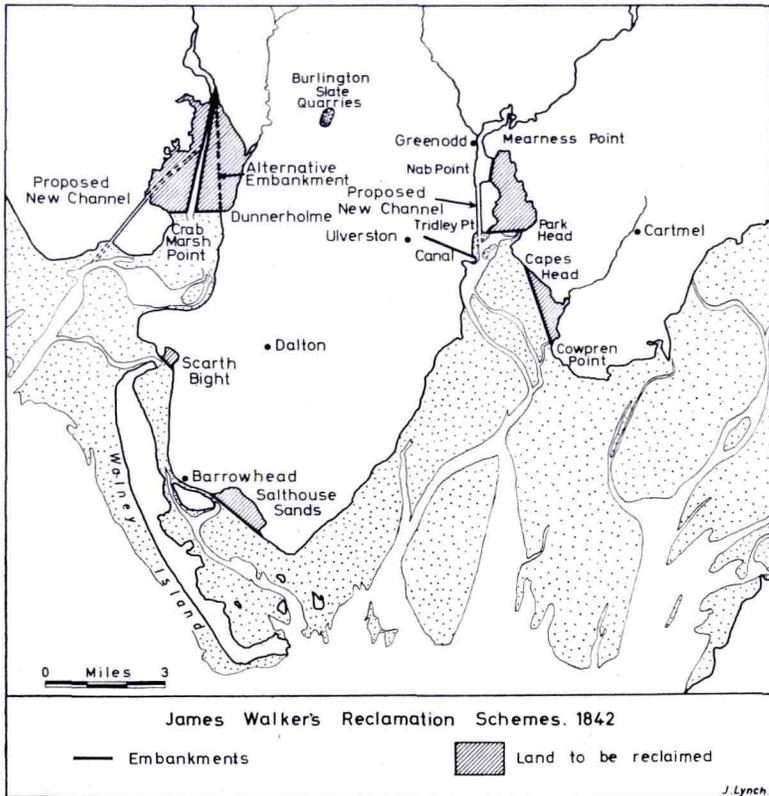


Figure 11.

The alternative proposals for the Duddon estuary should be noted.

Duddon reclamation project were rejected, an embankment $3\frac{1}{2}$ miles long should be constructed from Foxfield Hill to Dunnerholme; this would afford a site for a railway to transport

⁽²²⁾ Walker was commissioned by the earl of Burlington, but his proposals concerned Lord Lonsdale, as owner of the adjacent property on the Cumberland side of the Duddon, and the duke of Buccleuch, as lord of the manor. Walker's final report was therefore addressed to these three.

slates from the Burlington quarries, and the land thus enclosed, approximately 1,200 acres, could be reclaimed at a cost of £22,000.

As for Morecambe Bay, Walker advised the reclamation of part of the Leven estuary by means of two embankments, one from Mearness Point to Nab Point, the other from Park Head to Tridley Point. The Leven was to be re-routed through Plumpton Moss to the mouth of the Ulverston Canal, thus improving navigation into the canal and also access to the small port of Greenodd (see Fig. 11). A third embankment was to be built on the Cartmel side of the estuary, connecting Cowpren Point with Capes Head, and the area enclosed was to have been reclaimed. Finally, Walker recommended the reclamation of two small areas on the shores of Walney Channel, Scarth Bight and Salthouse Sands, the former amounting to 150 acres and the latter to 400 acres.

None of Walker's schemes was fulfilled, and the idea of land reclamation in Morecambe Bay was suspended for a time. However, a bill was placed before Parliament in 1874 to authorise the construction of an embankment between Arnside Point, Westmorland, and Hest Bank, Lancashire, and the reclamation of the enclosed land for agricultural purposes.⁽²³⁾ The proposal aroused opposition, especially from the owner of Leighton Hall, R. T. Gillow, who claimed that any interference with the level of the sands or of the course of the river channels would prove detrimental to the drainage of his estate;⁽²⁴⁾ the scheme failed to arouse enthusiasm and was eventually abandoned.

Occasionally projects to enclose and reclaim the bay are resurrected: it has recently been suggested that the bay should be converted into a huge fresh-water reservoir to supply the Lancashire conurbations. However, it still remains a watery barrier to communication between Cumbria and Lancashire, crossed now only by organised parties of walkers using the ancient coach route across the sands at low water. All that remains to remind one of the grandiose schemes of Wilkinson, Stephenson, Hague and Walker are a few small embankments on Winder Moor in the Cartmel peninsula.

⁽²³⁾ Bolton-le-Sands, Warton, and Silverdale Reclamation Bill, 37 & 38 Vict., 1874.

⁽²⁴⁾ Petition of R. T. Gillow against the Bolton-le-Sands, Warton, and Silverdale Reclamation Bill.

APPENDIX A

Statistics relating to the Jenkinson-Wilkinson scheme to reclaim Morecambe Bay, c. 1786, from Holt, J., *A General View of the Agriculture of Lancashire* (1795).

	£
Expense of the bank below Dallam Tower	2,463
" " " bridge at the end thereof	1,000
" " " cut from thence to the Loyne [Lune]	54,417
" " " bridges over the cut	4,600
" " " sand banks and purchasing ground	13,000
" " " diverting Lindlepool	5,300
" " " gaining part of Ulverstone Sands	20,000
" " " gaining part of Dudden Sands	26,000
Interest of money sunk, till the land to be gained becomes profitable, salaries of engineers, etc. with contingent expenses ..	73,219
Total expenses	<u>£200,000</u>
The land that might reasonably be expected to be gained upon the Lancaster etc. sands is Acres	32,510
Ditto upon the Dudden Sands	4,600
Ditto upon the Ulverstone Sands	1,600
Total number of acres	<u>38,710</u>

APPENDIX B

Statistics relating to John Hague's reclamation scheme, 1838.

	£	s.	d.
Timber, iron, materials, workmanship for the piles, framework, railway and embankment, sluices, tide-gates, swing-bridge etc. in Morecambe Bay	289,359	14	10
New Channels	73,501	6	0
	<u>£362,861</u>	<u>0</u>	<u>10</u>
The same work on the Duddon	55,870	8	6
New Channels	15,400	0	0
	<u>£71,270</u>	<u>8</u>	<u>6</u>
Total for the two bays	<u>£434,131</u>	<u>9</u>	<u>4</u>
Value of land to be reclaimed			
Morecambe Bay 46,300	} at £23 per acre	£1,196,000	
Duddon Estuary 5,700			

