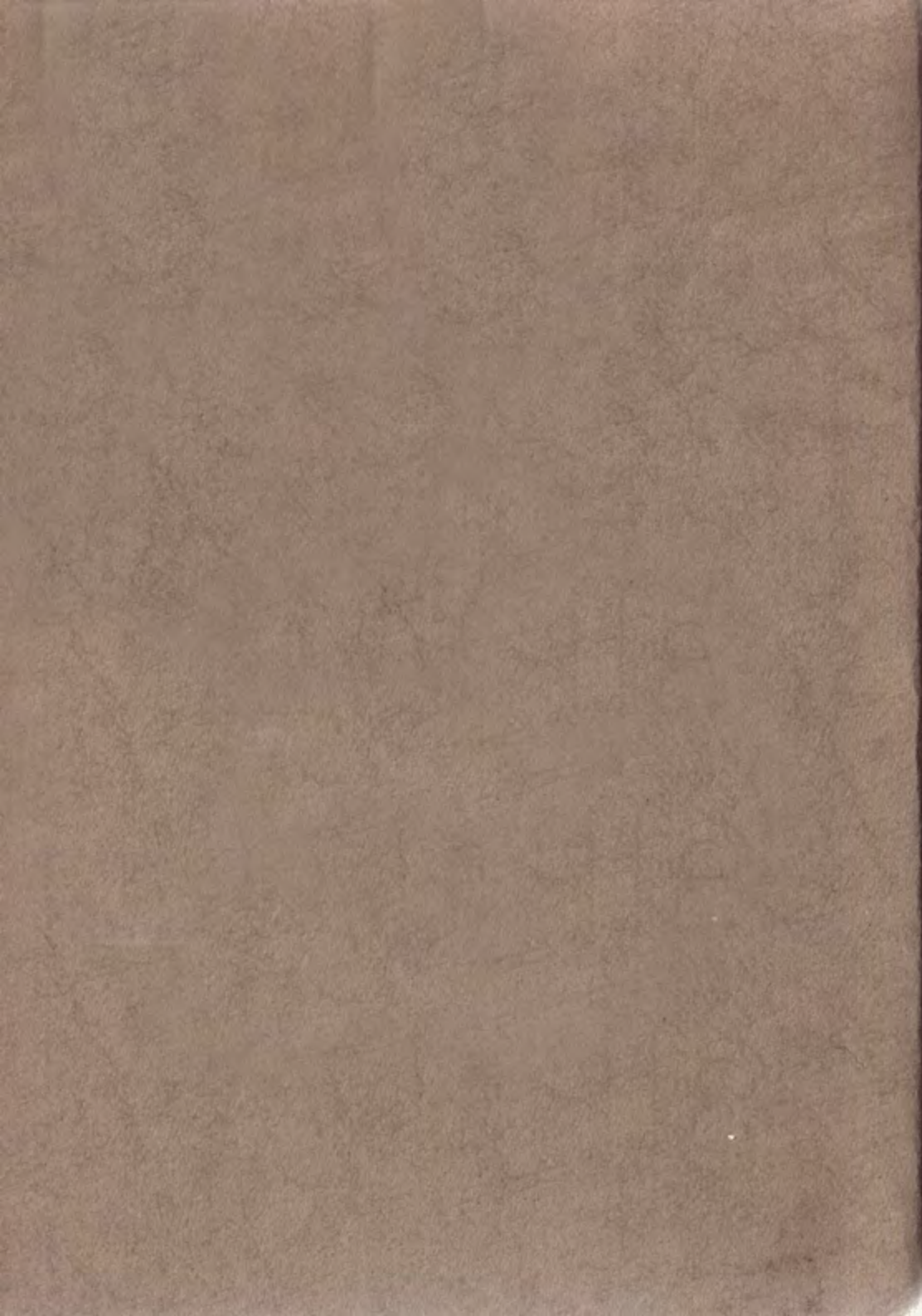

AN
Account
of the
FERRY ACROSS
THE TAY
at
DUNDEE
by
Captain Basil Hall R.N.
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PREFACE TO 1973 EDITION

Basil Hall (1788-1844), the second son of Sir James Hall, fourth baronet of Dunglass, was educated at the Royal High School of Edinburgh. He entered the navy in 1802 and served for twenty-one years. He was a scholar and literary man as well as a traveller and the varied nature of his published works (for which see the *British Museum Catalogue*) illustrates the breadth of his interests. His best known work is his *Fragments of Voyages and Travels*, amounting in all to nine volumes in three series, which is partly autobiographical. A brief biography will be found in *the Dictionary of National Biography*.

Two former presidents of the Abertay Historical Society, Miss C. M. Kinnear and Mr D. B. Taylor, have kindly loaned their copies of the original edition to the editor for use in the preparation of this facsimile, which has been taken from Miss Kinnear's copy. The plates of the low-water piers, missing from both the afore-mentioned copies, have been reproduced from one in St Andrews University library, by kind permission of the Librarian, Mr D. MacArthur.

R.P Doig
Hon Editor



LOW WATER PLANK AT DAYTON.



THE GREAT BRIDGE, NEW YORK.

FOR WATER FISH AT NEWPORT.

ACCOUNT
OF THE
FERRY ACROSS THE TAY
AT DUNDEE

BY CAPTAIN BASIL HALL, R.N.

(First Printed in the Edinburgh Philosophical Journal)

with
A letter from Messrs J. and C. Carmichael
Engineers in Dundee

DESCRIBING THE MACHINERY OF

The Twin Steam-Boats.

TO WHICH ARE ADDED.

THE REGULATIONS FOR THE FERRY;

*THE TABLE OF
RATES AND DUTIES LEVIABLE THEREAT;*

THE

REGULATIONS FOR PORTERS,

AND THE TABLE OF FARES PAYABLE TO THEM;

WITH

Views of the Low-Water Piers

ON BOTH SIDES OF THE FERRY

DUNDEE

PRINTED AT THE ADVERTISER OFFICE

1825

NOTICE

On reading the following treatise, which appeared in the Edinburgh Philosophical Journal for July last, it occurred to the Committee of management of the Tay Ferries that it contained statements and facts which it would be of importance to make known extensively in the surrounding districts. They therefore requested permission of the proprietors of that journal to republish it in a separate form; which was very handsomely conceded; and the treatise is accordingly again presented to the public in the present form, accompanied with a plate of part of the machinery of the twin steam boats, invented by Messrs J. and C. Carmichael, engineers in Dundee, and a descriptive letter by them, taken also, by permission of Professor Jameson, the editor, from the same admirable journal.

ACCOUNT
OF THE
FERRY ACROSS THE TAY
AT DUNDEE.

OF the many recent applications of science to the business of ordinary life, there is perhaps none which was less looked for, or which now promises to be of greater utility, than the adaptation of the steam-engine to travelling, and to the conveyance of goods, both by land and by water. The danger, the inconvenience, and the uncertainty of ferries, have been proverbial from time immemorial; and as there are few persons who may not, at some time of their lives, be obliged to cross the water,

anything which proposes to remedy these evils cannot be unimportant to the general reader. At first sight, indeed, the details of a ferry may seem out of place in a philosophical journal; but it will probably be admitted by those who examine what follows, that the genuine end of science—the advancement of human happiness—has in the present case been obtained.

The ferry across the Tay at Dundee, has long been a great thoroughfare between Forfar and Fife; but, owing to the strong tides, the numerous shoals in the river, and the frequency of hard gales, so much risk and inconvenience generally attended the passage, that many people preferred the circuitous route of Perth, to this short but dangerous and inconvenient ferry. A melancholy accident in 1815, by which no less than seventeen lives were lost, attracted the public attention to the subject. There were at this time twenty-five boats on the passage, manned by upwards of one hundred men and boys. The boats were ill adapted to the service required; the crews were composed of infirm old men, or equally inefficient boys; and as there was no system of management or any kind of discipline, much drunkenness and disorder

prevailed. There being no regular superintendent to direct the sailing of the boats, the passengers, on reaching the landing-place, had either to hire a whole boat, at a great expense, or to wait till a sufficient number of persons had assembled to make up the fare. This was productive of great hardship to the poor, and inconvenience to all parties; and, added to the discomfort of bad landing-places and unskilful management, rendered the simple passage of a mile and a half, especially in blowing or rainy weather, a service of no small risk.

In 1817, the Counties of Fife and Forfar appointed a Joint Committee, to consider the state of the ferry, and to concert measures for its improvement; and it being apparent, upon a slight examination, that, in spite of all its drawbacks, the ferry produced a revenue adequate, with proper care, to the maintenance of a far better system, the number of boats was reduced from twenty-five to eight, and at the same time rendered efficient by stronger crews, better equipment, and, as far as was possible, by punctuality of sailing at stated periods.

It may be necessary to state, that although the reduction of the number of boats here mentioned

was considered expedient in 1817, yet the arrangement was not carried into effect until 1819; when the ferry was vested in the Trustees, by the first act of Parliament.

In 1819, an act of Parliament was procured for erecting piers, and otherwise improving and regulating the ferry across the Tay. During the discussions on this bill, the idea of employing steam-boats first suggested itself to the Trustees; and, after careful inquiries, they decided upon trying the experiment with a double or twin steam-vessel, — such as they learned had been in use for some years on the American rivers, and also at Hamburg, and on the Mersey, near Liverpool. It was not, however, till towards the end of the year 1821, that the steamboat began to ply. Previous to that period, but after the improvements had been made in the sailing-boat establishment, the number of foot-passengers was about 70,000 annually, and the receipts 2510*l*. There was still, however, no convenient or certain means of transporting cattle or carriages across, except at certain times of the tide, and in fine weather. Until the twin boat was established, and indeed even for some little time

after she began to ply, no very great increase in the revenue took place. There was still a defect in the arrangements, owing to a circumstance which had not been foreseen in time to have it duly guarded against in the act of Parliament; and which, in consequence of this inadvertency, cost the Trustees a long course of the most unpleasant altercation, and finally the loss of a considerable sum of money. It was this: While the only convenient landing-place on the north side was Dundee, on the Fife coast or right bank of the Tay, there happened to be two, Newport and Woodhaven, not quite an English mile from one another; and the steam-vessel was made to ply from Dundee alternately to these two landing-places. A few weeks' experience, however, showed that the greatest public inconvenience must ever attend this alternate system; for not only was punctuality (which, it ought always to be recollected, is essential to the existence of a proper ferry) entirely broken in upon, but, in spite of every notification that could be given, passengers were perpetually mistaking the proper point of call. Sometimes the tide, sometimes the wind, did not serve for Woodhaven; and it often happened, that, when

circumstances obliged the boat to steer out of the direct course, the people who were waiting her arrival were inevitably misled, and so, by repairing to the wrong place, lost their passage altogether. The complaints of the excessive inconvenience of this plan, by every class of passengers, after a few months' trial, became so loud and general, that the Trustees, in July 1822, directed the boat in future to call at Newport only on the Fife side. The effect was instantaneous: — the public regained confidence, and the revenues of the ferry increased rapidly. The following is the amount of the fares collected for the last five years.

In 1820	L. 2510	6	1
1821	2526	13	9
1822	3209	9	0
1823	3552	4	10
1824	3790	12	10

It will give a good idea of the importance of this ferry, to state the exact number of passengers, cattle, &c. which crossed in the year 1824.

Foot passengers	Carriages	Gigs	Cattle	Sheep	Horses	Loaded Carts
100,536	130	474	6627	15,449	4777	2564

The distance from Dundee to Newport, in a straight line, is one statute mile and a little more

than a half, or very nearly 2760 yards, At certain times of tide, the passage cannot be made directly across, owing to the sand-banks which lie nearly in the middle of the stream; so that the average distance of the passage, allowance being made for the set of the tide, may be stated at about two miles and a third. This passage is made by the twin-boat in seventeen minutes, at an average, in neap-tides; and in twenty-three at spring-tides. In very blowing weather, it sometimes takes from thirty to fifty minutes; and once it took an hour. During 1824, the passage was never interrupted for one whole day; and it was only five times detained throughout the whole year, owing to hard westerly gales during the ebb-tide.

There are two steam-boats belonging to the ferry; one of which is employed at a time, except in harvest, when the reapers come down, or at the seasons when numerous droves of cattle come from the North.* On these occasions, both are put in requisition, though not absolutely necessary, in

* For the accommodation of cattle-dealers, the Trustees have provided an enclosure at Stobs Muir, near Dundee, as a resting-place for cattle on their route by the ferry; and it is now in contemplation to have a similar enclosure for them on the Fife-side of the ferry.

order to avoid the possibility of delay.

In order still farther to meet the public convenience, a pinnacle, with four able seamen is stationed at each side of the ferry; for the purpose of affording a passage to travellers who are unwilling to wait for the periodical sailing of the steam-boat. These boats are also in attendance during the whole night, when the steam-boat has ceased to ply.

The crews of these boats are likewise employed during the day in taking charge of large sail-boats, which are used for transporting goods and such articles as cannot be speedily put on board the steam-boat. These boats, when necessary, are towed across the ferry by the steam-boat.

As the twin-boat is very little known as yet in this country, an account of one may possibly prove interesting, if not useful, to some readers. There are some material differences between the two boats at Dundee; but that last built being the most perfect of the two, a description of her will be the most satisfactory.

She is called the George the Fourth; is 90 feet long over all, and 29 broad; she has 6 feet 8 inches depth of hold; and draws, when light, 4½ feet of

water, and, when loaded, rarely more than 5 feet 4 inches. She is of the double kind of steam-boat, with a single paddle-wheel, working in the middle, between two divisions, or separate smaller boats, placed parallel to one another, at the distance of 8 feet apart. Over these two divisions, are placed horizontal beams, covered *by* a deck, the planks of which, instead of being placed fore-and-aft, in the usual way, cross the vessel from side to side, and thereby contribute greatly to the strength of the whole. To a person standing on the deck, she appears to be but one vessel. At each end, there is a space railed off for cattle, one 33 feet by $27\frac{1}{2}$, the other $27\frac{1}{2}$ by 21. From 80 to 90 head of cattle is her average load; but, upon one occasion in fine weather, she actually carried 103 cattle, and 3 horses. In the middle part of the deck, between the spaces allotted for cattle and carriages, there is ample space for foot-passengers, for whom also, in rainy weather, there are two commodious cabins. The machinery of the two steam-engines (each of 20 horse power) is concealed below; but the paddle-wheel, being 14 feet in diameter, necessarily rises considerably above the deck, where it is covered by a wooden case. This wheel

is 7 feet wide, and is immersed 18 inches in the water. It is a matter of perfect indifference which end of the boat goes foremost, both being alike in all respects. As the method of fixing the rudders, one of which is fixed at each end, is, of course, different from that of a ship, it may be useful to describe it particularly. The rudder is a plate of iron $4\frac{1}{2}$ feet long, and 3 feet deep. It is fastened to a vertical spindle, reaching from the middle of the stern to the water. In the first boat employed in the Tay, the rudder was attached by one end to the spindle; so that, when she was in motion, its whole length trailed behind. But this rudder being found difficult to move, a device was adopted which answers the purpose perfectly. The spindle, instead of joining the rudder at the end, is fixed to it at one third of the length; so that, when the vessel is in motion, two thirds are abaft, and one third before the spindle, resembling a large weathercock, or vane inverted. A horizontal wheel is fixed to the upper extremity of the spindle, and this is turned by a wheel and pinion by the steersman. Both the divisions composing each twin-boat are flat-bottomed, have perpendicular sides, and are sharp-bowed; the angle at which the two bows meet at the

extremities being 60° , ample room is allowed for the escape of the back-water. The rudder is placed in the middle point between the two stems; and, of course, lies directly in the centre of the current of back-water thrown out by the paddle-wheel. The steersman stands on a raised platform, above the taffrail, from whence he commands a clear view over the paddle-case. There are no masts; and the only resistance which is offered to the wind is from the chimneys of the engines.

Though the manner in which the two engines of a steam-boat are made to act in concert, be known to every person at all acquainted with the subject, it may perhaps interest some readers to describe, in a popular way, the beautiful device by which this object is accomplished. The paddle-wheel is moved by one continuous shaft, to which both engines give their impulse, by means of two cranks, or bends in it, formed so as to be at right angles to each other. Thus, when one of the cranks is either quite up or quite down, and consequently the power of the engine connected with it for the moment entirely gone, the other crank must be in a horizontal position, and the power of its engine will be for the same moment at a maximum. The result

therefore is, that precisely in proportion as one engine loses power the other gains it; and, consequently, the united effect of the two against the resistance, at every instant of their action, is virtually equal to the constant power of one of them at its greatest; so that, whether the engine be moving fast or slow, or the resistance great or small, the same uniform force is exerted.

At each of the landing-places, there have been built low-water piers; along the sides, or across the ends of which, the steam-boat can be placed at any time of the tide, and during all weathers; so that passengers and cattle are embarked with as much ease as if they were going along a bridge; while carriages and carts drive in on one side of the river and out again on the other without removing the horses. The utmost attention is paid to the hours of departure. Three minutes before the Town-clock of Dundee strikes the hour, a bell is rung on board the boat; and the instant the hour is told, the paddle-wheel begins to move, and the vessel to glide from the pier. In like manner, when the half-hour strikes at Newport, she quits the opposite pier; and so on from sunrise to sunset; her crossings and re-crossings never being interrupted. To insure the

constancy of this essential but very difficult point, an able and active superintendent has been appointed, with a handsome salary, and a house on the spot: His exclusive business is to arrange the details of the passage, and to prevent all unnecessary delays. A collector also is appointed, — a gentleman who, in like manner, resides constantly on the spot, and attends exclusively to the money department. In consequence of the vigilance of these two officers, acting under the judicious regulations which the Trustees have from time to time established, it is most worthy of remark, that, however great the crowd of cattle, carriages, or passengers may be, not the least delay or confusion ever arises, either at the embarkation or re-landing.

On board the boat the system is equally perfect: There is a coxswain, an engineer, five seamen, and a fireman. Long practice has given to those people so exact a knowledge of the power which is in their hands, that this huge, and apparently unwieldy boat, is moved about with a celerity and precision altogether astonishing. To a stranger, however much accustomed he may have been to the wonders of machinery elsewhere, the

effect is truly magical. The steam-boat, or, more properly, this great double raft, is discovered advancing at the rate of seven or eight miles an hour, directly for the shore, threading her way like a little skiff amongst the vessels lying in her way. In a few seconds she arrives, still at full speed, close to the shore. In the next instant she is arrested, by a touch of the engineer's hand, as suddenly as if she had struck upon a rock; and is placed, by the sole instrumentality of her invisible machinery, close by the side of the pier, with as much accuracy as if she were in a dock, and as much gentleness as if, instead of being made of stout oak and iron, she were formed of glass. In a moment, two great folding gangways are lowered down; and her side being thus thrown open, cattle, horses, passengers, all walk out, and find themselves on land, with scarcely any circumstance having occurred to indicate they had been on the water. A very admirable contrivance, the invention of Messrs J. and C. Carmichael of Dundee, has been affixed to the machinery of these twin-boats, by which all these movements are rendered extremely simple; and I am happy to have prevailed upon them to favour the world with a description of this

apparatus.

Whatever might have been the degree of public spirit and activity of the Trustees, it was not possible that so extensive and perfect an establishment as this could have been completed without a very considerable expense. Yet, those who are most familiar with public works of this description, will readily understand that pecuniary difficulties were not likely to have been the most serious ones in the way of its attainment. But it were an invidious task to speak of the irksome opposition occasionally raised in the way of the patriotic and disinterested endeavours of the Trustees, whose final, and complete, and now universally acknowledged success, is the best, and certainly the most dignified answer to all such gone-by hostility, from whatever motive it originated. The public gratitude, which, for once, is both loud and steady in its acknowledgments, is an ample reward for labours which are sufficiently proved by the result to have been directed solely to the general good.

The heaviest expense into which the Trust has been led, is for erecting low-water piers on both sides of the Tay. That on the Dundee side is 429

feet long, by 30 feet wide of carriage-way, exclusive of a 4 feet railed path for foot-passengers. The pier at Newport is 350 feet long and 60 feet wide, with a carriage-way on each side, A depth of 5 feet water is obtained by means of these piers, at dead low-water springtides. The cost of the two, when completed, will be about 17,000/ These works, designed by Mr Telford, and executed by Mr Deter Logan of Dundee, are most perfect and beautiful of their kind.

The next important expense has been the purchase of the two twin-boats.

The Union, which was built in 1821, cost	L.	4245	8	6
The George the Fourth, built in 1823, cost		4330	14	10
Making for both,	L.	8576	3	4

Both these boats were built by Mr James Brown, shipbuilder at Perth, in conjunction with Messrs James and Charles Carmichael, engine-makers at Dundee, who furnished the whole of the machinery. The first boat, from a natural apprehension of the weakness of the principle, was made unnecessarily strong; and, consequently, from the quantity of materials, drew more water than she need have done. This defect was remedied

in the second boat. Many other important improvements on the second boat were also suggested by the previous experience. It is almost needless to point out to persons interested in other ferries, who may have thoughts of trying a similar experiment, how much advantage they will have in consulting workmen who, independently of a very high character for skill and diligence in the ordinary line of their business, now add the material qualification of successful experience in a Walk hitherto untrodden.

A considerable expense is annually incurred in maintaining the steam-boat.

The wages of the engineer, six seamen and a fireman, is about	L.	800 ^{l*}	0	0
The expenditure of coals is about 1000 tons annually, say	L	700	0	0
The wear and tear, including interest,		600	0	0
Incidental expenses,		57	0	0
Salaries of the Superintendent and collector including their houses, say		200	0	0
Making annually about	L.	2400	0	0

* The wages here stated as paid to the crew of the steamboat, include the wages of two crews of four men each, necessary for the sailing-boats referred to in page 10th: So that the above sum of 2400*l.* may be considered as nearly about the total annual expense of maintaining the ferry.

The funds for improving the Dundee ferry, to the extent of 7000*l.*, were advanced by private individuals, previous to the passing of the second act of Parliament. The interest to be paid on this sum was fixed at five per cent, by the first act. When the second act was in progress, some of the lenders petitioned to be relieved from their obligations, and the sums they had lent were in consequence repaid them. On the Exchequer-loan bill being passed, the Trustees of the ferry obtained from the Commissioners a loan of 18,000*l.*, and lately, the additional sum of 6000*l.*, making in all 24,000*l.*, for which four per cent, interest is to be paid, and five per cent, per annum to be appropriated as a sinking-fund, for liquidation of the principal sum due to Government. A bond has been granted, making this debt preferable over the whole property and revenue of the trust; and stipulating also, that the whole of the money lent by the Exchequer shall be applied to the erection of the works exclusively.

No private pecuniary interests appear to have been served by this establishment. The public, in point of fact, derive the whole benefit arising from it, as the hires for crossing goods and passengers

have in no case been raised, although the facilities of the ferry have been immeasurably increased, not only as to the traffic which formerly occupied the passage, but in the certain conveyance of cattle, sheep, and horses, the transport of which was heretofore almost unknown.

Thus, these great improvements have at last virtually united two great districts of the country, by converting into an easy and sure communication, that barrier which, in less enlightened times, it might have been said Nature had interposed in order to keep them separate.

Such is a very general account of the greatest ferry probably in the kingdom, if the number of passengers and the amount of traffic of all kinds be a just measure of its importance. A more minute statement of the details might easily have been given; but it is questionable whether they would interest the general reader who is chiefly concerned only about the efficiency of the final practical result. At the same time, it is right to state, that any one desirous of procuring more detailed information respecting the internal management of the ferry, with a view to the improvement of other ferries, or from motives of mere curiosity, will find,

upon the slightest wish to that effect being expressed to the Trustees, every channel of information unreservedly thrown open to him.

The successful establishment of twin-boats at Dundee, the consequent great increase of passengers, and the facility, in particular, which they have given to the transport of cattle and carriages, have naturally given rise to two questions: First, the possibility, and, next, the feasibility, of placing similar boats at the passage between Newhaven and Fife. My attention having been accidentally called to these points, I was led to pay considerable attention to the subject, as a matter of pure curiosity; and as it has been thought by some persons that the result of observations and inquiries made in this spirit may perhaps be useful. I give them freely. But I am well aware that the authority of a seaman in a question of steam-navigation ought to be received with caution. The inbred habits of his naval education, it must be admitted, are all against his being an impartial witness; and even supposing him to have risen above the natural prejudices of his profession, and that he freely acknowledge the vast superiority of this new power over ordinary navigation, still the

principles which apply to navigation by sails, and to that by steam, are so essentially different, that his former knowledge, even the theoretical part of it (to say nothing of what results from actual practice), very often stands more in the way of correct views than it aids a just apprehension of the subject. It is practically important that this risk should be duly understood, and that seamen themselves should be on their guard in reasoning on the subject. One instance may be mentioned of the errors into which naval men are liable to be led by constant familiarity with principles inapplicable to the subject under discussion. In ships moved by sails, it is essential that there should be a certain draught of water, in order that she may offer an infinitely greater lateral resistance than she does in the direction of her length. This necessity arises out of the well-known law by which the wind acts on the plane of the sails, by which the effect is at right angles to that plane, at whatever angle the wind may strike it. In the steam-vessel, however, the effect of the paddle being always in the direction of the length, the same draught of water, which in ships is indispensable to resist the lateral tendency caused by the sails, is not required in steam-

vessels, which may be said to have comparatively no lateral tendency at all, since the force of the wind on their hulls and chimney is immaterial when compared with that of the paddles. The fallacious conclusions drawn from this mistaken analogy have led to serious practical errors.

The result of the investigations which I instituted on the subject is, that the twin-boat may be established on the ferry between Newhaven and Fife, with perfect safety, and great advantage, not only as a matter of public convenience, but as a source of profit to the funds of the ferry.²

Of course, a twin-boat that has to contend with such a sea as frequently rolls into the Firth, or is often caused by the prevalent high south-west winds, must not only be more strongly built than the boat which has merely to cross the Tay at Dundee, but must also be impelled by much more

^{*2} Since the foregoing was written, it is generally understood that the Trustees of the King-horn ferry have resolved very shortly to adopt this suggestion, and that they are now instituting inquiries into the probable expense, &c. of a twin-boat establishment. The public, both at Dundee and in Fife, will learn with great satisfaction, that the whole of the different points of call on the Fife side of the ferry in question, are to be centered in one point, — namely Burntisland; and that the projected twin-boat will (probably in the course of next summer) ply between Newhaven and that port alone. Then, and not till then, will the Kinghorn ferry have any pretensions to equal that across the Tay.

powerful engines. Practical men, however, well qualified to give an opinion on the subject, conceive that great additional strength may easily be given to a boat of this construction, without such addition of weight of materials as will render the draught of water inconvenient for a low-water pier. One or two of the devices which have been thought of may be stated. The timbers which form the inner sides of the two divisions of the boat, instead of being cut off at top, might be formed alternately of crooked timbers, made to cross over nearly to the opposite boat, so as to form an arch over the space between the two, extending the whole length of the boat, with the exception of the space occupied by the paddle-wheel in the middle.

Thus this part, which is manifestly the weak point, would resemble a ship's bottom inverted. It might also be united firmly by sleepers or braces placed diagonally, according to Sir Robert Sopping's plan, under or over the arch, and bolted firmly to the timbers. The beams would lie, as they do now, across the boats; and the deck over all might be disposed across the length, as at present, or perhaps in a still more binding manner, by being placed, as the decks are in some of our line-of-

battle ships, diagonally. In the Union twin-boat at Dundee, strong trussed beams are placed diagonally from the keelson of one division to the upper works of the other; but it is found that these braces, which must pass through the water between the boats, impede her progress materially. This objection would not exist, if, instead of thick trussed beams, eight or ten inches square, flat bars or plates of iron, shaped like a blade of an oar, were substituted. Four or five of these, if placed diagonally from the keelson of both divisions to the top of the external timbers of the opposite ones, would add immensely to the strength of the boat, while they would offer scarcely any sensible resistance to the water. It is confidently believed, that a vessel so bound together, would not only encounter, without twisting, any sea likely to be met with in the Firth of Forth, but might be allowed to take the ground to the full as safely as any other description of steam-vessel. Ingenious practical men, whose attention was directed to strength and lightness, would probably strike out many other contrivances for obtaining the end in view ; and when we see such long, and consequently weak vessels, as the Soho and James Watt, encountering

heavy gales of wind and a high sea, without injury to their delicate machinery, we may safely conclude, that when care is professedly taken to give strength to a twin-boat, there would be no twist sufficient to impede the true joint action of the two engines, which in practice is the material point to be gained.

Supposing this point established, and twin-boats plying on the ferry in question, there can be no doubt it would immediately increase the thoroughfare, by offering a far more ready means of transporting across the Firth all the cattle and sheep intended for Edinburgh and for the South, than is now afforded by Alloa and the Queensferry. Horses, carts, and carriages, would in like manner be conveyed over with ease and celerity; and if anything comparable to the punctuality so admirably observed at Dundee, could be established between Burntisland and New-haven, the whole of the foot-passengers from all the adjacent parts of Fife would eventually be drawn to that ferry, where the means of embarkation and landing would be so superior to those of any other, and where alone, it is conceived, such a pier may be built as will insure the requisite facilities, at all

times of tide, and in all weathers. The advantages which Burntisland offers, as the point of call on the Fife side, over every other, are so great, that it would be quite wonderful there should ever have arisen for an instant any discussion on a matter so obvious, were there not some local interests concerned. These interests, however fairly acquired originally, or however honestly maintained at the present day, if they are allowed to interfere with the establishment of a single point of call on each side, are clearly in opposition to the general interests of society.

The distance between Kirkcaldy and Newhaven, in a straight line, is exactly nine statute miles; that between Burntisland and Newhaven, five and a half. The course (by compass) from Kirkcaldy is S. W. by S.; that from Burntisland is S, $\frac{1}{2}$ W.: So that, with the prevalent wind, which is from W. S. W. to S. W., a course may always be shaped both to and from Burntisland, while it will be useless to set a sail in the passage from Kirkcaldy during at least eight months of the year. Moreover, the passage from Burntisland lies directly across the tide; but that from Kirkcaldy, during two thirds of the distance, is directly along

it, a circumstance extremely inconvenient in any ferry. Thus it is probable, that as the natural advantages of Burntisland are so superior to those of every other place on the coast of Fife for the establishment of a frequent, punctual, and cheap ferry, it will eventually become

the most frequented, notwithstanding all the competition which may, and no doubt will for a time, be opposed to the regular ferry. The shortest passage, whatever be the obstacles in the meantime, must become, sooner or later, the cheapest; and that to a degree far exceeding in importance, even to foot-passengers, the difference in the length of the land-journey; the invariable certainty of which will render it eventually altogether insignificant, compared with the inevitable uncertainty which, from the nature of things, must for ever prevail in the passage from Kirkcaldy. And this will be true, whether the greater distance by sea be considered— since this must be paid for at a greater cost than the additional distance by land—or the varying action of the tide, which will often render the embarkation and landing, except at Burntisland, difficult, if not impossible; or the prevailing wind from the south-

westward, which blows during nine months in the year. When these disadvantages are contrasted with the certainty of a safe, commodious, punctual, "short, and cheaper ferry at Burntisland, at all times of tide and at all seasons, there seems little question but it must in the long-run be preferred to any other. Some few individuals, no doubt, will for a time fancy their object better served by embarking at Kirkcaldy, Dysart, or elsewhere; but the mass of travellers, both on foot and on horseback, will, on taking the average of circumstances, find their interests far better served by the regular and commodious ferry of Burntisland, though the land-journey, in some cases, may be lengthened a few miles.

APPENDIX

NO. I.

LETTER from Messrs **James** and **Charles Carmichael**,
to Captain **Basil Hall**, R.N.

(From the Edinburgh Philosophical Journal.)

Dundee, May 20, 1825

SIR,

In compliance with your request, we forward you a sketch of the machinery of the George the Fourth, twin steam* boat employed on this ferry; and we shall now proceed to give a description of that part of it invented by ourselves, the utility of which you have frequently witnessed, and which you are pleased to think may not be uninteresting to the scientific public.

The object of the contrivance we are about to describe, is to regulate the motions of the steam-vessel in a more easy manner than heretofore. By the simple motion of a small handle or index, placed on a tabic upon deck, in view and in hearing of the man at the helm, and of the master of the vessel, every movement which the engine is capable of giving to the paddle-wheel may be at once commanded. The vessel may be moved forwards or backwards, —or may be retarded, or entirely stopped, at any given moment, —by merely turning the handle to the places denoted by the graduations of a dial-plate. No skill is required for this purpose; so that the master himself, or a sailor under his directions, can perform the

office as well as the ablest engineer. Thus, the confusion which frequently arises at night in calling out to the engineer below, is avoided, and any ambiguity arising from the word of command being transmitted through several persons entirely prevented. In point of fact, it places the engine as much under command as the rudder is, — an undoubted improvement upon the clumsy method of bawling out to the engineer below, who either may not hear, or may chance to be out of the way, — circumstances which may lead to the most serious accidents.

The different parts of the machinery are not exactly arranged in the sketch as they are executed in said boat; but we hope that the principle will be better understood from having arranged them so as they can be better seen in the sketch Plate V.

The cylinder and jacket are cast in one piece, connected at the bottom, but altogether disconnected at the top when cast, — the vacancy between the two is closed at the top by an iron ring, and hemp or rust packing in the joints. The steam from the boiler enters between the cylinder and jacket, by the branch A, passes round the cylinder, and communicates with the side-pipe C. of the valve-chests by the branch B, but cannot enter the cylinder when the steam-valves DD are shut. The eduction-valves EE are situate below the steam-valves.

The steam-valve rods work through a flax packing at I'F, and are made hollow, to allow the eduction-valve rods to pass up the centre of them, — they are also made air-tight by a flax packing at GG.

The valve-lifters HHHH, are fast upon the lifter-rods IJ, only one of which can be properly seen; the foot of the one farthest from the eye is seen at the rocking-shaft. One of these rods lifts the upper steam-valve and lower eduction-valve; and the other the lower steam-valve and upper eduction-valve. The lower steam-valve and upper eduction-valve are represented as lifted in the sketch.

The rocking-shaft K turns and returns upon its centre about 40°; and having two spanners (or pallets) L, projecting from it upon opposite sides, cause the lifter-rods and the valves connected with them to rise alternately. The lifter-rods fall by their own weight, and when tine pallets

tire horizontal, all the valves are shut, and for an instant of time are at rest.

The rocking-shaft receives its motion from an eccentric-wheel M, fastened on the crank-shaft. The fixing of this wheel with relation to the crank and valves, is a point of considerable nicety, as upon this depends the opening and shutting of the valves at the proper time.

The eccentric-rod N is supported on the crank-shaft by a projecting part on each side of the eccentric-wheel, turned concentric with the shaft by the brass pieces O. The four rods P pass through these brass pieces, and slide freely in them. This part is shown in the section at Figure 2, with part of the crank (or paddle) shaft, and the crank on one end. The other end of the eccentric-rod is supported on the roller Q; and as the crankshaft turns round, the eccentric-rod travels backwards and forwards a distance equal double the eccentricity of the eccentric-wheel; and as the said rod is connected with the rocking-shaft by the double-ended spanner lilt on one end of it, consequently the rocking-shaft will travel from one extremity of its arch of motion to the other, in the same time that the crank-shaft makes half a revolution, or in the same time that the steam-piston travels from the top to the bottom of the cylinder, or from the bottom to the top. The steam-piston is represented in the middle of the cylinder, and as the lower steam-valve and upper eduction-valve are open, the piston must be ascending, and as the crank is connected with the opposite end of the walking-beam (or lever), the crank will be descending. By the time that the piston has reached the top, and the crank the bottom, the rocking-shaft will be in that position where the pallets upon it are horizontal, and, of course, all the valves will be shut. But the momentum of the paddle (or fly) wheel carries on the motion, and immediately the two valves that were formerly shut, — viz. the upper steam-valve and lower eduction-valve, — are opened, and the steam presses down the piston with a force equal to the difference between its own elasticity and the elasticity of the uncondensed vapours below the piston. Thus the engines will continue to go, and the paddle-wheel to turn in the direction of the dart.

But, that we may endeavour to explain to you the method of stopping or reversing the motion of the paddle-wheel, all that is disengaging tire eccentric-rod from the spanner of the rocking- shaft, and the valves all shut of their own accord, by the weight of the valves, lifter-rods, &c., and the engine will stand: And, to set the engine agoing, either the one way or the other, is to lower the eccentric-rod, to take hold of the double-ended spanner on the end of the rocking-shaft, as represented on the sketch, and then the paddle-wheel will move in the direction of the dart, or lift the eccentric-rod to the top of the spanner on the rocking- shaft, and then the paddle-wheel will move in the opposite direction. The use of the sector-formed appendages T, on the end of the eccentric-rod, is to conduct the pins on the ends of the double-ended spanner into the notches adapted for them on each side of the eccentric-rod, — the form of which is better seen detached at Figure 3. The hand-gearing, for starting or stopping the engines, is situate upon the deck of the boat, and all concentrated upon the top of a small table, in view and in hearing of the man at the helm, or the master, who directs both, when coming to the quay.

1, a double-ended handle, which is upon die right shaft 2, on the lower end of. which is a bevel-wheel 3, working into another wheel 4. This wheel is on a lying-shaft, which extends from the one engine to the other, and carries on each end of it a spur- pinion 5, which pinion works into the rack 6. There is a similar rack connected with the eccentric-rod of the other engine, into which the other spur-pinion works; so that, by turning the handle 1, both engines can be started, stopped, or reversed, with the greatest facility and certainty that could be wished for. These bevel-wheels, spur-pinions, and racks, must be so proportioned to one another, as that two complete turns of the handle 1 raises the eccentric-rod from the lowest to the highest position. One turn of the handle raises or lowers the eccentric- rods into the stopping position, and one turn, either the one way or the other, as circumstances require it, sets the boat ahead or astern. There is a projecting piece 7, fixed upon the upright shaft, which catches into a notch, pressed by a spring, which supports the racks and eccentric-

rods, at any of the three positions that may be required.

As the said upright shaft makes two turns, and always stops at the same point, it is not suitable for the index. To remedy this, there is a small pinion 8, below the table, working into a wheel 9 with four times the number of teeth, for carrying the index 10. This wheel, making but half a revolution for two revolutions of the upright shaft, makes the index upon its arbour stand fore-and-aft when the engines are going, and thwart-ships when the eccentric-rods are set in the standing position.

The index 11 is connected with the regulating-valve 12 by rods and spanners, and turned by hand, as circumstances require.

The index 13 is connected with the injection-cock by rods and spanners, — it being always shut before the engines are stopped, and opened when the engines are started. Each engine has separate gearing for the regulating-valves and injection-cocks, and graduated circles on brass plates, to show, by inspection, the position in which they are standing.

When the engines stand for some time, it is necessary to let the steam pass freely through them for two or three seconds, on purpose to heat them, and expel any air that may have got inside. For this purpose, the long handle 14, standing by the side of the table, is fixed to a shaft 15, which goes across the front of both engines, and by four short spanners (or pallets) upon it, lifts all the valves of both engines, and allows the steam to pass freely through them by the air-pump valves. The engineer knows by the Bound when to replace the handle in the position shown in the sketch; and, having previously set the index for the head or stern motion in the direction wanted, and adjusted the steam-regulating index, the last thing he has got to do is to open rite injection-cocks, and immediately the engines start in the direction wanted.

Thus we have, at your request, endeavoured to sketch and explain to you such parts of the ferry twin-boat. George the Fourth, of this place, as

you more particularly wanted information respecting. We hope that it is done in such a way as you will understand it; but if any farther explanation is wanted, be so kind as write us.

We are

Sir,

Your very obedient servants,

JAS. and CHARLES CARMICHAEL

NO. 11.

REGULATIONS for the DUNDEE FERRIES

I. Each sail boat, cutter, and yawl, shall, beside a cockswain, have two stout men and a boy. The boats shall be numbered, and have distinguishing vanes. The Cockswain shall wear a ticket in his hat, showing the number of his boat; and shall always keep on board the boat a copy of these Regulations, and of the Table of Fares.

II. The Steam-Boat shall be commanded by a master, and have a crew of five seamen, an engineer, and one fireman, with an assistant; and shall also have a copy of these Regulations and of the Table of Fares always on board.

III. The cutters shall not carry more than twenty-four passengers, nor the yawls more than seven; and the Superintendent shall have power to reduce the number according to the state of the weather.

IV. The Trustees or Committee of Management shall not be held to be accountable or liable for any goods, money, or effects, lost or abstracted in or from any of the boats or other vessels plying the ferries, or in being put on board of or landed from any of the said boats or other vessels; neither shall they be held accountable or liable for damage done to any horses or other beasts, or carriages or goods, or other articles, in carrying the same across the ferry, or in putting them on board or landing them from the boats or other vessels; unless such loss or damage shall have been occasioned or done through or by any fault or culpable negligence of the boatmen or other persons employed by the Trustees or Committee of Management, — any law or custom to the contrary notwithstanding.

V. No stallion shall be taken into any boat where other horses have been previously, put, if objected to by the owners of such horses, unless he can be put in such a place of the boat as, in the opinion of the Superintendent, shall not endanger them. Dogs shall be put in such a place of the boats as may be safe, and occasion least inconvenience to passengers.

VI. The boats and other vessels shall ply betwixt Dundee and the new ferry-pier at

Newport, unless any accidental circumstances, arising from wind or weather, should render it advisable and proper to use the harbours at Woodhaven or Newport. A Steam-Boat shall commence plying from Dundee every day except Sundays, at the following hours in the morning, and continue to ply every subsequent hour until and including the under-mentioned hours in the evening, - viz.

From 15 th February to 15 th March, both Days inclusive	} <i>Morning</i> <i>At 7 a. m.</i>	<i>to Evening</i> <i>5 p. m.</i>	
From 16 th March to 15 th May		... 6 a. m.	... 7 p. m.
..... 16 th May to 31 st August	... 6 a. m.	...	8 p. m.
..... 1 st September to 30 th September	... 6 a. m.	...	6 p. m.
..... 1 st October to 15 th October	... 7 a. m.	...	5 p. m.
..... 16 th October to 14 th February	... 7 a. m.	...	4 p. m.

And the Boat shall depart from Newport on her return to Dundee, at each intermediate half hour.

During the period from the 16th of October to the 16th of March, the Steam-Boat (wind and weather and other circumstances permitting, of which the Superintendent is to be the Judge) will start regularly from Dundee at 7 p.m., and return from Newport at half-past seven; and at such times as the Steam-Boat is not to ply at the above hour, a signal, by light, will be shown on the flag-staff at the Superintendent's house; and in that case, a sail-boat will be despatched, if practicable.

On the Sundays, the Steam-Boat will sail from Dundee and Newport at the following hours.

From 1 st November to 31 st January		From 1 st March to the 23 rd April, and 26 th August to the 30 th September	
<i>From Dundee</i>	<i>From Newport</i>	<i>From Dundee</i>	<i>From Newport</i>
At 9. 0 a. m.	At 9. 30 a. m.	At 7.30 a. m.	At 8. 0 a. m.
... 1. 0 p. m.	.. 1. 30 p. m.	... 9. 0 a. m.	... 9. 30 a. m.
... 3. 30 p. m.	.. 4. 0 p. m.	... 1. 0 p. m.	... 1. 30 p. m.
		... 4. 0 p. m.	... 4. 30 p. m.
		... 6. 0 p. m.	... 6. 30 p. m.

From 1 st to 28 th February, and 1 st to 31 st October		From 24 th April to the 25 th August	
<i>From Dundee</i>	<i>From Newport</i>	<i>From Dundee</i>	<i>From Newport</i>
At 9. 0 a. m.	At 9. 30 a. m.	At 7. 0 a. m.	At 7. 30 a. m.
... 1. 0 p. m.	.. 1. 30 p. m.	... 9. 0 a. m.	... 9. 30 a. m.
... 4. 0 p. m.	.. 4. 30 p. m.	... 1. 0 p. m.	... 1. 30 p. m.
		... 4. 30 p. m.	... 5. 0 p. m.
		... 7. 30 p. m.	... 8. 0 p. m.

The state of the wind and tide and other circumstances, may occasionally prevent the Steam-Boat from departing exactly at the hours Stated In the above Tables; but every effort will be made to maintain its regularity, and to prevent disappointment. The Superintendent is authorized, during the period when the latest hour of the Steam-Boat for the day is fixed at four o'clock, to substitute a sail-boat for the Steam-Boat at that hour, on such occasions as he may consider it advisable. On every day except Sunday, sail-boats shall ply from each side of the river, an hour before the Steam-Boat's first voyage, and an hour after her last voyage for the day, except in the morning, when the Steam-Boat begins to ply at six and in the evenings when the last trip from Dundee is at eight o'clock. Sail-boats or row-boats may be freighted after the Steam-Boat ceases plying in the evening, on the full freight being paid till nine o'clock p. m. from 22nd September to 22nd March, and ten o'clock p. m. from 22nd March to 22nd September; after which hours, the night fares will commence.

VII. In order to afford the greatest possible accommodation to the public, the Superintendent is authorized to employ both Steam-Boats, when the intercourse by the ferry arising from a press of cattle or other causes may render it necessary.

VIII. The Steam-Boat shall not commence the voyage from either side until the lapse of three minutes after the alarum-bell has been rung to give warning that she is about to depart; But the boat shall not wait beyond that period past her regular and stated hour of sailing, or after her arrival, in ease of any irregularity having occurred relative to her hours of departure, for passengers, carriages, horses, beasts, or goods of any

description; and when goods, &c. cannot be shipped on board of her, either for want of time or otherwise, they must wait for next voyage, or be put on board of a sail-boat or cutter, to be towed by the Steam-Boat as the Superintendent may direct.

IX. When the Steam-Boats are not plying, the ferry will be supplied with sail-boats; and sail-boats, cutters, or yawls, may occasionally be hired at other times, wind and tide serving, and when they can be spared from the general purposes of the ferry, of which the Superintendent will judge, at the rates for each passenger, beast, or piece of goods, &c. specified in the Table of Fares,—provided that if the rates payable for each passenger, beast, and piece of goods, &c. do not amount to the full freight of the boat, cutter, or yawl, the freighter shall pay the difference.

X. The Masters or Cockswains (subject to the orders of the Superintendent, or, in his absence, to the orders of the Collector) shall have the command of the boatmen belonging to their respective boats; and if any of the boatmen shall disobey the orders of the Superintendent, Collector, Masters, or Cockswains—or if any person or persons connected with the ferry shall behave insolently to passengers, or otherwise neglect their duty—the offender shall be liable in a penalty of not more than 5l., nor less than 5s., for each offence.

XI. No goods, carriages, or other articles, nor any horses or other beasts, shall be left in the boats after their arrival, or on the quays or accesses, or in the sheds, or boatmen's room, without permission from the Superintendent; and even though such permission be given, the Trustees shall not be responsible for any loss or damage which may thereby be sustained.

XII. When the Steam-Boat shall, from the state of the weather or tide, or from any other cause, be unable to keep within its exact time, and thereby fall behind the fixed hours of sailing, the Superintendent shall have power, when the time so lost shall amount to forty minutes, to detain the boat, until the next stated hour of sailing, in order as far as possible to prevent disappointment to the public: And this should be more particularly attended to at those times when a greater number of

passengers, &c. than ordinary are expected to cross the ferry. It is not however to be understood that tills is an imperative order on the Superintendent under every circumstance s In acting on it, he is to be at liberty to exercise a sound discretion, having always in view the greatest public accommodation. When the Steam-Boat shall from any cause be unable to sail exactly at the hour appointed, or within five minutes thereof, the particular reasons for such irregularities, together with the days and hours when they occur, shall be entered in a book to be kept by the Superintendent for that purpose, which shall lie in the Collector's office, for the information of the public.

XIII. The Superintendent shall himself see the Steam-Boats properly moored and the fires extinguished every night, immediately after the boats have ceased to ply. He must also know, before he retires to rest, that the men appointed to sleep in the boats are on board, and the watchman at his post.

XIV. The Superintendent shall attend personally to the first despatch of the Steam-Boat from Dundee in the morning, as well as at all hours of her departure from Dundee, when he does not go in the boat himself, or when not employed on other necessary business of the ferry.

XV. The watchman shall take his station whenever the boat is moored, after the last trip for the day: And he shall continue on duty until the boat is taken charge of by the fireman in the morning. The duty of the watchman shall be to patrol the deck, and now and then inspect the furnaces, occasionally going below to see that all is safe. In addition to the watchman, one of the boatmen, and the fireman or his assistant, shall sleep every night on board of the Steam-Boat employed the day previous; and they shall not absent themselves during the night on any account whatever (except in calling for assistance in case of danger to the boats); and should any of them have occasion to be absent, he must first obtain leave from the Superintendent, who shall appoint another person to supply his place. The watchman shall, on pain of dismissal, report to the Superintendent whenever any of the men appointed to sleep in the boats absent themselves without leave.

XVI. When any live coals are drawn from the furnaces, they shall be instantly and completely extinguished—particularly when the Steam-Boats enter the harbour of Dundee; and on no account whatever shall any of the vents be fired in the harbour of Dundee, for the purpose of cleaning them, under a penalty not exceeding 5*l*, Sterling, to be paid by the person contravening this order.

XVII. No firewood, tallow, oil, tow, or other combustible materials, shall be placed upon, at, or near to the furnaces or boilers, for any purpose whatever.

XVIII. The Superintendent, and Master of the Steam-Boats, shall be responsible that the boats, when employed, shall be well cleaned-out once every day, or oftener if necessary,—and that proper attention is paid to the ventilation of the cabins.

XIX. In the absence of the Superintendent, the Collector, as far as his own duties will admit, shall attend to the department of the Superintendent.

XX. During the time of uplifting the fares in the Steam- Boat, the Collector or Cockswain, or person employed in collecting, shall have power to cause shut the doors leading from the different divisions of the boat; and to require passengers, if he shall consider it necessary, to keep their places until the fares are collected. Any person not obeying this regulation, to be liable in a penalty not exceeding 20*s*.

XXI. Persons guilty of riotous or disorderly conduct, or of molesting the officers of the ferry, crew, or passengers, to be liable in a penalty not exceeding 5*l*, over and above any other punishment which the Judge Ordinary of the bounds or the Justices of the Peace may inflict.

XXII. As the prosperity of the ferry will depend much on the facility and accommodation with which its affairs are conducted, the Committee of Management direct, that all persons under their orders do pay the strictest attention to their duty—that they shall each, in his own department, use the utmost civility to every person frequenting the ferry—and that when disappointments or irregularities occur (which it is trusted will now be very seldom), they will afford to persons complaining such explanations

as the case may require.

XXIII. Passengers are requested to report to the Superintendent, or, in his absence, to the Collector, any breach or neglect of the above Regulations, on the part of the Masters, Cockswains, or boatmen, coming under their observation ; and if they cannot attend personally, they are requested to leave a written complaint, in the form of a letter, either with the Clerk of the Committee of Management, or the Superintendent, the latter of whom shall take immediate measures for punishing the offender, in terms of the act; but no complaint shall be received unless the same be intimated within six days from the date of the offence: And any complaint against the Superintendent or Collector must be in writing, specifying the grounds of complaint, and lodged with the Clerk to the Committee of Management also within six days from the date of the offence.

Dundee, August 81, 1825.—Signed, in presence and by order of the
Committee of Management,

(Signed) D. BLAIR jr. Preses.



As persons, relying on the information given to them by individuals unconnected with the ferries, have been misled with regard to the particular hours at which, from the state of the weather and tide, carriages, beasts, and bulky articles can be shipped on board the Stream-Boat, the Trustees recommend, that applications for information on this subject be always made at the Superintendent, or in his absence, at the Collector at the 'Craig Pier of Dundee, for the north side, and at the porters at the harbour of Newport, for the south side of the river.

NO. III

TABLE of RATES and DUTIES to be levied on the Ferries
across the River Tay

Freight of a Steam-Boat, sufficient time being given for preparing.....	L.	10	10	0
Freight of a sail-boat		0	6	0
Freight of a Pinnace or cutter or yawl		0	4	6
Each coach, barouche, or landau (except a hearse or mourning-coach)		0	7	0
Each hearse		0	12	0
Each mourning-coach		0	9	0
Each four-wheeled chaise, landaulet, &c.,		0	6	0
Each curricule, or pony-chaise		0	3	6
Each two-wheeled chaise, gig, or such vehicle		0	2	6
Each tax-cart		0	1	6
First cabin of Steam-Boat .		0	0	9
Each person (except children)	Second cabin of ditto	0	0	6
	Deck of ditto and sail boats	0	0	6
Each child under twelve years of age		0	0	3
Children on the knee, <i>gratis</i>		0	0	0
Each horse, used and drawing a cart or waggon, when accompanying the same		0	0	8
Each other horse		0	1	0
Each mule or ass		0	0	8
Each bull, cow, ox or heifer		0	0	8
Each sheep or goat		0	0	1½
Each lamb or kid		0	0	1
Each calf, boar, sow or hog, alive		0	0	4
Each calf, boar, sow or hog, dead		0	0	3
Each salmon		0	0	1½
Each grilse or trout		0	0	1
White fish, per cart load, including cart		0	2	6
White fish, per barrel-bulk		0	0	4
Herrings, per cart-load, including cart		0	2	0
Herrings, per barrel-bulk		0	0	3
Each sporting dog		0	0	6
Each other dog		0	0	2
Shepherd's dog, with the flock or drove, <i>gratis</i>		0	0	0
Each single cart-load of furniture		0	2	6

Each double-cart load of furniture	L.	0	4	0
Each cart, exclusive of baggage		0	1	0
Each ton of flax, and so in proportion		0	4	0
Each ton of hemp and tow, and so in proportion ...		0	4	0
Each ton of lint or cotton yarn		0	4	0
Each ton of tow or hemp yarn		0	4	0
Each ton of worsted		0	5	0
Each ton of wool		0	7	0
Reeds, per hundred bunches		0	2	0
Reeds, per cart-load, including cart		0	2	6
Oak-bark, per ton, in bags		0	6	6
Oak-bark, per ton, in carts, besides the fare above stated for the cart itself		0	6	6
Oak-bark, per ton, when loose		0	10	0
Each cart-load of hay, including the cart, per fifteen stone		0	0	6
Each cart-load of straw, including the cart, per eighteen stone		0	0	6
Each double cart-load of corn in the straw, including the cart,		0	4	0
Each single cart-load of corn in the straw, including cart,		0	2	6
Nota. – Hay, straw and corn in the straw, to be carried over at such times only as the Superintendent may direct, so as not to interfere with the general intercourse of the ferry				
Each sack of flour		0	0	4
Each boll of wheat		0	0	2
Each boll of barley or other grain		0	0	2
Each load of meal, of two bolls		0	0	3
Each boll of potatoes or carrots, weighing 32 stones Dutch, and so in proportion,		0	0	2
Each cart- load of turnips, including the cart		0	2	0
Each sack of chaff,		0	0	2
Linseed, per hogshead		0	1	0
A plough, or pair of harrows		0	0	6
Fanners,		0	1	6
Cart or carriage wheels, per pair		0	0	6
Each pipe of wine, or spirits, &c (except aquavita)		0	5	0
Each hogshead of ditto,		0	2	6

Each half-hogshead of ditto	0	1	3
Each anker of ditto	0	0	6
Each pipe of aquavitae	0	3	0
Each hogshead of ditto	0	1	6
Each half-hogshead of ditto	0	0	9
Each anker of ditto	0	0	4½
Each pipe of oil, not exceeding half a ton	0	2	0
Each hogshead of ditto	0	1	0
Each half-hogshead of ditto	0	0	6
Each anker of ditto	0	0	3
Each hogshead of ale, beer or porter	0	1	0
Each half-hogshead of ditto	0	0	6
Each hogshead of sugar, fifteen hundredweight and upwards,	0	2	6
Each tierce of ditto, from eight to nine hundred-weight,	0	1	3
Each millstone	0	6	0
Each crate of glass or stone ware	0	1	0
Deals of twelve feet long, each	0	0	1
Timber, per cubic foot	0	0	0½
Iron, in bars, per ton,	0	4	0
Stones, per ton	0	3	6
Lead, per ton	0	4	0
Cast-iron, machinery, per ton	0	3	0
Copper or brass, per ton	0	4	0
Each boll of lime	0	0	6
Coals, per boll	0	0	2
Cinders, or charcoal, per boll,	0	0	3
Each one thousand of blue slates	0	3	0
Each one hundred grey ditto	0	1	0
Each one hundred tiles or bricks	0	1	0
Each square foot of pavement, under three inches thick,	0	0	0¼
Each square foot of pavement, three inches and not exceeding four inches thick,	0	0	0½
Each cart load of baggage, goods or other articles not herein otherwise charged, not exceeding twelve hundredweight,	0	2	0
Above twelve, and not exceeding eighteen hundred-weight,	0	3	0
Above eighteen, and not exceeding twenty-four hundredweight,	0	4	0

Every one hundredweight more, not exceeding thirty hundredweight,	L.	0	0	1
Every one hundredweight above thirty hundredweight,		0	0	2
Each barrel-bulk of baggage, goods, or other articles not herein otherwise charged,		0	0	3
Each caravan of sixteen feet in length and upwards		0	12	0
Each ditto of twelve feet, under sixteen feet in length,		0	10	0
All under twelve feet in length		0	7	0

The Trustees will license vessels to convoy stones, lime and manure, within the boundaries of their right of ferry (excluding pavement to and from the ferry-piers). Application may be made on this subject to the Superintendent, who will explain the terms of this agreement, and will issue the requisite licenses.

The freights above mentioned are for boats or pinnaces, &c., from six in the morning to ten o'clock at night, from the 1st day of April to the 31st day of October inclusive, and from seven in the morning to nine o'clock at night from the 1st of November to 31st March inclusive. The freights of boats and pinnaces, &c., at other hours, to be one half more than the freights above mentioned.

In cases where the rates are chargeable by weight or measure, it shall be in the option of the Collector to charge either by the weight or barrelbulk.

A person engaging a boat or pinnacle, &c., to sail at a particular hour, must deposite the freight when he makes the engagement.

The fares for His Majesty's troops to be in terms of the mutiny act.

The same rates and duties are specified in the foregoing Table, to be levied for all persons, beasts and goods, or other articles, in boats, yawls, pinnaces, or other vessels arriving at the ferry-harbours at Dundee and Newport, from the ferries of Ferry-Port-on-Craig, Balmerino and Broughty Castle, or sailing to any of these ferries last mentioned from the ferry harbours of Dundee and Newport; and the Collector to levy a sixth part of

the said rates and duties for and in consideration of the accommodation which the boats, yawls, pinnaces, or other vessels from Ferry-Port-on_Craig, Broughty Castle or Balmerino, shall receive at the ferry-harbours belonging to the Trustees, situate within the right of ferry.

At Dundee, the 31st day of August 1825, - In a meeting of the Committee of Management under the acts passed in the fifty-ninth year of the reign of his late Majesty, and third year of his present Majesty, “for erecting, improving, regulating, and maintaining ferries and passages across the river Tay, in the counties of Fife and Forfar,” the foregoing Table of Rates and Duties was approved of, and the Collector was ordered to levy, in terms thereof, from and after the 15th day of September next.

(Signed) D. Blair, Jr. Preses

PENALTIES

59. Geo III

The Committee of Management have power to inflict reasonable fines or forfeitures not exceeding 10*l.* Sterling, for any offence, upon all persons offending against any rules, by-laws, or orders made by the Trustees or Committee of Management.

Owners of boats, yawls or pinnaces, or other vessels plying for hire on any of the ferries or passages belonging to the Trustees, or over which they have jurisdiction, without a licence from the Trustees, to forfeit a sum not exceeding 5*l.* for every offence.

Persons wilfully and maliciously setting on fire or destroying any of the piers, vessels, houses, or other works or property, or any of the materials intended therefor, shall be adjudged guilty of felony, and suffer punishment by transportation, fine or imprisonment.

Persons wilfully or maliciously damaging or destroying any works, or any of the boats or vessels belonging to the Trustees, or any rope or other thing by which the same may be moored or fastened, shall forfeit and pay a sum not exceeding 10*l.*, besides the damage thereby occasioned.

Persons throwing ballast, dust, ashes or rubbish, shingle, stones, or other things, into any of the harbours, to forfeit a penalty not exceeding 10*l.*, for each offence.

Any boatman or other person who shall demand or take any fee or reward, or greater rate of toll than is authorised by the Trustees or Committee of Management, or shall demand toll from any person or persons exempt from the payment thereof, and claim such exemption, - or, upon the legal rate or toll being paid or tendered, shall unnecessarily detain any passenger, &c., or shall use scurrilous or abusive language to any Trustee, member of Committee of Management, or Treasurer, Clerk, or other officer, or to any passenger, - shall forfeit and pay a sum, not exceeding 5*l.* for very such offence.

Any person or persons (not exempt from payment) who shall delay or refuse to pay the freight or rates and duties above specified, shall forfeit a sum not exceeding 40*s.*; and, by assaulting or interrupting the Collector in the exercise of his duty, the person offending shall forfeit a sum not exceeding 5*l.*

If any Superintendent shall demand, take, or receive any fee or reward from any person using said ferry, he shall, for such offence, forfeit and pay a sum not exceeding 5*l.*

The Superintendent is authorised summarily to carry any person offending against the act, or any orders, rules and regulations of the Trustees or Committee of Management, before a Justice of the Peace of either of the counties of Fife or Forfar; and in case a Justice cannot immediately be found, to lodge such offender in one or other of the Gaols of Dundee, Cupar, or St Andrews, nearest the place where the offence is committed, until such offender can be carried before a Justice.

3. Geo. IV.

Persons having charge of boats, pinnaces, or other vessels landing at ferry-harbours specified in said acts, from the ferries of Ferry-Port-on_Craig, Balmerino and Broughty Castle, or sailing to these places from

ferry-harbours aforesaid, who shall refuse to levy the rates established by the Trustees, shall forfeit and pay to the Trustees, not only a sum equal to that part of the said rates which they shall fail or refuse to levy, but also a penalty not exceeding 5s., for every offence.

N0. IV

REGULATIONS for PORTERS at the Ferry-stations of Dundee, Newport, and Woodhaven; enacted by the Trustees for the Ferries between foresaid Stations, in virtue of the act 59th Geo. III cap. 113.

I. No person shall act as a porter on any of the piers, quays of landing-places of the said ferries at Dundee, Newport or Woodhaven, who is not appointed by the Trustees or Committee for Management of the said ferries, under the penalty of 10s., for each transgression.

II. Before any porter shall be appointed as aforesaid, he shall produce a responsible person or persons, as surety, to the amount of 10*l*. Sterling, for his good behaviour, and for all loss or damage that may be sustained by his negligence or breach of trust, and for payment of the fines which may be incurred by misbehaviour, or in not obeying the Regulations of the Committee or orders of the Superintendent of the said ferries.

III. Every licensed porter shall wear four fathoms of rope at his side; and shall under forfeiting his place, constantly wear upon the breast of his upper garments a badge with "Dundee &c., Ferry Porter," and the number of the badge engraved thereon.

IV. Every licensed porter is prohibited from receiving from any passenger employing him, under any denomination whatever, any greater sum than that authorised by the Table of Fares after specified under penalty of 10s., for each transgression; and no fare whatever to be exacted unless the porter has been actually employed.

V. Every licensed porter, when employed, shall always have a copy of these Regulations and a Table of Fares ready to show when called for, under penalty of forfeiting his hire.

VI. Every licensed porter, unless when in the employment of a passenger, shall be constantly (Sundays excepted) in attendance at the station to which he is appointed, during the hours the boats are ordered to ply. On Sundays, there shall always be two porters at Dundee, and one at Newport. The hours for their meals to be fixed by the Superintendent.

VII. No licensed porter shall, under any pretence whatever, refuse

employment from any passenger, or in the loading or unloading of boats, unless he shall establish to the satisfaction of the Superintendent that he is then in the actual employment of another passenger, or employed in some other respect as a porter at the ferry, under a penalty of 10s.

VIII. If any licensed porter shall be convicted of any act of insolence or drunkenness, he shall forfeit his situation as a porter.

IX. The licensed porter shall be obliged, at all times when required by the Superintendent at the station, or the boatmen of the ferry-boats, to assist in hawling the boats up or down the harbours, and to afford every other aid to the boatmen in their power, without recompense or gratuity whatever, farther than the exclusive privilege conferred upon them of plying as porters at the said ferry-stations; and if they are convicted in a breach of this article, they shall be dismissed from the ferry.

X. No porter shall go on board any boat on its arrival, unless employed; and he must be careful not to obstruct the passengers, under a penalty of 5s., for each offence.

XI. The licensed porters shall in every respect be under the authority of the Superintendent, and obey his orders, under the penalty of forfeiting their situation.

TABLE OF FARES FOR PORTERS EMPLOYED AT THE FERRIES OF DUNDEE, NEWPORT, AND WOODHAVEN.

DUNDEE

For any bundle, box, or parcel, or one or more such articles, belonging to one person or party, from the boat,

	For parcels &c under 28lib		For parcels &c. over 28lib	
	s.	d.	s.	d.
To any part of the town as far west, both in the Nethergate and Overgate, as the Long Wynd, and as far East as the east end of the Trades Hall.....	0	2	0	3

	For parcels &c under 28lib		For parcels &c. over 28lib	
	s.	d.	s.	d.
To any part from the foot of the Long Wynd to the foot of Small's Wynd, and the West Port, and from the Trades' Hall to the head of the Wellgate, Cowgate Port, and Dens Bridge.....	0	3	0	4½
To any part of the suburbs beyond the above places, not exceeding a mile from the Craig.....	0	4	0	6
To any part of the suburbs, exceeding a mile from the Craig.....	0	6	0	9

NEWPORT

	For parcels &c under 28lib		For parcels &c. over 28lib	
	s.	d.	s.	d.
From the boat to the Inn, or from the inn to the boat	0	2	0	3
From Newport to Woodhaven.....	0	4	0	6
From boat to head of pier or Packhouse, Greater weight in proportion	0	4	0	6
From boat to the inn, with a barrow	0	4	0	6
A lift from the pier to Just's meetinghouse.....	0	3	0	6
Ditto from the pier to Marytown	0	4	0	6
Other distances in proportion				
Each ton of flax from pier to packhouse	1	0		

AT DUNDEE, NEWPORT, OR WOODHAVEN.

For shipping or taking on shore (whatever number of porters may be employed)

A four-wheeled carriage	1s	0d
A two-wheeled ditto	0	4
An empty cart	0	2
Horses or cattle, each	0	1
Each Bull or stallion	0	4
Each calf or sow	0	0½
Each score of sheep or lambs	0	4

For loading or unloading carts &c. (whatever number of porters may be employed), and also if required, for shipping or taking ashore.

Each boll of meal or grain	0	0½
Ditto potatoes	0	0½
Each cart load of furniture or baggage of 12 cwt	0	4
Ditto, from 12 to 18 cwt	0	6
Ditto, from 18 to 24 cwt	0	8
Each hogshead of tobacco or sugar	0	4
Ditto of flax-seed, linseed, porter, ale, or oil	0	2
Each puncheon of wine or spirits	0	4
Each barrel-bulk	0	0½
Pavement, double horse cart,	0	6
Ditto single-horse cart,	0	4

All other work to be paid for in the same proportion; and in case of any dispute between the porter and his employer, the fare to be determined by the Superintendent.

It is the duty of the boatmen to load and unload the boats when the goods, &c. are laid alongside the boat; but when the Superintendent, either from the weight of the articles, or the difficulty of shipping or unshipping, or for the purpose of giving despatch, shall consider it expedient to order the porters to assist in performing that duty, he shall have power to do so, and in that case they shall be paid the fares specified above for shipping and taking on shore; but in no case shall they be entitled to any fare unless they are actually employed by order of the Superintendent, or by those having charge of the articles, &c. shipped or taken ashore.

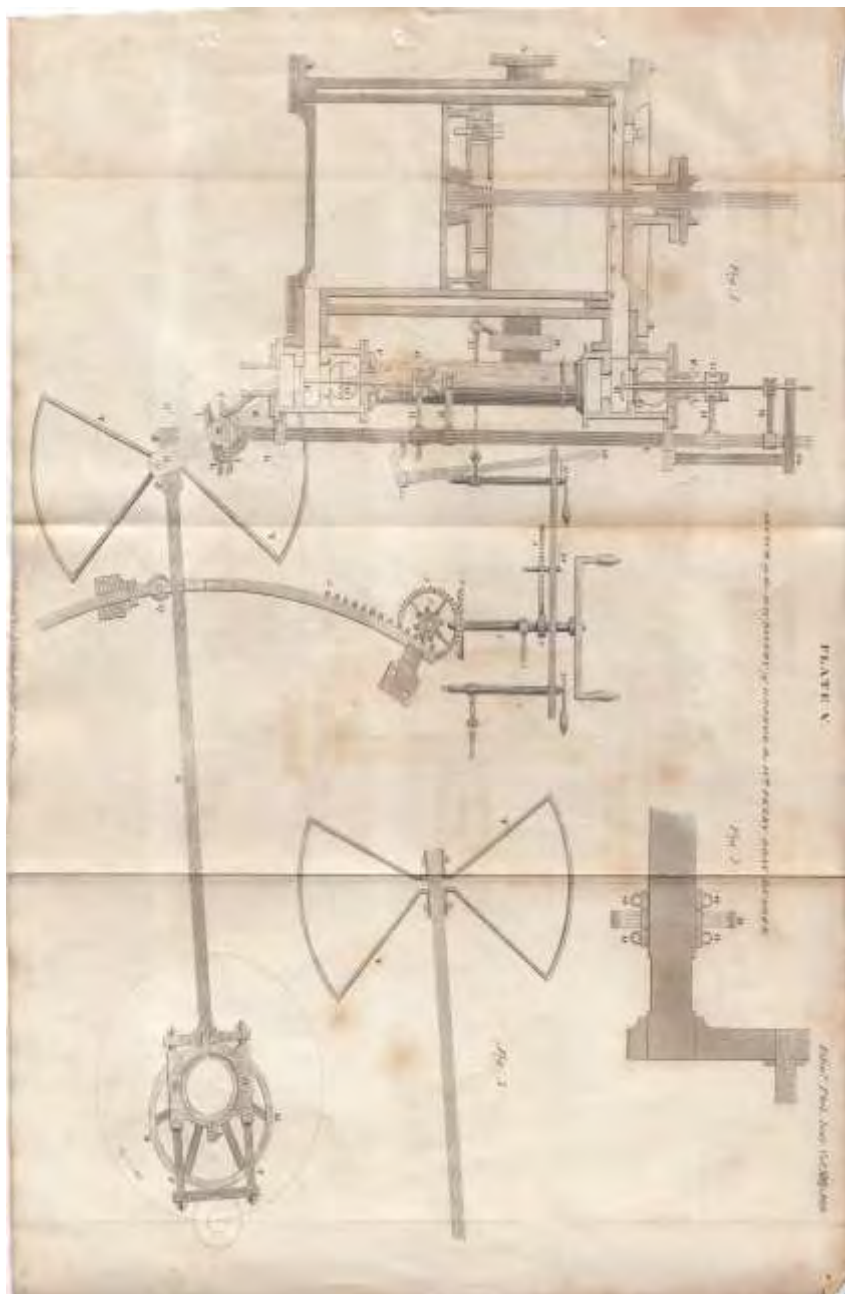
NO. V.

STATEMENT of the RATES and DUTIES uplifted on the Ferry across the Tay, from 23d August 1819, when the Ferry began to be Regulated by Act of Parliament, to 1st September 1825.

	1.	2.	3.	4.	5.	6.
	From 23d August 1819 to 1st August 1820.	From 1st August 1820 to 1st August 1821.	From 1st August 1821 to 1st August 1822.	From 1st August 1822 to 1st August 1823.	From 1st August 1823 to 1st August 1824.	From 1st August 1824 to 1st August 1825.
August,	L. 44 7 7	L. 391 6 5	L. 598 7 11	L. 469 5 4	L. 339 14 2	L. 434 3 3
September,	975 9 3	567 11 3	380 19 11	341 16 8	424 9 9	386 3 11
October,	227 11 7	269 9 8	241 2 4	238 6 2	327 9 3	332 6 3
November,	193 18 1	290 7 7	240 8 1	255 10 7	230 19 7	327 14 1
December,	189 19 11	161 1 2	183 13 1	228 18 3	224 18 7	240 5 11
January,	149 17 4	159 0 1	195 10 11	228 2 6	240 17 4	274 2 9
February,	164 9 5	173 16 8	174 16 7	188 9 8	224 12 4	244 17 2
March,	202 17 0	188 4 1	214 16 9	264 2 7	232 4 6	306 7 5
April,	209 18 1	192 12 10	241 0 0	228 19 4	300 18 8	358 6 6
May,	220 19 7	204 1 9	220 6 0	310 19 9	303 3 11	365 7 3
June,	211 19 7	196 19 4	202 1 6	315 12 0	328 3 8	367 3 7
July,	230 9 0	197 7 8	206 0 5	340 4 8	324 18 2	404 12 0
	L. 2302 9 5	L. 2441 18 6	L. 2800 3 0	L. 3415 7 6	L. 3737 9 11	L. 4041 10 1

August 1825,

L. 500 13 10





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