XV. Thirteenth report of the commissioners for making and maintaining the caledonian canal. Dated May 17, 1816

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water, or simply water strongly impregnated with salt. The whole is concluded with a strong layer of salt, and the pieces are covered with a lid, on which a weight is placed sufficient to plunge them in the brine.

In about three weeks, more or less, according to the bulk of the pieces, salt, and the time which it is wished to preserve them, they are withdrawn from the tubs: they are suffered to drip, and are then carried to the drying-room, where they generally remain fifteen days, or three weeks, to receive during that time the action of the smoke of a fire, which is kept up with only three or four pieces of oak chips, very dry. It has been remarked, that the smoke of resinous woods makes the meat contract a very disagreeable taste, and that those pieces which remained longest in the drying-room exposed to a feeble smoke were capable of being kept longer, because a more intimate combination took place between the smoke and the constituent principles of the meat.

When it is wanted to produce what is call *scarlet* smoked beef, the meat is only left seven or eight days in the tubs before drying it, or rather care is taken to rub it with a mixture of three parts of common salt and one of saltpetre; but if the latter gives a colour to the meat, it also renders it harder.

The beef when smoked is preserved in a dry and well aired place, and it is exported by placing it in layers in well-joined chests, and by filling with new ashes or chaff the vacancies between each layer.

The beef is generally dressed with vegetables, such as cabbages, potatoes, or carrots, after having been first washed in warm water, and steeped afterwards for twenty-four hours in cold water to freshen it: aromatics are sometimes thrown into the dish to disguise the smoky taste, which does not please all palates.

XV. *Thirteenth Report of the Commissioners for making and maintaining the Caledonian Canal. Dated May 17, 1816.*

THE works of the Caledonian canal have now advanced to such a state, that in every part of the line it is become necessary to calculate the application of labour and machinery, so that no obstacle may singly retard the completion of the canal, when the rest of it shall have become navigable throughout; and it is for the consideration of parliament, whether it may not be a real economy to augment the annual grant for the two next years, rather than continue it for three years at the usual rate of fifty thousand pounds per annum. Not only will any delay retard the

receipt of tolls, which, according to the best information we have been able to procure, may probably produce forty thousand pounds per annum, when the benefit of the canal passage shall have become thoroughly understood; but even the present loss, resulting from delay, is not inconsiderable, because the number of labourers and workmen is diminished, while the expenditure on management and superintendence remains unaltered. The degree in which this disproportion takes place, may be estimated by comparing the number of labourers and workmen now employed, with the highest average number in any former year; and the average number in the last twelvemonth having been four hundred and ninety, shows a decrease of four hundred and sixty-nine in nine hundred and fifty-nine, or almost half. The largest number we ever employed was during the three months of June, July, and August 1811, averaging at fourteen hundred and four. Even this number was not felt as an inconvenience by our superintendents, not even at Corpach, where the extraordinary accumulation mostly existed, in consequence of a depression of trade at that time, and a consequent stagnation in all branches of employment at Glasgow.

A comparison of the sum of money then and now expended in labour, gives nearly the same result. In our ninth Report the sum appears to have been fifty thousand pounds, in our present Report thirty thousand; which again will be much diminished in our next Report, unless a larger grant than usual shall be assigned to this service in the present session of parliament.

This will be understood, when we state, that after it became evident to us in the year 1814, that oak timber of proper dimensions for the posts and bars of lock gates, was no longer procurable on any terms, and we had thereupon determined to apply cast iron to that purpose,—no time was lost in employing skilful persons in forming models for this new application of what, from its many and increasing uses in this country, may be called a British material; and after proper experiments by the modellers and iron founders, they became able to furnish a supply from the iron-works at Butterley in Derbyshire, some part of which has already been used at Clachnasharry, and from Pontcysyllte in Denbighshire, for the Corpach district of the canal, of which none is actually arrived, though a freight is now daily expected.

Thus the respective iron foundries being now fairly in action, can furnish any quantity as soon as required; and the labour and time necessary for planking and hanging the gates, after the arrival of the cast-iron work materials, makes it desirable to us, for the regular progress and uniform completion of all the canal
works,

works, that a sum of eighteen thousand pounds should be appropriated to this expenditure on iron castings in the next ensuing twelvemonth from the date of this Report: nor will this be doubted when we state, that sixteen pairs of lock gates of this kind might at this time be hung in their respective places, if ready, no more than two pairs being as yet in action: these however serve to prove satisfactorily the facility of their motion, two men being able to open or to close them, although no water is in the lock to lighten their weight and pressure. We shall postpone any particular description of these newly invented lock gates, until their actual use shall have enabled us to state all the details.

Adding to the above eighteen thousand pounds, four thousand pounds for the current expenditure on timber and machinery of various kinds, and three thousand pounds for management and miscellaneous expenses, it will appear that no more than twenty-five thousand pounds will remain for expenditure on labour, and that we should be compelled to dismiss many of our experienced workmen, much to the detriment of the work, in case the quantity of labour should afterwards again be increased, as indeed could not fail to happen.

ESTIMATE. We have endeavoured to ascertain the total expenditure which will be necessary before the Caledonian canal can become navigable throughout; and we are of opinion, that the sum of one hundred and sixty or one hundred and seventy thousand pounds will be sufficient; and as we have twenty-five thousand pounds remaining of the last year's grant, two grants of seventy-five thousand pounds each, or three grants of fifty thousand pounds each, will amply cover the expenditure.

Being aware that our present estimate is not conformable to what might have been expected from our calculation founded on Mr. Telford's estimate of October 1813, we have called upon him to explain the difference, no change of prices having been alleged to have taken place since that time; and it appears that to his estimate of two hundred and thirty-five thousand pounds, not including payments for land and for management, we added for these purposes eighteen thousand pounds, which is so short of the truth, that the payments for land and quarry rents will probably exceed that sum: but it is obvious, that we could only venture to state the amount of valuations, and that we could not control the opinion of a jury; much less could we foresee that the intervention of any jury would become necessary, the expense of which in itself amounted to more than a thousand pounds. In effect, twenty-seven thousand pounds would not have been too much to have added to Mr. Telford's estimate, considering that the expense of management from that time may extend

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extend to six years instead of three, at the rate of about fifteen hundred pounds per annum.

Mr. Telford has omitted to add the usual ten per cent. upon engineering estimates, which is more than usually allowable in a work of unexampled dimensions, and which would have amounted to twenty-three thousand pounds; as also the expense of steam-boats for towing large vessels,—and of moorings to be laid down in the lakes, estimated together at ten thousand pounds*. Thus the estimate of October 1813 should have been two hundred and ninety-five thousand pounds; since which time one hundred and twenty-four thousand pounds have been expended, leaving about one hundred and seventy thousand pounds as the largest supposable estimate, from which ten thousand pounds will be deducted, if we succeed in placing the locks at Fort Augustus in the bed of the river Oich. A large portion of the per centage is in reserve for this contingency, but the greater part may be deemed to have been consumed in the unexpected occurrence of hard ground and rock cutting at Strone and at Muirshearlich (hereafter to be described in this Report) and in dredging operations, of which no experience existed, and which were certainly under-estimated by Mr. Telford.

STATE OF THE WORKS. Before we enter into any particular description of the present state of the works along the whole line of the canal, from Inverness to Fort William, it will be convenient to advert to certain general points of information connected therewith.

Our two superintendents have extended their care to the north and south ends of Loch Oich respectively; the deepening of the loch by dredging machinery will be assigned to the Clachnacharry establishment, because experience in that art has been acquired by them in the similar loch of Doughfour.

The communication between Clachnacharry and Fort Augustus is maintained by means of a sloop of sixty-five tons burthen, which habitually navigates Loch Ness; and we take this occasion to observe, that her voyages with an adverse wind are usually made in about twenty-two hours; that she has not yet experienced any material detention from the weather, and that the squalls of

* Mr. Telford's estimate, October 1813	-	-	£234,734
Land and damages	-	-	18,000
Management, six years	-	-	9,000
Per centage for contingencies	-	-	23,473
Steam-boats and moorings	-	-	10,000
Total	-	-	295,207
Deduct expended since October 1813	-	-	124,000
Present estimate, May 1816	-	-	171,207

wind

wind supposed to be so frequent and so dangerous, have not been found to exist in any prejudicial degree.

A smaller sloop of forty tons burthen performs similar service in Loch Lochie with respect to the Corpach establishment, and has experienced no difficulty in navigating that lake; a sloop still remains at each end of the canal, for the occasional carriage of a freight of stone or provender, and the same crews which navigate the sloops on the lakes are then borrowed for that purpose.

The circumstances attending the navigation of the Corpach sloop in Loch Eil, and the Linnhè loch, are worthy of notice, because those lochs differ in nothing from Loch Ness and Loch Lochie except in containing salt-water instead of fresh. Inspection of any map of Scotland will show that the Linnhè loch is in fact a continuation of the great valley which extends from Inverness to the Western Sea.

The Corpach sloop was built in the year 1804, and for ten years navigated these salt-water lakes without intermission, bringing free-stone from Cumbræ in the Firth of Clyde, and rubble-stone from Fassefern; lime from Lismore, and provender from Appin. In all this variety of service and length of time, neither the sloop nor any one of her crew have sustained the least injury. Indeed the facility of navigating the Linnhè loch is fully established by this simple fact;—that the freight and insurance of cargoes to Fort William from Glasgow or Ireland costs no more than to Oban or Tobermory, which are south of this Linnhè loch; into which vessels of three or four hundred tons burthen frequently run for protection, and obtain it there with such certainty, that not one has been lost since the canal works commenced in the year 1803. Large vessels of the above burthen are now built in Loch Eil, an active and intelligent shipwright having very successfully formed an establishment close to the sea entrance of the Caledonian canal at Corpach.

At the other end of the canal, no difficulty of navigation was anticipated by those who apprehended danger and detention in the lakes; and in fact the head of the Murray-frith (more properly called Loch Beauley) must be deemed a well protected harbour from Fort George to Clachnasharry.

From this statement we may venture to conclude that all former objections to navigation of the Caledonian canal have now been removed by experience; and that the advantage derivable from avoiding the dangerous passage northward by Cape Wrath and the Orkneys, will suffer no subtraction in the short and expeditious passage which will be open to vessels of all sizes when the Caledonian canal is fully opened and in use.

The absence of alternate tides, and indeed of any perceptible current

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current in the fresh-water lakes, might appear to threaten detention in calm weather; such weather however is not common in a mountainous region; and were it otherwise, we are not without expectation of giving motion to the largest vessels, by an expedient which can hardly fail of success. We here allude to the new application of the steam-engine for propelling vessels through the water; a practice which has been carried to such extent on the Clyde and elsewhere, that we have been led to consider how far any such machines might be rendered useful for saving horse-labour in towing heavy vessels along the Caledonian canal, and for occasionally assisting them in the lakes. We are not without hope that the various steam-engines which we now possess, especially two of great power, may hereafter be applied to this purpose with much advantage; and we shall cause this subject to be carefully investigated without delay.

The weather during the last twelvemonth, especially the winter half-year, has been remarkably unfavourable, as indeed appears from the daily register of the winds and weather [inserted in the Appendix, and which when it has answered its immediate purpose of showing that the winds on the line of the canal are as variable as elsewhere, may be applicable for the purposes of general information.] From the 12th October 1804 to the present time, this register has been kept at Clachnacharry, at Fort Augustus, and at Corpach, and may be relied on, especially as to the first and last of these places, for the most perfect fidelity, and as much precision as the subject admits.

We have not considered it to be necessary to repeat in the Appendix to this Report, the map which was inserted in the Report of last year; which may be referred to in reading the following description of the present state of the works along the entire line of the canal, as no alteration affecting the map has taken place.

CLACHNACHARRY DISTRICT. The present scene of operations being much confined to the Middle District, our description of the state of the works at the two ends of the canal will exhibit little variation from the Report of last year.

Beginning as usual at the Inverness end of the canal, we have to state that the entrance lock (commonly called the Sea-lock) and its gates are in a perfect condition, and that the banks which are advanced into the sea four hundred yards, in order to obtain deep water for the position of this lock, are protected from the action of the waves by a coating of refuse stone brought from the neighbouring quarry; and as far as the experience of last winter proves any thing, the safeguard is likely to be effectual.

Above the high-water mark, the continuation of these banks is of course no further necessary, and at a very small distance

was

was found a spot of indurated clay, on which the second lock is placed, and by means of it, the level of the canal becomes raised quite out of the reach of ordinary tides. The gates of these two locks are made entirely of wood, as being liable to the effects of the salt-water, and more subject than any others to be struck by vessels which enter from the sea-ward.

The temporary dam outside the entrance of the first lock has been partly removed, though not to the full depth hereafter necessary for large shipping, and the excavation of the earth between the first and second locks has proceeded to a corresponding level, so that the entrance of coasting vessels would experience no obstacle.

The Culvert, which, with a back drain, was found necessary for draining the low lands of Muirtown, has been finished, and discharges into the sea, halfway between the high and low-water marks.

The Muirtown Bason extends eastward from the Clachnacharry or second lock, terminating at the Muirtown wharf and the adjoining bridge. Here the temporary wooden bridge still continues in use; but the iron castings for completing those already prepared for the iron turn-bridge, have been shipped at Gainsborough, and probably have been landed at Clachnacharry before now; the motion of this bridge, and of all others on the Caledonian canal, will be horizontal, constituting what is usually called a turn-bridge, as distinguished from a draw-bridge, which is raised vertically.

The four Muirtown locks being connected together, as well as with the bridge and wharf, will require no more than five pairs of gates, each pair consisting of two leaves or valves, as usual. Of these the upper pair is finished, and as being more exposed to concussions than the others, is wholly made of timber; this upper lock gate is hung in its place, and has been caulked and pitched. Two of the other gates below (both of the iron-framed kind) are also finished and hung in their respective places; one leaf of the fourth gate is set up and is now receiving its planking; the iron castings for the fifth and last lock-gate are arrived, and all the five Muirtown lock-gates will be ready for use before the end of July next.

From this place to the bridge at Bught, distant above a mile, the canal is finished; this bridge, like that at Muirtown, awaits the iron castings, which will furnish means for substituting an iron turn-bridge in place of the wooden bridge now in use. Half a mile southward from this bridge the canal takes a more westerly direction under the steep hill of Torvaine: the operation by which the river Ness was diverted from its former bed for the length

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length of half a mile, to make room for the canal and the canal bank, has been described in our third Report; and the public road has since been turned from the confined and dangerous situation which it heretofore occupied between Torvaine and the river Ness; it now passes behind the hill, thus avoiding danger, and shortening the distance, at the expense of a moderate acclivity: for these purposes the new road extends nearly to the burn of Doughfour.

We shall not repeat our former Reports as to the operations which have secured the course of the canal from Torvaine to the regulating lock, a distance of nearly three miles, throughout which the canal is complete, and awaits only the admission of water to become navigable.

The foundations of the regulating lock were of necessity laid close to the river Ness, whose ordinary level was about twenty feet above the necessary excavations for the lock pit: this difficult task having been accomplished and the masonry afterwards completed in July 1814, the lock gates ought to have been hung long since; but by an unlucky mistake in freighting vessels from Gainsborough, part of the cast-iron materials for the lower gate is not arrived, though now daily expected. The upper gate is in its place complete, and affords security against the occasional floods of the river Ness, which might otherwise by breaking through the dikes above, rush into the yet unfilled canal, very much to its injury.

The process of deepening Loch Doughfour and the passage which connects it with Loch Ness, is highly important, and was contemplated with some anxiety until the successful operation of our dredging machine had been ascertained, as mentioned in our last Report. The entrance of the canal from Loch Doughfour we described to have been then cleared to a sufficient depth for small vessels, and since that the shallows near Castle Spiritual have been the chief scene of operation; the result of which is that ninety thousand tons of gravel have been lifted and removed within the last twelvemonth, and thereby a passage of nine feet depth is now open into Loch Ness. The most improvable river channel was found to be on the west side of the Gravel island, so that it became necessary to remove a part of the point of land on which the ruins of Castle Spiritual will continue to stand close to the brink of the deepened water.

A depth of nine or even of ten feet will appear very inadequate for the passage of large shipping into Loch Ness; but not only the channel will be more regularly deepened before the dredging machine is removed to the Middle-District, but the formation of a dam across the river at the lower end of Loch Doughfour will maintain

maintain that loch at a high level, and afford the twenty feet depth of water which is to be established throughout the Caledonian canal.

At present nothing hinders coasting vessels from navigating into Loch Ness from the sea except the want of the lower gate at the regulating lock, and two lock gates at Muirtown. Our own sloops, one of which is now on Loch Ness, one at Clachnacharry, will be the first to profit by the opportunity, and will convey materials to the works in the Middle District at a much less expense than at present; and no doubt coal and lime for the district of Strath-herrick will be imported largely, and landed at the pier of Farigag, constructed for this purpose at the termination of the Inverfarigag road.

MIDDLE DISTRICT. At the upper end of Loch-Ness exists the only considerable obstacle we have to encounter; for all the other works require merely labour applied to objects wherein from experience we expect no extraordinary difficulty to occur. But at Fort Augustus a situation is to be found for the chain of four locks, or rather for the lowest lock of the four; for that once finished and a drainage thereby established, the upper locks may be constructed with certainty of success. The situation in which our attempts have hitherto been exerted is at the small island about two hundred yards above the bridge, or twice that distance from Loch Ness. It was not difficult to turn the river course wholly to the north side of the island by means of proper dams; but when this had been effected, the island itself was found to be so penetrable by water that even a steam-engine pit could not be sunk without the greatest difficulty.

It was accomplished however to the requisite depth of twenty-eight feet, soon after the date of our last Report, and preparations for affixing the great steam-engine were forthwith put in progress: the necessary piling and platform was finished and the engine-house erected last autumn; and since the weather has permitted masonry-work to proceed in the present season, the two large boilers have been fixed, and the cylinder, working-beam and cisterns are now placed in their proper situations. This great steam-engine, whose cylinder is four feet in diameter, will begin to work immediately, that is before the end of June; and as its power is that which is inadequately* computed to be equal to that of thirty-six horses, it will lift and discharge an immense quantity of water; we hope sufficient to permit the lock-pit to be sunk, and the future masonry in it to proceed

* This manner of estimating the power of steam-engines is understood to express the *power* they are capable of exerting; but as they may be made to work throughout the twenty-four hours, they do much more *work* than the number of horses at which their power is estimated.

without

without molestation. Still we have another engine of twenty-horse power, which if necessary may be brought from Corpach, and in the last resort the locks may be placed on the rocky bank north-side of the river Oich. This event however may be contemplated as extremely improbable.

Until the precise situation of the locks at Fort Augustus can be determined, the course of the canal immediately connected with them must also remain unsettled; for which reason no commencement of excavation has yet taken place in the Government land, which extends six hundred yards above the River island whereon the great steam-engine is erected, and by the south-side of which the lower lock will be placed. The four connected locks will occupy a space of two hundred and sixty yards in length.

Beyond the march or boundary between the Government land and the Lovat property, the canal has been carried on to completion for the space of four miles, excepting only the Cullachie lock, and the additional earth-work which became necessary from the change of its situation described in our last Report. It is remarkable that the rock on which this lock is built, is found to extend no further than was necessary for the purpose. The masonry of the lock itself is nearly complete, and the walls of the recess below the lock are commenced, the lower platform having been bolted down to the solid rock.

The Glengarry property intervenes between Lovat's southern boundary and Loch Oich, and in this space, about one mile and an half in length, the canal is not commenced, the attention of our superintendent in this part of the line being at present occupied in preparing a dredging barge for clearing a passage through Loch Oich. This operation, though from our experience in Loch Doughfour we may now pronounce it to be sure in effect, is slow in execution, and unless speedily commenced in Loch Oich, the navigation of the whole canal may perhaps be retarded by this obstacle when all others are removed. For this reason the carpenters began to work on the dredging barge in November last, and she is now ready for caulking. The dredging machine which is destined to float in this barge is in store at Bona, and will be brought up Loch Ness when necessary. We have reason to expect that this engine is on an improved construction in comparison with that now at work in Loch Doughfour, advantage having been taken of the experience there acquired. Four discharging boats or punts, which must be in constant attendance on the dredging barge, are in preparation at the north end of Loch Oich.

At the south end of this loch, which is almost four miles in length, the excavation is commenced, and for the first seven hundred

hundred yards is as deep as the summer level of the water in Loch Oich; for the next five hundred yards the ground is opened, but the excavation is not so much advanced. At the termination of this twelve hundred yards, is the summit of the Great Valley, which is occupied by the Caledonian canal and by lakes from Inverness to Fort William. Here for three hundred yards in length the ground is not yet opened; but from thence to Loch Lochine, nearly a mile, there is no interval in the excavation, which in this space averages at about eleven feet in depth. In the deep cutting at the summit of the land, horse-labour will be required for removing the earth, and a wood-framed stable with a barn have been erected, sufficient to contain eight horses and a store of provender.

Between Loch Oich and Loch Lochie one-third part of the excavation is finished.

CORPACH DISTRICT. We have had occasion to state in our former Reports, that the level of Loch Lochie will be raised several feet when the canal at the head of the loch is ready for use, and the regulating lock which is to be placed there, has been completed, and its gates hung. The river Lochie, which issues from the lower end of the lake of the same name, will then be turned into the new bed prepared for it at Mucomer, and the regulating lock adjacent to the present bed of the river will serve to dam up the passage of water and raise the present level of the lake.

This lock is in a state ready to receive its gates; at a short distance below it, the south bank of the canal is placed in the bed of the river Lochie, which is made to take a new passage outside the canal bank; but the excavation necessary for this purpose at the confluence of the rivers Spean and Lochie, has not produced earth enough to finish the southern bank of the canal, which for the space of two hundred yards remains to be raised eight feet in height by means of earth brought across the canal from the high ground north of it; and this is now in operation. The outside of the canal bank which is washed by the river, required some protection, which has been afforded by a coating of rubble cut out of the bottom of the canal. The rocky nature of the ground was indeed the reason for placing the canal in the former bed of the river. From this place through the farms of East-Moy, West-Moy, and Eræht, two miles in length, the canal is completely finished, comprehending the back drain for intercepting the mountain brooks, the inlet of five arches at Moy, the outlet, and the masonry abutments of Moy bridge.

The last and easy operation of puddling, or rendering water-tight the banks of the canal over the great aqueduct of Loy is

now in progress; but the rocky ground at Strone is not yet all removed, still remaining nine feet deep for the space of one hundred and sixty yards in the bottom of the canal. From Strone to Muirshearlich, a full mile, the southern bank of the canal is formed of earth brought from the deep cutting of the latter place, which has been a very tedious and expensive operation, and will not be finished until the close of the present season. Last year we had reason to form the same expectation; but the earth near the bottom was unexpectedly found to be unusually hard, and the weather has been extremely unfavourable for this kind of work from the beginning of November almost to the present time. The action of the horses which remove the earth by means of rail-ways, becomes circumscribed as the work draws towards its close, and their number is consequently diminished from thirty to twenty-three; they are the property of the contractor, and maintained by him.

From the deep cutting at Muirshearlich through Shangan, Upper and Lower Banavie, to the chain of eight locks, a space of two miles, the canal is perfectly finished; as also from the chain of locks to the sea entrance at Corpach, about a mile distant, including therein the two Corpach locks and the bason between them and the sea entrance.

The whole of the masonry of the five several aqueducts of Loy, Muirshearlich, Shangan, Upper Banavie, and Lower Banavie, with the road-ways under each of them, remain as before reported, perfect and uninjured by floods or other accidents. The great chain of locks rising from Corpach Moss, and the two Corpach locks, require only the addition of lock-gates for their completion. The sea-lock, with its gates, which are of wood, is quite ready for use; but the coffer-dam which surrounds the entrance from Loch Eil cannot be removed until the lower gate of the Corpach locks is hung, the bottom of the platform there being four feet lower than the level of low water in Loch Eil. The iron materials for these gates are now daily expected, having been prepared at Pontcysyllt in Denbighshire, and embarked at Chester.

It remains to be mentioned that in the Corpach district we have caused to be planted at Upper Banavie, at the chain of locks, and near Corpach, not less than a hundred thousand seedlings of fir and larch and thirteen thousand young trees in the present spring; and we shall not fail to plant the entire banks of the canal as fast as we acquire means of protecting the young trees from injuries of every kind.

PURCHASE OF LAND. We have much satisfaction in stating that by the payment of eight thousand pounds with the interest due thereupon, to Colonel Macdonell of Glengarry, in full for the land

land purchased of him at the two ends of Loch Oich, our transactions relative to the purchase of land have been terminated.

The amount of rent to be paid by us for the Redcastle quarry is to be determined under the direction of the court of session by William Fraser Tytler, esq. sheriff depute of the county of Inverness.

ACCOUNTS. The amount of our expenditure to the end of April 1816, appears to have been five hundred and ninety-four thousand pounds; twenty-five thousand pounds in full of the grant of the last session of parliament is now payable to us at His Majesty's Exchequer.

The account inserted in the Appendix is similar to all our preceding accounts; and the series is in such form as to embrace an extensive classification, and always to show the expenditure of the preceding twelvemonth, as well as of the total expenditure to the present time.

Mr. Telford's accounts and vouchers have been examined and passed by our accountant to the 12th day of August last; every part of our expenditure which does not pass through Mr. Telford's hands, is paid by ourselves, and audited under the direction of the Lords Commissioners of the Treasury.

May 17, 1816.

CHARLES ABBOT.
N. VANSITTART.
W. GRANT.
CASTLEREAGH.
MELVILLE.
BINNING.
CHARLES GRANT.
I. H. BROWNE.

XVI. *A few additional practical Observations on the Wire-Gauze Safety-Lamps for Miners. With some Evidence of their Use.* By Sir HUMPHRY DAVY.

I HAVE already published an account of the researches which led me to discover that explosion and flame are incapable of passing through tubes and apertures, which are nevertheless very permeable to both light and air, and I have described several contrivances for lighting coal-mines, in which inflammable air is disengaged, all founded on the same principle of security.

The lamp which has been found most convenient for the miner, is that composed of a cylinder of strong wire-gauze fastened round the flame by a screw, and in which the wick is trimmed by a wire passing through a safe aperture.

Lamps of this construction have been commonly used in the