

The construction of Aberdeenshire's first turnpike roads

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Construction of the first turnpike road in the shire county of Aberdeen in the north-east of Scotland commenced in 1796.¹ This was more than 130 years after the establishment of the first turnpike trust in England and over forty-five years after the first turnpike gate in Scotland had been erected on the road between Edinburgh and Glasgow. The initial impetus to road building in the county continued for some fourteen years before being resumed later, to a lesser extent, during the third and fourth decades of the nineteenth century, with the final turnpike road being completed in 1855.² It is hoped, using the arguments presented, to show, because a considerable knowledge of road construction had been accumulated by the time turnpike roads were built in Aberdeenshire, that they were more soundly and economically constructed than earlier turnpikes

This thesis will be tested on data pertaining to those Aberdeenshire turnpikes constructed before 1810 and will be considered from five standpoints: Aberdeenshire roads before 1796, the administration of the turnpike trusts, the topography of Aberdeenshire, local road construction practice, and the supervision of road construction. It will also be tested against relevant data published in the *Edinburgh Encyclopaedia*³ and the observations of contemporary writers.

First it is necessary to establish the physical and theoretical criteria and the limits to be considered in argumentation. First, the roads to be considered all lay within the boundaries of the old county of Aberdeenshire as it existed before it became a part of the Grampian Region. Whilst concentrating on events in Aberdeenshire, reference will be made to road conditions and construction in the adjacent counties of Kincardineshire and Banffshire which formed the sparsely populated land mass of north-east Scotland. Second, the emphasis of this article, unlike some previous studies of turnpike roads,⁴ will be aimed primarily toward the engineering aspects of road construction, with the administration of road trusts being considered only where it impinged directly on engineering matters. Third, local road construction practices, established from archival sources, will be compared with those specified by Telford and McAdam, and with those used previously for the construction of roads in other areas of Britain.

Aberdeenshire roads before 1796

The turnpike roads of Aberdeenshire, as in other regions of Britain, were superimposed over a network of local parish roads. The condition of these roads, maintained in repair by statute labour, was the subject of comment that ranged from praise to condemnation, the latter being the most usual. Comments by parish ministers about the condition of local roads were recorded in *The Statistical Account of Scotland*, and whilst they may not be entirely accurate they do give an indication of the contemporary state of parish roads. At Kintore, Aberdeenshire, it was reported that 'The roads are better in this parish than in many parishes around, as we have much sand and gravel for making them' and at Crimond that 'the work was always too superficially performed'.⁵ In the neighbouring parishes of Fettercairn and Dunottar, Kincardineshire, it was noted that the roads were 'in excellent condition' and that 'no highways in Scotland are in worse condition'.⁶ The minister of the parish of Grange, Banffshire, wrote, 'the roads are in wretched repair'.⁷

The comments about the state of the parish roads in north-east Scotland were largely adverse, and were echoed by colleagues with parishes in the lowland agricultural counties as far south as the border with England. North of the Firth of Tay in the counties of Angus and Perthshire where turnpike and post roads were then under construction the comments about parish roads were generally negative. In the parish of Glenisla the minister noted that the roads were in bad condition and would remain so until a competent overseer was appointed, and at Monikie the roads were described as 'not in the best condition' and 'in bad weather almost impassable'.⁸ At Errol in Perthshire, on the north bank of the river Tay, it was recorded that 'This parish has always had a bad name for roads', and because they lacked repair they soon became 'unpleasant, if not impassable'.⁹ It was hoped that the repair of the post road from Perth to Dundee and the construction of a new turnpike would result in improvements to roads in the parish.

The introduction of turnpike roads into the Lothians and the counties that lay between Edinburgh and the border did not always provide a stimulus to the improvement of parish roads. At Haddington, it was reported, 'many of the bye roads are in very bad repair, owing to the nature of the soil, which is generally clayey',¹⁰ and before 1770 the roads in the parish of Humbie had been bad and impassable but they had been improved when the proceeds of a locally levied ploughgate tax was used to fund repairs.¹¹ At Lauder, Berwickshire, the situation was better, and turnpikes, parish roads and bridges were kept in good repair by the application of toll and commutation money.¹²

In those English counties dominated like Aberdeenshire by agrarian interests, contemporary descriptions of parochial and turnpike roads were as varied as those of their counterparts in north-east Scotland. In Cumberland they were described as being 'in general very good'¹³ but in the North Riding of Yorkshire the parochial roads in Ryedale were considered to be 'in as bad a state as possible' and those in Cleveland to be amongst the best of their type.¹⁴ Farther south, in the Lincolnshire wolds, the roads were thought to

be 'for a greatest part of the year, in a good state' but in some places 'nearly impassable in Winter'.¹⁵ In Devonshire the turnpike roads near Exeter were described as being the best in England whilst the condition of the adjoining parish roads was considered to be indifferent.¹⁶ This synoptic view of the condition of parish roads in the counties of Scotland to the south of Aberdeenshire and in England suggests that the condition of the parish roads in Aberdeenshire, when turnpikes were introduced in the county, was similar to those elsewhere in Britain.

In addition to parish roads, the Aberdeenshire turnpike roads overlaid two other road formations – drove roads and military roads. In reality the first were not roads but a set of tracks, generally in a north–south direction, along which cattle, reared on the pasture lands of northern Aberdeenshire and Banffshire, were driven south to markets in Angus.¹⁷ Because of the nature of driving activities these tracks tended to be remote from urban and industrial centres, and they were not used by other commercial interests.

The second category may be divided into roads that were either built by or kept in repair at the expense of the military.¹⁸ The former are usually associated with the Highland areas of Scotland, where such roads were built by military personnel to give access to the garrisons stationed in the Great Glen rather than for social and commercial use by the local population. However one of their number, the Lecht road, from Blairgowrie, Angus, to Fort George on the Moray Firth, completed in 1755, passed through the western extremities of Aberdeenshire and Banffshire. Besides this road, there were four roads in the north-east of Scotland maintained in repair at the expense of the military authorities. These had a total length of 229 miles.

The military roads, generally constructed 16 ft wide, with a gravel roadway, were not well engineered. Direction was the military engineer's chief concern, little account being paid to the severity of gradients, so that they were suitable only for the able-bodied. For the military with an ample supply of draught animals the roads offered few problems but for the less able the steep ascents from a valley floor over high passes were taxing. The administration of the military roads remained largely outside the remit of civilian authorities.

In Scotland, during the eighteenth century, two sets of appointees, the Commissioners of Supply¹⁹ and the Justices of the Peace, became jointly responsible for the maintenance of roads and bridges. The fiscal control exercised by the commissioners allowed them to make contributions towards the upkeep of the military roads and made them the dominant body that controlled the improvement of parish roads that formed part of long-distance routes. Local legislation passed in Aberdeenshire during the eighteenth century shows that efforts were made to improve the condition of roads. In 1721 Alexander Jaffray, laird of Kingswells, was appointed 'General Surveyor of all the highways, causeways and Bridges within the countie', and was instructed to determine what work necessary to maintain highways could not be performed adequately by parish authorities. In 1739, to improve the condition of their part of the important road from Aberdeen to Inverness via the town of Inverurie and the district of Strathbogie (Huntly), the commissioners

ordered that the road should be divided into sections and nominated local landowners to become responsible for the 'management and direction' of specific sections of road adjacent to their estates.

The commissioners continued to promote improvements to the parish roads, and in 1741 they recommended that a layer of 'small stones and Chingle' be applied on some rural roads, and that this layer should be certified as being 6 in. thick before any payment was made. In 1756 it was decided that all roads should be a minimum '20 ft in breadth' and that the metalled surface of the roads should 'be raised in the middle so as water might run off them'. These physical efforts to improve the parish roads seem to have been ineffective, and in 1759, for the purpose of road repairs, the commissioners amalgamated the parishes into districts. The districts, analogous to the presbyteries of the Church of Scotland, then appointed suitably qualified individuals to oversee road repairs.²⁰ Ninety years later the returns for the statute labour trusts in Aberdeenshire show that the eight districts into which the county had been originally divided were responsible for 1,751 miles of road.²¹

Thus there was, before 1769, when a proposal for the introduction of turnpike roads was discussed at a meeting of the Commissioners of Supply for Aberdeenshire, an attempt to introduce a more ordered system of road construction and maintenance into the county. Discussion at this meeting arose from the consideration of a similar proposal by the commissioners for Kincardineshire. A disagreement arose between the two sets of commissioners about the introduction of tolls on the Bridge of Dee–Stonehaven road. This road, the main highway to the south from Aberdeen, was free of toll, and Aberdeen town council had agreed to keep the road in repair with the assistance of statute labour from adjacent parishes. The commissioners for Aberdeenshire instructed their Member of Parliament to oppose any application by the commissioners for Kincardineshire to construct turnpike roads in their county unless travel along the road to Stonehaven remained toll-free.²² It was twenty-six years before turnpike roads were introduced into either county. Thomson, writing in 1800 about the previous introduction of turnpike roads into Fifeshire, succinctly described the attitude to the erection of toll gates that was held in Aberdeenshire and throughout Britain, and noted, 'prejudices are commonly entertained against such practices as are new and unusual, especially if they shall touch the pocket'.²³

When the Commissioners of Supply for Aberdeenshire thwarted their neighbours' proposals to construct turnpike roads in Kincardineshire no turnpikes had been constructed in the counties north of the Firth of Tay. As the condition of many parish roads in Aberdeenshire was unsuitable for use by wheeled vehicles, journeys, both social and business, were made on horseback. Large heavy items were either carried on primitive carts or dragged on sledges, and loose bulk materials were carried in panniers on horses.²⁴

In 1755 a thrice-weekly post service between Aberdeen and Inverness was inaugurated, with the riders completing the journey in twenty-four hours, and a regular coach service, operating three times a week, between Edinburgh and Aberdeen commenced operation in 1781. The latter had a journey time of

thirty-six hours, and travellers wishing to proceed farther north could use the twice-weekly 'fly' that ran from Aberdeen to Inverness, a journey of two days.²⁵ In 1789 communication with the south was improved by the introduction of a mail coach that ran between Edinburgh and Aberdeen, but the coach still took three days to complete the journey.

The introduction of this service was preceded by a request from the Post Office that the roads and bridges on the proposed route be put 'in a proper state of repair'. This may have been one stimulus to the introduction of turnpike roads in Aberdeenshire but there were others. Writers in *The Statistical Account of Scotland* drew attention to the profits to be made by both landowners and merchants from the introduction of turnpikes, the former benefiting from the increased value of their estates and the latter from the ease and reduced cost of transport.²⁶ The greatest stimulus to road improvement probably came from the landowners themselves. The second half of the eighteenth century saw substantial changes in the agrarian practices employed in north-east Scotland, consequent on the need to increase the profitability of the great estates. For this it was necessary to provide a road system for the transportation of agricultural produce, fertiliser, coal and goods manufactured in the planned settlements built by landowners.²⁷ Besides the increased value of their estates landowners would have hoped, as the major investors in the turnpikes, to benefit from the revenue provided by the tolls.²⁸

The administration of turnpike trusts

It is prudent to acknowledge the differences between the administration of the Aberdeenshire road trusts and the trusts responsible for the construction of earlier roads in other areas of Britain. Whilst there were common factors, there were significant disparities. A majority of early turnpike trusts took control of poorly maintained parish roads and proceeded to repair them. In north-east Scotland, although some existing lines of road were turnpiked, new lines of road were constructed, and existing roads adjacent to the newly constructed turnpikes were closed.

In 1793 the Commissioners of Supply for Aberdeenshire, following the county-wide strategy for the improvement of parish roads noted previously, considered a proposal to introduce turnpike roads to the county,²⁹ and two years later they obtained parliamentary authorisation to proceed.³⁰ Parliamentary Acts were subsequently obtained for the construction of turnpike roads in the neighbouring counties of Kincardineshire (1796)³¹ and Banffshire (1804),³² and an amending Act was sought for Aberdeenshire (1800)³³ to include the construction of further lines of road which were considered to be 'in bad Repair, narrow, incommodious and dangerous to Travellers'. Details of the Aberdeenshire roads specified in this legislation are given in Table 1.

In the eighteenth century it was usual for individual roads to be turnpiked under separate legislation, and for main routes between towns and cities to be created by the interconnection of adjoining lines of road to form a single

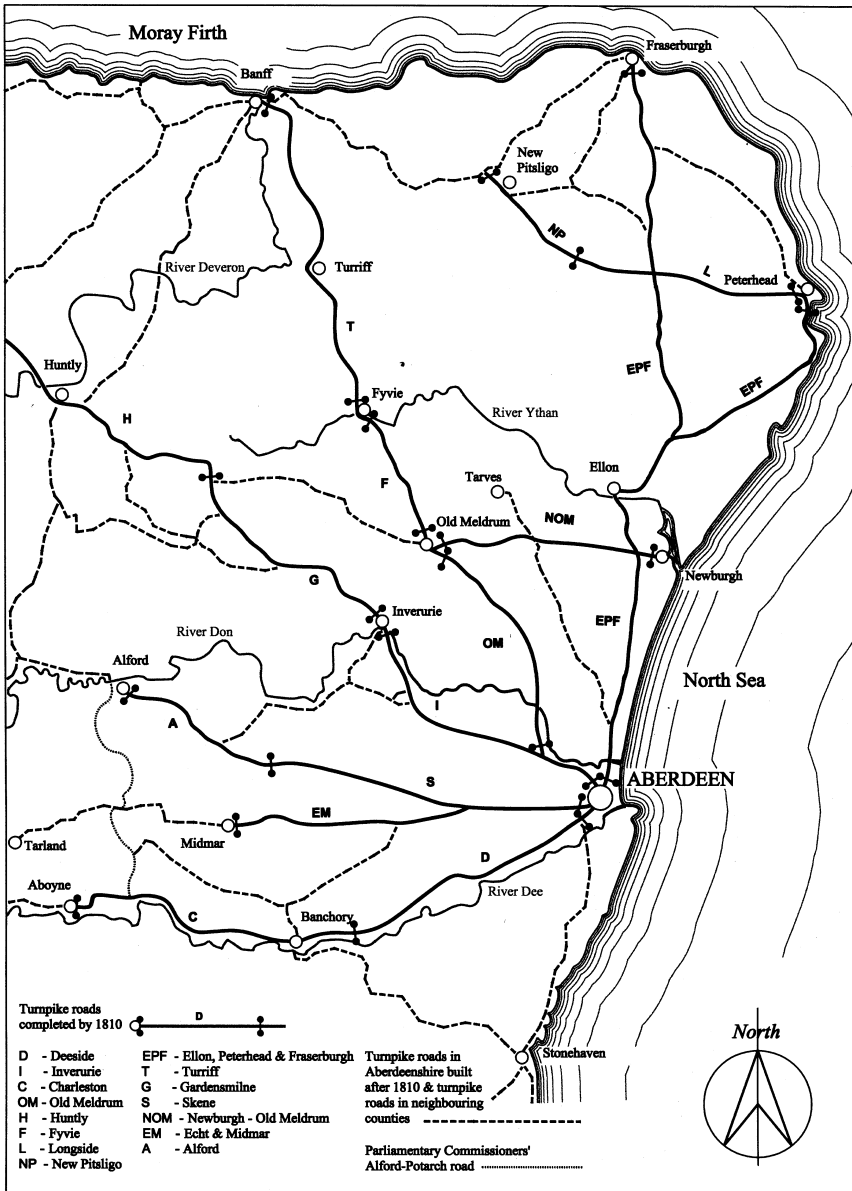


Figure 1 Turnpike roads in Aberdeenshire, 1798–1810

conduit.³⁴ In north-east Scotland, with the exception of the Banchory–Stonehaven road in Kincardineshire, a two-tier administrative system, comprising county and local road trustees, was used to control the construction of turnpike roads. Like their predecessors the Commissioners of Supply, the Aberdeenshire county road trustees, whilst maintaining overall control of the turnpike roads, subdivided the main highways through the county into a

Table I Mileage of Aberdeenshire turnpike roads constructed before 1810

Name of turnpike	Year opened	Length		
		Miles	Furlongs	Yards
Deeside	1798	13	4	0
Ellon, Peterhead and Fraserburgh	1799	52	4	0
Inverurie	1800	15	4	0
Turriff	1802	20	6	0
Charleston	1802	16	6	120
Gardensmilne	1803	13	2	0
Old Meldrum	1803	14	1	14
Skene	1803	17	4	0
Huntly	1804	22	0	0
Newburgh–Old Meldrum	1804	11	1	209
Fyvie	1806	7	6	73
Echt and Midmar	1807	13	2	97
Longside	1807	12	0	0
Alford	1810	8	4	0
New Pitsligo	1810	7	4	0
Total mileage		246	2	73

Source W. Alexander, *Northern Rural Life* (reprinted 1981), p. 173.

number of local trusts. A local trust became a semi-autonomous body responsible for the construction, maintenance and finances of its length of road whilst still being answerable to the county road trustees.³⁵

The organisation of the county road trusts in Aberdeenshire was not unique. In Devon a movement to decentralise administration occurred over forty years earlier when the Exeter turnpike trust, which controlled 'some 150 miles of road' that radiated from the city, subdivided its large number of trustees into groups to supervise work on specific lengths of road.³⁶ The roads of the Aberdeenshire turnpike trust, like those of the Exeter trust and a number of trusts in Devonshire, were 'centred on a town rather than operating over a stretch of road'.³⁷ A more usual radial development of turnpike roads centred on a town is typically shown by the situation that occurred at York, where there were 153 miles of turnpiked road leading into the city, controlled by seven trusts.³⁸ The significant differences between the Exeter and Aberdeenshire trusts were that the former had many hundred trustees who were concerned with the repair of existing roads whilst the latter had significantly fewer trustees who were engaged with the construction of new lines of road.

There was a general assumption, throughout Britain, that property ownership was the only qualification required to become a turnpike trustee. Aberdeenshire was no exception, and the road trustees qualified by the value of the property they held.³⁹ At the end of the eighteenth century land in Aberdeenshire was owned mainly by a small number of proprietors who had large estates, so that in the remoter areas of the county few persons were able to qualify as road trustees. Whilst this might encourage homogeneity of interest and alleviate disagreement in the furtherance of a road, it might also prevent the necessary quorum being present to conduct business at meetings

of trustees. To simplify and secure the administration of local trusts the county road trustees, in a manner used previously by the Commissioners of Supply, nominated three local road trustees, as a quorum, to agree contracts for the construction of roads on behalf of their fellow trustees.⁴⁰

Charles Abercrombie,⁴¹ a leading Scottish road surveyor, was responsible for setting out the lines of the Aberdeenshire roads that were named in the parliamentary legislation, and in this respect he laid out an integrated network of turnpiked highways throughout the county. Later he acted as arbiter when the line of a road was disputed and liable to alteration.⁴² The routes described in the Acts of Parliament allowed a degree of flexibility by merely naming the towns or listing the parishes through which the roads would pass. Keith divided the Aberdeenshire turnpikes constructed before 1811 into four main lines of road that radiated to the west and north of the city of Aberdeen: along the valley of the river Dee, to the Aberdeenshire towns of Alford, Peterhead and Fraserburgh, and to Banffshire. Besides these roads there was a short length of turnpike that connected the city southward with the Brig o' Dee and Kincardineshire.⁴³ He noted that 'Above 300 miles of turnpike have been made out since 1796, or will be completed in the course of a few months.' This figure for the mileage of turnpike roads then constructed in Aberdeenshire is considerably higher than that (246 miles) quoted in Table 1. It is possible that both were inflated.⁴⁴

The topography of Aberdeenshire

The terrain of north-east Scotland across which the system of turnpike roads was built is, with few exceptions, open and level. It is intersected by a number of fast-flowing rivers, liable to sudden spate, that flow either eastward into the North Sea or northward into the eastern extremities of the Moray Firth. Before 1770 only a few medieval bridges spanned these rivers, but, with the introduction of wheeled vehicles, a number of bridges were built in the last decades of the eighteenth century to span the rivers Dee, Don and Ythan. The turnpike roads were aligned to make use of the existing bridges, which were generally free of tolls and sited near towns.⁴⁵ The construction of these bridges, few in number, was usually financed by the Commissioners of Supply and by local subscription, and in many instances the upkeep and repair of the bridges was taken over by the local trust whose road crossed the bridge.⁴⁶

Besides benefiting from the favourable terrain, those promoting and building turnpikes were able to make use of abundant supplies of good-quality road-making material, locally available, in the form of either hard igneous rock, described generically as 'granite', or river gravel. These two materials were used exclusively but gravel was acceptable only when locally sourced granite was unavailable.⁴⁷ By the end of the eighteenth century the quarrying of granite for building construction had become well established throughout the north-east of Scotland.⁴⁸ Besides the nucleus of large quarries close to Aberdeen there were many small quarries and local granite outcrops that

were worked sporadically for masonry of lesser quality. As the friable rock near the surface had to be removed before any body of granite suitable for building masonry could be worked, there was a considerable quantity of waste material which, together with the pinnins obtained as masons worked the granite, was suitable material for road construction. To this source was added the vast quantity of stones removed from fields during agricultural improvements to the great estates. Pawson has noted that expenditure on road repairs was largely due to the acquisition and the transportation of materials,⁴⁹ but in Aberdeenshire these costs were less significant than in areas where suitable road-making materials were scarce. They were partially offset by the cost of breaking hard granite rock to appropriate dimensions for road making.

It is difficult to establish what effect the use of broken granite had on the cost of road construction in Aberdeenshire. Keith states that the turnpikes built in the county before 1811 cost £350 per mile,⁵⁰ whilst Alexander quotes a cost of £394 per mile.⁵¹ Examination of data in the minute books of the local turnpike trusts shows that the prices for the construction of roads using broken rock varied between £212 and £390 per mile. If gravel was used as the construction material prices ranged from £150 to £170 per mile.⁵² These costs did not include the formation of cuttings and embankments, building drains beneath a roadway or the construction of boundary walls and bridges. The construction of the Ellon turnpike to the north of Aberdeen was let in two contracts, which, when the construction of the bridges on the line of the road was included, resulted in a construction cost of £312 per mile.⁵³ Besides the additional costs noted previously, the cost of the ground taken for the road should be included. If this cost and those noted earlier were added to the cost per mile of the Ellon road it would appear to establish the veracity of the construction cost quoted by Alexander.

The writer of the article 'Roads' in the *Edinburgh Encyclopaedia* balanced the importance in road construction of the line of direction and the line of draught (inclination) and argued that where possible roads should be level, steep gradients should be avoided and 'undulating' roads should not be constructed. A view with which earlier writers concurred. Tuke, a professional land surveyor, writing about roads in the North Riding of Yorkshire, noted that 'little ingenuity is shewn in many instances in avoiding hills' and described the Saltergate to Whitby road as 'one continued steep ascent or descent'.⁵⁴ Vancouver bemoaned the fact that on the Barnstaple to Chumleigh road in Devon travellers were 'compelled to ascend and descend the sharpest hills in the county'.⁵⁵ This situation did not prevail in Aberdeenshire, where the topography was favourable to the construction of roads with easy gradients. This applied particularly to the main lines of turnpike road constructed before 1811, with the exception of the road from Aberdeen to Banffshire via Inverurie and Huntly. Between these towns the traffic had to negotiate a long, shallow incline and descent where the road crossed Gartly moor. Of early roads in north-east Scotland it was only in Kincardineshire, where the road between Stonehaven and Banchory crossed the eastern foothills of the

Grampian mountains, that a turnpike had to climb steeply from sea level to cross high ground before dropping again to the valley of the river Dee.

Only a few comments about road gradients are noted in the minute books of the local road trusts. On the Deeside road the maximum gradient was 1 in 31 and most other gradients on this line of road were nearer 1 in 40.⁵⁶ A similar situation pertained on the Newburgh – Old Meldrum turnpike, where it was stated, ‘no rise will be occasioned beyond one foot in thirty’.⁵⁷ On the Skene road the trustees were prepared to amend the line of their road so that ‘the greatest Elevation . . . now proposed will not exceed one foot in Twenty five upon a very short space’.⁵⁸ Only in one instance did the gradient of the Marnock road exceed 1 in 20, and on this road that crossed from Huntly, Aberdeenshire, into Banffshire other gradients were significantly less.⁵⁹ The magnitude of these gradients largely mirrored the directions given to the surveyors responsible for the construction of the roads in the county of Angus, who ‘were directed, if possible, not to admit of a rise of more than one foot in 20; but except in impossible cases, no road should have more than one foot in 30 of rise’.⁶⁰ Later Telford, as engineer for the construction of the road between Glasgow and Carlisle, specified a ruling gradient of 1 ft in 30 ft.⁶¹

It must not be assumed that road trusts were always biased towards a reduction of gradient. The trustees of the Inverurie road amended the line of their road so that it climbed over the southern slopes of Tyrebagger hill on a revised line surveyed by Thomas Fletcher rather than follow the more level but less direct route adjacent to the river Don proposed in Abercrombie’s parliamentary survey.⁶² By their decision the trustees altered the line of their road to follow the existing line of communication between Aberdeen and Huntly. An opposite situation occurred on the Slug road, where, whilst maintaining the line of their road, the trustees decided that to reduce the gradient at the summit of the road it ‘should be cut down Eight feet Perpendicular’.⁶³ These examples may not give a comprehensive picture but they do indicate that, on the relatively level terrain of north-east Scotland, attempts were made to limit the gradients of turnpike roads.

Gerhold has categorised a good road as being ‘smooth, hard and level’ whilst a bad one was ‘muddy and hilly’, and states that the latter were more subject to wear, and increased the cost of transport.⁶⁴ With the local topography and the good road-making materials available in the county it appears that the trustees of Aberdeenshire’s proposed turnpikes could expect that their new roads would be suitable for contemporary traffic. Much of this was agricultural in the form of farm waggons transporting grain and produce to nearby ports and returning inland with lime and coal. The transportation of goods to and from north-east Scotland had traditionally been by sea, and it was to the local ports that the new system of turnpike roads gave access. Two of Aberdeenshire’s major products, timber and granite, were transported short distances by road, so that roads, particularly those adjacent to granite quarries, were liable to suffer local damage.⁶⁵

Local road construction practice

Keith noted that the Aberdeenshire turnpikes were ‘generally 40 ft in all’ and had a central metalled roadway 14 ft wide.⁶⁶ This generality is confirmed by reference to the Sederunt Book of the (Aberdeenshire) Turnpike Trusts and the minute books of the local road trusts.⁶⁷ There were variations in the width of the carriageway of two roads adjacent to Aberdeen, where it was necessary to accommodate an increased number of heavy vehicles that originated from local granite quarries. In these locations the width of the roadway of the Inverurie road was made 16 ft wide⁶⁸ and that of the Skene road 18 ft wide.⁶⁹ On some of the less trafficked roads remote from Aberdeen, whilst the metal beds remained 14 ft wide, the overall width was reduced.⁷⁰

In comparison with these dimensions, those of Telford’s Glasgow–Carlisle road were 34 ft wide, with a roadway 18 ft wide, and the Lanarkshire roads 30 ft and 15 ft respectively.⁷¹ The dimensions of the Aberdeenshire roads did not quite meet the criteria specified in the *Edinburgh Encyclopaedia* that ‘The highways or great lines of road should, in no instance, be formed of less breadth than forty feet broad, and the metal bed not less than eighteen feet broad’. Nor did they meet the minimum dimensions specified for roads converging on cities.⁷²

There was little contemporary comment in extant minute books about the excavation of cuttings and the formation of embankments. Keith notes that this work was undertaken but gives no details. Contracts for the Deeside and the Ellon roads give an indication that embankments could be subject to settlement through inadequate compaction of the placed soil and the choice of inappropriate material for earthworks. It was agreed with the contractor of the Deeside road that all embankments should be completed by November 1796 and that no metal should be laid on the roadway ‘until March 1797’. The Ellon road contracts specified ‘that no metall is to be laid upon any part of Road hereby contracted for, untill six months after the same has been formed and Embankt’. The earth to be used to form embankments had to be approved before use, and had, when placed, to ‘form a dry and compact body’ with the side slopes of the embankments being ‘brought to a slope of at least one foot to two, or an angle of Thirty Degrees’.⁷³

In common with other specifications for road construction the contractors had to remove all ‘fixed stones’ from the bed on which road metal was laid. Extant contracts do not give information about the profile of the roadbed except that it was not to be below the level of the adjacent ground. The situation in Aberdeenshire is further confused by the use of metal beds that tapered from the centre toward the sides and those that were constructed with a metal bed of constant thickness.⁷⁴ There is no indication whether the metalling of constant thickness was laid on a bed that had a fall from the centre to the sides of the roadway like that specified for the Glasgow–Carlisle road or whether it was laid on a flat bed like the gravel of the parliamentary roads in the Highlands.⁷⁵

In Aberdeenshire there does not seem to have been any standardisation of the cross-sectional profile of turnpike roads within the county; a situation revealed by the deliberations of the trustees of the Charleston road. The overseer was asked to construct a frame 'for ascertaining the proper form of the Road' and the trustees requested that the contractor should 'make a small Part of the Road shewing three different Slopes, when the same would be fixed'.⁷⁶ It seems that the trial resulted from the lack of detail specified in the contract, which called for metalling '10 inches deep all over'.

An aspect of early nineteenth-century road construction to have received much attention has been the formation of the roadway, especially the proposals promoted by Telford and McAdam. It was an important, if not the most important, procedure in the construction of a road and, apart from the ideas promoted by these men, insufficient attention has been paid to other contemporary practice. This is perhaps due to unspecified reportage like Keith's description, in 1811, of road construction in Aberdeenshire. He stated that 'An open space of 14 feet wide, by as many inches deep, was left in the middle of the road. This was filled up with granite, which was broken into small pieces about two inches square, and is called Metalling.'⁷⁷

The practice, in Clackmannanshire, of using metal broken small to a uniform size to pass through an oval ring with a smaller diameter of 1½ in. had been noticed by Erskine some fifteen years previously, and many years before it was promoted by McAdam, and an experimental length of road had been built in Edinburgh using stone of these dimensions with a roadway 16 ft wide and 12 in. deep in the centre tapering to 9 in. at the sides.⁷⁸

In Aberdeenshire roadways were usually constructed of two layers of broken rock, the bottom layer being broken 'so as not to exceed the size of a man's fist, and the other . . . so as not to exceed that of an ordinary hen's egg, and thereafter the whole metal is to be blinded or covered with clean Sand or Gravel properly prepared for that purpose, to the depth of two inches'.⁷⁹ The dimensions and profiles of roadways varied, and relevant details are listed in Table 2. A greater width and depth of road metal was used on roads closer to Aberdeen that carried a larger volume of traffic. Whereas granite, whinstone and, on occasion, plum-pudding rock were specified as acceptable materials to be broken for road metal in both the top and bottom layers of a roadway, there were instances when different qualities of broken rock were used in the layers. On the Skene road the contractor was allowed to use granite, whinstone or plum-pudding rock broken to larger dimensions than normal in the lower layer provided that the top layer of the roadway, broken to the size of a hen's egg, was 'composed solely of whinstone'.⁸⁰ Although broken rock was the main material used for road construction in Aberdeenshire, there were occasions when trustees were prepared to allow gravel to be used. The Deeside road was one trust that offered contractors this option despite the fact that the trustees considered there was 'a very essential difference between metal composed of broken stones, and that composed of Gravel only'.⁸¹ The difference in the properties of broken rock and gravel was ameliorated in the two-layer construction system by increasing the thickness of the gravel where

it was used as the top layer, but the trustees of the Deeside road subsequently reneged on this amendment when it was discovered that suitable supplies of gravel could not be easily obtained.⁸² The material dimensions of a ‘man’s fist’ and a ‘hen’s egg’ were ridiculed in the *Edinburgh Encyclopaedia* but it was acknowledged that ‘the quality of rock should be kept in view in fixing the depth of this upper stratum’.⁸³ It was recommended that the size of material broken for construction should be based either on imperial dimensions as specified by Telford or on weight.

Table 2 Dimensions of Aberdeenshire turnpike roads

<i>Name of road</i>	<i>Overall width (ft)</i>	<i>Roadway width (ft)</i>	<i>Layers of construction</i>	<i>Roadway thickness at centre (in.)</i>	<i>Roadway thickness at side (in.)</i>	<i>Depth and type of blinding (in.)</i>
Deeside	40	14	2	10	8	2 (sand or gravel)
Charleston	30	14	2	10	10	2 (gravel)
Ellon (Aberdeen–Ellon)	40	14	2	12	10	2 (sand or gravel)
Ellon (Ellon–Fraserburgh)	35	14	–	11	11	2 (good gravel)
Ellon (Peterhead–Fraserburgh)	30	12	2	12	10	– (not recorded)
Inverurie (Aberdeen–Bucksburn)	40	16	2	14	12	– (not recorded)
Inverurie (Bucksburn–Inverurie)	40	14	2	12	10	– (not recorded)
Gardensmilne	40	14	2	12	12	2 (proper stuff)
Skene (Aberdeen–Rubislaw)	40	18	2	14	14	2 (good gravel)
Skene (Rubislaw–Skene)	40	14	2	12	12	– (not recorded)
Newburgh–Old Medrum	35	14	2	12	10	2 (proper stuff)

Note—Not recorded in contemporary sources.

The Commissioners for Roads and Bridges in the Highlands, with Telford as their engineer, were responsible, in Aberdeenshire, for the construction of the Alford road. This road was completed in 1819, and the specification for its construction varied from that used elsewhere in the Highlands, where roads were constructed from gravel, smaller in size than a hen’s egg, laid 14 in. deep in the centre of the road, tapering to 9 in. at the sides, with any material greater than 4 in. diameter being laid as a bottom layer, with gravel of lesser size applied above.⁸⁴ The specification for the construction of the Alford road was similar, with the exception that the thickness of gravel at the sides of the road was increased to 10 in. It was thought that gravel might be scarce and an addition was made to the standard specification to permit the use of broken rock in lieu. Where this occurred the contractor was permitted to form the road of a single layer of rock, broken to the size of a hen’s egg, that tapered from 12 in. thick at the centre of the roadway to 10 in. at the sides and was covered with a 4 in. thick layer of gravel of ‘proper blinding quality’.⁸⁵

The general specification for the Aberdeenshire turnpikes as well as the alternative specification for the Alford road might be considered as early examples of road construction practice that were modified by Telford for the

construction of the Lanarkshire roads and the Glasgow–Carlisle road. These roads had base courses of hand-set stones covered by broken stones not exceeding 6 oz weight that passed through a ring 2½ in. diameter.⁸⁶ If roadway construction in Aberdeenshire was akin to that used subsequently by Telford it did not preclude McAdam's method being used later in the county. In the winter of 1830–31 the first three miles of the Inverurie turnpike had fallen into disrepair, and, having received favourable reports of road repairs to McAdam's specification on roads near Dundee, he was consulted. For many years the trustees had problems keeping the Inverurie road in repair and they decided that the local quarry owners should become responsible for the maintenance of the road. This resulted in a large quantity of broken granite being laid upon the road, an ideal situation for McAdam to demonstrate his method of road repair. The cost of repair to McAdam's specification, on the first three miles of road, was £650 per mile. The initial cost of construction had been £295 per mile and Macadam's method of repair was discontinued.⁸⁷

The specifications used for the Aberdeenshire turnpikes were an advance on those used on some of Abercrombie's earlier roads in south-west Scotland. For the road between Hamilton and Elvanfoot he specified that the metal bed in the middle of the road should be 18 ft wide and 'not under sixteen inches of depth', covered by a layer of blinding, but did not state the dimensions to which the road metal was to be broken.⁸⁸ Telford, reporting on a section of the Glasgow–Portpatrick road laid out by Abercrombie, noted that it had been made with 'gravel and large pebbles' which he considered inferior to whinstone and recommended that an additional layer of broken stone 4 in. deep should be laid on top to improve the roadway.⁸⁹

In Aberdeenshire the precautions taken where roads crossed peat bogs appear rudimentary. The contractors on the Newburgh – Old Meldrum turnpike were instructed to lay on 'Gravel or other proper materials to the Depth of one Foot over the whole Breadth of the road in such parts as it may be carried through mossy Ground'.⁹⁰ There is no indication whether the 'other proper materials' alluded to were heather, ling or brushwood, used as a raft by Metcalf on some of the roads he constructed. The trustees of the Skene road also resorted to the use of a layer of gravel 12 in. thick but in this instance issued instructions to the contractor that the metal bed was 'to be brought up to the additional Height with the moss before the chingle is laid on'.⁹¹ This indicates that an attempt was made to form a viable foundation for this road but the instruction to the Skene road contractor does not compare favourably with the specification prepared by Telford for the construction of the commissioners' Alford road. For that road it was specified that any boggy ground less than 2 ft deep should be excavated and that, if deeper, two layers of sward with grass sides outermost, and brushwood, if necessary, should be laid on the unstable ground to form a raft. This supported the gravel of the roadway which was laid to a depth of 18 in. in the centre of the roadway, tapering to 13 in. deep at the sides.⁹² Hopkin, in a contemporary report on turnpike roads in South Wales and Gloucestershire, commented that roads crossing boggy ground should be 'effectively under-drained and

well faggoted' in order to support the stones of the roadway, which should have the largest at the bottom and those at the top should not exceed the size of a hen's egg.⁹³ Such comment indicates that the practice of raft construction was understood and used elsewhere. It may have been used in north-east Scotland but it received no mention in either contract documents or trustees' minute books.

Longitudinal ditches beside roads were a necessity, particularly where the surrounding ground was waterlogged, if the base beneath a roadway was to remain in a viable condition. The cost of digging ditches was usually included in the price agreed with contractors. Besides ditches it was necessary to construct cross-drains to permit the transverse flow of water beneath a roadway. As the earthworks associated with the construction of a line of road were likely to affect the natural drainage of the land traversed, it could be difficult before contracts were finalised to ascertain the extent of the drainage required. This resulted in the contractors for the Aberdeenshire turnpikes either including the cost of drains in their price or, preferably, quoting an individual rate for the construction of drains. Although asking contractors to quote an inclusive rate per mile for the construction of their roads the trustees of the Inverurie and the Gardensmilne roads received offers from contractors that both included and excluded the cost of drains.⁹⁴ The fact that, during the construction of one section of their road, the Gardensmilne trustees had to obtain a separate offer for the construction of seven or eight additional drains illustrates how difficult it was to make an initial assessment of the work required.⁹⁵

This situation was not uncommon, and the trustees of the Deeside and the Skene roads asked their overseer to ascertain the location and dimensions of any additional cross-drains he considered to be necessary. They were aware of the importance of cross-drains and instructed their contractor to ensure that such work was 'well and substantially executed'.⁹⁶ Drains were usually constructed 18 in. square and were built with lime-mortared masonry walls that supported flat slab stones beneath the road metal. The trustees of the Deeside road, fearing that slab stones of sufficient length would be unavailable, instructed their overseer to build two drains with slabs and two with arches before they decided what action should be taken.⁹⁷ The arched drains were to be constructed 37 ft long and the rectangular drains 35 ft, with stones set at each end to prevent the ingress of material likely to cause the drains to become blocked.

Whilst road contractors were considered capable of building rectangular drains 18 in. square, larger drains and those that were arched were let as separate contracts to skilled masons. This situation happened on the Longside road, where a drain 2 ft 6 in. high by 1 ft 6 in. wide was required which was to be 'built with lime' and to be 'properly shoed'.⁹⁸ Similar enlarged drains, varying in cross-section from 2 ft to 3 ft 6 in. square, were required on the Gardensmilne road. It was specified that these cross-drains should be 'substantially built on the sides, properly shoed or Causewayed in the bottom and covered with long stones projecting at least nine Inches over each side of the Syver'.⁹⁹

From the limited references to drain construction that appear in trustees' minute books it is difficult to establish exactly the extent of the work done by the Aberdeenshire road contractors when building drains. It is easier to establish the work to be done by the contractors engaged to build the Highland roads and the Glasgow–Carlisle road. For the Highland commissioners' Alford road Telford specified that the cross-drains should be 2 ft square and that the side walls, 2 ft thick, should be constructed 'of dry stones'. These walls projected at either end of the drain, and the drains were shoed to prevent erosion. The slab stones, supporting the gravel of the roadway above, were 3 ft long and 4 in. thick.¹⁰⁰ Whilst establishing 2 ft square as the standard dimension for cross-drains the contractor could, if conditions warranted and permission was given, build an increased number of drains either 1 ft 6 in. or 1 ft square in lieu of the standard-size drain. For the Glasgow–Carlisle road Telford specified that there should be nine cross-drains per mile of road, and that these drains should be 1 ft 6 in. wide, with walls of the same dimensions, 'faced on both sides in the manner of a good stone dike that projected 5 ft at either end of the drain. The shoed base of these drains sloped longitudinally so that the drain was 16 in. deep at the upper end and 22 in. deep at the lower end. The slab stones, like those of the drains on the Alford road, were 4 in. thick.¹⁰¹ It is not surprising that Telford's specifications were more unambiguous, as the conditions imposed on the contractors for the construction of his roads were more rigorous than those placed on the contractors constructing the turnpikes in Aberdeenshire.

Supervision of road construction

In Aberdeenshire the supervision of road construction was shared between the road overseers and the road trustees. The overseers, some with considerable experience of road construction, had day-to-day supervision of work on the roads. The road trustees' supervision was less formal, but many of them had knowledge of and an aptitude for estate management, and their contribution to road construction should not be underestimated. Each local trust appointed an overseer. In some instances, with the agreement of trustees, an overseer might be employed by more than one local trust. Shier, a professional road maker who moved north to Aberdeenshire,¹⁰² was employed by the Deeside, Ellon and Skene trusts, all of whose roads emanated from Aberdeen, but was dismissed by the Skene trust because he devoted insufficient time to their business.¹⁰³ Other overseers did not come from the same background as Shier, and those employed on the Charleston and Bridge of Dee – Stonehaven roads were respectively a squarewright¹⁰⁴ and a merchant in Aberdeen,¹⁰⁵ and Shier's replacement on the Skene road was a well respected local mason.¹⁰⁶

Although the minute books of the local trusts record the names and activities of overseers and the salaries paid to them, only two instances of written agreements between trustees and overseer have been found that specified the extent of the overseer's duties.¹⁰⁷ It was the overseer's responsibility

to set out the line of a road, to take levels, to prepare accurate drawings and to make out a specification of the work to permit potential contractors to prepare estimates. Overseers also prepared drawings and specifications for any bridges to be built,¹⁰⁸ but contracts for their construction were let separately from those of the roads.

In Aberdeenshire supervision by overseers was reinforced by the attention paid to road construction by local trustees. Sub-committees of trustees paid periodic visits of inspection, and these visits were augmented by individual trustees going about their daily business who reported their observations at formal meetings. In only one minute book of the Aberdeenshire road trusts, noted previously, is there no record of trustees inspecting their road. This suggests that the trustees either considered such involvement to be normal or did not rely on the vigilance of their overseers. Before construction commenced it was usual in Aberdeenshire for the trustees and the overseer to inspect their line of road and for the trustees to approve any deviations from its parliamentary line.¹⁰⁹ It was the overseers' responsibility to mark out any deviations from the approved line of the road and to assist the trustees to make decisions concerning the choice of route. Some deviations were proposed by landowners but overseers, influenced by engineering and economic considerations, did suggest alterations to improve alignment.¹¹⁰ The trustees remained vigilant to ensure that there were no unauthorised deviations from the line of a road, particularly if these increased the length of a road or the expenditure.¹¹¹

During construction both overseers and trustees paid attention to a number of features of road construction, particularly the formation of cuttings and embankments¹¹² and the metal bed, and to the type, depth and size of metal being laid.¹¹³ The trustees often ordered overseers to make trial excavations to ensure that roadways were properly constructed, and it was usual for the number, size and siting of drains to be examined.¹¹⁴ These inspections could be thorough, with the trustees asking for the masonry of drains to be exposed to view.¹¹⁵ As bridges were constructed under separate contracts, trustees received reports direct from local masons appointed to inspect the masonry of bridges before they were accepted as complete.¹¹⁶ Prior to the completion of a contract it was usual for trustees accompanied by their overseer and the contractor to inspect their road to ascertain that it had been completed according to the specification. The trustees were then able to ensure that unsatisfactory work was condemned,¹¹⁷ payment was withheld for unfinished work¹¹⁸ and the final instalments were paid for completed work.¹¹⁹

Conclusion

In describing the construction of Aberdeenshire's first turnpike roads reference has been made to the work of four men whose names have become associated with the history of road construction. In 1796, when turnpikes were introduced to Aberdeenshire, only Metcalf and Abercrombie had either been or were then involved with road construction, and Telford's and McAdam's

systems of road construction had not yet been finalised. Since Abercrombie acted as surveyor to the Aberdeenshire turnpike trustees, it seems likely – although this is unconfirmed – that he would have provided a specification for the construction of turnpikes in the county. If this thesis is accepted then an unsatisfactory situation is reached with Metcalf's work as the sole comparator against which to judge the quality of the engineering of Aberdeenshire's first turnpike roads.

However, it is possible, from the observations of contemporary writers, to establish criteria that were thought to be good road construction practice. Douglas, when discussing roads in the county of Roxburgh, noted:

The first care should be to get a firm foundation. All the soil, and any soft substance that may be under it, must be thrown aside, till gravel, rock, or hard till is found. In cases, where this would be difficult or expensive, let the bottom of the road after paring off the surface, be laid with brushwood, bramble, the branches of trees, especially those which have numerous twigs, or such weeds and roots as are tough and cohesive. These form a kind of thick net, to prevent the stones from sinking, and the mud from rising. The stones should all be hard, broken very small, and none of them smooth or round. The rough sides and sharp edges and angles of those pieces made by the hammer, adhere together, detain particles of sand and gravel which are forced down among them, and become a compact and firm body The greatest depth of stones should always be on the middle of the road, and there should be a very gentle slope towards each side, not above an inch or thereabouts to every three feet. When the slope is less, water will not descend readily; and, when it is much greater, all carriages will shun the declivity on the sides, and go along the highest part, crush it down, form ruts, and destroy the road. A slope of five or six inches in fifteen feet is too trifling to be felt . . . and affords reason to expect equal pressure on every part of the road.¹²⁰

He further suggested that if a road was formed in this manner, spread with a thick layer of raked and well rammed gravel, and received adequate maintenance, the trustees would be 'no losers in the course of 30 years'. The need to form roads of 'hard stone, broken very small' was echoed by Bailey and Culley, who, when describing roads in Northumberland and Cumberland, thought that whinstone or limestone broken small to pass through a 2 in. diameter ring were the best materials for road making.¹²¹ In parts of Devon stone broken to pass through a ring 4 in. in diameter was used for carriageway repair.¹²²

Reviewing road construction practice in the North Riding of Yorkshire, Tuke expressed views similar to those of Douglas. He considered that the roadbed should be higher than 'the natural surface on each side' and whilst not giving a specific fall from the centre to the side of the carriageway suggested a curved profile to allow drainage but still permit vehicles to use the entire width of the road.¹²³ Warnings were also given about roads where the carriageways, as in Devonshire, had been so steeply pitched as to cause rapid deterioration of the surface.¹²⁴ Two problems, affecting the operation of turnpike roads, that received considerable adverse comment from contemporary

writers were the longitudinal profile of roads (inconveniently steep gradients) and the fact that many roads were too narrow, not constructed to the width specified in legislation.¹²⁵ The preceding comments show that before 1796 some general principles of road construction had been accepted and were being practised in Britain, and it is against them that the construction of the Aberdeenshire first turnpikes will be judged.

As Aberdeenshire's first turnpikes lay, with the exception of the road to Banffshire, either along river valleys or across the flat coastal plain in the east of the county, they were generally constructed with easy gradients that presented few problems for wheeled vehicles. On the Banffshire road there were only two stretches with long, gradual gradients where greater physical effort would have been required. Although, in some places, roads traversed wet, unstable ground, little comment has been found about the use of brushwood fascines on which to 'float' the metal of the carriageway. This suggests three possibilities: that the use of fascines was common and unremarkable, that this constructional method was unnecessary, or that it was not in general use in the area. The abundant supply of granite rock throughout Aberdeenshire, and its use, broken small, for carriageway construction have been noted. As material for road construction it was among the best available: though its inherent strength necessitated the expenditure of more effort to break it to a suitable size for carriageway construction, this factor was offset by better wearing characteristics than those of softer rocks. The use of carriageways constructed of two layers of stone broken to different dimensions antedates the construction of Telford's government roads from London to Holyhead and in the environs of Glasgow and Lanarkshire. Instructions to break rock to the size of 'a man's fist' or a 'hen's egg' do not indicate the close control of dimensions that occurred in other counties, where rings were used to gauge the size of broken material. The use in the lower layer of larger material, sometimes of lesser strength than that in the upper layer, lessened the cost of construction and indicates the Aberdeenshire road trustees were aware of the need to use harder rock broken small in the top layer of carriageways.

The carriageway profiles of the majority of Aberdeenshire turnpikes had a fall from the centre of the carriageway to the sides. A minority of these roads, although listed with a carriageway of constant thickness, may have had a similar surface profile, provided the roadbed on which they were formed had a central camber. The accusation, noted previously, that turnpikes were not constructed with sufficient width to accommodate vehicular traffic did not obtain in Aberdeenshire. Here the width of roads reflected the volume of traffic anticipated, with the widest roads located adjacent to Aberdeen and the width of successive lengths of turnpike roads being reduced in more remote areas. The formation of drains beside and beneath turnpikes, an important facet of road construction, has received little comment in contemporary sources. In Aberdeenshire the local road trustees paid considerable attention to the size and siting of drains, and they were prepared, where necessary, to increase the dimensions and number of drains and to have the masonry of cross-drains and the road bed excavated to allow visual inspection. Such

inspections may not have had the rigour of those undertaken by the officials and subscribers to Telford's Highland roads, but they were thorough, with the trustees, their overseer and the contractor jointly making the final inspection of a completed road.

Although a complete specification for the construction of an Aberdeenshire turnpike road has not been found, it has been possible to show, using extracts from local trustees' minute books and comments from contemporary writers, that, in general, these roads were constructed using the best methods then applicable, and that the work of road construction was competently organised and brought to fruition. That many of these early lines of turnpike road in Aberdeenshire were not economically viable does not reflect adversely on the competence of the engineering used in their construction.

Notes

- 1 Contract for the construction of the Deeside Road, April 1796. (Sederunt Book of the (Aberdeenshire) Turnpike Trusts, pp. 26–32, Aberdeenshire Archives, AC 2/2/1.)
- 2 *Report for the Aberdeenshire Committee on Road Reform*, 1863, cited in W. Alexander, *Northern Rural Life* (reprinted 1981), p. 173.
- 3 *Edinburgh Encyclopaedia* XVII (1830), pp. 352–9. This entry, by an anonymous contributor, postdates the construction of these roads by twenty years but will be used as an indicator of 'best' construction practice in the early years of the nineteenth century.
- 4 W. Albert, *The Turnpike Road System in England, 1663–1840* (1972); E. Pawson, *Transport and Economy: the turnpike roads of eighteenth-century Britain* (1977); Dorian Gerhold, *Road Transport before the Railways* (1993).
- 5 *The Statistical Account of Scotland* (OSA) XIV (1791–93), p. 576, and XV (1792), p. 73.
- 6 OSA, XIV (1792), pp. 64, 105.
- 7 OSA, XVI (1791), p. 221.
- 8 OSA, XIII (1790–91), pp. 286, 533.
- 9 OSA, XI (1791), p. 177.
- 10 OSA, II (1789), p. 504.
- 11 OSA, II (1791–92), pp. 508, 514. A ploughgate was deemed to be the area of land that could be cultivated by a single plough (in Fifeshire it was taken as fifty acres), and the tax was set at 20s per ploughgate.
- 12 OSA, III (1790–91), p. 234.
- 13 J. Bailey and G. Culley, *General View of the Agriculture of the County of Cumberland* (1797), p. 219.
- 14 J. Tuke, *General View of the Agriculture of the North Riding of Yorkshire* (1800), pp. 298–9.
- 15 T. Stone, *General View of the Agriculture of the County of Lincoln* (1794), p. 52.
- 16 C. Vancouver, *General View of the Agriculture of the County of Devon* (1813), p. 370.
- 17 A. R. B. Haldane, *The Drove Roads of Scotland* (1952), pp. 115–32.
- 18 K. MacKenzie, 'Military roads', *The Inverness Scientific Society and Field Club* (1902), pp. 380–1.
- 19 The Commissioners of Supply were established by the Parliaments of Scotland to collect the national land tax. (A.P.S., VII, Act of Convention, 23 January 1667.) At first they were landowners nominated to collect tax from fellow landowners, and their duties were purely fiscal. By the middle of the eighteenth century they and the Justices of the Peace had assumed responsibility for the maintenance of roads and bridges. (A. E. Whetstone, *Scottish County Government in the Eighteenth and Nineteenth Centuries*, Edinburgh, 1981, pp. 61–94.)
- 20 Alexander, *Northern Rural Life*, pp. 75–81, 172.
- 21 Two further districts were subsequently added to the original eight, which increased the supervised length of roads by fifty-nine miles.
- 22 Minute Book, Commissioners of Supply for Aberdeenshire, 1766–77, 3 and 24 October, 1 December 1769 (Aberdeenshire Archives, AC1/1/8).
- 23 J. Thomson, *General View of the Agriculture of the County of Fife* (1800), p. 292.

- 24 Typically 320 'horse loads' of slaking lime were required for the construction of the first bridge over the river Dee at Ballater. (Agreement between Francis, Alexander and James Farquharson and Charles Gordon, re. Ballater bridge, 22 July 1777, NRA(S) 61, Farquharson of Invercauld, Scottish Record Office.)
- 25 Within a few months the Edinburgh–Aberdeen service departed daily but that to Inverness was terminated at Elgin. (Alexander, *Northern Rural Life*, pp. 82–4; *Aberdeen Journal*, 8 April, 9 September 1782.)
- 26 OSA, III (1790–91), p. 499, XI (1791), p. 177, XIII (1792), p. 259.
- 27 Alexander, *Northern Rural Life*, pp. 89–98.
- 28 Most Aberdeenshire turnpikes were too lightly trafficked to generate regular income from toll revenue. (T. Day, 'Studies of the Development of the Turnpike Roads . . . in North-east Scotland, 1780–1880', unpublished Ph.D. thesis, University of Aberdeen, 1992, pp. 618–20.)
- 29 Minute Book, Commissioners of Supply for Aberdeenshire, 1786–99, 1 October 1793 (Aberdeenshire Archives, AC1/1/10).
- 30 Local and Private Acts, 35 Geo. III, c. 161.
- 31 Local and Private Acts, 36 Geo. III, c. 132.
- 32 Local and Private Acts, 44 Geo. III, c. 81.
- 33 Local and Private Acts, 39, 40 Geo. III, c. 32.
- 34 The road between London and Bath was typical of a main route formed linearly of 'some fifteen trusts'. (B. J. Buchanan, 'The Great Bath Road, 1700–1830', *Bath History* 4, 1992, p. 71.)
- 35 The main road north-west from Aberdeen to the boundary with Banffshire, a distance of forty-five miles within Aberdeenshire, was typical of the situation, and it was divided into three local trusts: the Inverurie, Gardensmilne and Huntly trusts.
- 36 M. C. Lowe, 'The Exeter Turnpike Trust, 1753–1884', *Report and Transactions of the Devonshire Association* 127 (1995), pp. 164–7.
- 37 M. C. Lowe, 'The turnpike trusts in Devon and their roads, 1753–1889', *Report and Transactions of the Devonshire Association* 122 (1990), p. 48.
- 38 W. B. Taylor, 'A history of the York–Tadcaster turnpike', *York Historian* 12 (1995), p. 40.
- 39 Trustees resident in Aberdeenshire had to be proprietors of property valued at £100 Scots and those dwelling in the city of Aberdeen had to hold land within the city valued at £400 Scots.
- 40 In the case of the Deeside road trust the three trustees were the prominent landowners George, Earl of Aboyne, Alexander Irvine of Drum and John Menzies of Pitfoddles, who contracted with John Millar for the construction of the road. (Sederunt Book, Turnpike Trusts, pp. 26–32.)
- 41 A. W. Skempton (ed.), *Biographical Dictionary of Civil Engineers I* (2002), pp. 1–2.
- 42 Sederunt Book, Turnpike Trusts, 1 May 1797 – 18 April 1804.
- 43 G. S. Keith, *A General View of the Agriculture of Aberdeenshire* (Aberdeen, 1811), pp. 535–7.
- 44 By measurement of the roads listed by Keith that are shown on a Sketch Map of the Turnpike Roads in the County of Aberdeen (1865), the total was nearer 250 miles. The discrepancy was caused by double measurement of some roads. There is also dubiety about the completion date of a few roads.
- 45 J. Godsman, *A History of the Burgh and Parish of Ellon* (1958), p. 304.
- 46 Day, *Turnpike Roads*, pp. 486, 491–2, 495, 567–70.
- 47 Of the seventy-six contracts for road construction noted in extant minute books of local turnpike trusts in north-east Scotland sixty-nine contracts specified the use of broken stone (granite) for use in construction, five specified either broken stone or gravel (depending on the availability of suitable stone) and only two specified the use of gravel. (Day, *Turnpike Roads*, table 3.3.1, pp. 176–81.)
- 48 W. Diack, *Rise and Progress of the Granite Industry in Aberdeen* (Aberdeen, 1949), pp. 11–14, 58.
- 49 Pawson, *Transport and Economy*, pp. 238–9.
- 50 Keith, *General View*, p. 535.
- 51 Alexander, *Northern Rural Life*, appendix, p. 174. The writer has based this cost per mile on the total sum raised to construct the Aberdeenshire turnpikes and the total length of the turnpike roads built in the county before 1863.
- 52 In forming these comparisons, as a majority of roadways were constructed 14 ft wide, only turnpikes of this width have been considered.
- 53 Contracts for the Ellon turnpike road, Sederunt Book, Turnpike Trusts, pp. 32–45.
- 54 Tuke, *North Riding*, pp. 303–4.

- 55 Vancouver, *Devon*, p. 368.
- 56 Day, *Turnpike Roads*, p. 262.
- 57 Minute Book, Newburgh – Old Meldrum Road (Trustees), 27 May 1803, p. 9 (AC2/11/1).
- 58 Minute Book, Skene Road, 20 August 1801, p. 20 (AC2/13/1).
- 59 Map of Marnock turnpike road prepared by Thomas Shier, 1805 (Aberdeenshire Archives, BC2/2/8).
- 60 J. Headrick, *General View of the Agriculture of the County of Angus, or Forfarshire* (1813), p. 515.
- 61 J. Rickman (ed.), *The Life of Thomas Telford* (1838), p. 474.
- 62 T. Day, 'The construction and maintenance of the Aberdeen–Inverurie turnpike road, 1795–1866: a case study', *Review of Scottish Culture* 9 (1995–96), pp. 46–8.
- 63 T. Day, 'The Banchory–Stonehaven turnpike road: the Slug road, 1800–78', *Northern Scotland* 13 (1993), pp. 59–60.
- 64 Gerhold, *Road Transport*, pp. 84, 139–40, 196.
- 65 The large quantities of timber grown in inland Aberdeenshire were floated down river to ports for shipment. As most of the major granite quarries producing material for export were concentrated within six miles of the ports of Aberdeen and Peterhead, damage was done only to the limited lengths of carriageway over which the heavily laden waggons passed.
- 66 Keith, *Aberdeenshire*, p. 538.
- 67 Typically Sederunt Book, Turnpike Trusts, p. 33, and Minute Book, Gardensmilne Road Trustees, 15 May 1802, p. 9 (AC2/9/1).
- 68 Minute Book, Inverurie Road, 8 July 1799, p. 45 (AC2/10/1).
- 69 Minute Book, Skene Road, 1 March 1803, p. 45.
- 70 This applied to the Charleston road that adjoined the Deeside road and continued the line of turnpike westward up Deeside, to the road from Newburgh on the coast north of Aberdeen inland to Old Deer, and to the Ellon to Fraserburgh road. The first road was 30 ft wide and the last two were 35 ft. (Minute Books, Charleston Road, 20 December 1800, p. 14, AC2/6/1, Newburgh – Old Meldrum Road, 24 July 1802, p. 2, and Ellon Road, 18 November 1808, p. 114, AC2/8/1.) The Peterhead to Fraserburgh road, still more remote from Aberdeen, was made 30 ft wide and the roadway was reduced to 12 ft wide. (Minute Book, Ellon Road, 26 July 1802, p. 93.)
- 71 Rickman, *Life of Telford*, p. 473, and Draft Contract for the Carluke section of the Lanarkshire roads GD 253/93/11, Messrs D. and J. H. Campbell, W.S. (Scottish Record Office).
- 72 *Edinburgh Encyclopaedia* XVII, p. 355.
- 73 Sederunt Book, Turnpike Trusts, pp. 30, 33–4, 39–40.
- 74 The Skene road was one of the latter, being 'Twelve Inches deep all over'. (Minute Book, Skene Road, 23 April 1801, p. 16.)
- 75 The bed of the Glasgow–Carlisle road had 'a curvature of four inches in the middle eighteen feet', whilst it was specified that the bed of the Highland roads was 'to be brought to a perfect level from side to side before gravel is laid on'. (Rickman, *Life of Telford*, pp. 421, 474.)
- 76 Minute Book, Charleston Road, 22 January 1801, p. 20.
- 77 Keith, *Agriculture of Aberdeenshire*, pp. 537–38.
- 78 J. Erskine, *General View of the Agriculture of Clackmannanshire* (1795), pp. 77, 79.
- 79 Sederunt Book, Turnpike Trusts, p. 33.
- 80 Minute Book, Skene Road, 10 October 1801, pp. 26–7.
- 81 Minute Book, Deeside Road, 15 May 1797, p. 20 (AC2/7/1).
- 82 Where broken rock was used, the top layer, broken to the size of a hen's egg, was 4 in. thick; where gravel was used in the top layer it was spread 5 in. thick. (Sederunt Book, Turnpike Trusts, p. 27.)
- 83 *Edinburgh Encyclopaedia* XVII, p. 355.
- 84 Rickman, *Life of Telford*, p. 420.
- 85 Contract for the Alford road, pp. 2, 9. Scottish Highways Papers (doc. 596) (House of Lords Record Office).
- 86 The Lanarkshire roads had a base course 6 in. deep, the top layer, 6 in. deep, and a layer of blinding 2 in. thick. (GD 253/93/11, Draft Contract, Carluke Road.) The dimensions of the corresponding layers for the Glasgow–Carlisle road were 7 in., 7 in. and 1 in. thick. (Rickman, *Life of Telford*, p. 474.)
- 87 Day, *Review of Scottish Culture* IX, pp. 53–4.
- 88 C. Abercrombie, *Report respecting a new Line of Road from Hamilton to Elvanfoot* (1813).

- 89 *Report from the Select Committee on Glasgow and Port-Patrick Roads* (1824), appendix 1, p. 9.
- 90 Minute Book, Newburgh – Old Meldrum Road, 24 July 1802, p. 3.
- 91 Minute Book, Skene Road, 14 May 1802, p. 36.
- 92 Contract for the Alford Road, p. 2.
- 93 E. Hopkin, *An Abstract of the Particulars contained in a Perambulatory Survey of above two hundred Miles of Turnpike-roads . . .* (1805), p. 16.
- 94 Minute Book, Inverurie Road, 27 July 1799, p. 49.
- 95 Minute Book, Gardensmilne Road, 5 July, 13 October 1802, pp. 13, 22.
- 96 Minute Book, Skene Road, 26 February 1802, p. 32.
- 97 Minute Book, Deeside Road, 9 February 1797, pp. 17–18.
- 98 Minute Book, Longside Road, 2 April 1807, p. 20 (AC2/12/1).
- 99 Minute Book, Gardensmilne Road, 13 October 1802, p. 22.
- 100 Contract for the Alford Road, p. 3.
- 101 Rickman, *Life of Telford*, p. 475.
- 102 Minute Book, Deeside Road, 21 June 1796, p. 14.
- 103 Minute Book, Skene Road, 20 March 1802, p. 33.
- 104 Minute Book, Charleston Road, 1 November 1800, p. 7.
- 105 Minute Book, Bridge of Dee – Stonehaven Road, 23 April 1796, pp. 2–3.
- 106 Alexander Gildawie, who replaced Shier as overseer on the Skene road, had a background as a mason and contractor and was inspector on the Bridge of Dee, Deeside and Inverurie roads. (Day, *Turnpike Roads*, pp. 205, 269, notes 127, 128.)
- 107 Minute Books, Gardensmilne Road, 24 July 1802, p. 16, and Longside Road, 10 September 1806, pp. 16–18.
- 108 Minute Books, Newburgh – Old Meldrum Road, 15 April 1803, p. 7, and Old Meldrum Road, 17 July 1802, p. 17.
- 109 Minute Book, Charleston Road, 9 February 1801, pp. 22–3.
- 110 Minute Books, Inverurie Road, 5 October 1799, p. 61, and Charleston Road, 1 November 1800, pp. 11–12.
- 111 The trustees of the Gardensmilne road, ‘with a good deal of surprise’, discovered that their overseer, Shier, had laid out an unauthorised deviation and demanded to know on what authority he had acted. (Minute Book, Gardensmilne Road, 13 October 1802, p. 24.)
- 112 Minute Books, Skene Road, 14 May 1802, p. 37, and Inverurie Road, 29 September 1800, p. 98.
- 113 Minute Books, Charleston Road, 27 April 1801, p. 29, Skene Road, 20 March 1802, p. 34, and Ellon Road, 8 October 1800, p. 58.
- 114 Minute Book, Skene Road, 14 May 1802, pp. 36–7.
- 115 Minute Book, Charleston Road, 6 July 1801, p. 32.
- 116 Day, *Turnpike Roads*, p. 274, notes 170–1.
- 117 Minute Book, Ellon Road, 8 October 1800, p. 58.
- 118 Minute Book, Keith Road, 6 June, 1 July 1806, pp. 31–2 (BC2/2/6).
- 119 Minute Book, Longside Road, 28 November 1807, pp. 23–4.
- 120 R. Douglas, *General View of the Agriculture of the Counties of Roxburgh and Selkirk* (1798), pp. 202–3.
- 121 J. Bailey and G. Culley, *General View of the Agriculture of the County of Northumberland* (1797), p. 149; *id.*, *General View of the Agriculture of the County of Cumberland* (1797), p. 219.
- 122 Vancouver, *Devon*, p. 370.
- 123 For a road constructed with a carriageway 15 ft wide whose surface was subtended by an inclusive angle of 22.5° the rise from side to centre line would be 8 in. (Tuke, *North Riding*, pp. 299, 302.)
- 124 Vancouver, *Devon*, p. 370.
- 125 A. Pringle, *General View of the Agriculture of the County of Westmorland* (1797), p. 297; Bailey and Culley, *Northumberland*, p. 149; Tuke, *North Riding*, pp. 295, 299, 302–4; Vancouver, *Devon*, pp. 368–9.

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